



THE ANIMATION STAND™
version 3.4 for SGI



THE ANIMATION STAND™ version 3.4
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Thanks to the people who made The Animation Stand what it is: Mark Hartman, Amala Kelshiker, Rachael Linker, Sheldon Linker, David Lee, Roger Long, Arthur Patterson, Toni Poper, Ando Sonenblick, and Anthony Wong.

As always, if you have any questions, you can reach us at 714-552-1904, fax us at 714-552-6985, or eMail us at linker@linker.com.

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Have your machine and serial number ready

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Getting started

A Note on Versions

Text pertaining both to the 32-bit and 64-bit versions of The Animation Stand appear as does this paragraph.

32 bits: Text pertaining only to the 32-bit version appears as does this paragraph.

64 bits: Text pertaining only to the 64-bit version appears as does this paragraph.

Before You Begin

Before proceeding with this manual, you already should be thoroughly familiar with how your machine works. If you are not, study the manuals that came with your machine. You should know how to:

- use the mouse, trackball, or tablet,
- access menus, and
- use the shell.

It is not necessary to have a 32-bit display to do 32-bit work, or a 64-bit display to do 64-bit work. The Animation Stand is capable of using monitors of any depth for any type of work.

You should also be familiar with and know how to use all of the peripherals and add-in units connected to your system.

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Also, it is important that you consider what you want to accomplish using The Animation Stand. If you are just getting into animation, the answer is simple. The Animation Stand will allow you to begin learning about the animation process. As your knowledge increases, The Animation Stand will provide the tools to explore each new element. If you are using this product to augment an existing animation studio, however, you will most likely use The Animation Stand to increase productivity, lower production costs, or give your product a better look. If this is the case, please pick just one of these noble goals, and stick with it; you'll find great success. Trying for two of the above, or all three is a road likely to lead to disaster.

Installing The Software

To install The Animation Stand on your hard disk, from CD, execute `/CDROM/install`. To install from tape, execute `tar xv`.

Installing an external controller

If you are using an external recorder controller, you must also do the following:

- Step 1 Connect the RS-422 port of your recorder to the RS-422 port of the controller, as you usually do.
- Step 2 Connect the output of your main video card to the video input jack of your recorder.
- Step 3 Connect the video output jack of your recorder to your main monitor.
- Step 4 Connect the controller to a serial port.

Installing an Abekas Video Disk

If you are using the Abekas recorder, you must also do the following:

- Step 1 Cable the computer to the A60 or A64 recorder so that the computer modem transmit pin is connected to the GPI input pin, and connect ground to ground. If using an A66, connect with a null-modem cable.
- Step 2 Set the A60 or A64 recorder to record a single frame on a GPI pulse using the recorder's macro facility. Set A66 to REMOTE.
- Step 3 Connect the output of your main video card to the video input jack of your recorder.
- Step 4 Connect the video output jack of your recorder to your main monitor.

Installing a Sony Video Disk

If you are using a Sony video disc recorder, you must also do the following:

- Step 1 Cable a serial port to the disc recorder controller's external control input.
- Step 2 Set the recorder to Remote operation.
- Step 3 Connect the output of your main video card to the video input jack of your recorder.
- Step 4 Connect the video output jack of your recorder to your main monitor.
- Step 5 Set the LVR controller to a baud rate of 9600 baud.

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Installing a Hitachi time-lapse VCR

If you are using the Hitachi time-lapse recorder, you must also do the following:

- Step 1 Connect a serial port (data transmit and data ground) to the external trigger connector in the recorder.
- Step 2 Connect the standard video output of your display card to the video input jack of the recorder.
- Step 3 Set the recorder time mode to 00 (on demand).

Installing a Sanyo Deck

If you are using the Sanyo recorder, you must also do the following:

- Step 1 Connect the RS-232 port of your recorder to a serial port.
- Step 2 Connect the output of your main video card to the video input jack of your recorder.
- Step 3 Connect the video output jack of your recorder to your main monitor.

Product Support

If you have any questions about The Animation Stand and you can't find the answer in the manual, call your dealer, or our technical support personnel at 714-552-1904. When you call, please have the following ready:

- your program serial number
- your The Animation Stand manual
- your machine

Alternatively, you may fax a Software Problem report to Linker Systems, Inc., at 714-552-6985, eMail it to linker@linker.com, or mail the report to us at 13612 Onkayha Circle, Irvine, California 92720.

Files Included

All of the files listed here appear in /usr/TASfiles

Tutorial Files Included

mountain.rgb and skier.rgb files are used throughout this tutorial. Once you are through with the tutorial, these files may be erased.

Palette Files Included

These files each contain a palette.

- 256ColorPalette contains the standard 256 Color Palette. Should you be working in the 256 color mode and ruin your standard palette, you may switch back to it simply by opening this document.
- 8ColorPalette contains the colors used in 8 color printing: White, Black, Red, Green, Blue, Cyan, Yellow, and Magenta. This palette is useful when preparing documents for 8 color printing, such as with the ThinkJet.
- grayPalette contains 256 shades of gray.
- NTSCPalette is a palette consisting entirely of NTSC-legal colors. Using this palette, you should not have any displayability problems on NTSC.
- marblePalette, metalPalette, earthtonePalette, rainbowPalette, forestPalette, and skySeaPalette each contain color sets which should be most useful in painting certain kinds of pictures.

You are not limited to the palettes and patterns which we supply. You can save any palette and/or pattern set at any time, and place them into the folders with the palettes and patterns which you already have, or put them in any folder on any disk you like.

Pattern Files Included

Two pattern files are included. colorPatterns and colorPatterns#2 each contain 32 color patterns, and is the default set of patterns. bwPatterns and bwPatterns#2 each contain 32 black-and-white patterns.

Image Files Included

There are a number of texture files supplied with The Animation Stand. These textures are useful as surfaces of objects (see information on the “Wrap” tools in subsequent chapters) and in supplying basic or underlying textures in partial color component modes (see information on these in the Modes chapter). There are a number of texture disks, each with about three textures on them.

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Texture Files Included

There are a number of bump-map files supplied with The Animation Stand. These bump-map files are useful as drawing surfaces (see information on “Bump mapping” tools in subsequent chapters) and in supplying basic or underlying textures in partial color component modes (see information on these in the Modes chapter). There are a number of bump-map disks, each with a number of bump-maps on them.

Aborting an Operation

Any time-consuming operation can be canceled. To cancel an operation, use escape

Where to Go From Here

Where you go from here depends on how you like to work, what you want to do, and how you like to learn programs. You should first go through the animation portion of the tutorial section of this manual.

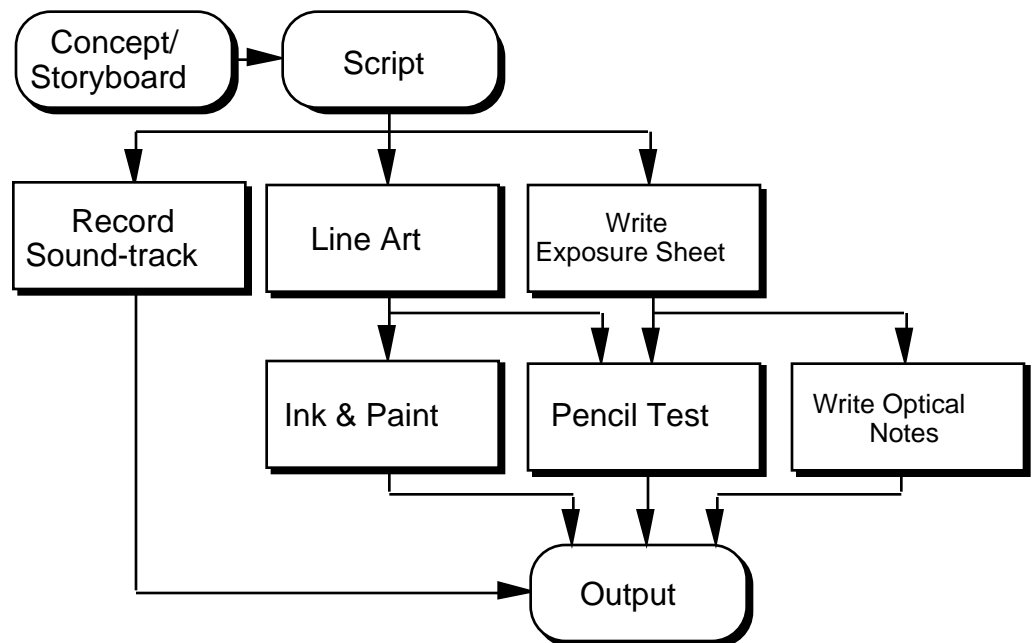
Start-up options

To start The Animation Stand, type TAS.

When the program starts up, it will look in /usr/TASfiles, and load a file named Color.pats. In this file, it expects to see its default set of patterns. If this file is not present, you will get an error message. Then, it looks for a file named Default_prefs. If this file is found, all of the preference items in the file, including palettes, PF keys, etc., will be loaded. Thus, if you want to set up any system-wide preferences, place them into t /usr/TASfiles/Default_prefs.

The Steps in Animation

This drawing represents a simplified version of the various steps in producing an animated production. The process of animation begins with an idea. From this idea, the characters and story are developed. Once that's done, you can write your script or scripts. After the script is written, the cast needs to produce a sound-track, and have it recorded onto tape or film. The artist also needs to begin drawing the cel and background art. This normally begins with line art and ends with completed character and background art. The chief animator writes an Exposure sheet, which correlates motion, sound, and art. Once the Exposure sheet is written, and line art has been drawn, it is possible to run a pencil test, to get an idea of what the final product will look like, and how the characters move. Optical press and other special effects may be added by specifying them on the Exposure sheet. Last, the final result is placed on tape or film.



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The Script

The script is a real script, or story-board. Using the script, you first decide what you are up to, what you are doing, and where you are going with the animation. No program can produce a good animation for you — you need a good script.

The Sound-Track

The sound-track is usually prepared directly from the script. You place the sound-track on tape or film, annotate the Dialog field of the Exposure sheet from the sound-track, and animate to that. When you work this way, and then lay the animation onto the same tape, you always get perfect synchronization between picture and sound. For on-screen uses, you can digitize sound files using any sound program you like, and add sound files into the Exposure sheet. This is called "comp" (for "comparable" sound), since the sound output seen during on-screen playbacks cannot exactly be frame accurate on the computer. Note, though, that everything else the program does is frame-accurate.

Line Art

Line art and Ink & Paint are handled through the Paint module.

The cel layers are the artwork which are layered over the background. What you see in each frame is the stack of cel art and whatever background can be seen through the cel art. By using these cel layers, you alleviate the need to redraw the entire frame — you need only draw what changes from frame to frame. No redrawing is needed to compensate for motion, rotation, magnification, or change of aspect ratio. Cel layers differ. You can be stored with transparent areas, thus, in effect, storing non-rectangular documents. There is no requirement that the cel layers and backgrounds be at the same color depth, resolution, or size.

Writing the Exposure sheet

Exposure sheets are handled in the animation module. An Exposure sheet is a form used by the animation industry to denote what happens during scenes in an animation. The Exposure sheet describes each exposure, or frame, of the animation. The background and each layer of the animation is called out, along with a sound-track reference, positions and other information for each piece of art, and notes for special effects, the multiplane camera, the lab, the cutting room, and anywhere else work is done on the film. You can get a more detailed explanation of the Exposure sheet in the sections which describe how to run the program, or how to build a sample animation. The Animation Stand provides three views of the film. If you change the position of a layer in the Current frame window, the Exposure sheet automatically updates. If you change the Exposure sheet or the art, the Current Frame window will automatically reflect these changes. The Exposure sheet Window has two possible views. In the primary view, you get a list of frames, top to bottom. Each frame consists of a list of layers, background to foreground, top to bottom. In the alternate view, you get thumbnail sketches of the background and each cel layer used in each frame listed, left to right. You can switch between these two views by clicking in the top line of the Exposure sheet. The Current Frame window shows you what the current frame looks like at all times.

Pencil Testing

Pencil test mode allows you to see your animation on the screen at up to 60 frames per second.

Writing Optical Notes

The optical press emulation module allows a full range of optical and special effects to be added to the animation.

Output

You have a wide variety of output devices available, including the screen, tape, film, disk files, and video disk, all frame-accurate.

Creating Animation & Playing It

The object of these exercises is to build an animation of a ball bouncing, taking some time to explore some side-avenues. Although there are a lot of steps in the examples below, don't be alarmed. There are so many steps because we're showing you an entire set of techniques, covering most, if not all, of what you will go through to put a typical film together.

There are two interfaces provided. The spreadsheet interface (very close to the traditional animation interface) provides you with the most detailed information about your work. The iconic interface allows you to see time and layers independently. Please read both sections, as you will need information presented in the spreadsheet interface text whether using the spreadsheet or the iconic interface.

Spreadsheet Interface: Creating the Elements

See Paint Section for an in-depth description of how to create a sphere.

- Step 1 Press ALT-N (New cel from the File menu) to get a new paint window.
- Step 2 We'll first paint a floor for the ball to bounce on. Select the filled polygon tool by mousing down (using the left mouse button) on the open polygon tool and holding it.



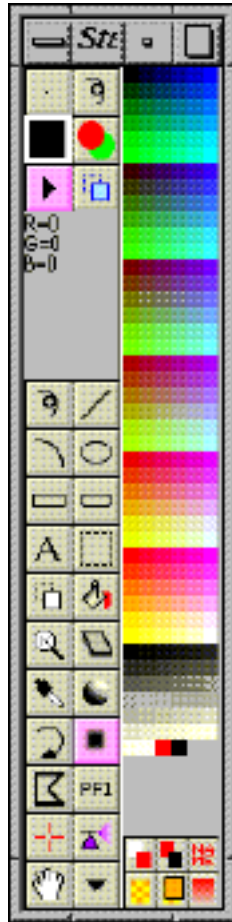
- Step 3 The polygon tool list will appear in the status window.
- Step 4 Left-click the filled polygon tool.



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Step 5 Select a color suitable to be a floor by clicking in the color/pattern selection area. The palette will appear.



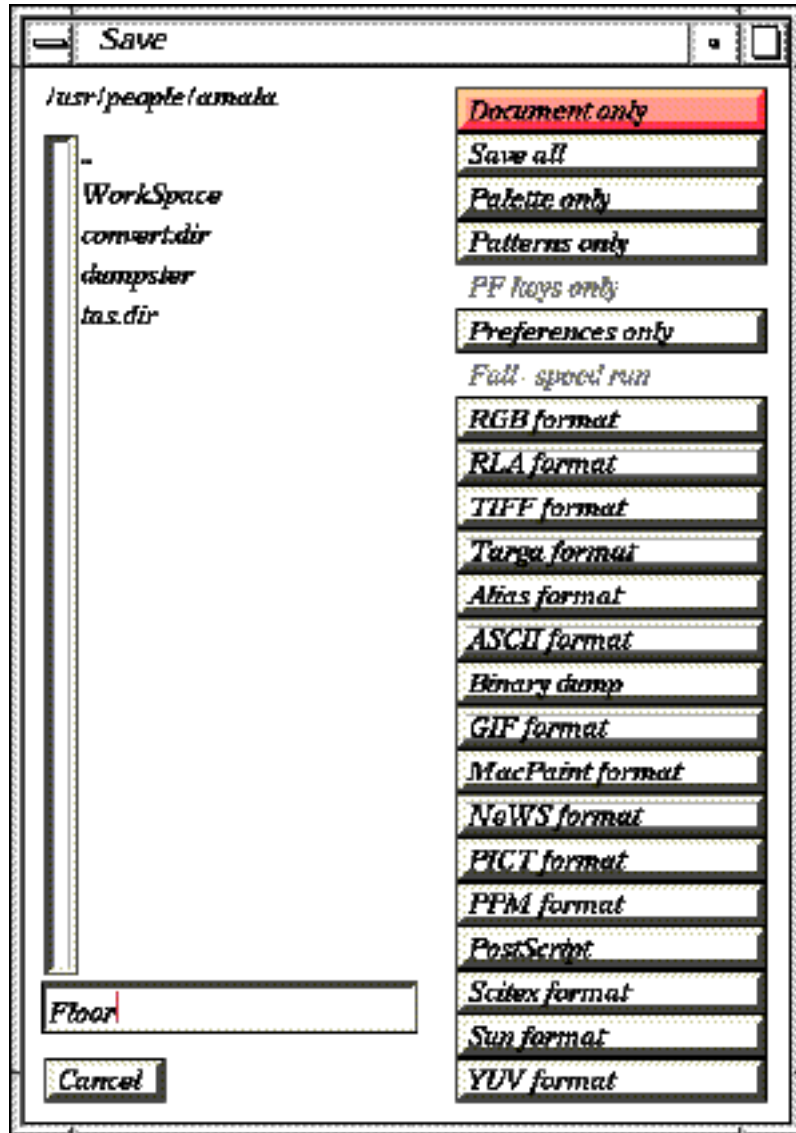
Step 6 Left-click on a color you'd like to use for drawing a floor.

Step 7 Paint a polygon as follows:



This will be your “floor”.

Step 8 Select Save as from the File menu. A standard Save dialog will appear.



Step 9 Enter Floor as the file name and click Document. The Save dialog will disappear, and the file will be saved.

Step 10 Press ALT-W (Close from the File menu) to close the file.

Step 11 Press ALT-N (New cel from the File menu) to get another new paint window.

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Step 12 Select the circle tool to paint a ball. Do this by mousing down on the circle tool set marker, and holding the mouse:



Step 13 The circle tool palette will appear in the Status window.



Step 14 Click on the filled circle tool.

Step 15 Select another color or pattern for the ball.

Step 16 Paint a circle to be the ball.



Step 17 For some things we'll do later, we'll need to have a registration point at the center of the ball. Select the registration point tool by clicking on it:

Step 18 Click at the center of the ball. The registration crosshairs appear.

Step 19 There's no reason for us to keep looking at the registration crosshairs. Let's hide them. Center-click on the registration point tool, and the + mark vanishes.



Step 20 Use the marquee tool to roughly outline the image of the ball, and release the mouse. The marquee will shrink down and only the ball will be selected.

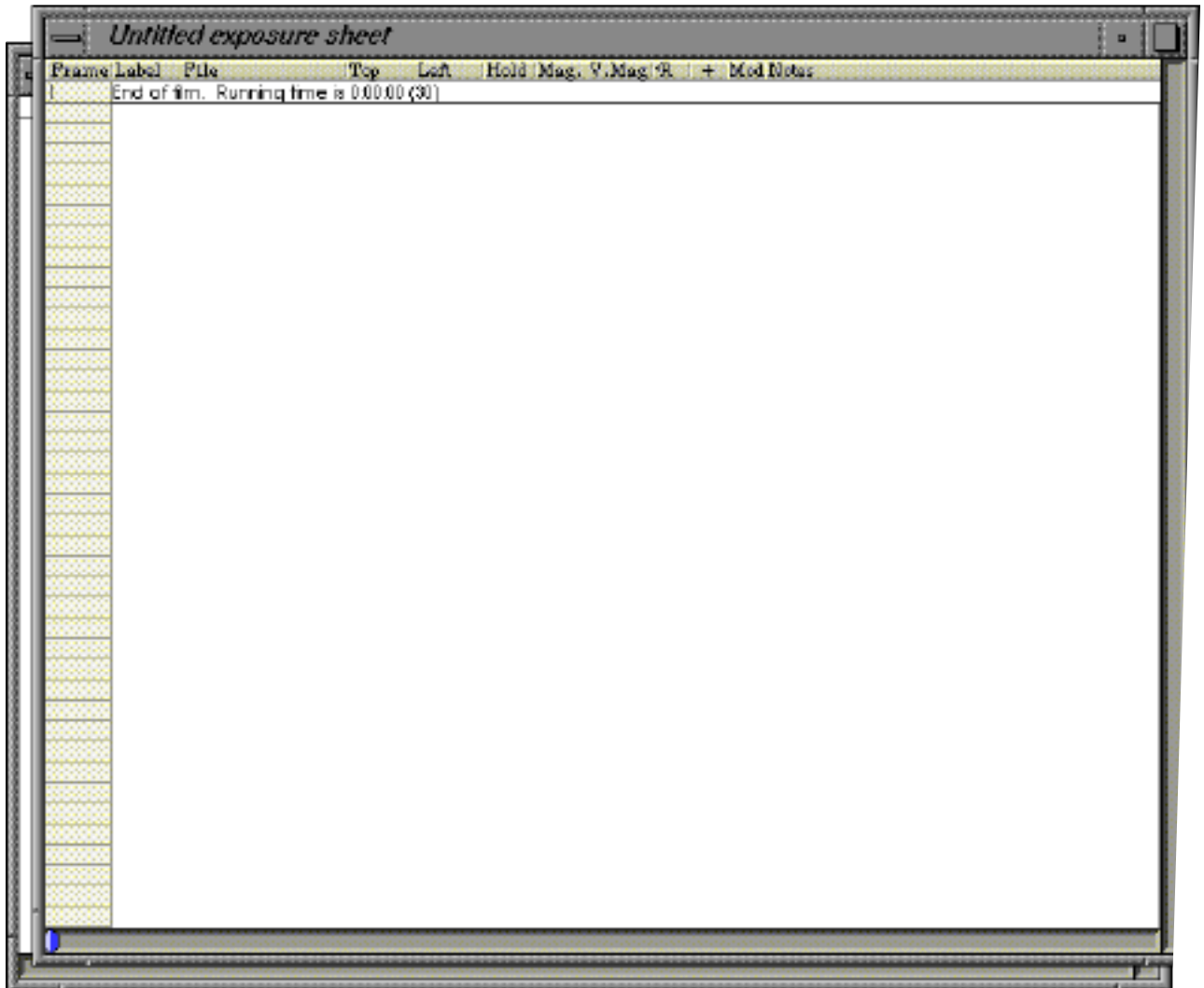
Step 21 Press ALT-= (Save area from the File menu) to save the selected area. A standard Save as dialog will appear.

Step 22 Enter the name Ball and click on Document. The dialog will disappear, and the document is saved.

Step 23 Press ALT-W (Close from the File menu) to dismiss the ball window.

Spreadsheet Interface: Setting Up the Exposure sheet

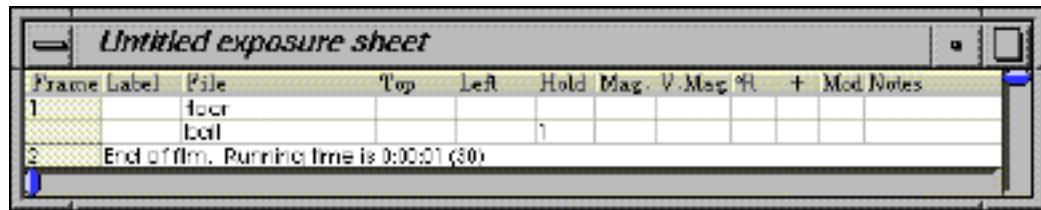
- Step 1 Press ALT-R (New film from the File menu) to create a new Exposure sheet.



- Step 2 Center-click the number 1, under the Frame header and to the left of the End of film marker. This will open a new frame, of one layer.
- Step 3 Center-click the number 1, under the Frame header and to the left of the new, empty layer. This will open a new layer, at the beginning of the frame, giving you a single frame of two layers. The first of these layers shown to you is the background layer. The second one is, in this case, the foreground layer. At this time, both are empty.

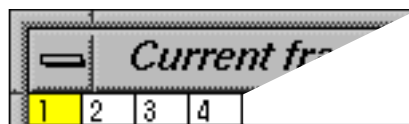
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- Step 4 Center-click in the first, empty File field, to insert a picture into the background layer. The Open dialog will appear.
- Step 5 Shift-click on the file Floor. This will load the file Floor into the first File field, and move the selected area down one layer, and leave the Open dialog present.
- Step 6 Center-click on the file Ball. This will take down the Open dialog and insert the file name into the Exposure sheet as the first foreground file. You should now have an Exposure sheet that looks like this:



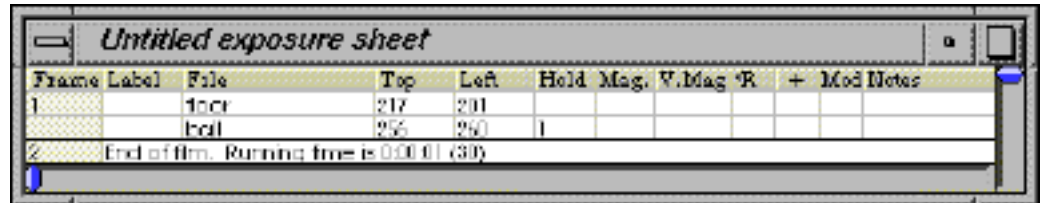
Spreadsheet Interface: Manipulating the Elements

- Step 1 Now you've got the files you'll need, and they're in the right order, but the pictures are not in the right place. To get the pictures in the right place, it's easiest to work with the Current Frame window. Click in the drag bar of the Current Frame window. The Current Frame window will move in front of the Exposure sheet window.
- Step 2 Let's get the floor into position first. The floor should be at the bottom of the frame, centered. To move the floor, which is the first cel layer in our stack, click in the 1 of the layer selector. The 1 will highlight. Shown below is the selector.



- Step 3 Mouse down on the floor. Move the floor to the desired position and release the mouse button.

Step 4 Now, let's get the ball into position. The ball should be resting on the center of the floor, in its bounce position. What we're really trying to do here is to set up an animation with key frames showing a ball in a high position, a low position, and a high position again. So far, you've set up the ball into the low position, which should look something like this:



Step 5 You have now set up your first frame. Now, let's set up a ball in an “up” position. Mouse down over the 1 in the frame number field, and keeping the mouse button depressed, move the cursor one line down, then release the mouse button. This will select (blacken) both layers of the first (and only) frame. Alternatively, you could have used ALT-A (Select all from the Edit menu) to just select everything.

Step 6 Press ALT-C (Copy from the Edit menu) to copy the whole thing into the clipboard.

Step 7 Click on the 2 in the frame number field, selecting the End of film marker.

Step 8 Press ALT-V (Paste from the Edit menu) to insert another copy of the frame. The End of film marker is not destroyed by the Paste operation, since there is always an End of film marker. You now have two identical frames, numbered 1 and 2.

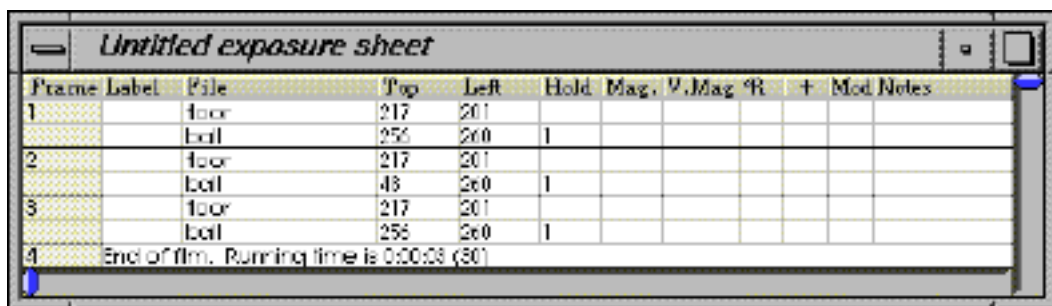
Step 9 We want to raise the ball to its terminal (after bounce) position, which is also going to be the initial position. Select the second frame by clicking the 2 in the frame number field.

Step 10 Let's switch to the Current Frame window. Now, mouse down over the ball, and drag it up to a good ending (as well as starting position). Notice by manually moving the ball, you have probably not placed the ending position in exactly the same position as the beginning. Don't worry. In the next few steps we will explain how to correct this.

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Note: We could have avoided this problem by using the center mouse button to constrain movement to the vertical direction, but then you would have missed out on the following example of using the numeric fields to correct the position.

- Step 11 Switch back to the Exposure sheet window again. If the Left field of your two Ball layers have the same numerical values, please still review these next two steps. We want the last Left field (Ball of frame 2) to have the same value as the second Left field (Ball of frame 1). Click on the last Left field. It will highlight to indicate selection.
- Step 12 Enter the same numeric value as that of the other Ball frame. As soon as you press any key or mouse click, the edit will end, and the picture in the Current Frame window will reflect this change.
- Step 13 Now, it's time to get a copy of this last frame, so that we can also make it the first frame. Mouse down on the 2 in the Frame field. While still holding down the mouse button, drag the cursor down one line, then release it. This will select the second frame.
- Step 14 Press ALT-C (Copy from the Edit menu) to copy the second frame into the clipboard.
- Step 15 Click on the 1 in the Frame field, selecting the first layer of the first frame.
- Step 16 Select Paste before from the Edit menu. This will insert a copy of the selected frame before the current first layer. We use Paste before, rather than Paste, because Paste replaces the selected item(s) with the new item, and Paste before pastes layers in before the selected layer. At this point, your Exposure sheet should look something like this:



Frame Label	File	Top	Left	Hold	Mag	V.Mag	R	+	Mod	Notes
1	floor	217	201							
	ball	256	200	1						
2	floor	217	201							
	ball	48	200	1						
3	floor	217	201							
	ball	256	200	1						
4	End of film. Running time is 0:00:03 (30)									

Step 17 You now have the three key frames: The up position, the down position, and another up position. It's time to create the movement. We will insert an accelerated move between frames 1 and 2, and a decelerated move between frames 2 and 3. Whenever we insert a movement marker, it is inserted before the marked frame, and after the frame before the marked frame. To begin, mouse down on the right arrow in the Status window:



Step 18 Drag the Move tool onto the first line of the second frame.

Step 21 The Move dialog will appear, asking you to enter the number of frames over which you want the move to occur. Type 10 into the Slow in field, and click OK to enter a 10 frame accelerated interpolation (9 new frames, plus the existing end point). The dialog will disappear, and the Exposure sheet will show a new 9-frame marker, with the frames renumbered to 1, 11, and 12. There is nothing magic about the number 10. It's just a number being used in this example.



Step 22 Drag the Move tool onto the first line of frame 12.

Step 23 Type 10 into the slow out field and click OK to enter a 9-frame decelerated interpolation. The dialog will disappear, and the exposure sheet will show a new 9-frame marker, with the frames renumbered to 1, 11, and 21. The exposure sheet should look something like this:

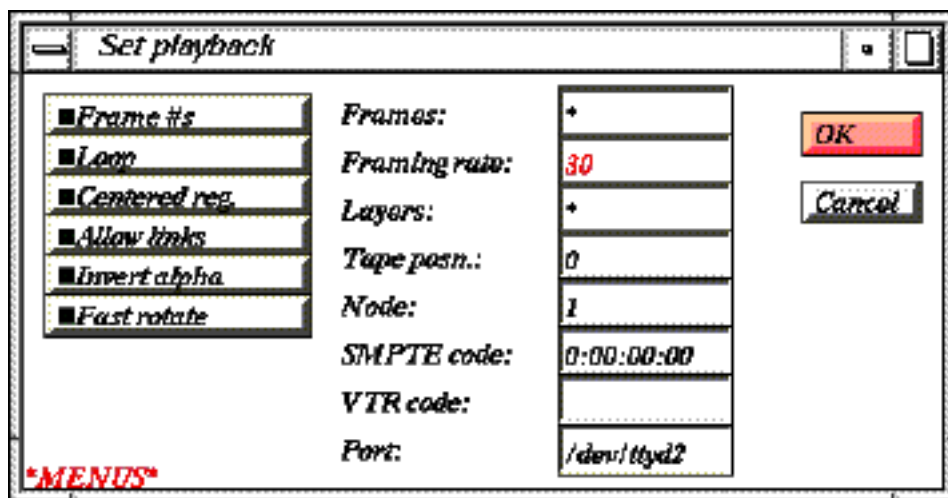
Frame Label	File	Top	LoA	Hold	Mag.	V.Mag	R	+	Mod	Notes
1	floor	217	201							
	ball	255	260	1						
2	Move, 9 frames									
11	floor	217	201							
	ball	48	260	1						
12	Move, 9 frames									
21	floor	217	201							
	ball	255	260	1						
22	End of film. Running time is 0:00:21 (30)									

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- Step 24 Press ALT-S (Save from the File menu) to save the Exposure sheet. Any time you finish a logical set of operations, such as entering the Exposure sheet, it's a good idea to save your work. The Save dialog will appear.
- Step 25 Enter a file name, such as Bouncing ball, and click Document. The dialog will vanish as the file is saved.

Spreadsheet Interface: Testing the Animation

- Step 1 Now, let's look at a test. To do that, you'll have to bring the Current Frame window forward, or you'll only see a very narrow sliver of the test going by in a mostly-obscured window. Click in the Current Frame window's drag bar.
- Step 2 Press ALT-J (Play or Record from the Animate menu). All 21 frames of the file will be shown in the Current Frame window.
- Step 3 Let's try it again with looping, and on the full screen. Press ALT-MINUS (Set playback from the Animate menu). The controlling dialog will appear.
- Step 4 Click on Loop to turn on looping.
- Step 5 Mouse down with the right mouse button and select on Full screen from the Where menu. A menu will appear showing a list of playback locations. This determines where output will be sent.

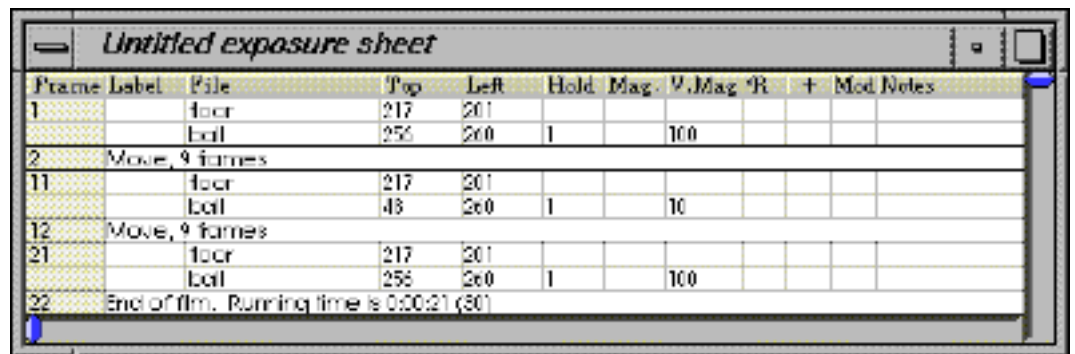


- Step 6 Click OK to accept the edit.
- Step 7 Press ALT-J (Play or Record from the Animate menu). All 21 frames of the file will be shown, this time full screen, and looping. Playback will continue indefinitely.
- Step 8 Press escape to stop playback.

Spreadsheet Interface: Adding Special Effects

At this point, you've completed the animation. Now, it's time to spice it up with special effects.

- Step 1 Now, let's add squash (as in "squash and stretch"). Click on the Exposure sheet window's drag bar to bring it forward.
- Step 2 Click on the V.Mag field of the last layer of the middle frame. It will show a red zero.
- Step 3 Enter 10 into the vertical magnification field, meaning that the ball's vertical dimension will be shown at 10% of its normal size. Because this frame is preceded and followed by interpolation sets, this squash will actually affect frames 2 through 20.
- Step 4 Similarly enter 100 into the other V.Mag fields. This means that we're going between 100% and 10%, rather than 0% to 10%.



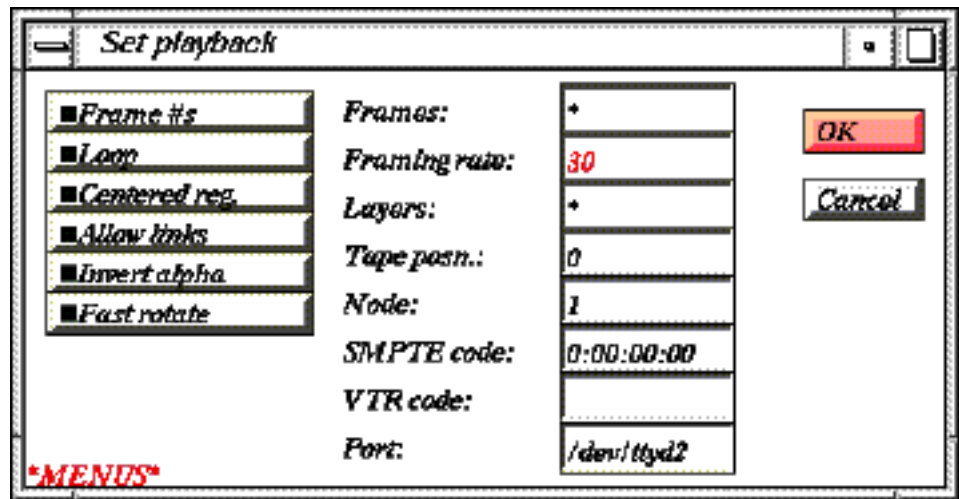
- Step 5 To see how the animation looks now, press ALT-J (Play or Record from the Animate menu) again.

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- Step 6 When you want to end the looped play-back, press escape. By changing the horizontal and vertical dimensions of the appropriate layers or frames, you can adjust the squash and stretch any way you choose.
- Step 7 Press ALT-S (Save from the File menu) to save the Exposure sheet again. This brings up the Save dialog.
- Step 8 Click on Document only and your file is saved.
- Step 9 Select Save as Full-Speed Run from the Animate menu to ask that a full-speed run file be generated onto disk. The Save dialog will appear.
- Step 10 Enter a name, such as Bounce. Click OK. Some time will pass as the file is created and packed. While this is occurring, you will see intermediate results on the screen. The program is using the screen storage to save on overall storage requirements.
- Step 11 Now, let's look at the full-speed run. Press ALT-O (Open from the File menu). An Open dialog will appear.
- Step 12 Click on Bounce (or whatever you named the file). The animation will play. Playback will be continuously looping, since we had looping set.
- Step 13 Press escape to stop the playback.

Spreadsheet Interface: Creating Final Output

- Step 1 Now, having seen that everything is just right, we can set our parameters and create our final output. For the purpose of this tutorial, we will create a Full-speed run as our final output. This is by no means the only output method available using The Animation Stand! If you would like your final output to be to video tape, video disk or film, please refer to the appropriate sections later in this manual. Press ALT-MINUS (Set playback from the Animate menu) to set the parameters.
- Step 2 Notice that the Framing rate is set to 30. You can leave it at 30, or enter in any Framing rate you desire. Click OK. Your parameters are now entered.



- Step 3 Select Save as Full-speed run, under the Animate menu. The Save as dialog will then appear.
- Step 4 Enter in a new file name for your full-speed run and click OK. You will see your animation displayed one frame at a time while the run is being created.
- Step 5 To see your run, open it.

Spreadsheet Interface: Management Reporting

Step 1 Last, let's take an accounting of what we've done. Click on the Exposure sheet window's drag bar to bring it forward.

Step 2 Select Document info from the File menu. The output shows the frames we've used, and information about the film just created, including how long it took.

Bouncing ball

```
Current edit: 0:03
Total editing time: 0:03
Running time: 0:00:21
Framing rate: 30 FPS
Control sheet lines: 9
Cells in use: 2, as follow:
```

```
/usr/people/amala/Ball.Animation/Ball
/usr/people/amala/Ball.Animation/Floor
```

Congratulations — You've finished your first animation with The Animation Stand.

Iconic interface: Setting Up the Exposure sheet

This section assumes that you have already done the art, as directed in the text covering the spreadsheet interface.

Step 1 Click in the columns headings bar to change from the spreadsheet format to the iconic format.

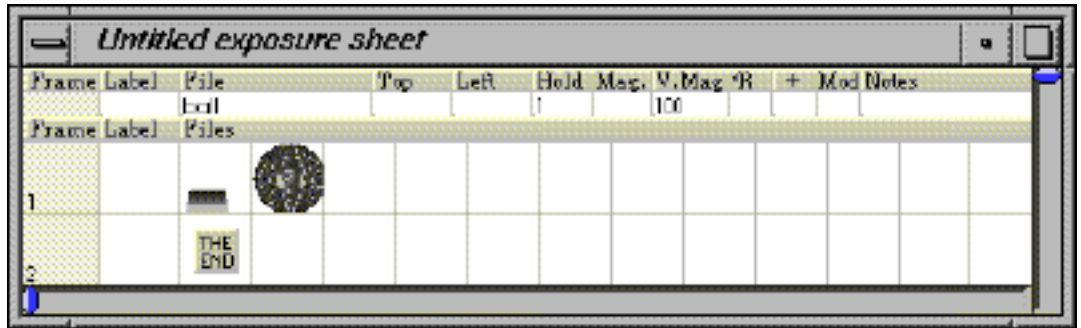
Step 2 Center-click the number 1, under the Frame header and to the left of the End of film marker. This will open a new frame. You may use as many layers in the frame as you like.

Step 3 Center-click in the first, empty File field, to insert a picture into the background layer. The Open dialog will appear.

Step 4 Click on the file Floor. This will load the file Floor into the first File field.

Step 5 Center-click in the second, empty File field, to insert a picture into the foreground layer. The Open dialog will appear.

Step 6 Click on the file Ball. This will take down the Open dialog and insert the file name into the Exposure sheet as the first foreground file. You should now have an Exposure sheet containing an iconic area that looks like this:



Iconic interface: Manipulating the Elements

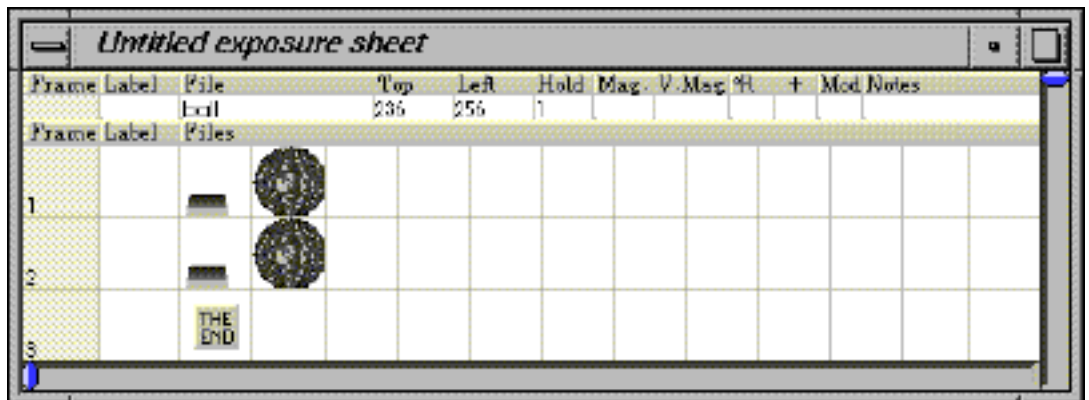
Step 1 Now you've got the files you'll need, and they're in the right order, but the pictures are not in the right place. To get the pictures in the right place, it's easiest to work with the Current Frame window. Click in the drag bar of the Current Frame window. The Current Frame window will move in front of the Exposure sheet window.

Step 2 Let's get the floor into position first. The floor should be at the bottom of the frame, centered. To move the floor, which is the first cel layer in our stack, click in the thumbnail image of the floor in the Layer Selector portion of the window. The thumbnail will highlight. Shown below is the selector area.



Step 3 Mouse down on the floor. Move the floor to the desired position and release the mouse button.

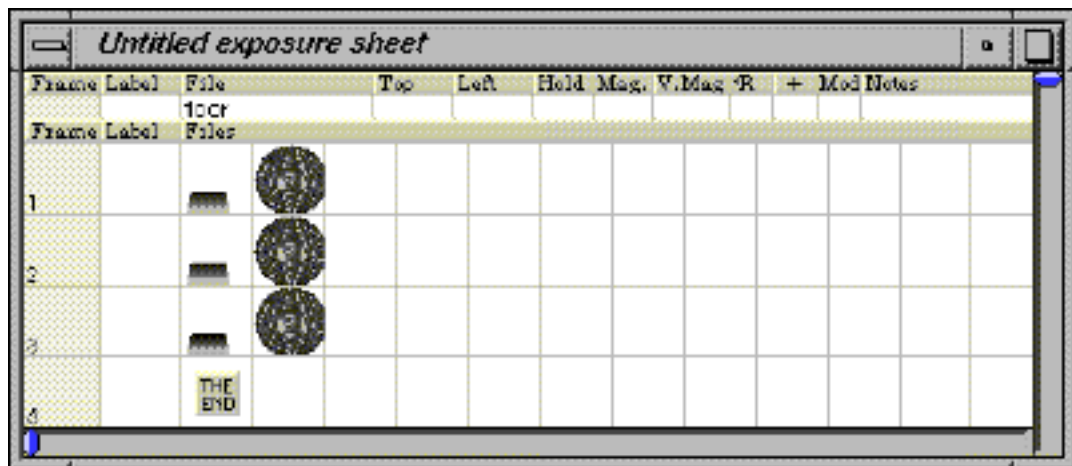
- Step 5 You have now set up your first frame. Now, let's set up a ball in an "up" position. Click on the 1 in the frame number field. This will select both layers of the first (and only) frame. Alternatively, you could have used ALT-A (Select all from the Edit menu) to just select everything.
- Step 6 Press ALT-C (Copy from the Edit menu) to copy the whole thing into the clipboard.
- Step 7 Click on the 2 in the frame number field, selecting the End of frame marker.
- Step 8 Press ALT-V (Paste from the Edit menu) to insert another copy of the frame. The End of film marker is not destroyed by the Paste operation, since there is always an End of film marker. You now have two identical frames, numbered 1 and 2.



- Step 9 We want to raise the ball to its terminal (after bounce) position, which is also going to be the initial position. First, we have to select the frame. Click on the 2 in the frame number field, selecting the second frame.
- Step 10 Now, we want to place the art. Click on the Current Frame window's drag bar, bringing it forward.
- Step 11 Now, mouse down over the ball, and drag it up to a good ending (as well as starting position). In all probability, you have moved the ball to a horizontal position which is not 100% directly over the position in frame 1. Use the center mouse button to constrain movement to the vertical direction.
- Step 12 Click on the Exposure sheet window's drag bar to bring it forward again.

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- Step 13 Now, it's time to get a copy of this last frame, so that we can also make it the first frame. Click in the 2 in the Frame number field. Thus, you have selected the second frame.
- Step 14 Press ALT-C (Copy from the Edit menu) to copy the second frame into the clipboard.
- Step 15 Click on the 1 in the Frame number field, selecting the first frame.
- Step 16 Select Paste before from the Edit menu. This will insert a second copy of the copied frame before the then-first frame. We use Paste before, rather than Paste, because Paste replaces the selected item(s) with the new item, and Paste before pastes layers in before the first selected frame. At this point, your Exposure sheet's should look something like this:



- Step 17 You now have the three “extreme” (or “key”) frames: The “up” position, the “down” position, and another “up” position. It's time to create the movement. We will insert an accelerated move between frames 1 and 2, and a decelerated move between frames 2 and 3. Whenever we insert a movement marker, it is inserted before the marked frame, and after the frame before the marked frame. To begin, mouse down on the right arrow in the Status window:



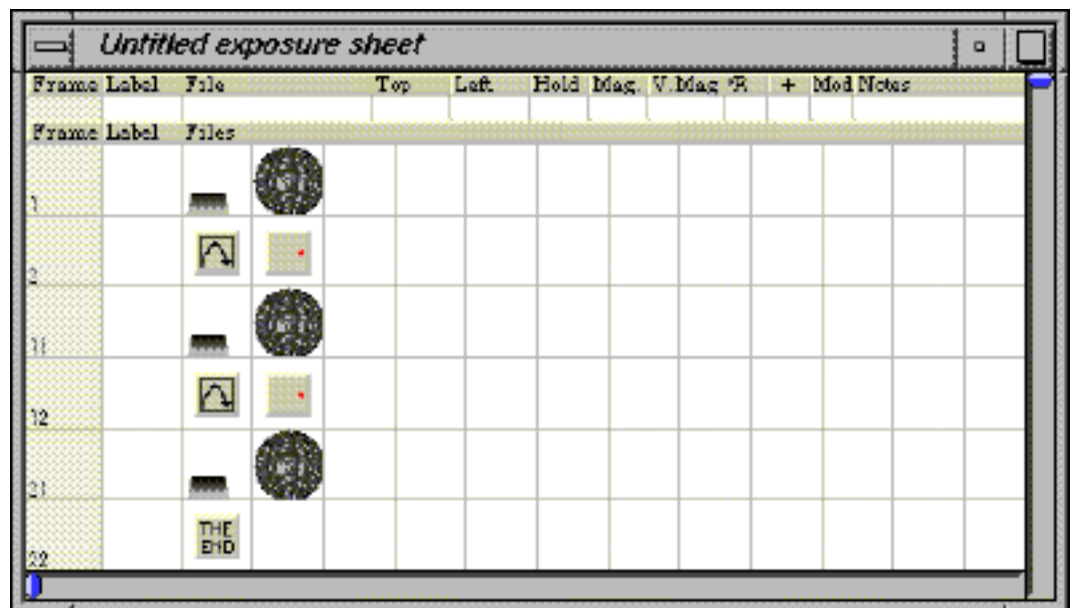
- Step 18 Drag the Move tool onto the first line of the second frame.

Step 19 The Move dialog will appear, asking you to enter the number of frames over which you want the acceleration to occur. Type 10 and click OK to enter a 10 frame accelerated interpolation (9 new frames, plus the pre-existing terminal frame). The dialog will disappear, and the Exposure sheet will show a new 9-frame marker, with the frames renumbered to 1, 11, and 12. There is nothing magic about the numbers 9 or 10. They're just a number being used in this example.



Step 20 Drag the Move tool onto the first line of frame 12. Remember:

Step 21 The Move dialog will appear to ask what is to appear in the move. Type 10 into the Slow out field and click OK to enter a 10 frame decelerated interpolation (9 new frames, plus the existing end point). The dialog will disappear, and the Exposure sheet will show a new 9-frame marker, with the frames renumbered to 1, 11, and 21. The Exposure sheet should now look something like this:



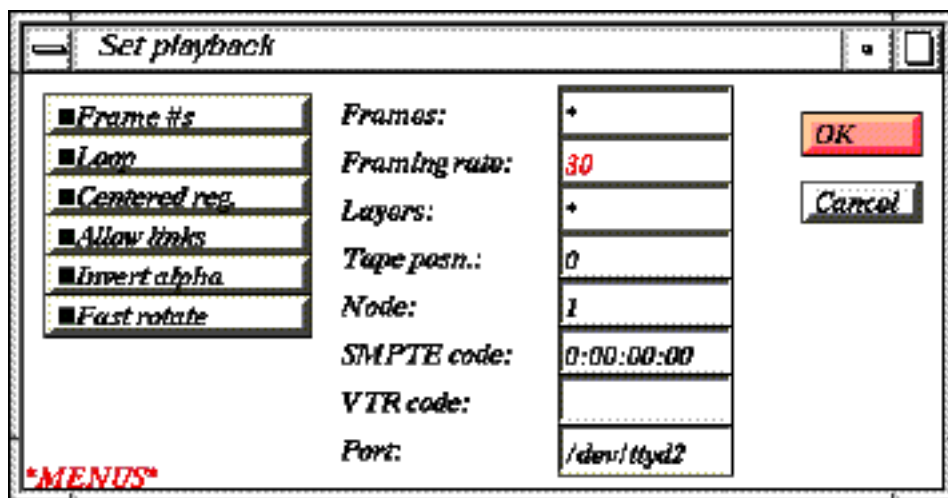
Step 22 Press ALT-S (Save from the File menu) to save the Exposure sheet. Any time you finish a logical set of operations, such as entering the Exposure sheet, it's a good idea to save your work. The Save dialog will appear.

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Step 23 Enter a file name, such as Bouncing ball, and click Document. The dialog will vanish as the file is saved.

Iconic interface: Testing the Animation

- Step 1 Now, let's look at a test. To do that, you'll have to bring the Current Frame window forward, or you'll only see a very narrow sliver of the test going by in a mostly-obscured window. Click in the Current Frame window's drag bar.
- Step 2 Press ALT-J (Play or Record from the Animate menu). All 21 frames of the file will be shown in the Current Frame window. If you have very little caching in effect, this will take a while. If you have a fair amount of caching, these frames will be composed and painted quickly.
- Step 3 Let's try it again with looping, and on the full screen. Press ALT-MINUS (Set playback from the Animate menu). The controlling dialog will appear.
- Step 4 Click on Loop to turn on looping.
- Step 5 Mouse down with the right mouse button and select Full screen from the Where menu



Step 6 Click OK to accept the edit.

- Step 7 Press ALT-J (Play or Record from the Animate menu). All 21 frames of the file will be shown, this time full screen, and looping. Playback will continue indefinitely.
- Step 8 Press escape to stop playback.

Iconic interface: Adding Special Effects

At this point, you've completed the animation. Now, it's time to spice it up with special effects.

- Step 1 Now, let's add squash (as in "squash and stretch"). Click on the Exposure sheet window's drag bar to bring it forward.
- Step 2 Click on the middle frame to select it.
- Step 3 Click on the Current Frame window to bring it forward.
- Step 4 Click on the animation tool portion of the Status window:



Note: Some of the icons used in the animation tool portion of the Status window look very similar to the icons used for the paint movement tools. In addition to being contained in different tool boxes, the animation tools use blue lines, and the paint tools use black lines.



- Step 5 The animation tool palette will appear. Click on the Squash/Stretch tool.
- Step 6 Mouse down and move the mouse so that the ball image is squashed.

Congratulations — You've finished your first animation with The Animation Stand.

Note:: Creating Final Output and Management Reporting are fully covered in the final sections of the Spread Sheet Format instructions above.

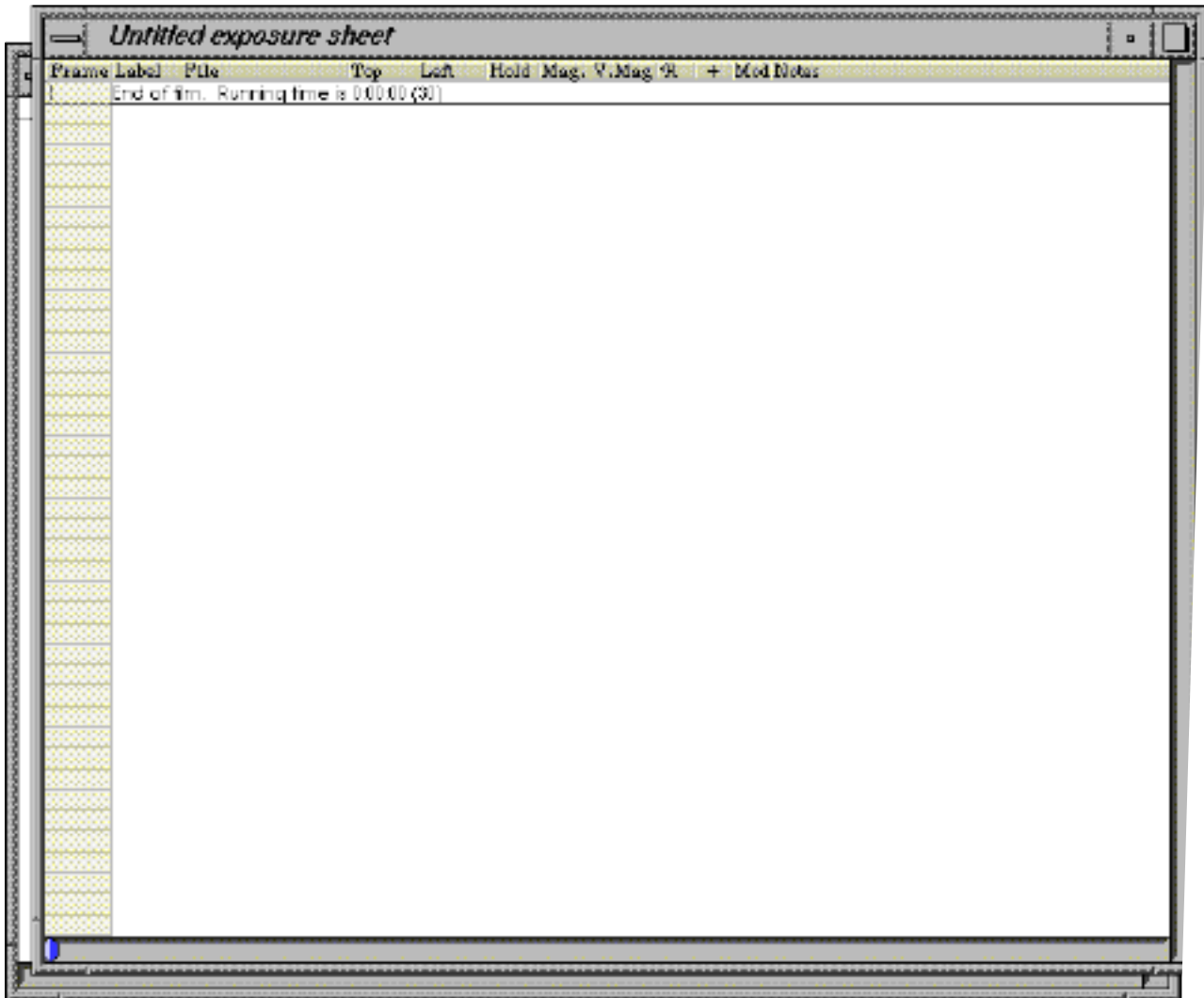
Animation

In this section of the manual, you will learn the basics of the Exposure sheet. The Exposure sheet is where you create your animation. That is, you tell The Animation Stand which pictures (or cels) to put in the frames in your animation, and how to move those pictures from frame to frame. You'll learn about the special effects you can create for your films later in this tutorial, but for now, just remember that the Exposure sheet is where you'll do most of your animation work. You'll learn how to save and name files later in this tutorial, too.

The Exposure sheet can appear in three forms. In the initial, default form (spreadsheet format), frames are displayed top to bottom, and within the frames, cel layers are displayed top to bottom. In the other (iconic & studio) formats, frames are still listed top to bottom, but layers within the frames are listed left to right. If you prefer to use the other interface, just skip ahead to that section.

Exposure sheet: Spreadsheet Format

To open a new film, select New film from the File menu. An empty Exposure sheet window (in spreadsheet format), with a Current Frame window behind it, appears:



Relationship of the Exposure Sheet & Current Frame Windows

The Exposure sheet window describes every frame of the film being created. It shows all frames in textual form, a spreadsheet of sorts.

The Current frame window shows the contents of the current frame, graphically.

The Exposure sheet window describes every frame of the film being created. It shows all frames in textual form, a spreadsheet of sorts. Changes made to the Current frame window will change the Exposure sheet immediately.

The Current frame window shows the contents of the current frame, graphically. The current frame is always defined as the frame containing the spreadsheet cell being edited, if any, or the frame containing the first selected layer, if any. Barring that, the “current frame” is usually the frame that last fit one of those criteria. Changes made to the Exposure sheet, or any file appearing in the current frame will change the Current frame window immediately. This includes changes made to artwork made through other programs, on your machine or another machine on a network. Changing your selection in the Exposure sheet may change the definition of the current frame, and may thus cause the Current frame window to update. The Current frame window will not update if Caps Lock is down.

At the top of the Current frame window is an area which shows which layers are selected for modification in the Current frame window, as a series of numbers, highlighted for selected layers.

Both of these windows can be used to edit the film. The Exposure sheet window is used for textual, spreadsheet edits, while the Current frame window allows direct moves of picture elements.

Fields

While some things are true of all fields, some basic differences exist between the fields. Fields break up into three categories, and each category behaves differently.

- Control fields (Title Area and Frame field) control selection and format only. No data can be entered into these fields, and clicking in these fields have effects as discussed on the sections on the individual fields.
- The File field uses an Open dialog to edit its contents, placing file names (or pictures of the files) into the Exposure sheet.

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- The remainder of the fields are text edit fields, following the normal text editing procedures. These numbers & text strings control how & for how long the various images will be displayed.

When you select a File field or a text editing field, the entire field is selected. If the field selected is a text editing field, subsequent mouse clicks in the field can be used to position the cursor, select an entire word, or to drag out an area. To move between text editing fields, you may use the mouse to move directly to a field, or use Enter or Tab to move to the next field, or use the arrow keys to move in the indicated direction.

Title Area

If you click in this field, the format of the Exposure sheet changes format.

At the top of the Exposure sheet window is the window's title area. Currently, this Exposure sheet is called "Untitled Exposure sheet" because we haven't told the system to call it anything else yet. If your Exposure sheet does have a name (for instance, most likely it will be the title of your movie), it will display in this area.

Within the window proper is the Exposure sheet itself. The Exposure sheet has its own title area:

Frame Label	File	Top	Left	Hold	Mag.	V.Mag	°R	+	Mod Notes
-------------	------	-----	------	------	------	-------	----	---	-----------

If you click in this field, the format of the exposure sheet changes, from spreadsheet format to iconic format.

Frame Field

The leftmost field, the Frame field, contains the frame number. Each frame has one or more lines or layers. The frame number is automatically inserted and maintained. You need do nothing to set up frame numbers.

Frames consist of one or more layers. A simple frame consists of one layer containing the frame number, the layer data, and a positive Hold Time.

Note: Iconic format can handle up to 36 layers per frame. If you need more than 36 layers for your animation, use the spreadsheet format

Frame Label	File	Top	Left	Hold	Mag.	V.Mag	°R	+	Mod Notes
1	floor			1					

In the alternate format, the Left, Top, Hold, Mag., V.Mag., °R, +, and Mod fields are not displayed.

A more complex frame may consist of one layer containing the frame number, layer data, and a zero Hold time; a second layer containing layer data and a zero Hold time; and a third layer consisting of later data, and a positive Hold time.

Frame Label	File	Top	Left	Hold	Mag.	V.Mag	°R	+	Mod Notes
1	floor	227	201						
	ball	256	260	1					

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You may have an unlimited number of frames in your film and an unlimited number of layers in your frames. In the alternate Exposure sheet formats, the first 36 layers are shown. If you need to or add more than 36 layers, you must do so in the top down format Exposure sheet.

Selecting Frames

If you click on the Frame field when using the spreadsheet format, the entire layer displayed on that line is selected. If you release the mouse, your simple selection is made. If you drag on this field, either upwards or downwards, the selection is extended to cover multiple layers and/or frames.

If you hold down shift while clicking, and there was another layer, frame, set of layers, or set of frames selected, then the previously selected layers or frames remain selected, the newly clicked layer or frame becomes selected, and all of the intermediate layers and/or frames are also selected.

Layers

Each frame is composed of one or more layers.

Adding a layer before another layer is extremely easy: Using the spreadsheet Exposure sheet format, center-click in the Frame field. Notice that a new layer has been inserted before the clicked layer.

Inserting lines

If you center-click the Frame field when using spreadsheet format, a new layer line will be inserted before the line on which you clicked. The Hold field will be zero, so a new frame will not normally be created.

The End of Film Marker

The last line of the film is always the End of film marker. Since insertions always occur before the selected line or group of lines, we need to guarantee that there is always a line past the end of the film, which the End of film marker does. The End of film marker also shows the film's running time (unless the film shows at the rate of one frame per mouse click).

Deleting Lines

At some point, you may have a frame or layer in your film that you don't want. Deleting a frame is very easy:

- Step 1 Using the Frame field, highlight the layers to be deleted.
- Step 2 Press Backspace on your keyboard, or select Clear from the Edit menu. Notice that the layer(s) are gone, and that frames are renumbered as required.

Adding a Layer to the End of a Frame

This technique is only required for the spreadsheet Exposure sheet format. The iconic Exposure sheet format makes this process automatic.

Very often, you will find yourself wanting to add a layer to the end of a frame. In this case, do the following:

- Step 1 Center-click in the Frame field immediately following the frame to which you are adding the layer.
- Step 2 Enter 1 into the Hold field of the newly created layer.
- Step 3 Enter 0 into the Hold field of the layer immediately above the newly created one.

Special Effects Lines

There is a set of lines which each represent one or more frames of special effects or other actions. These lines have no editable fields; otherwise, they act much like any other line. The special effects lines are:

Move, xxx frames
Pantograph, xxx frames
Spline, xxx frames

These markers are created from the Animated tools, and are discussed more fully in the section covering the Animated tools. Move is a computed movement. Pantograph and Spline are curve-controlled moves.

Label Field

The Label field is a text field, which is not actually used by The Animation Stand. Normally you will put the portion of the dialog associated with this particular frame in this cell, for your own reference and assistance.

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Step 1 Create a frame by center-clicking on the End of Frame marker's Frame field. A new Frame 1 appears.

Step 2 Click on the Label field. The field will highlight.

Step 3 Type in the phoneme — “ah” for instance.

In classical animation, the sound track is recorded first, and then the animation track is placed over it. In desktop computer animation, sound and pictures are handled at the same time by the computer. This program allows you both options. To have sound handled by the computer, read the section on the File field. To handle sound in the classical method, do the following:

For Video

Step 1 Write your script.

Step 2 Record your script directly onto your master tape, which will later have the animation edited in over it. Remember to use black burst and to record any required timing tracks.

Step 3 Create an Exposure sheet.

Step 4 Create enough frames of enough layers each in the Exposure sheet to handle your animation.

Step 5 Frame by frame, or sound by sound, play your sound track back. For each sound that must have animation matched to it, make a note in the Label field for the appropriate frame. Use the frame number (or SMPTE) read-out of your recorder.

Step 6 Create your animation to match what is shown in the Label field.

Step 7 Record your animation directly onto the tape as an edit-in. Be sure to have the animation start on the tape in the same frame as the sound starts. Synchronization will happen as a matter of course.

For Film

Step 1 Write your script.

Step 2 Record your script onto tape.

Step 3 Transfer this tape to a film sound-track.

Step 4 Create an Exposure sheet.

Step 5 Create enough frames of enough layers each in the Exposure sheet to handle your animation.

- Step 6 Frame by frame, or sound by sound, play your sound track back. For each sound that must have animation matched to it, make a note in the Label field for the appropriate frame. Use the frame number feet-and-inches marks of the film.
- Step 7 Create your animation to match what is shown in the Label field.
- Step 8 Shoot the animation to film.
- Step 9 Optically combine the two films (sound and picture). Once the first frames are aligned, synchronization will happen as a matter of course for the rest of the film.

File Field

The File field has several uses:

- To show or use a picture file as a frame, normal layer, partially transparent layer, matte, or the like. It contains the name of the picture file that appears in this layer of this frame.
- To execute a link to another Exposure sheet file, it contains the name of the Exposure sheet file that will be executed next.
- To execute a filter file, it contains the name of the filter file that will be executed next.
- To play a sound file, or any file containing a sound resource, starting with the current frame, and continuing until the sound has played out.

Note: When using certain Notes field commands, this field is unused.

For filters:

Filters are executed according to their placement in the exposure sheet, after composition listed before the filter in the frame, and before the items in the frame listed after it.

- Step 1 Center-click the File field, as above.
- Step 2 When the dialog box appears, select the name of a file containing a filter. The filter file name will appear in the File field. Filters may be any executable program or shell script. Each program or shell script must take its arguments as follow:

```
programName inputRGBFile outputRGBFile
```

For Sound Files:

Note: Sound files are used for “comp” sound. The computer can't play back animation and sound together with absolute frame accuracy. Thus, showing tests with sound and pictures will give you a good approximation of synchronization, but not broadcast quality.

- Step 1 For sound files, just center-click on the File field.
- Step 2 Click a sound file. The Open dialog will disappear. Notice that the file selected now appears in the File field in Frame 1 of the Exposure sheet.

The name of the file will appear in the edited field of the Exposure sheet.

NOTE: The exposure sheet tracks files based on their full path name. If you move or rename a file or directory, the exposure sheet will no longer know where to find the file.

Loading Multiple Files

Very often, you will want to load more than one file at a time. When selecting a file after center-clicking in the File field, you can use the shift key and center mouse button to modify how file selection works.

As you know, the left mouse button loads the selected file into the Exposure sheet cell marked.

Shift-click loads the file into the cell marked, and also selects the next File field cell, leaving you in the Open dialog.

Center-click loads all files in the sequence into the selected File field, starting with the item selected, and the following File fields.

Top & Left Fields

IMPORTANT!
You should
actually read
this section!

The Top and Left fields define how far from the top and left edges of the frame to place the registration point of a picture. Pictures generated by programs other than The Animation Stand, or generated by The Animation Stand without having had a particular registration point set are registered at their upper left-hand corners. If you explicitly gave the item a registration point, then that point is placed at the given frame coordinates. Zero is the default setting for the Top and Left fields. Thus, to decrease the amount of things for you to look at, the Top and Left fields will be displayed in gray when their values are zero.

Changing the Top and Left Fields:

You can change the Top and Left field settings in two ways. The first way is by directly editing the Top and Left fields:

- Step 1 Click on the Top field.
- Step 2 Enter 100. The Top field value is now 2, but this won't affect the Current Frame window until you're done editing the field.
- Step 3 Tab to the Left field.
- Step 4 Enter 100. The Left field value is now 2, but this won't affect the Current Frame window until you're done editing the field.
- Step 5 Click in the File field. Your highlighting moves from the Left field to the File field, and you can now see that the picture, as seen in the Current Frame window, is no longer at (0,0), but has now moved to (100,100).
- Step 6 Click the Current Frame window to see what has happened.

Note that the Current Frame window will not update if Caps Lock is down.

Editing the picture position via the Current Frame window is the second way to change the Top and Left field settings. But before we can do this, we need to add a new layer so that the examples below will be complete.

- Step 1 Click on the Exposure sheet window's drag bar to bring it forward.
- Step 2 Center-click in Frame field of Frame Number 1. This will open another layer in frame 1, before the other layer. The layer that appears first is the layer in back, and the layer that appears second is the layer in front.
- Step 3 Center-click in the File field of the first layer of Frame Number 1. This will bring up the Open dialog.

Step 4 Click on the Blue skier file name. This will place “Blue skier” into the Exposure sheet. You will also note that the Blue skier picture appears in the Current Frame window.

Now we have this example's requisite layers. The following shows position editing using the Current frame window.

Step 5 Click on the Current frame window's drag bar. This brings the Current Frame window foreword. Note that Red skier (the topmost layer, layer 2) is already selected in the control portion of the Current Frame window.

Step 6 Mouse down on the red skier. Move the mouse. The red skier will follow the mouse, because you are dragging the red skier picture around. Notice that on the Exposure sheet, two lines have become selected. This is because you are modifying Frame 1, which appears on the Exposure sheet as two lines. In this step, you are moving the front-most layer. The default is that the front-most layer is the one moved.

Step 7 Now, let's move the blue skier. Click on the 1 in the control portion of the Current Frame window. It will highlight, and the 2 will cease to be highlighted. This means that layer 1 in the frame is selected for modification.

Step 8 Mouse down and drag the blue skier.

Step 9 Now, let's move them both. Hold down Shift and click on the 2 in the control portion of the window. Layer 2 will highlight, without deselecting layer 1.

Step 10 Mouse down and move both layers.

So far, in these examples, all of the coordinates have been entered in pixels. For instance, 100 means 100 pixels. Anywhere distances are entered, you can enter other forms: xxx is a number of pixels. xxxpt is a number of points. xxxpi is a number of picas. xxxmm is a number of millimeters. xxxcm is a number of centimeters. xxxm is a number of meters. xxx" is a number of inches. xxx' is a number of feet.

Note that positions of items in the frames can be affected by the FRAME and # notes commands, which affect the position of the virtual camera.

Hold Field

1

This field contains the number of frame times you wish to display or shoot each frame, for normal frames (or an asterisk for frames which contain a link to another Exposure sheet). For example, if your framing rate is 24 frames per second, and you wish your frame to be shown for one second, then you want the frame shot 24 times. Entering a hold time of 24 would give you this one-second time. You may enter feet and frames. For instance, 1'8 is 1 foot, 8 frames, or 24 frames.

0

A Hold field value of zero means that the line is just a layer in a frame, and not itself the end of a frame.

Step 1 Click on the Hold field.

Step 2 Enter the number 15, for example.

Merge/Split

You can change the end-of-frame to be just part of a larger frame by changing its Hold field value to zero, and you can change a layer at the end of a frame, breaking a frame into two frames, by changing a Hold field value from zero to another value.

Display

Hold field values of zero are not shown. Other values are shown in black.

*

If a Hold field contains an asterisk (indicating a link to another Exposure sheet), you may not edit the field. When the corresponding File field is cleared or changed, this field may again become editable.

Magnification Field

You can magnify or reduce the size of each of your layer pictures by changing the setting in the Mag field. The numbers in this field indicate percentage of magnification. If the V.Mag field is 0, then the Mag field determines the actual magnification. If the V.Mag field is nonzero, then the Mag field determines horizontal magnification only.

- Step 1 Click in the Mag field.
- Step 2 Enter 200 to change the magnification to 200% of drawn size.
- Step 3 Click on the Current Frame window's drag bar.

Notice that the layer's picture is now twice as big as before.

Magnification values of 100 are not shown, as that is the default value.

Vertical Magnification Field

Using this field, you can change the aspect ratio of an item shown as a layer, or “squash” and “stretch” a piece of art. This allows you to make an object thinner or fatter, taller or shorter.

When the Vertical Magnification, or “V.Mag.” field is zero, the Magnification, or “Mag.” field controls both the vertical and horizontal magnification. When the Vertical Magnification field is nonzero, the Magnification field controls horizontal magnification, and Vertical Magnification shows the vertical magnification. Thus, the following shows an object at normal size:

Frame Label	File	Top	Left	Hold	Mag.	V.Mag	%R	+	Mod	Notes
1	Exterior BG D			1						

The following also shows the object at normal size:

Frame Label	File	Top	Left	Hold	Mag.	V.Mag	%R	+	Mod	Notes
1	Exterior BG D			1		100				

The following shows an object twice as tall, and three times as wide as it would normally appear:

Frame Label	File	Top	Left	Hold	Mag.	V.Mag	%R	+	Mod	Notes
1	Exterior BG D			1	200	300				

Magnification always occurs around the layer's registration point. This means that when the object is resized, the registration point will not move.

Note: If you want a cell layer to go from a normal aspect ratio to a 50% squash during a Pan move, you can't use a magnification of 100% and vertical magnifications of 0 and 50, because this will expand improperly to 0% (which will act as 100%), 25%, and 50%. You have to use vertical magnifications of 100% and 50%, which will expand properly to 100%, 75%, and 50%.

Rotation Field

Using this field, you can rotate a piece of art. Specify the degrees of clockwise rotation as a positive number, or use a negative number for counterclockwise rotation. Rotation always occurs around the layer's registration point.

Note: Because of the nature of computed rotation, drawing of layers using rotation will take a long time. This is because we take the time to handle layers with pieces which sometimes extend off the end of the screen, have registration points, antialias, use sub-pixel computations, and a host of other good-looking, time-consuming operations. During the computational period, files are generated to hold the rotational pictures. If the original file is named XYZ, for instance, the new files will be named XYZ:001 through XYZ:359. These files are never deleted by The Animation Stand directly. If you want these files deleted or recomputed, you must delete them through the shell.

For example, to show a ball rolling down a hill, top left to bottom right, taking 10 rotations in 120 frames, do the following:

- Step 1 Create an empty frame of two layers.
- Step 2 Load a background into the first of the layers.
- Step 3 Load a foreground layer of a ball. Later in this example, we'll assume the file is named Ball.
- Step 4 Move the ball to the upper left corner of the background.
- Step 5 Copy frame 1 over the end of frame marker to become frame 2.
- Step 6 Move the ball to the lower right corner of the background.
- Step 7 Set the •R field to 3600, signifying 3600° of rotation, or 10 complete revolutions.
- Step 8 Insert a 118 frame Move marker between the two frames.

- Step 9 Bring the Current Frame window forward.
- Step 10 Invoke Play or Record from the Animate menu, using ALT-J. Frame 1 will show very quickly, since no rotation need be computed. Frames 2 through 11 will each take some time to come up, while Ball:030 through Ball:330 are generated. Frames 12 through 120 will also come up very quickly, as they will be using files which will already exist.
- Step 11 Invoke Play or Record again. This time, all the frames will come up quickly, since all the required files have been generated.

+ and Mod fields

The + and Mod fields provide a powerful method to insert cycles and sequences of animation with variable timing.

Using a series of Picture files

Let's assume that we wanted to have a series of frames, in which art named B1 through B30 appeared, and that we have 30 files named B1 through B30 all stored in a folder together. If we want to insert these files as 30 frames into the exposure sheet, there are several ways to do it. Some of the ways have already been discussed in the topic "Loading Multiple Files". A faster technique for this type of work, however, is to use the + field to define offsets.

The concept here is that we can think of files B1 through B30 as B1+0 through B1+29. We can enter these offset values into the exposure sheet in the plus field. Thus, to insert the use of B1 through B30 into the exposure sheet, using BG as a background, we would do the following (assuming an empty exposure sheet):

- Step 1 Create a frame containing two empty layers. (center-click on the 1 in the frame field, creating a new frame. center-click on the new 1 in the frame field, creating a second layer.)
- Step 2 Edit the first File field so that it references BG. (center-click on the first File field. Use the Open dialog to select BG.)
- Step 3 Edit the second File field so that it references B1. (center-click on the second File field. Use the Open dialog to select B1.) At this point, we have one complete frame.

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- Step 4 Using the Copy and Paste before functions, duplicate this frame. (In the Frame field, drag out both layers of the frame. Use ALT-C to copy, and ALT-] to paste in a new copy.) At this point, we have two identical frames.
- Step 5 In the second layer of the second frame, change the + field to 29. (Click in the field. Type 29.) At this point, we are specifying two frames, one using BG and B1, and one using BG and B30.
- Step 6 Insert an interpolation marker calling for the remaining 28 frames. (Click on the right-facing arrow in the Status window, which brings up the animated toolbox. Drag the interpolation tool [first one on the second column] to the first layer of the second frame. Tell the dialog that you want 0 frames of slow in, 29 frames of constant motion, and 0 frames of slow out. Click on OK.) At this point, you have an interpolation set calling for the 30 frames.

Using a variable-timing picture file set

Sometimes, you will want to use a picture files set with variable timing, or missing file numbers. Normally, this will occur when an animator or tweener gives you a series of drawings. Often, the pictures will be numbered something like B1, B3, B4, B7, etc. This means that B2, B5, B6, etc. are missing. The sequence that the animator means you to show (or shoot) is B1, B1, B3, B4, B4, B4, B7, etc. Thus, you could enter this as B1 with a Hold of 2, B3, B4 with a Hold of 3, etc. Using the + field, you could just enter B1, with + values ranging from 0 to 6. When The Animation Stand looks for a missing item, such as B2 (when you specify B1+1), it will fall back and use B1. This can greatly increase the speed of building an exposure sheet.

Inserting a cycle

You can use the + and Mod fields in combination to insert multiple cycles of a move. Mod stands for modulus, and is used to define the number of cels in a cycle. For instance, if you wanted to insert 3 cycles of a 6 frame cycle, you want to insert 18 frames total, so the + values will range from 0 to 17. Thus, frame 1 would have ART1 +0 Mod 6, through ART1 +17 Mod 6. In this example, you are using the files ART1, ART2, ART3, ART4, ART5, ART6, ART1, ART2, ...

Notes Field

The Notes field is just a free format field where you can write notes to yourself about your film, or place special optical press instructions. Optical press instructions must be a single word in all upper case. Words in upper and lower case, or all lower case are ignored by The Animation Stand. To use this field, just click in it and type whatever you like.

Note: The Notes field will activate your commands only when they are entered in upper case. Otherwise, it will act mostly like the Label field — in which you store notes regarding sound.

Exposure sheet: Iconic Format

The iconic format of the Exposure sheet has two components. At the top of the Exposure sheet is a single spreadsheet format line. Following this line, are the iconic lines defining the frames:

Frame	Label	File	Top	Left	Hold	Mag.	V. Mag	R	+	Mod	Notes
		files									WHITE
		Files									
1											WHITE
2											WHITE
3											WHITE
4											THE END

Thus, this format is a superset of the Exposure sheet's spreadsheet format, and you should read the preceding articles on the spreadsheet format.

In this section of the manual, we will deal only with the differences of the two Exposure sheet formats.

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The Exposure sheet can appear in three forms. In the initial, default form (spreadsheet format), frames are displayed top to bottom, and within the frames, cel layers are displayed top to bottom. In the other formats, frames are still listed top to bottom, but layers within the frames are listed left to right. In the third format, words are used instead of icons for file names, but the format is otherwise the same as the iconic format.

To switch between the formats, click in the header bar at the top of the window: (Not shown here, there is the third format.)



Frames consist of one or more layers, in a single line.

The following descriptions involve only changes to the meaning and usages of fields between the iconic format and the spreadsheet format.

The Frame Field

If you click on the Frame field, the entire frame displayed on that line is selected. If you release the mouse, your simple selection is made. If you drag on this field, either upwards or downwards, the selection is extended to cover multiple frames.

If you hold down Shift while clicking, and there was another frame or frames selected, then the previously selected frames remain selected, the newly clicked frame becomes selected, and all of the intermediate frames are also selected.

Inserting Lines

If you center-click the Frame field, a new frame line will be inserted before the line on which you clicked. The Hold field will be 1.

Deleting Lines

At some point, you may have a frame in your film that you don't want. Deleting a frame is very easy:

- Step 1 Using the Frame field, highlight the frames to be deleted.
- Step 2 Press Backspace on your keyboard, or select Clear from the Edit menu. Notice that the frames are gone, and that remaining frames are renumbered.

Adding a Layer to the End of a Frame

No special technique is required.

Special Effects Lines

There is a set of lines which each represent one or more frames of special effects or other actions. These lines have no editable fields; otherwise, they act much like any other line. The special effects lines are displayed as icons. Movement icons are:



Move



Pantograph



Spline

These icons may be followed by modifiers, indicating changes occurring in the following:



Position



Cycling



V.Mag



Mag



°R

Label Field

No changes.

The File Field

In this Exposure sheet format, there is one File field per layer, listed left to right. The leftmost File field controls the background, and subsequent picture fields are loaded over it. Thus, the rightmost picture field of this format is equivalent to the last listed File field of the spreadsheet format.

In the File field, a picture of the file in use is displayed, rather than its name. If there is something unusual about the layer, such as magnification other than 100%, a note, or a hold field value higher than 1, the picture is displayed with a red border.

Click in a picture field to select that layer. Center-click in a picture field to edit it, using an Open dialog. When a layer is selected, the data for that layer is displayed at the top of the window in the single spreadsheet line. Data in that line is editable.

If you Cut, Copy, Clear, or Delete a File field in the iconic format, you are dealing with an entire layer, rather than just the picture name.

Once you click on the File field, the 0, -, and + (or =) keys get special meanings: 0 copies the marked file name down to the same position in the next line. - and + do the same thing, except that the previous or next file name in the sequence (respectively) is used. This allows you to rapidly set up exposure sheets.

All other fields are not displayed in this format.

Animation tools

The animated tools palette allows use of several types of functions, each of which modifies the Exposure sheet in some way. These tools apply to both the spreadsheet format and the iconic format of the Exposure sheet. When examples are shown below, they are shown in spreadsheet interface, or in the iconic interface. These depictions are for example only, and each function shown works in both formats, unless otherwise specified.

To use the animated tools, follow these simple steps:

Step 1 Click on the Animated tools pop-up button in the Status window:



Step 2 The Animated tool icons appear in the Status window. Drag an animated tool from the Animated tool palette onto a frame or layer of the Exposure sheet. The Exposure sheet will be immediately affected. Normally, only the layer you release the mouse over will be affected. However, if you use the center mouse button, all of the layers in the entire exposure sheet on that level will be affected.



Shoot frame: Drag this tool onto a layer. It will change the layer's zero Hold time to a Hold time of 1. If the layer had a positive Hold time, then the layer is unaffected.



Insert empty layer: Drag this tool onto a layer. It will insert an empty layer into the Exposure sheet before the existing layer.



Insert empty frame: Drag this tool onto a frame. It will insert an empty frame into the Exposure sheet before the existing layer.



Interpolations: Each of these tools will insert an interpolation set between two existing, similar frames.



Transitions: Each of these tools will insert an interpolation set between two existing frames.

Everything else: All of the other tools are quick ways to place Notes commands into the Exposure sheet and are further explained in the following pages.

Interpolations

Interpolations, or interpolation markers, are used to represent a smooth transition from one frame to another. In any interpolation, we always have a starting frame and an ending frame. The starting and ending frames are normal frames, but they are related to one another. They represent a sequence, with a start and an end. The starting and ending frames in an interpolated set must have the same number of layers, and in each layer, they must call out the same file names. The numeric values involved are expected to change over time. How these values change is determined by the type of interpolation marker used.



Move: Motion from each layer's start point to the end point is linear, but the speed may vary over time.



Pantograph: A pantograph is a drawing which shows how one or more layers will move. Use of pantographs in The Animation Stand allows you to insert one of these pantograph drawings as a Pantograph marker in your Exposure sheet. This function can be used to insert a Pantograph marker between two similar (as defined previously) frames, to edit an existing Pantograph marker, or to convert a Spline marker to a Pantograph marker.



Spline: A spline is a curve which shows how layers will move, using a minimum of points. Use of splines in The Animation Stand allows you to insert one of these curves as a Spline marker in your Exposure sheet. This function can be used to insert a Spline marker between two similar (as defined previously) frames, or to edit an existing Spline marker.

Move, Pantograph, and Spline must be from one similar frame to another, or surrounded by similar frames. This means the two frames differ only in the values of their numeric arguments.

For example, if you were to want to insert a 5 frame walk cycle, using 5 character files, with names Fawn01 through Fawn05, you could just enter frames 1 & 5, with a 3 frame Move set between them. Thus,

Untitled exposure sheet									
Frame	Label	File	Top	Left	Hold	Mag	V.Mag	R	+ Mod Notes
1		Fawn01			1				
2	Move 3 frames								
3		Fawn01			1			2	
4	End of film. Running time is 0:00:05 (30)								

and

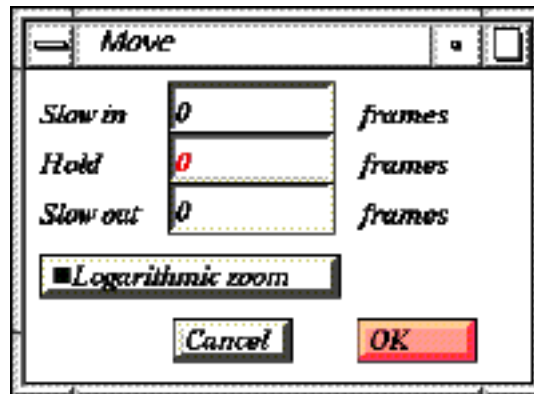
Frame Label	File	Top	Left	Hold	Mag.	V. Mag.	R	+	Mod/Notes
1	cfawnd1			1					
2	cfawnd2			1					
3	cfawnd3			1					
4	cfawnd4			1					
5	cfawnd5			1					
end of film. Running time is 00:05:30									

are equivalent.

Usage of each of these tools is similar — These tools perform various types of moves and numeric interpolations. All numeric fields, other than Hold, are affected. When an interpolation set is inserted between two frames, only one line of the Exposure Sheet is taken up by the interpolation marker to perform the move, no matter how many actual frames or layers are involved.

- Step 1 Create a frame using Mountain as a background, and Blue skier as a foreground.
- Step 2 Switch to the Current Frame window and position the two layers into a good starting position.
- Step 3 Switch back to the Exposure Sheet.
- Step 4 For the spreadsheet format exposure sheet, mouse down on the first layer in the first frame, drag down to mark the second layer, and release the mouse button. This selects both layers. For the iconic format of the exposure sheet, just click on the first frame, selecting it.
- Step 5 Press ALT-C to copy the frame into the clipboard.
- Step 6 Click on the End of Film marker's frame, to say that you're going to insert at the end of the film.
- Step 7 Press ALT-V to paste a second copy of this frame over the End of Film marker. The End of Film marker is indestructible, so there's no need to worry. If you were doing this work before other frames, you would most likely use Paste before from the Edit menu. At this point, a second copy of the frame appears.
- Step 8 Modify the positions of both layers of the second frame, either using the Exposure Sheet window or the Current Frame window.

- Step 9 Drag one of the interpolation tools (differentiated below) from the Animated tool palette onto the first layer of the second frame for spreadsheet format exposure sheets, or anywhere onto the second frame for iconic format exposure sheets. The following dialog appears for Move:



- Step 10 If this move is to be logarithmic, turn on the Logarithmic zoom checkbox. If a zoom is logarithmic, then the time to double an image size is constant. For instance, if we go from 100% to 25% in 10 frames, we'll go from 100% to 50% in 5 frames, and from 50% to 25% in 5 frames. With linear zooms, we would decrease (in this example) 7.5% each frame. Logarithmic zooms are more real-worldly.
- Step 11 Enter the number of frames involved in the slow-in (acceleration), the hold (constant speed motion), and the slow-out (deceleration). The sum of these three values forms the time of the move, including the ending frame, but not including the beginning frame. For instance, a Move with values of 10, 20, and 5 would involve a total of 36 frames: The initial frame, 10 accelerated frames, 20 constant frames, and 5 final frames, concluding with the frame following the Move on the exposure sheet. The Move marker will show 34 frames: The preceding frame + 34 frames + the following frame also = 36 frames.

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If you requested an effect other than Move, the dialog will be:



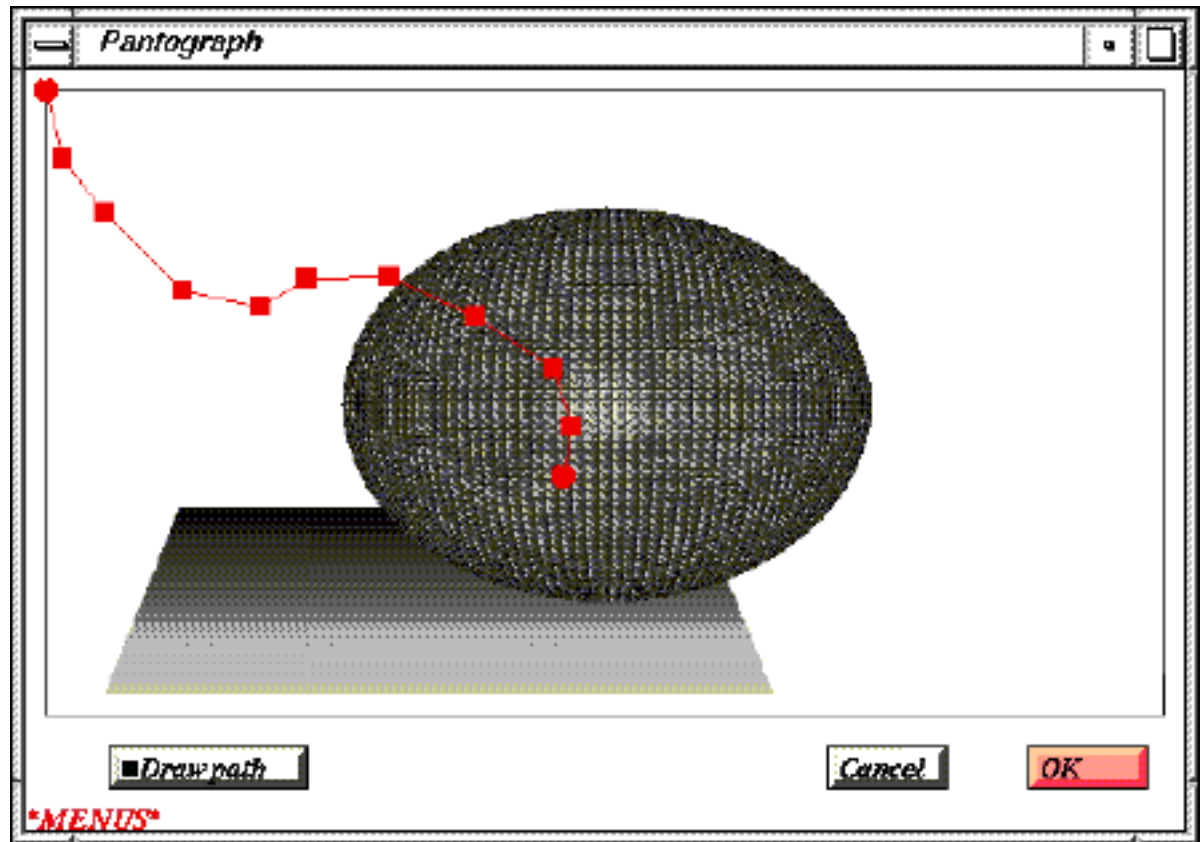
Enter some number of frames. The number you are entering is the number of intermediate (or “in between”) frames, not the total number of frames involved in the movement. Thus, if you enter 10, the first frame will be numbered 1, the interpolation marker will be numbered 2, and the last frame will be numbered 12.

Step 12 Click OK to insert the marker.

For Moves, you're done. For Pantographs and Splines, there's an edit to perform. But first, an explanation is due as to what each of the interpolation tools does.

Pantograph Edit

Once you have established the length of the Pantograph set, or when you are re-editing a Pantograph set, you are presented with the pantograph edit screen:



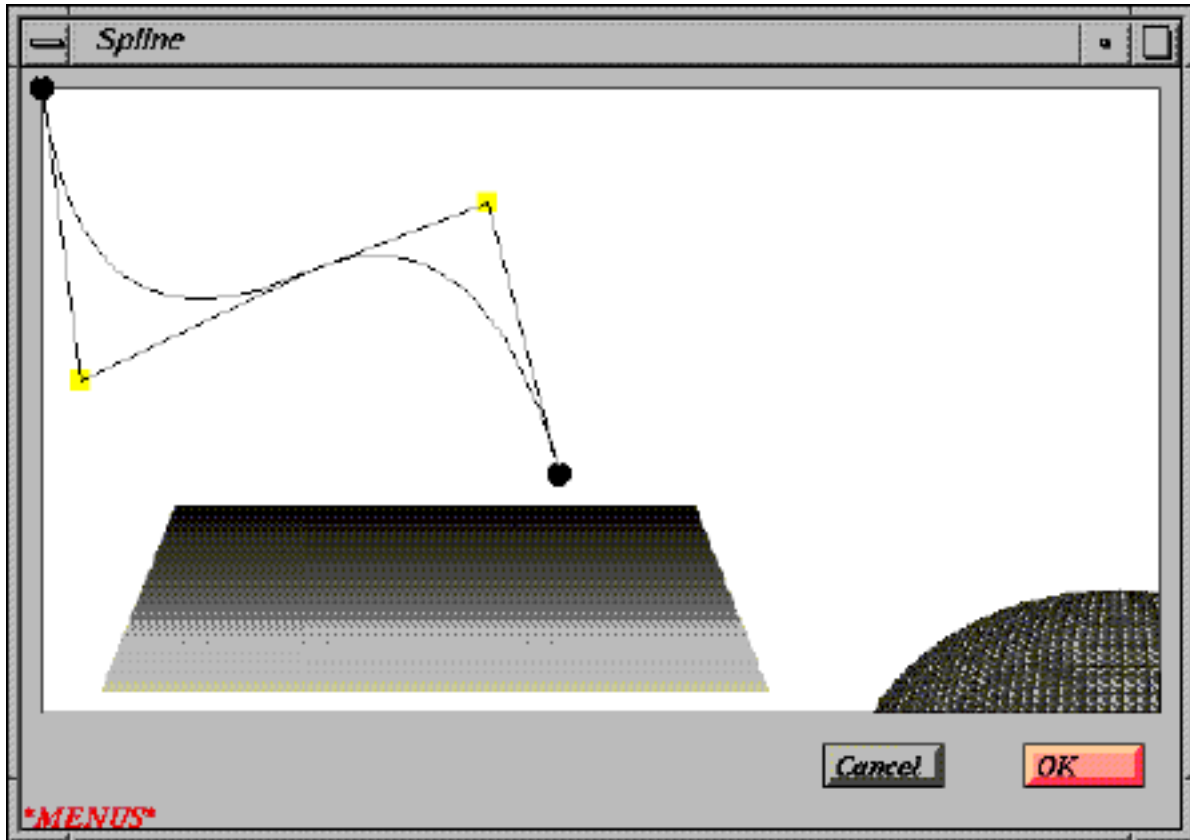
The circles represent points which can't be moved — the points in the frame before and after the Pantograph set. The squares represent the locations occupied by the layer's registration point for various frames (3 in this case). You may drag the “shoot squares” to any desired position.

If you select Drawn path, rather than drag a shoot position, you draw the motion of the layer.

There is also a Layer menu which allows you to choose which layer will be affected.

Spline Edit

Once you have established the length of the Spline set, or when you are re-editing a Spline set, you are presented with the spline edit screen:



The circles represent points which can't be moved — the points in the frame before and after the Spline set. The squares represent the curve's control points. You may create new control points and drag them to any desired location (using the Add point function), drag existing control points about (using the Move point function), or delete control points (using the Delete point menu function). All of these functions are available from the Function pop-up menu.

There is also a Layer menu which allows you to choose which layer will be affected.

Transitions

Each of the transition tools create a transition between two frame images. The transition takes a user-specified number of frames, not counting the controlling frames, before and/or after the transition marker.



Wipes transition between two images, by wiping one image (the “After” frame) over the other (the “Before” frame). Wipes are indicated by an icon which itself constantly wipes from “A” to “B”.



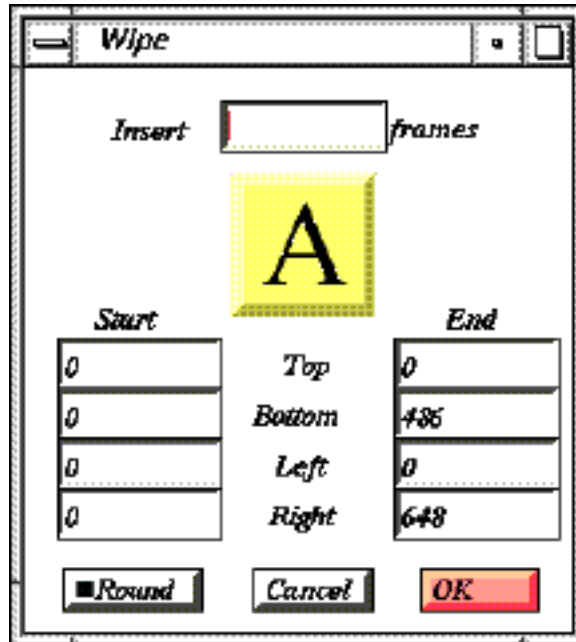
Fades transition between two images, by fading or dissolving from one to the other. Fades are indicated by an icon which itself constantly fades from “A” to “B”.

To use any of these tools, you drag the tool onto the Exposure sheet. For the spreadsheet Exposure sheet format, drag one of the wipe tools onto the first layer of the transition’s “After” frame. For the iconic format, drag onto the frame itself. Then, a dialog will appear asking how many frames are in the set. Answer with the number of intermediate frames, not counting the “Before” or “After” frame.

Wipes

When you drag the wipe tool onto a frame, you are creating a wipe between that frame and the previous frame. You need to establish the number of frames, the starting position, ending position, and shape. The result is actually a traveling matte, controlling the wipe.

The Wipe insertion dialog is as follows:



There are a number of displays and controls in this dialog.

The Insert frames field determines how many frames of wipe will be inserted. Note that this does not count to 100% "A" (before) or 100% "B" (after) frames. You must fill in this field before you can OK the insertion.

The numeric fields, labeled in groups Start and End, with fields Top, Bottom, Left, & Right serve to control the position of the wipe. For rectangular wipes, these eight positions define the coordinates of the wipe at the start and end of its cycle. By default (default values shown here), the wipe starts in the upper left corner (all zeroes), and progresses to fill the entire screen. You can enter any control values you like here. For round wipes, these values define the boundaries of an oval.

The "A/B" box, shown in the figure as "B" in a shaded box, starts off showing "A" (signifying the original image), and wipes to "B". The format of the wipe shows what the result will look like on the screen. Each time you make a change to the parameters, this A/B wipe sample will change to show you the current wipe. Clicking in the A/B box establishes a wipe from the indicated point.

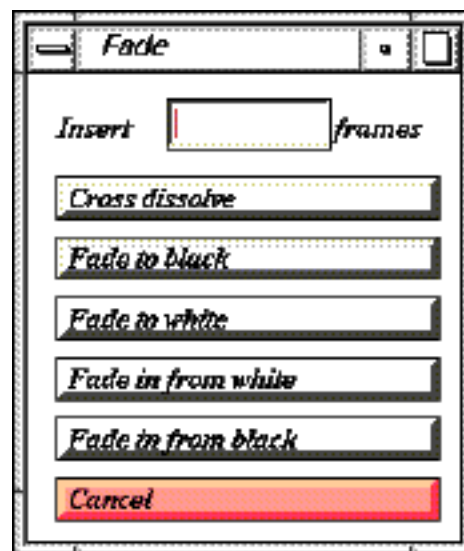
Clicking on Round changes to round wipes or back to square wipes.

OK and Cancel have the usual meanings. Once the insertion is OK'd, a traveling matte set is built. Traveling mattes can be used at any resolution, and can take advantage of sub-pixel movement and sub-pixel antialiasing. Wipe sets always use a pseudo-file, named "*Rectangle" or "*Oval". These markers draw a black rectangle or oval at the coordinates specified by the Top, Left, Mag (right), and V.Mag (bottom) fields.

Fades

When you drag the Fade tool onto a frame, you are creating a Fade. This fade may be between two existing frames (the one before your fade marker, and the one you dropped the fade tool on), fading out from a frame (from the frame before the marker), or fading into a frame (the one you dropped the tool onto).

The Fade insertion dialog is as follows:



The Insert frames field determines how many frames of wipe will be inserted.

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Cross dissolve will insert a fade set which fades from the preceding frame to the frame you dropped the fade tool onto.

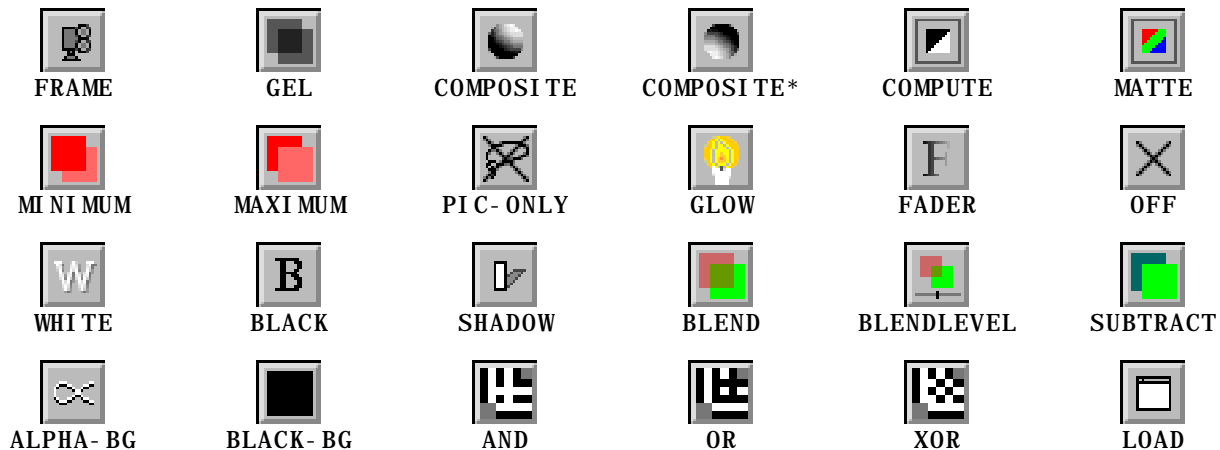
Fade to black and Fade to white will each insert a fade set, fading from the previous frame to the indicated color, without affecting the frame you drop the tool onto.

Fade in from white and Fade in from black both insert a fade set, leaving the previous frame untouched, while affecting the frame the tool was dropped onto.

Notes

Each of the remaining items on the Animated tools palette is a shortcut for a Notes command. To put the note into a layer, drag the icon from the tool palette onto a layer.

The equivalencies are as follow:



Each of these notes command is explained fully, along with all of the other Notes commands, in the Optical Press section.

Current Frame window

The Current Frame window is open whenever an Exposure sheet is open. This window always shows the currently selected frame. If more than one frame is selected, then the Current Frame window displays the first selected frame. When an Exposure sheet is played (not full-screen), it is played into the Current Frame window.

The Current Frame window tracks changes in the Exposure sheet, and in the art. If you change the Exposure sheet, you see the changes reflected immediately in the Current Frame window. Also, if you change art which appears in the Current Frame window, using any program on any machine, you will see the changes immediately reflected in the Current Frame window. You can prevent the Current Frame window from updating to match the Exposure sheet and new art by depressing Caps Lock. While Caps Lock is down, no updating will occur. When Caps Lock is lifted, the Current Frame window will catch up to the current state.

Conversely, the Exposure sheet tracks the Current Frame window. If a change is made to the Current Frame window, then the Exposure sheet changes to match. Changes to the contents of the Current Frame window are made using the window's control bar (just under the Title bar), the drawn area, and the Current Frame tools.

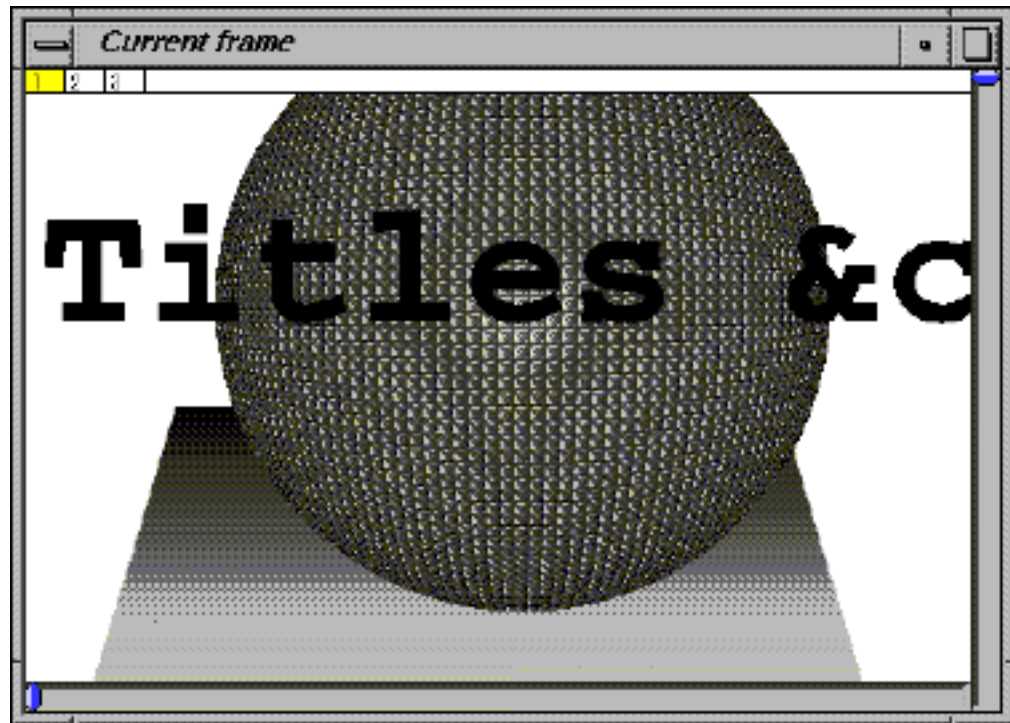
Content Area

The content area of the Current Frame window is the large area where the picture appears. Here, you see the currently selected frame of the Exposure sheet. You can drag the selected layer(s) around (using the default Move tool), by mousing down on the selected layer(s), and moving it.

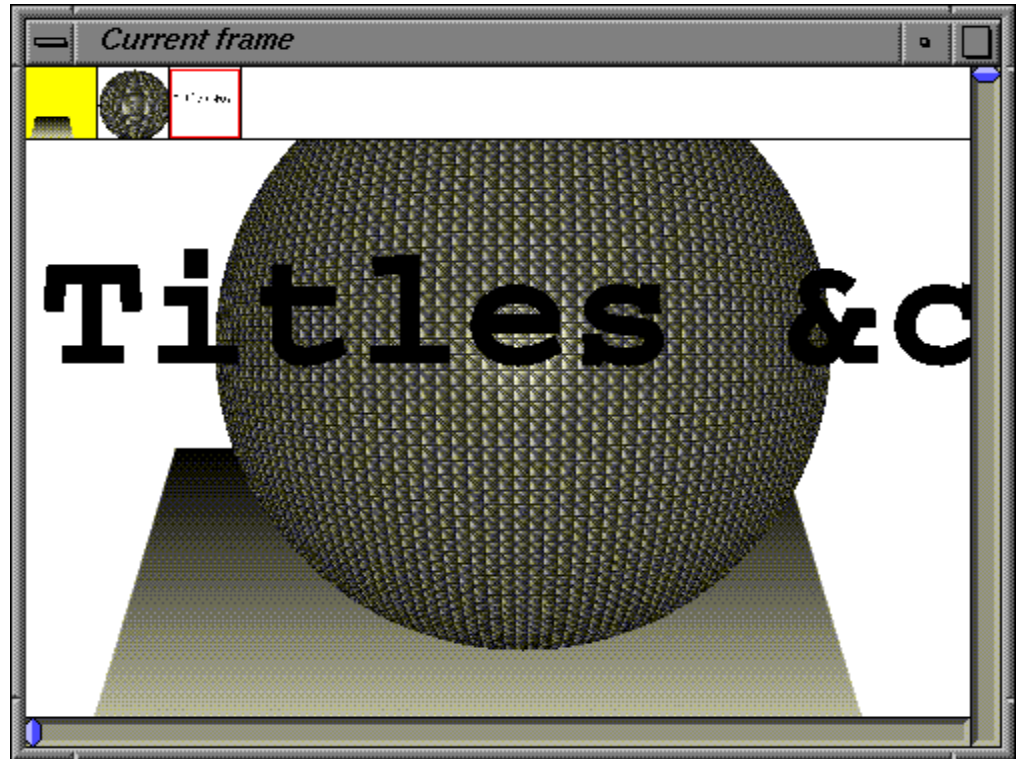
When you drag an image around, you will see a red image tracking the movement of the mouse. When you release the mouse, the frame is redrawn.

Control Area

The control bar is located at the top of the Current Frame window. It controls which layers are to be affected by any action. Layers which are not highlighted (shown with a white background) are not affected. Layers highlighted in yellow are affected in the current frame only. Layers highlighted in red are affected in all selected frames of the exposure sheet. (This is sometimes called hierarchical editing.) For the spreadsheet format of the exposure sheet, the layers are displayed numerically:



For the other formats, the layers are displayed as they are in the exposure sheet:

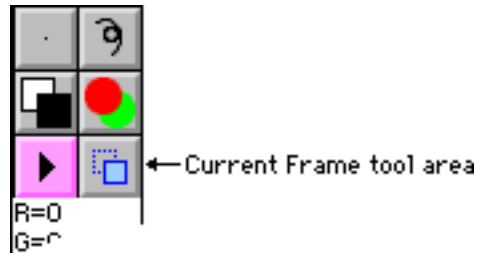


To highlight a layer, click on its number or icon. All the other layers will lose their highlights. To select additional layers concurrently, hold Shift and click on additional layers. You can also use the number keys to highlight layers 1 through 9. If you click on a white (unhighlighted) item, it turns yellow (highlighted). If you click on a yellow item, it turns red. If you click on a red item, it turns white again.

Tools

By default, mouse actions in the content area of the Current Frame window move images. By selecting other Current Frame tools, you can perform other actions in the current frame window.

First, you'll need to get the Current Frame tool palette. Click the Current Frame tool area on the Status window:



Click on the Current Frame tool area. The Current Frame tool palette appears in the Status window. To pick a tool, click it. The Status window will reflect this tool pick.



Move: This tool allows you to move the selected layer(s) in the frame. Choose this tool, choose your layer(s), and then mouse down and drag in the content area of the Current Frame. With this tool, as with all others, the frame will redraw as soon as you mouse up.



Copy: This tool is the same as the Move tool, except that the layer(s) are moved and copied.



Stretch: This tool modifies the Vertical Magnification field. Mouse down in the content area, and drag to reshape the layer(s).



Resize: This tool modifies the Magnification field. Mouse down in the content area, and drag to resize the layer(s).



Rotate: This tool modifies the Rotation field. Mouse down in the content area, and drag to rotate the layer(s).



Send back and Send forward. Each of these tools immediately affects the last selected layer, sending it forward or backwards in the layer stacking.



Add layer: This tool immediately adds an empty layer before the last selected layer.



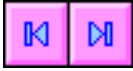
Remove layer: This tool immediately removes all selected layers.



Rewind: This tool immediately changes your selected frame. The first frame in the Exposure sheet will be selected.



Fast forward: This tool immediately changes the frame selected. The End of film marker at the end of the Exposure sheet is selected, and the Current Frame window will become blank.



Step back and Step forward. These tools immediately affect the frame selected. Either the frame before or the frame after the current frame will be selected, and the Current Frame window will update to show that frame.



Play: This tool immediately plays the film into the Current Frame window.



Recolor: This tool adds a RECOLOR note at the end of the frame. When the frame is drawn, all pixels the color of the clicked-on area are recolored to the current draw color (as of the time of the tool click). This tool can be used to change palettes on a set of documents. For instance, you design a scene, and show it to the customer. The customer tells you that he wants all the blue changed to green, and all the orange changed to red. Select the Recolor tool. Select green (the first change-to color). Click on a blue area in the frame. A RECOLOR note (which changes blue to green) is added to the end of the frame. Select red and click on orange to make the second change. You may Cut, Copy, and Paste the RECOLOR layers just like any other layer.



Apply shadow: This tool acts immediately to apply a shadow to the selected layer(s). It does this by duplicating the last layer, moving the new copy 10 pixels down and to the right, and then adding the SHADOW notes command to it. See the description of the SHADOW notes command in the Optical Press section for a more detailed description.

General Topics



This chapter defines a number of general topics, special techniques, and trade-offs, all too general to discuss in any less-broadly defined chapter.

High Resolution Painting & Scanning

There are basically two ways to get a high resolution look. One is called sub-pixel antialiasing. Using the sub-pixel method, you can scan in a 1-bit mode without having to worry about any sort of edge effects, and then composite. Using the line weight method, you scan in 8 bits. Using this technique, there are fewer pixels to deal with, but you have to correct for unwanted edge effects if you make a mistake. We suggest that you try both of these schemes on two or three frames, and see which you like best.

Sub-pixel antialiasing

You can get a very good look from scanned line-work by following these steps:

- Step 1 Handle your backgrounds as you normally would.
- Step 2 Scan your line work as 1-bit black-and-white, at the twice the largest size it will be needed. For instance, if the art is to be shown at up to 100% magnification, scan it at 72 DPI x 2 = 144 DPI. If it will be shown at 400% magnification, scan it at 72 DPI x 4 x 2 = 576 DPI. This should not be a problem, as most scanners go easily to 600 DPI.
- Step 3 Paint your cel.
- Step 4 Use Next Cel from the File menu ( ) to get to the next cel, even if this is the last cel in the set. That will save the document with white transparency.
- Step 5 Build your exposure sheet. Set each layer painted at double size to 50% magnification.

Scan-based antialiasing

You can get approximately the same look from scanned line-work by following these steps:

- Step 1 Handle your backgrounds as you normally would.
- Step 2 Scan your line work as 8-bit gray-level, at the largest size it will be needed. For instance, if the art is to be shown at up to 100% magnification, scan it at 72 DPI. If it will be shown at 400% magnification, scan it at 288 DPI.
- Step 3 Set up the paintbuckets to expand by 1 pixel: Center-click the paintbucket tool, enter **1**, and press **Return**.
- Step 4 Select the Minimum (red over pink) or Gel (gray over gray) mode.
- Step 5 Paint your cel.
- Step 6 Select the Alpha invert tool (the last paint bucket, showing a black and white background).
- Step 7 Paint each background area black using this tool. An alpha mask channel is built.
- Step 8 Save the file and go on to the next.
- Step 9 Build your exposure sheet. To composite one layer onto another, use the COMPOSITE command in the Notes field.

Determining scan DPI

Normally, you will draw your cel outlines outside the system on Acme-peg-punched paper, and then scan the art in, using a scanner with Acme pegs glued to it. You may have to drill holes in the scanner cover to accommodate the pegs. If all else fails, you can get the pegs and the paper from Cartoon Colour, 310-838-8467, 9024 Lindblade St, Culver City, California 90232.

Here are the formulas:

Let S be the Scan DPI

Let W be the image width (for instance, 640 for TV)

Let B be the field basis (for instance, 12 fields)

Let F be the tightest field (for instance, 6 fields)

Let D be the drawing width, in inches

$$S = (W \times B) / (D \times F)$$

For instance, let's say we have a screen width of 640, a 12-field basis, a 6-field shot, and a set of 10" drawings...

$$S = (640 \text{ dots} \times 12 \text{ fields}) / (10 \times 6 \text{ fields}),$$

Thus,

$$S = 256 \text{ dots/inch}$$

Character shading

There are a number of ways to shade a character. Some of the techniques involve doing all the shading in the cel layers, others do all the shading at the optical effects stage, and some divide up the work. Here is a sampling of the methods:

3D: The use of 3D shading involves The Animation Stand's shading heuristics to determine what an object looks like, and to apply the shading. Fortunately, you need not do any 3D design.

Step 1: Draw your cel without shading.

Step 2: Use any combination of selection tools to get the area to be shaded selected. There are separate sections on each selection tool in the Paint chapter.

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- Step 3: Use the lighting edit of the sphere tool (also in the Paint chapter) to set up your lighting. Note that the angles of light appear in the Status window, and can help you vary the lighting frame to frame.
- Step 4: Use the Extrude/Relight tool (last 3D tool, explained in the Paint chapter) to relight the object. If the object does not look right, adjust items in steps 2 and 3, and try again.
- Step 5: Repeat this process for each shading area.
- Step 6: Deselect everything (by clicking the simple draw tool) or select whatever you need to select, and so a Save or Save area, as appropriate. No action need be taken in the exposure sheet.

Circular wash: The circular wash modes allow you to paint two colors at once with a selectable highlight direction. For instance, let's say that you want to paint something orange, with a highlight and shadow. One way to do this might be...

- Step 1: Select dark orange or brown as a background color, to represent shadowed orange.
- Step 2: Select yellow or a similar color to represent highlighted orange.
- Step 3: Go to the Preferences dialog and set the Wash to menu to Background color, so that both of these colors selected will be used in a single paint operation.
- Step 4: Edit the circular wash mode to select the fall-off pattern you want. In special circumstances, you might use the user-defined wash mode.
- Step 5: Paint your cels. No special action will be required in the exposure sheet.

GEL and GLOW: This is a conventional animation technique in which the line drawing is annotated using color to show how the character will be shaded. The glow and shadow layers are constructed as separate cel layers.

- Step 1: Scan the colored-line drawing.
- Step 2: Using the Finder, make a duplicate of the scans.
- Step 3: Open the scan.
- Step 4: Use the eraser to erase the non-character lines (the highlight and shadow note lines)
- Step 5: Paint the image the usual way.

- Step 6: Save the cel.
- Step 7: Do the rest of the cel art this way.
- Step 8: Open the first scan again.
- Step 9: Use New cel from the File menu to create a new cel which will be the gel layer.
- Step 10: Set the scan up as a light table image.
- Step 11: Draw a gel, using shades of gray (usually) to control the shading. White means No effect, Black means Black, and shades of gray will darken the art. The limits of the grays and black must conform exactly to the outline of the character.
- Step 12: Save that
- Step 13: Repeat steps 9 through 12 to create a glow layer. The glow layer will be different in that black represents No change, white represents White, and shades of gray (or sometimes yellows or other colors) will represent varying amounts of light to be added to the art. Again, the extent of the glow mask must conform to the edge of the character.
- Step 14: Repeat steps 8 through 13 for the rest of the art.
- Step 15: Build the exposure sheet. The gel and glow layers must follow the character art, and bear either the Note GEL or GLOW. For a diffuse backlight effect, you may replace the use of GEL with BACKLIGHT. In this case, you may also be using the PIXLEVEL Notes command.

OVER-GEL and OVER-GLOW: These functions are much like GEL and GLOW above, with the following exceptions:

- Change 1: Rather than saving any way you want, use Save area.
- Change 2: You need not conform the shape of the masks to the shape of the character. The masks may extend past the edge of the character, allowing you to slop on colors much more quickly. However, the masks may not fall short of the edge of the character.
- Change 3: Rather than using GEL and GLOW, use OVER-GEL and OVER-GLOW.

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Self-colored line: Self-colored lines are easy:

Method 1: Use the Line coloring tool to paint the line the right color, and then paint as normal.

Method 2: Set the paintbucket to expand by 1 pixel (or your line width), and paint.

Self-colored line with blur or smudge: This gives a smoother transition.

Step 1: As before, you do a self-colored line cel.

Step 2: Select the line and the area around the line, using the Lasso tool.

Step 3: Set the Blur tool to blur by an appropriate number of pixels.



Step 4: Blur the line using the Blur tool. Alternatively, you can use other blur and/or smudge. tools.

Airbrush with frisket: This allows you to smooth shade a character in an artistic manner seldom used in films. Note that using this method, the shading will jitter around as if drawn by hand.

Step 1: Paint the cel as normal.

Step 2: Use the Paint with Protection bucket to protect areas which are not to be airbrushed.

Step 3: Set up and use the airbrush.

Step 4: Deselect the airbrush using   if you need to do other painting.

Flow of Work

Before you read this section, you should have already read the chapter describing the steps in animation. This section defines the major steps used in The Animation Stand in actual production.

For productions involving one person:

Step 1: Write the script.

Step 2: Do all the sound recording.

Step 3: Find out at what time the sounds in the soundtrack occur.

- Step 4: Do the key and line art.
- Step 5: Scan in the line art.
- Step 6: Do the background art (scanning if required).
- Step 7: Create an exposure sheet using the line art and backgrounds.
- Step 8: Do a pencil test on-line and repeat steps 4, 5, and 7 as required.
- Step 9: Color the cels
- Step 10: Annotate the exposure sheet for special effects
- Step 11: View a color test on-line, and repeat steps 9 & 10 as required.
- Step 12: Commit to tape or film (unattended).

For productions involving one person:

- Step 1: Write the script. One group proceeds to step 2A while other groups proceeds to steps 2B and 2C.
- Step 2A: Do all the sound recording. This group proceeds to step 3A.
- Step 2B: Do the key and line art. This group proceeds to step 3B.
- Step 2C: Do the background art (scanning if required). Proceed to step 4A.
- Step 3A: Find out at what time the sounds in the soundtrack occur. Proceed to step 4A.
- Step 3B: Scan in the line art. Proceed to steps 4A and 4B.
- Step 4A: When steps 2C, 3A, and 3B are complete, create an exposure sheet using the line art and backgrounds. Proceed to steps 5A and 5B.
- Step 4B: Color the cels. Proceed to steps 5A and/or 6.
- Step 5A: Do a pencil test on-line.
- Step 5B: Annotate the exposure sheet for special effects
- Step 6: View a color test on-line.
- Step 7: Commit to tape or film (unattended). The crew is free to start on the next episode.

Focus Effects

There are varying levels of layering you can use to provide the effect of three dimensions.

Without careful layering, your 2D animation will seem flat. This is fine for most purposes.

If foreground layers are larger and move at a differing rate (more X/Y distance during moves), you get some feeling of 3D.

If the main character action is in focus, and the action and static objects in front of the characters and behind are out of focus, lens effects are emulated, and attention is drawn away from layers out of focus, and onto layers which are in focus. If there is a single background layer which is to be blurred by a certain amount, it is best to blur the background in the paint stage, using the Blur tool. If the background is to be composited with other items before defocusing, or if the defocus level on the background changes, it is best to blur the items during the compositing stage. After all background layers are called out in the frame, call out an additional layer in the exposure sheet, with nothing in the File field, but with BOTH in the Notes field. The Mag field should contain a blur factor, usually between 1 and 8. This will have the effect of blurring everything composited to this point. Next, composite the character action layers. If you do nothing special to them, they will be in focus. Foreground layers which will be out of focus should have RACK in the Notes field. The RACK command uses blurring levels passed to it by the Mag field of layers containing PIXLEVEL in the Notes field.

To add extra depth, you can blur multiple times at differing blur levels, and bring in multiple rack focus layers at differing rack focus amounts.

To add even more depth (with even more work), you can move and zoom at the same time, giving the effect of zooming into the frame. This will be especially true if you use the Logarithmic zoom setting of the Move dialog. To emulate long focal lengths, have the BLUR's Mag field and the PIXLEVEL's Mag field vary during the move.

You can shift focus (in both senses of the word) from one character action level to another while bringing one layer into focus at the expense of another layer's focus. To do this, have the Mag fields described above shift values during a Move operation in which only these values are changing. This effect should last between 1 and 3 seconds, and should not be used more than twice in an episode, or it loses its excitement and starts to look odd.

When to Composite

When animation and/or special effects are to be composited against live action, there are a few ways of going about this:

Method 1: Lay out the animation to a QuickTime movie or series of Picture or other files, with alpha channel. Some other machine or program will composite with the live action or 3D work.

Method 2: Lay out the work with a blue or green background, and have Ultimatte™ or some other device mix with the live action.

Method 3: Lay out the work twice, once normally, and once with Set Playback's Display menu set to Mask or Reversed mask, normally onto tape. This mask and image tape set will later be used to control external compositing.

Method 4: For 3D, bring the 3D layers into The Animation Stand's exposure sheet. Have the images generated with an alpha channel and use COMPOSITE in the Notes field. Alternatively, use a reversed alpha channel and the COMPOSITE* command.

Method 5: For compositing with live action, load the live action onto the system using the Diaquest controller or some other means. Use the live action as a background in the exposure sheet. Have The Animation Stand perform all the compositing.

Methods 4 and 5 give the best overall look, by far.

Avoiding Jitters

Under some circumstances, you will see “jitters” during a move. These jitters occur when an uneven movement is made. Movement is uneven when the number of pixels moved in each frame is not constant. This inconstant movement comes from round-off error. For instance, if we direct a layer to move 30 pixels in 9 frames, at normal resolution, you are really asking that the layer move 3.3333 pixels per frame. What will really happen is that the layer will move 3, 3, 4, 3, 3, 4, 3, 3, and 4 pixels. Thus, in frames 3, 6, and 9, the layer will appear to jerk by one pixel.

There are several solutions to this matter. By increasing resolution, you can decrease the amount of the jitter. By going to 4:1 resolution, you have pixel positions available which are a multiple of 0.5. This means that the movements for the above example would be 3, 3.5, 3.5, 3, 3.5, 3.5, 3, 3.5, and 3.5. Thus, in frames 2, 5, and 8, there will appear to be 0.5 pixel jerks. By going to 256:1 resolution, the movements will all vary slightly, and there will be very small jerks observed in each frame.

Another means of avoiding jerk or jitters is to use a movement which eliminates the possibility of jitters in the first place. You can do this by adjusting the movement to a number of pixels which will work well with the number of frames over which the movement occurs, or you can do this by adjusting the number of frames in the move to work well with the number of pixels being moved. Use the following table to determine which will work best:



<u>Resolution</u>	<u>Best moves are multiples of...</u>
Normal	1 pixel per frame
4:1	0.5 pixels per frame
16:1	0.25 pixels per frame
64:1	0.125 pixels per frame
256:1	0.0625 pixels per frame

Advanced Techniques

In this article, we describe a special technique our customers have been kind enough to teach us. Let us know if you come up with something new. We'll be publishing new ideas in the future.

Starburst Fade

The following describes a method of making a transition from one scene to another using a starburst-shaped transition which appears at the center of the frame and grows until the transition has been made. For this example, we'll assume two pictures, Before and After:

- Step 1 Open a new document of the same size as your frames.
- Step 2 Select a black color
- Step 3  click the User wash mode icon to edit and select the mode.
- Step 4 Click on the Center button to select a star wash.
- Step 5 Press  to complete the edit.
- Step 6 Select the Fill selected area tool, which will paint the starburst.
- Step 7 Place a registration point at the center of the frame.
- Step 8 Save the file as Starburst.
- Step 9 Edit the Exposure sheet to show a transition, as follows:

Frame Label	File	Top	Left	Hold	Mag.	V. Mag	%R	+	Mod	Notes
1	before									
	starburst	240	320		0					MATTE
	after			1						
2	Move, 23 frames									
25	before									
	starburst	240	320		800					MATTE
	after			1						
26	End of film. Running time is 0:00:25 (30)									

In this example, 240 and 320 place the starburst in the center of a 640 by 480 frame. If you are using another frame size, you will have to use different numbers. Note that if you have set the Centered reg. checkbox of the Set playback dialog of the Animate menu, these numbers will always be 0.

In the iconic format, the presence of a special effect (matte) would be shown as a red box around the starburst image.

Setting up a Junk Matte

If you'd like an animation to be able to go behind something in an image, but be in front of the rest of the image, a junk matte should be used.

- Step 1 Open the art that needs a junk matte built for it, using Open from the File menu.
- Step 2 Create a new cel document, using New cel from the File menu.
- Step 3 Select the old picture into the light table, using Light table from the Options menu, then selecting the first document from the Light table A menu, then clicking OK.
- Step 4 Select the Free draw tool, the Free draw tool with a big nib, and/or the Paintbucket tool. Draw black over the matting portion of the item.
- Step 5 Save the item as a matte, using Save from the File menu.
- Step 6 Use it in the exposure sheet with BWMAT as the Notes command.

Menu items

The following menus appear when you use the right mouse button:

General File Edit Options Effects Fonts A-M Fonts N-Z
Size Animate Notes Statements Functions Variables

General — Allows certain information features about the Animation Stand.

File — Allows operations on files and windows.

Edit — Allows editing and clipboard operations.

Options — Controls various facets relating to how The Animation Stand will act.

Effects — Performs various optical effects on paint windows.

Fonts A-M — Allows you to choose any font from A-M for use in paint windows.

Fonts N-Z — Allows you to choose any font from N-Z for use in paint windows.

Size — Allows you to choose any font size available for use in paint windows.

Animate — Controls all facets of animation.

Notes— Lists all the possible notes commands. Selecting an item from this menu will enter data into the exposure sheet.

Statements— Lists all the statements in the PF language and will enter the statement in a text window.

Functions— Lists all the functions in the PF language and will enter the function in a text window.

Variables— Lists all the variables in the PF language and will enter the function in a text window.

General Menu

The following menu items apply to the General menu:

About the Animation Stand— Gives serial number and contact information.

Calculate — Enter an item in hours:minutes:seconds:frames, feet'frames, or frames, and it will be translated to the other two formats..

File Menu

The following menu items apply to the File menu:

New Cel — Creates a new paint window.

New film — Creates a new Exposure sheet and Current Frame window.

New text — Creates a new text window.

Open... — Opens file and creates any appropriate windows.

Open as palette... — Opens a picture file as a floating palette

Scan... — Scans one or more pictures, and may build an exposure sheet

Revert — Restores the frontmost window to its original, on-disk version.

Close — Closes the frontmost document window.

Save — Saves the contents of the frontmost document window.

Save area — Saves selected part of the document

Next cel — Closes a paint window and opens the next in succession.

Previous cel — Closes a paint window and opens the previous in succession.

Document info — Gives a report on a document.

Regionize — Performs paint-flow calculations on a series of files as specified by the exposure sheet

De-regionize — Removes regionization information from a file

Quit — Exits program.

New Cel

Use this selection to open a new paint document. The new cel will be determined by the current cel size preference. The default for the size is the size of the main monitor.

New Film

Use this selection to open a new film document, which will be displayed as an Exposure sheet window and as a Current Frame window.

This menu item is not available if you already have an Exposure sheet open.

New Text

Use this selection to open a new text document, either for notes, or to create a PF-key program.

Open

Use this selection to open a file that already exists on the disk.

- If you open a paint, draw, or cel document, a paint (cel) window appears.
- If you open a The Animation Stand preferences file, then only your preferences are loaded, and no added windows display.

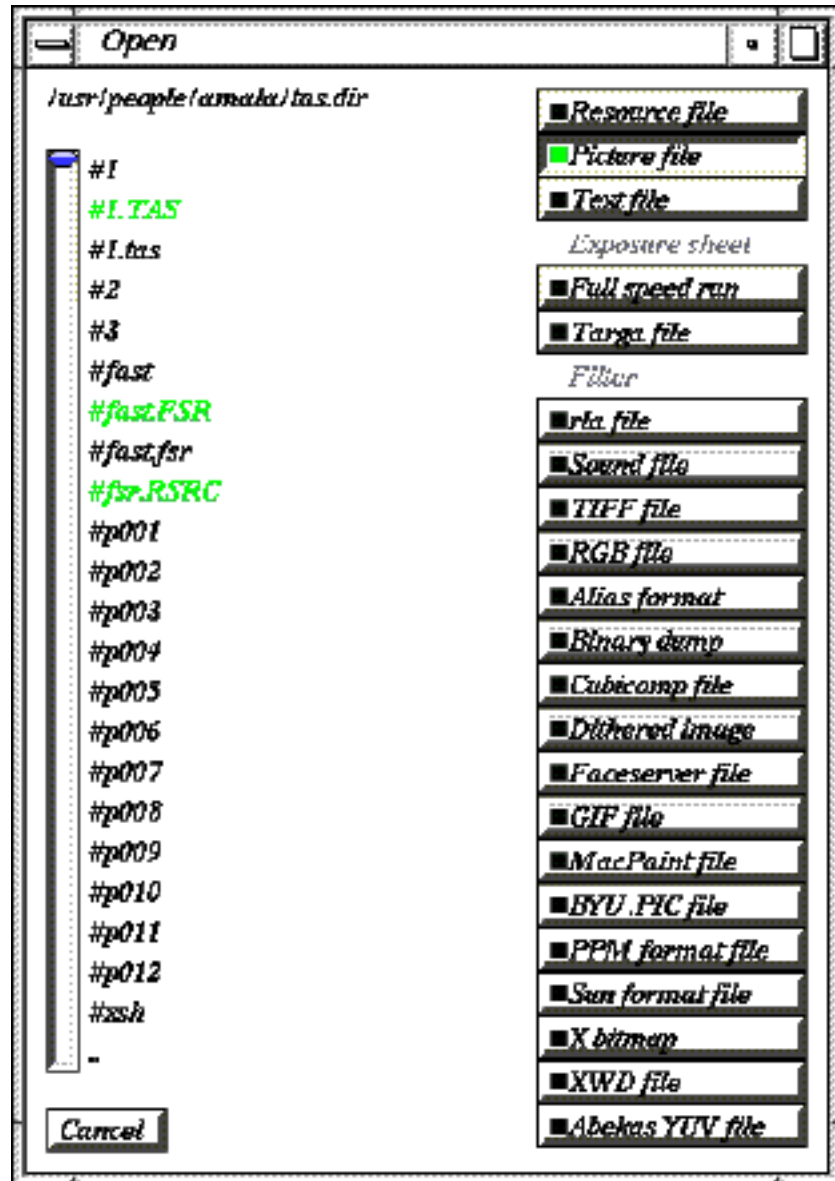
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- If you open an Exposure sheet, then an Exposure sheet window and a Current Frame window is opened. Exposure sheet files will not appear on the list if an Exposure sheet is already open.
- If you open an animation file, then the animation is played back.
- If you open a text file, a text window appears.

When a file is opened, absolutely every data item in the file is used. Thus, if you open a picture file, and that file contains a cel image, a registration point, a palette, patterns, preferences, and who knows what else, all of those data items will be used. You can prevent extra data, such as preferences, palettes, and the like from being loaded by center-clicking to select the file.

There are three steps in this process:

- 1) Select Open from the menu or use ALT-O. The following dialog appears:



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- 2) Click on one of the type selector buttons. If the file name contains one of the known types (see table below), then the file name will appear in green, and you can skip this step.

<u>EXT</u>	<u>Type</u>
RSRC	Animation Stand Resource file
TAS	Animation Stand Picture file
TXT	Text file
XSH	Animation Stand Exposure sheet file
FSR	Animation Stand Full-speed run file
TGA	Targa file
EXE	Executable code
BAT	Batch file
RLA	rla file
AIFF	AIFF file
AIFC	AIFF-C file
TIFF	TIFF file
RGB	RGB file
RGBA	RGBA file
ALIAS	Alias file
BIN	Binary dump file
CUBE	Cubicomp file
DI	Dithered image file
FACE	Faceserver file
GIF	GIF file
PNT	MacPaint file
BYU	B.Y.U. file
PPM	P.P.M. file
SUN	Sun format file
X	X bitmap file
XMD	X.M.D. file
YUV	Abekas Y.U.V. file

- 3) Click on a file or directory. If you click on a file, that file is opened. If you click on a directory, the open dialog does a “cd” to that directory and continues at this step.

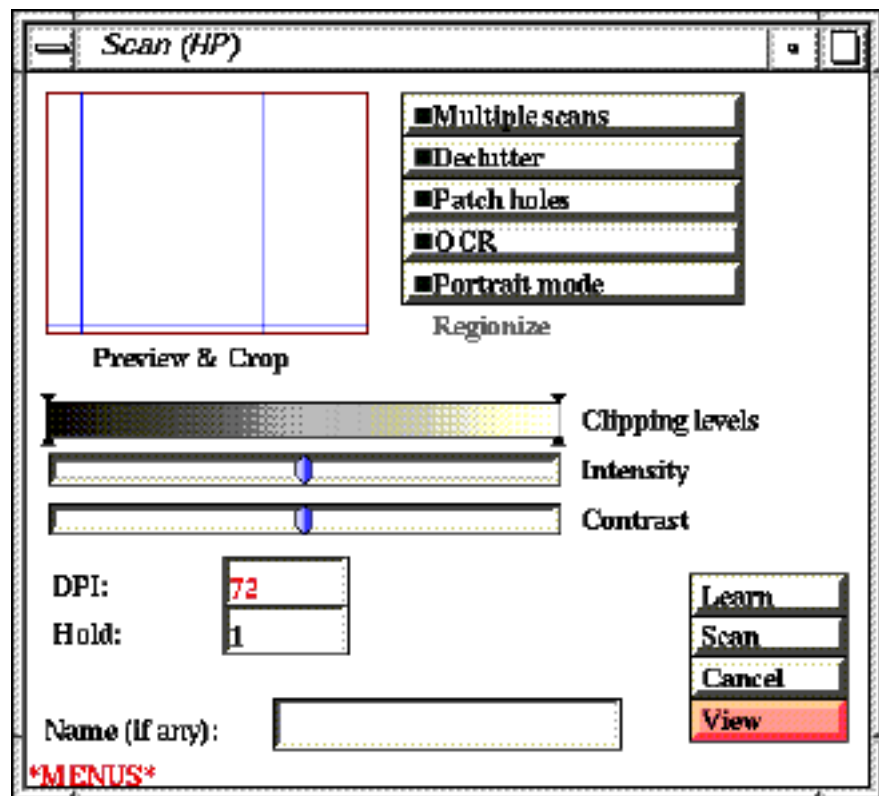
Note: If you center-click the File field in the Exposure sheet, you also get this dialog box.

Open as palette

This selection Opens a picture file into a window, but now for editing. The picture is Opened as a palette window. The new palette window will show the name of the file it came from, but the file does not remain Open. Clicking in the palette window will select a color for drawing.

Scan

This menu item allows you to scan one or more images. First, you are presented with a dialog. The dialog you get will depend on the scanner connected. The following is the dialog for HP scanners.



This dialog contains several options, each of which affects the scanning process:

View: This button does a quick low-resolution scan of the document in grayscale, but otherwise using the current settings. The scan is placed into the Preview & Crop sub-window.

Cancel: Cancels the operation without performing a scan or saving the values.

Scan: Performs the requested scan(s), and retains the values entered. Once entered, verified, and used, the values become part of the preferences, and can be stored with and loaded from a preference file. Preferences may be modified by the scanner. For instance, if you choose 30 DPI, and the scanner connected can't go under 38 DPI, the DPI stored in the preferences would be 38.

Learn: Scans a blank document, to determine where the peg holes are, and what the bounds of the paper are, setting the crop area.

Preview & Crop: This area is used to set up the scanning area. Use View to get a document image into this sub-window. Then, drag out a rectangle to show which areas of the document are to be scanned, or click to indicate that the entire document is to be scanned. Shift-drag or shift-click to indicate which parts of the scanned area are to be saved. The reason you would want to scan an area, but not save it, is that part of the document might have registration peg images and/or a cel ID in it. You would want to scan those items so that they could be used in alignment and naming, but not save them as part of the art.

Clipping levels: This double slider indicates the minimum and maximum values to be considered significant. Any pixels darker than this slider's dark setting are set to black. Any pixels lighter than this slider's light setting are set to white.

Intensity: This slider controls the scanner's light/dark setting. At the center position, you get what the scanner sees. As the slider moves right, the document appears lighter. As the slider moves left, the document appears darker.

Contrast: This slider controls the scanner's contrast setting. At the center position, you get what the scanner sees. As the slider moves right, colors get closer to white and black. As the slider moves left, colors get closer to gray.

DPI: This field determines the DPI at which the image will be scanned, within the scanner's limits.

Hold: When the scanner is building an exposure sheet, the Hold field determines how many times the scanned image will appear. If the Hold field is 1, the image will be scanned once, and dropped onto disk once, and loaded into the exposure sheet in one cel. If the Hold field is greater than 1, the image will still be scanned and stored once, but will be called into the exposure sheet in multiple frames. This field may be overridden by OCR data.

Multiple scans: When this item is not checked, one image is scanned. When this item is checked, the item is scanned, and then the automatic sheet feeder is signaled to load the next sheet of paper. So long as all goes well, the scanning process will continue. If a file name was specified, the file name is changed to reflect the Hold field. For instance, if a file name of C-17 was used, and a hold value of 2 was used, the next automatic name used would be C-19. These automatic names can be overridden by OCR data.

Declutter: If this item is checked, a declutter operation will be done, as if the Declutter operation was chosen from the Effects menu.

Patch holes: If this item is checked, hole patching operation will be done, as if the Patch operation was chosen from the Effects menu.

Portrait mode: Normally, cels are scanned in landscape mode. When Portrait mode is checked, the image orientation changes.

Regionize: If this option is selected, a Regionize operation will be done when scanning is complete.

Depth: This menu determines the scanning depth:

Black and white: When this setting is used, the scanner is directed to scan in black and white only. When the file is used in the exposure sheet, it will load into the frame as if it had the WHITE Note. This will remain true until the file is rewritten by a Save operation.

Grays: When this setting is used, the scanner is directed to scan in grayscale mode, using as many grayscale bits are available in the scanner. When the file is used in the exposure sheet, it will load into the frame as if it had the MINIMUM Note. This will remain true until the file is rewritten by a Save operation.

Color: When this setting is used, the scanner is directed to scan in color mode, using 24 bits.

Register by: This menu tells The Animation Stand how your art is to be registered:

Pegs: This means that your art is placed securely against the document guide, or on a pegbar. It assumes that the documents are scanned at exactly the same location each time, and that no changes need be made.

Dies: This means that the document is held securely in guides, and can slip only in one direction, and can't rotate. To use this setting, you must use Acme-punched paper. The Animation Stand will find the holes, and use their positions to set the coordinates for the registration tool. This process takes virtually no time.

Feeder: This means that the paper can both shift and wobble. To use this setting, you must use Acme-punched paper. The Animation Stand will find the holes, and use their positions to set the coordinates for the registration tool, as well as rotate the document into alignment. Rotating the document takes some time.

Filter: This menu presents a list of the various filtering techniques available in the scanner. See your scanner manual for details.

Name: If this field is not filled in, all scanned items appear in a paint window(s). None of the special modes mentioned above are set up, since those modes apply only to files saved on disk by the scanning process. All files so scanned will be untitled, with the newest scan being the frontmost document. If this field is filled in, documents will be saved to disk as soon as they are scanned and ready. When multiple scans are done, the file name will advance by the value of the Hold field. For instance, a Name of C-17 with a Hold field of 2 would result in the next file being named C-19. This field can be overridden by OCR data.

If an exposure sheet is open, file names are also placed into the exposure sheet. The location used in the exposure sheet is the first cel of the first frame marked. When a cel is scanned, it is stored onto the disk as a picture file. Its name is then placed into the exposure sheet at the specified location. If the Hold field so specifies, the file name may be repeatedly placed in this manner.

OCR: OCR stands for Optical Character Recognition. If the OCR checkbox is set, this processing is performed. If not checked, this step is skipped. To use this function, you must use printed paper, or affix printed labels to your documents. If using labels, paste in the label just to the right of the center registration peg.

⋮⋮ - ⋮⋮⋮⋮ [⋮⋮]

The first two digit slots hold the layer number, 0 (layer 1 in the exposure sheet) for background, and 1 through 99 for layers over that (layers 2 through 100 in the exposure sheet). The next four digit slots hold the frame number. Together, these six digit slots are assembled into a file name. Layer 0 is coded as BG, and other layers are coded as A through Z. Then a dash appears, and then the numbers appear. The two digit slots in the brackets allow you to override the dialogs Hold time for this drawing. Thus,

4⋮ - ⋮17⋮⋮ [2⋮]

would result in a file name of C-17. The name entered here will override any use of the Name field, and the Hold would override to 2.

The symbols used in OCR must be drawn as follow:

0:123456:789

Close

This selection closes the front-most document window. If the front-most window is the Current Frame window, then the Exposure sheet window is closed with it. If the front-most window is the Exposure sheet window, then the Current Frame window is closed with it. This selection does not close the Status window or any of the Tool windows.

If a document is being closed, rather than just a window into a document, and the document has been modified but not saved, you are presented with a dialog asking what you want done with the file:



Pressing OK begins a Save process on the file. Save is discussed in more detail later.

Pressing Discard closes the file without first saving it. All of your work on the file will be lost.

Pressing Cancel aborts the closing process, and neither the file nor the window is closed.

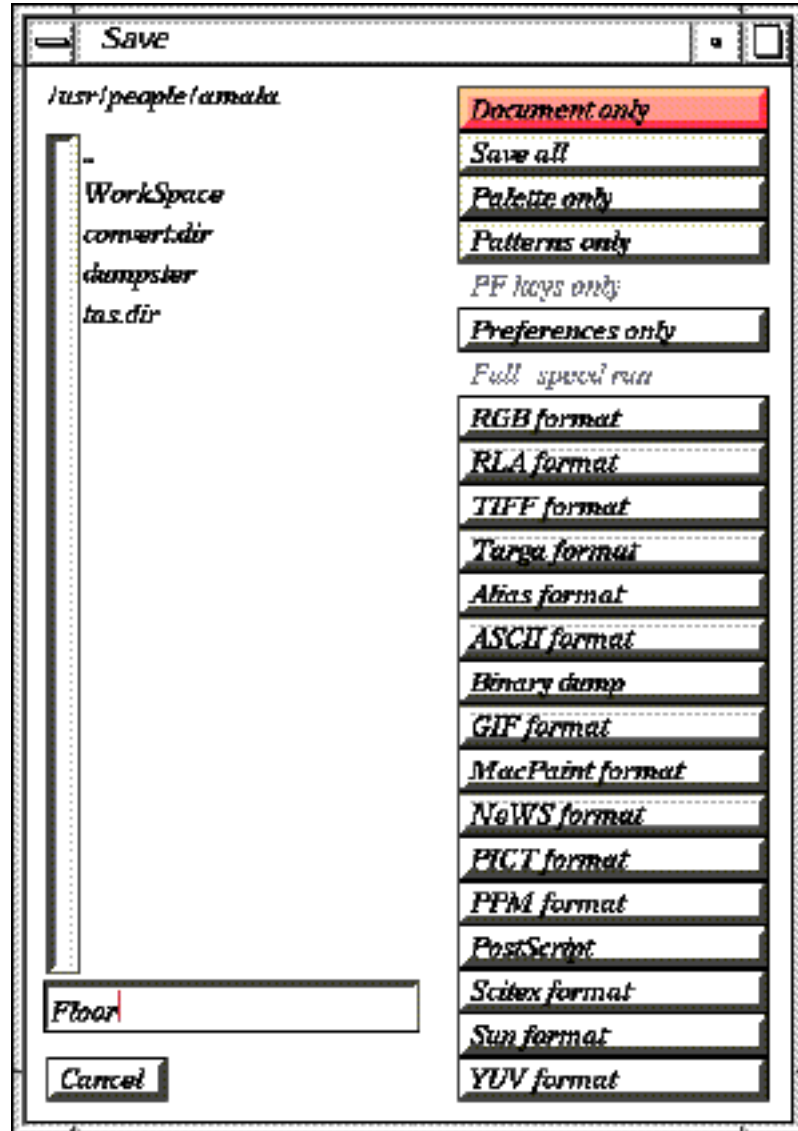
Save

32 bits: This function saves the current document window. You may save the document in any format, the palette, the patterns, the compiled PF key code, the preferences, or all of the above. A dialog appears to give you these choices.

64 bits: This function saves the current document window. You may save the document in either 64-bit format, the palette, the patterns, the compiled PF key code, the preferences, or all of the above. A dialog appears to give you these choices. Only The Animation Stand's own format, and RGB format can hold 64 bit data.

Save area is the same as Save, with two major differences: First, this command is only available on paint windows with a selected area, and second, only the selected area is saved. This will generally result in a nonrectangular document. When compositing layer upon layer in the Current Frame window, only the saved areas will have any effect. The edges may also be taken into account by various edge processing commands and settings described elsewhere.

The following dialog appears:



Save all Saves everything in the document, including the pens, color and pattern palettes, and special settings you have used.

Document Saves everything in the front-most window, but nothing else relating to it (such as the palette).

Palette Saves the color palette only.

Patterns Saves the patterns only.

PF keys Saves the compiled PF key code only. PF-key text files themselves are not saved by this button, only the compiled executable PF key. To save the PF text file itself, use Save when the PF document window you wish saved is front-most.

Preferences Saves the preference settings, such as pen shapes and sizes, the results of tool edits, the results of mode edits, etc. Items set by **Set playback** are not saved by this button, but are saved as part of an **Exposure sheet**.

Other buttons save the picture data in the indicated format.

Next Cel

This function saves the current cel window, closes it, and then opens the next cel in succession. This is used to paint multiple cels. For instance, if you have scanned in a series of cels, named SCAN01 (or SCAN1) through SCAN35, you could open SCAN01, paint it, save it, close it, and then open SCAN02 in the usual way. Alternatively, you could open SCAN01, paint it, and then invoke **Next cel**, which would go through the above process, and would automatically open SCAN02. For another example, X-1B follows X-1A.

When automatic painting is used, this function must be used to finish one cel and start the next.

There is also a **Previous cel** function, which goes back one cel.

Document Info

For the **Exposure sheet** window, the **Document info** function outputs text with a full management report and statistics on the **Exposure sheet**. For paint windows, it outputs text which gives statistics on the document and window.

Regionize

Regionization is a method of precomputing all the painting that has to be done. Without regionization, The Animation Stand must compute where paint can flow, from the point you click at in a document, to the extent of the flow. When a document is regionized, all possible flow patterns are analyzed, and when you click in the document, all the program has to do is to redraw the area. Also, you can tell that a document has been regionized when it's loading: You'll see a happy-face.

Regionize

To regionize a group of files, follow these steps:

- Step 1: Create a new exposure sheet.
- Step 2: Add all files to be regionized into the exposure sheet. Order and framing is unimportant, just so the names appear in the sheet.
- Step 3: For each file that is to have lines patched, place PATCH into the Notes field for that layer. The regionizer does not actually patch the holes in the lines, but it acts as if the lines have been patched. Thus, you get your lines just as they looked, and you get paint that does not flow through.
- Step 4: Select Regionize from the File menu. All files in the sheet will be regionized. The Status window will show the number of files thus batch processed.
- Step 5: When the process is complete, paint the cels as you normally would, but faster. Regionized files flash a happy face on the cursor when loading.

De-regionize

If, for some reason, you wish to de-regionize a file, so that paintable areas need to be recomputed, select De-regionize from the file menu. Changes are applied to the in-memory copy only.

Print

This function outputs the contents of the Exposure Sheet window in a printable format.

Quit

This function is used to exit the program. Any open files go through the saving process, asking if it should be saved.

Edit Menu

The following menu items apply to the Edit menu:

Undo — Undoes the preceding operation.

Cut — Removes the selected area or item, and places it into the clipboard.

Copy — Copies the selected area or item into the clipboard

Paste and **Paste before** — Inserts an item from the clipboard into the document.

Insert — A special form of Paste, described later.

Clear — Clears the selected area

Clear all — Clears the entire document and/or auto-paint list.

Select all — Selects the entire document, regardless of settings

Change functions — Changes values in the exposure sheet.

Show clipboard — Shows the clipboard as a full-screen window. Click the mouse to return to normal operation.

Undo

This function undoes the last action, assuming that the last action was not itself some form of undo. For instance, the Magic eraser tool is a partial undo, and thus cannot be undone. Also, the ability to undo an action depends on the amount of memory available. An action can't be undone if there was no room for an undo buffer.

Usually, you can undo an undo, “re-doing” an action.

Cut

Cut removes whatever area is selected, and places it into the clipboard.

Copy

Copy places whatever area is selected into the clipboard.

Paste

The operation of Paste depends on the current mode of operation. Whenever there is a text edit in progress, and if the clipboard contains text, the clipboard's text replaces the marked text. If there is no text marked, then the clipboard's text is inserted at the current flashing cursor position.

For paint documents (without an active text edit), the picture in the clipboard is pasted in as a floating image, in its own layer above the rest of the document. This layer may be moved or erased. Any action which changes or saves the document will cause the floating paste layer to be stamped onto the document at its current location. You may also use the Merge command from the Effects menu to merge the floating paste layer in using some special mode or setting. If there is no picture in the clipboard, but there is text, the text is formatted into a picture using the current font settings. Normally, the floating image will appear in the size and location from which it was cut. If there is some reason that the image can't be pasted into its original location, such as the original location being off the end of the document, then the new floating layer appears centered over the document. If there is a selection in effect, the new floating layer is scaled to the size and position of the current selection. This technique can be used to scale an old document to a new size: Create a new document, select it, and paste in the old document.

For Exposure sheet documents, the Exposure sheet contents of the clipboard are inserted, replacing the currently selected area. Note that the End of film marker cannot be destroyed or overwritten. If there is no Exposure sheet item in the clipboard, but there is text, the text is taken to be tab-delimited spreadsheet storage, and is converted to Exposure sheet format, and then pasted.

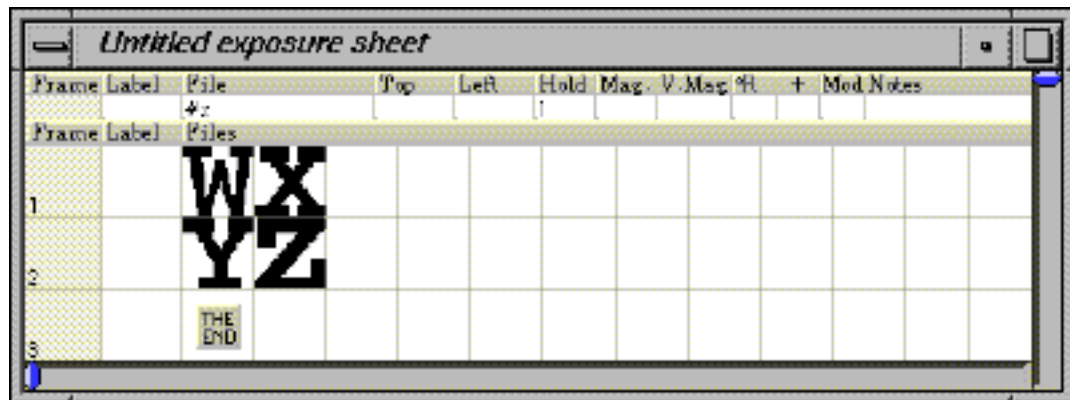
Paste before is equivalent to Paste (for the Exposure sheet only), except that instead of replacing the selected area, the clipboard contents are pasted in before the selected area, and no data is lost.

Insert

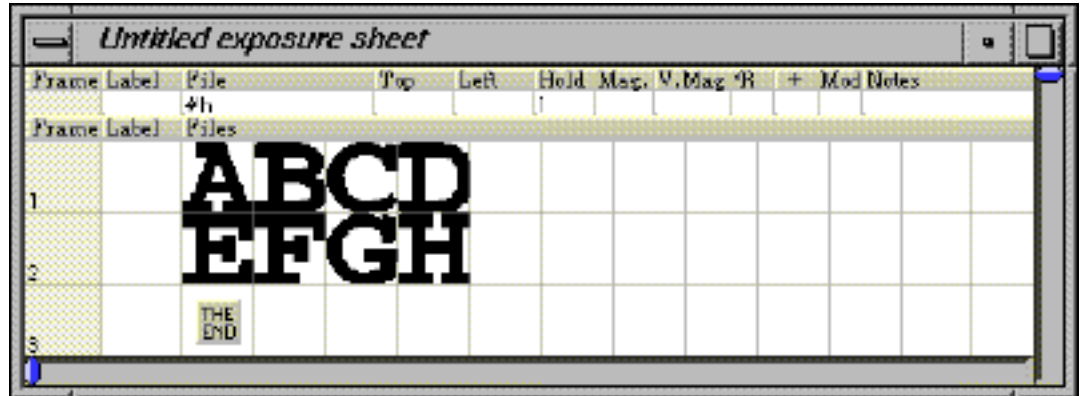
Insert is an extremely specialized form of Paste. When the clipboard contains a copy of some or all of an Exposure sheet, insert will insert a number of layers as follows at the beginnings of a series of frames, more or less as a vertical column.

This is best shown by example:

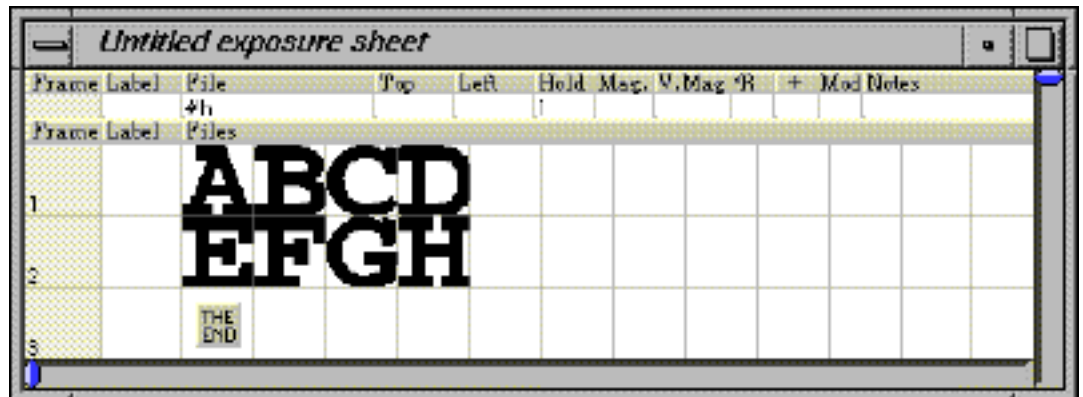
Let's say that the following section of Exposure sheet is copied into the clipboard:



And the following section of an Exposure sheet is then selected:



This will result in the copied area being inserted into the Exposure sheet, resulting in:



This technique allows easy set-up of large numbers of varying actions in one scene, since all motions can be worked out independently, and then merged into a single scene, by inserting each movement set into the scene with the Insert function.

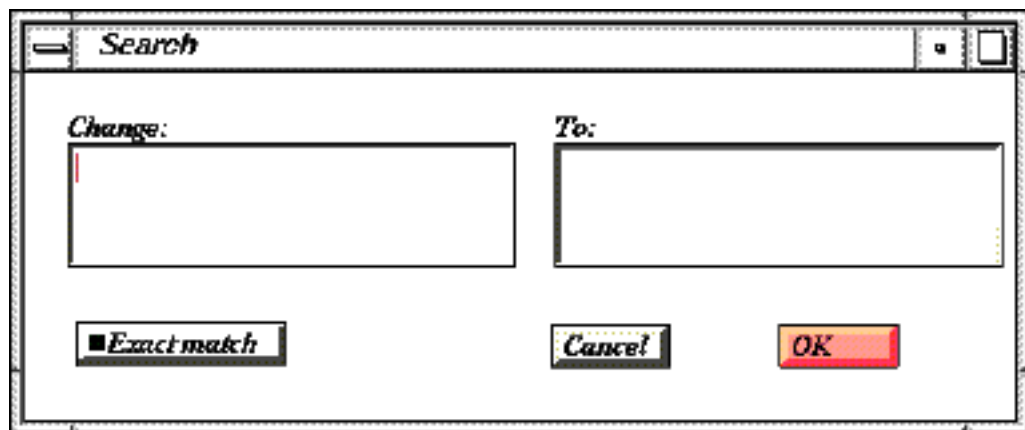
In order for the Insert function to operate, the following conditions must be true:

- The clipboard must contain Exposure sheet data.
- The clipboard must contain layers only.
- The clipboard may not contain any interpolation sets or markers.
- A layer, layers, or frames in the Exposure sheet must be marked or selected.
- If there are a certain number of frames in the clipboard, then there must be room for that many frames in the Exposure sheet between the first marked layer and the end of the film, or the first Exposure sheet or marker.

Any deviation from this set of criteria will prevent Insert from functioning.

Change functions

The Change text fields, and Change numeric fields functions are similar. The Change dialog allows you to specify and change values in the exposure sheet, acting all selected layers, or on the entire exposure sheet if no selection has been made.



Here, only the Change text fields dialog is shown, since Change numeric fields is a simple subset of the Change operation.

Change and To fields control what is to be found, and what it is to be changed to. Note that the exposure sheet's File field contains more text than is shown. For instance, if file File is in path /path, then its actual text is /path /File.

If Exact match is on, "Cat" matches "Cat", but not "Cataract". When off (the default), "Cat" matches "Cataract".

The most common use of the Change text fields function is to correct an exposure sheet to reflect new file positions. If you move a file or set of files or directory, the exposure sheet will not be able to locate the files. It will still be looking for the files in their old locations. Thus, you would use the change function to redirect the search. For instance, if we had our files in a path named /path, and then renamed the path to /newpath, we would have to use Change to change path to newpath.

Options Menu

The following menu items apply to the Options menu:

Set new cel size — Sets preferences for new windows

Preferences — Sets general preferences.

Set DPI — Opens a new window into the current paint document at a specified DPI setting.

Snap to grid — Turns this mode on or off.

Visible grid — Turns this mode on or off.

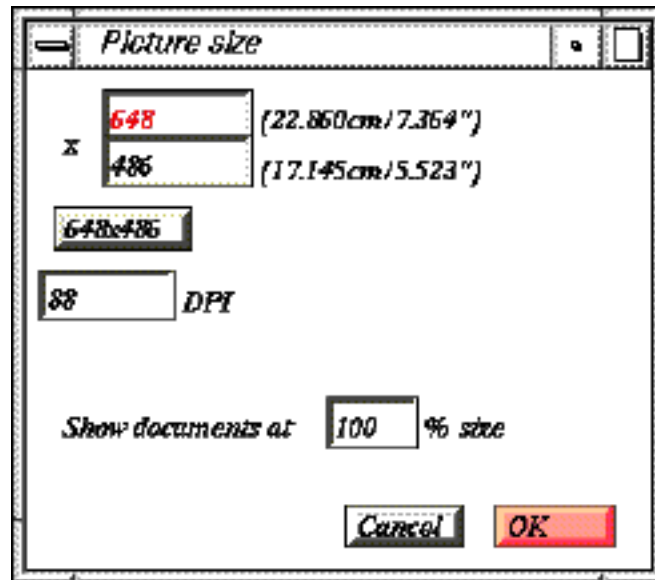
Compile — Compiles the current text window into a PF-tool. You are presented with a dialog asking where (into which PF tool) to store the compiled code.

Lightbox — Sets lightbox preferences for a single picture window.

Field guide overlay — Allows you to post or remove a field guide. You may specify the number of fields. Specify 0 for no field guide overlay.

Set New Cel Size

This option allows you to change the size and/or depth of the new cells which the New cel and New film options of the File menu will create. There's a standard size: 648 x 486. You may also use custom sizes. To set the new cel size and/or depth, bring up the dialog from the menu:



Each of the following items describes an item in the dialog.

Width and height fields: This is the height and width of the document, in pixels, or any other form of measurement.. Anywhere sizes are entered, you can enter other forms: xxx is a number of pixels. xxxpt is a number of points. xxxpi is a number of picas. xxxmm is a number of millimeters. xxxcm is a number of centimeters. xxxm is a number of meters. xxx" is a number of inches. xxx' is a number of feet.

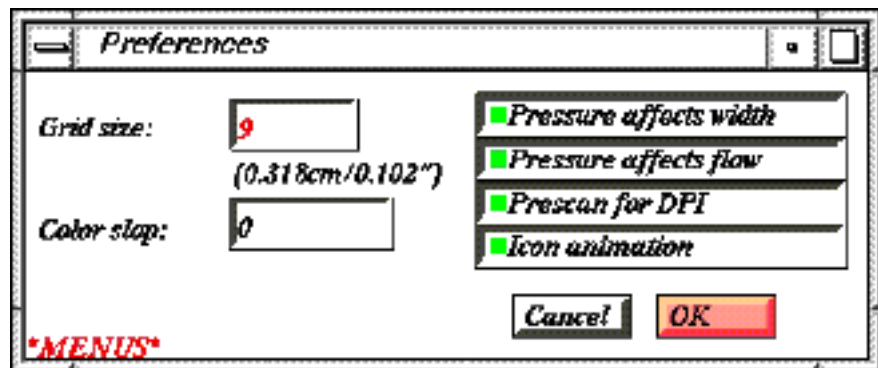
648x486 button: This button can be used to set the height and width fields to match the height and width to the size of a standard 8cam NTSC screen.

DPI field: This is the number of DPI (dots per inch) in the document. This is not the display DPI. Rather, it is the print DPI. You will always see one document pixel per screen pixel onscreen.

Open document at ...% size field: When this field is set to 100, documents will be opened at their normal size, and in the position they last occupied. When this field is any other number, the document will be opened at some other percentage of its normal display size, and the window will automatically position and size itself without regard to the last known location stored in the file. This resizing will not affect the stored off-screen data, only the displayed size.

Preferences

This item changes to the ways in which the program works. Each of the items will be explained on subsequent cards of this article. To set the prefs, bring up the dialog from the menu:



Grid size: This field allows you set the number of pixels between the cyan (printer's blue) lines of the grid. This applies to both paint cels and the Current Frame window. Note that you may use pixel counts, or units, such as points (pt), picas (pi), metric (mm, cm, and m), and English (" and ') units.

32 bits: Color slop: This item is used to control color matching. The preset, or default, setting is 0, which means that colors must match exactly. 127 means that colors any even close will match. Settings between these two values lead to different color match tolerances. The setting of this field affects the functioning of the Paint Bucket tool, the Bounded Fill tool, and the color comparison performed by the three selection tools, when they are using an Ignore or Only color match criterion.

64 bits: Color slop: This item is used to control color matching. The preset, or default, setting is 0, which means that colors must match exactly. 32,767 means that colors any even close will match. Settings between these two values lead to different color match tolerances. The setting of this field affects the functioning of the Paint Bucket tool, the Bounded Fill tool, and the color comparison performed by the three selection tools, when they are using an Ignore or Only color match criterion.

Note: The setting of this field affects the functioning of the Paint Bucket tool, the Bounded Fill tool, and the color comparison performed by the three selection tools, when they are using an Ignore or Only color match criterion.

Let's take an example. Say you have a white cloud against blue sky in your cel, and you wish to repaint the cloud, making it darker. The color you are really seeking is any color which is sort of white, and not any color which is sort of blue. Let's try an example:

Step 1 Press ALT-O to open a new document. The Open dialog will appear.

Step 2 Double-click on the file Cloud. The dialog will disappear, and the cloud and the sky will appear in a new window.

Step 3 Press ALT-2 to bring up the Preferences dialog.

Step 4 32 bits: Enter 127 into the Slop field.

Step 4 64 bits: Enter 32767 into the Slop field.

Step 5 Press Return to end the Preferences edit and accept the changes.

Step 6 Now, let's set up a darkening effect, using black at a 10% blend percentage. Mouse down on the Mode Box. The Mode list will appear.

Step 7 Center-click on the Blend mode icon. The Blend dialog will appear.

Step 8 Enter 10 to set a 10% blend level.

Step 9 Press Return to end the edit and accept the changes.

Step 10 Select the Paint Bucket tool.

Step 11 Click in the cloud. The painting will be analyzed, and The Animation Stand will find that the cloud should be filled. It will be filled with 10% black, darkening it.

Edge antialiasing: This menu is used to control how much antialiasing is used during drawing operations. The more antialiasing used, the longer drawing takes, but the smoother the edges appear. Conversely, at low antialiasing values, drawn items will look jagged, but draw quickly. At 1:1 antialiasing, antialiasing is off, and you will get exactly what you are drawing, with no post-draw smoothing. At antialiasing values of 4:1 through 256:1, The Animation Stand will draw each pixel using 4 times as many subpixels through 256 times as many subpixels as there are pixels, taking 4 to 256 times as long to draw offscreen, too. Assuming that you are going to use antialiasing, the most reasonable values to use are 4:1 and 16:1. To find out just what antialiasing will do for you, try the following steps:

- Step 1 Press ALT-N to Open a new paint document.
- Step 2 Select the circle tool.
- Step 3 Draw a circle.
- Step 4 Press ALT-2 to bring up the Preference dialog.
- Step 5 Select 16:1 antialiasing.
- Step 6 Press Return to close the dialog.
- Step 7 Draw another circle. You'll see the difference in line quality.

Wash to: This menu is used to control how the various partially transparent paint modes work. It has four settings: Underlying image (the default), White, Black, and Background color. Each of the menu items describe (on a pixel-by-pixel basis) how transparency works in various modes, such as blend, and the various "watercolor" modes. For instance, if a particular portion of the area being drawn into is 75% opaque and 25% transparent, then 75% of the new image (at the current pixel, at least) comes from the current color or pattern. 25% comes from somewhere else. This preference menu determines where that somewhere else is.

Underlying image means that the other 25% (for this example) comes from the underlying, existing image.

White and Black mean that the draw color or pattern is mixed with white or black, regardless of the underlying image. These settings can also affect paint-time edge-pixel antialiasing.

Background color means that the draw color or pattern is mixed with the chosen background color, regardless of the underlying image.

Icon animation: When this item is checked (the default), the animated tools animate. Otherwise, they will appear as normal, static icons.

Pressure affects width: When this preference is off, all tools work with the specified pen size. When this preference is on (the default), the operation of the Free draw tools, the Constrained free draw tools, and the Airbrush tool are all affected by stylus pressure when using a pressure-sensitive tablet. At the minimal pressure (threshold stylus pressure, as defined by the stylus-controlling control panel item), the tools all paint at single pixels widths. At the maximum pressure, the tools all paint with the selected pen or flow pattern. For points in-between, a linear interpolation is made. Thus, if a 20x20 pixel pen was selected, and the force used on the stylus was halfway between the stylus threshold pressure and the maximum pressure, a 10x10 pixel pen would be used.

Note: Pen sizing is changed only for rectangular and round pens. The clipboard pen is not affected.

Pressure affects flow: When this preference is off (the default), all tools work with the specified ink type. When this preference is on, the operation of the Free draw tools, the Constrained free draw tools, and the Airbrush tool are all affected by stylus pressure when using a pressure-sensitive tablet. At the minimal pressure (threshold stylus pressure, as defined by the stylus-controlling control panel item), the tools all paint at 1% of their normal ink flow. At the maximum pressure, the tools all paint with the selected color or flow pattern. For points in-between, a linear interpolation is made. Thus, if black was selected, and the force used on the stylus was halfway between the stylus threshold pressure and the maximum pressure, gray would be painted.

Note: Paint color is only affected for the Normal, Minimum, and Maximum modes.

When a pattern is used with this mode, each time the pen image is painted, it is painted in a pattern which is a weighted average of the background color and the selected paint pattern.

Pre-scan for DPI: This preference affects the opening of picture files. With this preference on, the file's DPI setting is preserved. With this preference off, files load at the DPI setting specified in the New cel size dialog of the Options menu

Snap to Grid

This selection causes all paint windows and the Current Frame window use a grid. All mouse actions in these windows use only mouse positions at the intersection of grid lines. If the mouse is over the intersection of grid lines, the actual mouse position is used. If not, the mouse position is used as if the mouse were really at the grid line intersection nearest the actual mouse position, looking up and to the left.

This option has effect whether or not the Visible grid option is in use.

- Step 1 Press ALT-N to get a new paint window.
- Step 2 Press ALT-5 to bring up a grid, so that you can see what you're doing.
- Step 3 Press ALT-4 to lock to the grid. Although you can't see it at this point, the Snap to grid entry of the Options menu just received a check mark.
- Step 4 Paint. Note that the lines always pass through the intersection points of the grid lines.

Visible Grid

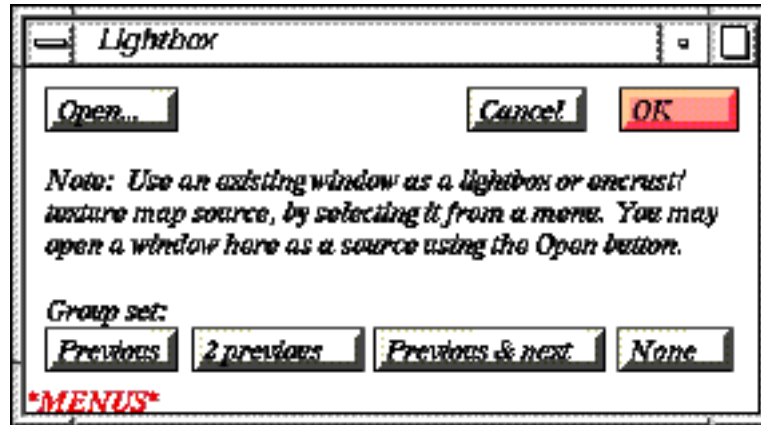
This selection causes all paint windows and the Current Frame window show a grid.

- Step 1 Press ALT-N to get a new paint window.
- Step 2 Select Visible grid from the Options menu. Notice that the window fills with a grid of cyan lines.
- Step 3 Use the mouse to pull down the Options menu. Notice that the Visible grid entry has a check mark to its left. This signifies that Visible grid is in effect.
- Step 4 To get rid of Visible grid, just release the mouse button over Visible grid.

You can edit the grid spacing by selecting Preferences from the Options menu, or by pressing ALT-2.

Lightbox dialog

Normally, the picture shown in a paint window is of the document itself. But, under some circumstances, other picture data will also be shown in the window. The Lightbox dialog of the Options menu allows you to create a “lightbox” function, control how the encrusting mode works, and control the “painting surface” through texture (or bump) mapping. The dialog appears as follows:



Each of the functions of this dialog use a menu which calls out other windows. If what you need is not already open as a window, you can open it from this dialog using the Open button. The document will be opened behind the current one (out of the way), and will be immediately available on the pop-up menus.

Lightbox

The lightbox feature of The Animation Stand emulates a lightbox used in animation studios. This feature is most often used in “inbetweening” (or “tweening”) between two cels, to get a third cel which is halfway between them in the action. For instance, let’s say that a character is to go from a standing position to a sitting position in 15 frames. First, you draw frame 1, then frame 15. Next, draw frame 7 as an in-between between frames 1 and 15. Next, draw frame 4 as an in-between between frames 1 and 7. This process continues until all 15 frames have been drawn. To perform these drawing operations, it would be useful to see frames 1 and 15 composited over frame 7 as you’re drawing it. Also, for the example above, it would be nice to have the chair picture available while drawing the character in the sitting position. To do this, follow these steps:

- Step 1 Create a new cel.
- Step 2 Draw the character in a standing position.
- Step 3 Save the cel as Frame 1.
- Step 4 Create a second new cel.
- Step 5 Draw the chair.
- Step 6 Save the cel as Chair.
- Step 7 Create a new cel, which will become frame 15.
- Step 8 Invoke the Lightbox function of the Options menu.
- Step 9 From the Light table 1 menu of the dialog, select Chair as the source image and press Return.
- Step 10 Draw the character in the sitting position on the chair. You will notice that newly painted items, while they are being painted, appear normally; but when you release the mouse, the old image fades back in.
- Step 11 Invoke the Lightbox function again.
- Step 12 Select None for the Light table 1 menu option and press Return. Note that the chair image vanishes, and the character drawing now appears as it was painted.
- Step 13 Save the drawing as Frame 15.
- Step 14 Create a new cel.
- Step 15 Invoke the Lightbox function again.

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- Step 16 This time, we need two light table images. Select Frame 1 for the Light table 1 option, and Frame 15 for the Light table 2 option; then, press Return. The order of the elements in the light table menus is unimportant at this time.
- Step 17 Draw frame 7.
- Step 18 Save this as Frame 7.
- Step 19 Repeat steps 14 through 18 until you are done.

Encrusting

When the Encrust mode is used in painting, you are painting a part of one document onto another. The document from which this data comes from is called the encrust source. You set the encrust source using the Source windows dialog of the Options menu. Just select the source window in the Encrust menu. Each paint document can have its own encrust source.

Texture mapping

Normally, The Animation Stand paints as if you have ideal ink being placed onto ideal paper. For instance, in the normal, opaque paint mode, each pixel is drawn at 100% opacity. In the real world, however, painting does not always work like this. For instance, in drawing on a blackboard with chalk, you tend to get large areas of 100% opacity, with small areas of no chalk at all, and a few pixels' worth of some values near 50%. The Animation Stand gives you two methods of having texturized drawing:

The Built-in Way:

- Step 1 Open a document from the supplied Bump map directory, for instance, Chalk.
- Step 2 Create a new cel.
- Step 3 Bring up the Source windows dialog.
- Step 4 Select Chalk (for this example) from the Texture menu and press Return.
- Step 5 Draw.

The User-defined Way:

- Step 1 Take a picture of a surface, with a very low angle, bright, stark light.
- Step 2 Scan it into the Bump map directory.
- Step 3 It's now “built-in”. Proceed as above.
- Step 4 Select Chalk (for this example) from the Texture menu and press Return.
- Step 5 Draw.

Group sets

There are four group set buttons. Each affects the lightbox function for all of the documents in memory.

Previous means that each item uses the previous item as its lightbox. For instance, XX05 would use XX04 as its lightbox image.

Previous 2 means that each item uses the two previous items as its lightbox images. For instance, XX05 would use XX03 and XX04 as its lightbox images.

Previous and next would mean that XX05 would use XX04 and XX06.

None turns off the lightbox feature for all open cels.

Effects

The following options are available in the Effects menu:

Resize — Allows you to resize and/or squash or stretch the selected area, numerically.

Merge — Places the floating paste area into the document.

Unprotect — Drops any protected zones established by the Protect tool or mode.

Discern line — Determines the exact location of a fuzzy line.

Patch lines — Patches holes in lines

Declutter — Removes scanner clutter

RGB block change — Changes the RGB values of an area.

HSV block change — Changes the HSV values of an area.

Legalize area and **Legalize palette** — Transforms colors to NTSC-legal values.

Sort palette — Sorts the palette into name order

Invert alpha — In the selected area, all alpha channels are inverted: Transparent becomes opaque, and opaque becomes transparent.

Separate alpha — Separates the document into RGB and alpha components.

Merge alpha — Merges the first document (RGB) with the second (alpha) to produce an alpha//RGB document.

Generate hard alpha — Automatically creates a hard-edge alpha channel to mask out the background.

Generate soft alpha — Automatically creates a soft-edge alpha channel to mask out the background.

Set alpha to white, **Set alpha to black**, and **Set alpha to red** — Aid in the viewing of alpha channels.

Crop — Crops the image to the selected area.

Merge

This function is used to control how and when a floating paste object drops into the document. A floating paste object occurs when a clipboard image is pasted onto a paint window. Rather than becoming a true part of the document immediately, the paste object floats above the document. You can reposition it without changing the document, but if you go to another window, or begin painting, the object drops into the document at its current position, exactly as it looks. Using the Merge function, you can cause the floating paste object to drop at a particular location immediately. This function uses the current paint mode to paste the image in. For instance, let's say that you wanted to paste in an image using the Blend mode; here's what you do:

- Step 1 Use ALT-V to paste in the image. It is now floating.
- Step 2 Position the object.
- Step 3 Select the Blend mode.
- Step 4 Select Merge from the Effects menu.

Discern Line

This selection is used to point out where the center of a line is in a selected area, or in the entire document. The area is scanned. The darkest portion of all lines, no matter how faint or how low in contrast, are redrawn in the current color or pattern. This feature is especially useful in reading scanned images. For instance, let's say that some of the lines are too faint to notice, or that you need a border of a certain color for use with one of the Paint bucket tools. Use this function to mark the lines.

- Step 1 Select an area of the document with the Marquee or Lasso tool, or have no selection range to discern lines in the entire document.
- Step 2 Select a color or pattern in which to render the line. Normally, this will be the darkest color in use in the document, or simply black. Do not use a color too light, or you will get doubling effects.
- Step 3 Select Discern line from the Effects menu. The area will be analyzed and redrawn. During this process, the number of lines left to be computed is displayed in red in the Status window.

Patch

This selection is used to patch one pixel holes. The holes are patched in the selected area only, or the whole document, if there is no selection. Holes larger than one pixel are not patched because they're so often significant to the art. On the other hand, they're easily seen. Pixels darker than 50% are considered black for this function, and pixels lighter than 50% are considered to be white.

RGB Block Change

This selection is used to change a group of colors, as defined by minimum and maximum RGB color values, to another range of colors defined in the same way. Each pixel in the selected area, or in the entire document is examined, one by one.

If the pixel's red component falls between the minimum and maximum red value, and the pixel's green component falls between the minimum and maximum green value, and the pixel's blue value falls between the minimum and maximum blue value, then that pixel is changed.

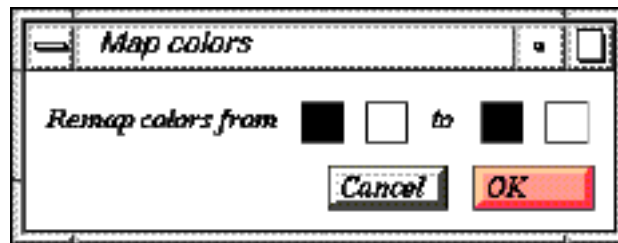
32 bits: The change occurs by finding the distance the pixel's red component lies along the line from the minimum to the maximum red value, and adjusting that red component to a similar percentage along the line from the low new red value to the new high red value. This is best shown by example. If the minimum red is 39 and the maximum is 78, and the new low is 117 and the new high is 233, then a red value of 19 would not be used, as it lies outside the range. A red value of 54 would be used. 54 is 40% of the way from 39 to 78. Thus, a new red value of 163 would be used, as 163 is 40% of the way from 117 to 233.

64 bits: The change occurs by finding the distance the pixel's red component lies along the line from the minimum to the maximum red value, and adjusting that red component to a similar percentage along the line from the low new red value to the new high red value. This is best shown by example. If the minimum red is 10,000 and the maximum is 20,000, and the new low is 30,000 and the new high is 50,000, then a red value of 5,000 would not be used, as it lies outside the range. A red value of 14,000 would be used. 14,000 is 40% of the way from 10,000 to 20,000. Thus, a new red value of 38,000 would be used, as 38,000 is 40% of the way from 30,000 to 50,000.

The green and blue pixel values are changed similarly.

Step 1 Select an area of the document with the Marquee or Lasso tool, or have no selection range to affect the entire document.

Step 2 Select RGB block change from the Effects menu. The following dialog box appears:



Step 3 Click on the first color box to set the minimum color, independently in each of red, green, and blue components.

Step 4	32 bits: Use the Color Picker to pick a minimum color. For this example, choose a color with red, green, and blue values each of 39.
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Step 4	64 bits: Use the Color Picker to pick a minimum color. For this example, choose a color with red, green, and blue values each of 10,000.
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Step 5 Click on the second color box to set the maximum color, independently in each of red, green, and blue components.

Step 6	32 bits: Use the Color Picker to pick a maximum color. For this example, choose a color with red, green, and blue values each of 216.
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Step 6	64 bits: Use the Color Picker to pick a maximum color. For this example, choose a color with red, green, and blue values each of 50,000.
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Step 7 Click on the third color box to set the new low color values, independently in each of red, green, and blue components.

Step 8 Use the Color Picker to pick a new low color. For this example, choose black.

Step 9 Click on the last color box to set the new high color values, independently in each of red, green, and blue components.

Step 10 Use the Color Picker to pick a new high color. For this example, choose white.

Step 11	32 bits: Click OK to start the block change operation. The area will be analyzed and redrawn. During this process, the number of lines left to be computed is displayed in red in the Status window. In this example all pixels which contain red, green, and blue components each between 39 and 216 will be shifted to the range 0 to 255, in effect increasing the contrast of those colors.
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Step 11	64 bits: Click OK to start the block change operation. The area will be analyzed and redrawn. During this process, the number of lines left to be computed is displayed in red in the Status window. In this example all pixels which contain red, green, and blue components each between 10,000 and 50,000 will be shifted to the range 0 to 65,535, in effect increasing the contrast of those colors.
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There is an alternate method of loading the first two color boxes. When the Eyedropper tool is used, each color displayed by that tool is used to broaden the scope of the minimum and maximum colors. If the color “sucked up” by the syringe is not in the minimum/maximum range, then that color is added to the range, pulling down the minimum or increasing the maximum, as needed.

HSV Block Change

This selection is used to change a group of colors, as defined by minimum and maximum HSV color values, to another range of colors defined in the same way. Each pixel in the selected area, or in the entire document is examined, one by one.

If the pixel’s hue component falls between the minimum and maximum hue value, and the pixel’s saturation component falls between the minimum and maximum saturation value, and the pixel’s value falls between the minimum and maximum value, then that pixel is changed.

32 bits: The change occurs by finding the distance the pixel's hue component lies along the line from the minimum to the maximum hue value, and adjusting that hue component to a similar percentage along the line from the low new hue value to the new high hue value. This is best shown by example. If the minimum hue is 10 and the maximum is 20, and the new low is 30 and the new high is 60, then a hue value of 5 would not be used, as it lies outside the range. A hue value of 14 would be used. 14 is 40% of the way from 10 to 20. Thus, a new hue value of 42, would be used, as 42 is 40% of the way from 30 to 60.

64 bits: The change occurs by finding the distance the pixel's hue component lies along the line from the minimum to the maximum hue value, and adjusting that hue component to a similar percentage along the line from the low new hue value to the new high hue value. This is best shown by example. If the minimum hue is 10,000 and the maximum is 20,000, and the new low is 30,000 and the new high is 60,000, then a hue value of 5,000 would not be used, as it lies outside the range. A hue value of 14,000 would be used. 14,000 is 40% of the way from 10,000 to 20,000. Thus, a new hue value of 42,000, would be used, as 42,000 is 40% of the way from 30,000 to 60,000.

The saturation and value pixel components are changed similarly.

The usage of HSV block change is identical to that on RGB block change, including the use of the Eyedropper tool.

Legalize

These functions serve to avoid color problems on composite monitors and recorders. Composite color systems (as opposed to RGB and β -Cam systems) have a problem with colors that are too saturated. These functions drop the saturation level to no more than 75%.

64 bits: Using legalization really only pertains to NTSC TV, and not to movies. Thus, it is unlikely that you will be using this function from the 64-bit version.

Legalize area will examine each pixel in a given area (or the entire document, if no area is selected), and drop the saturation as needed on a pixel-by-pixel basis.

Legalize palette will examine each color in the palette, and drop the palette color saturations to no more than 75%. This may result in some duplicate colors on the palette.

Animate

The following items are available on the Animate menu:

Play sound file — Plays the current (marked) frame's sound file (if any).

Add layers — Adds frames or layers to the Exposure sheet.

Expand — Expands a movement marker to individual frames.

Check exposure sheet — Checks an exposure sheet for errors that would be encountered when laying out the animation.

3/2 frame pulldown — Translates the exposure sheet from 24 frames to 30 frames per second.

3/2 field pulldown — Translates the exposure sheet from 24 frames to 60 fields per second.

Set playback — Sets playback options.

Generate TEXT file — Converts the exposure sheet to text format, for export to other systems.

Page flip — Page-flips all open picture windows.

Play or record — Plays or records exposure sheet as specified by Set playback.

Save as group — Lays out an animation file.

Reduce to Leica-reel — Keeps only frames bearing KEY in their Notes field, and retains timing. Leica-reel exposure sheets shoot to tape much faster.

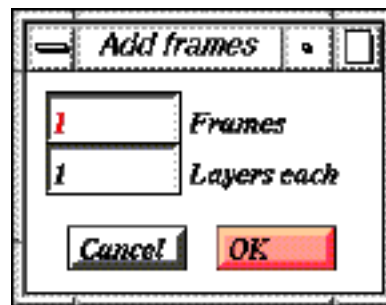
Reduce to storyboard — Keeps only frames bearing KEY in their Notes field, and sets all frames to shoot once only.

Add Layers

This selection is one of the means to add frames or layers to your Exposure sheet. To use this selection, you must have a layer or a field selected or marked.

Step 1 Click on a Frame field. The position you click shows before which layer the insertion is to take place. To add frames to the end of the film, or into an empty Exposure sheet, click on the End of film marker.

Step 2 Select Add Layers from the Animate menu. A dialog appears:



Step 3 Decide what to add:

To add one layer of one frame, do nothing for this step, since that is the default.

To add many frames, each of one layer, just type in the number of frames you wish to add. This number will replace the default one frame, and show some number of frames of one layer each.

To add one frame of many layers, click on the Layers field, and enter the number of layers you would like.

To add many frames, each of many layers, first type the number of frames you would like, then press Tab, and then enter the number of layers you would like in each frame.

Step 4 Click on OK to add the frames. Frames will renumber themselves according to the changes made.

Expand

This selection is used to expand frames on an Exposure sheet from a Move, Pantograph, or Spline into a series of frames. When you select one of these markers, and then select Expand from the Animate menu, that effect is expanded to every frame and every cel in those frames. Normally, you would only have the layers expanded if there was (a) something you wanted to do to a particular frame of the set, or (b) if you are going to export the data to another program.

For instance, let's say you have a Move, shown below:

Frame Label	File	Top	Left	Hold	Mag.	V. Mag.	%R	+ Mod Notes
1	mountain blue skier			1				
2	Move, 5 frames							
7	mountain blue skier	100 300	200 400	1				
8	End of film. Running time is 0:00:07 (30)							

When you use Expand, the Exposure sheet will show this Move in expanded form:

Frame Label	File	Top	Left	Hold	Mag.	V. Mag.	%R	+ Mod Notes
1	mountain blue skier			1				
2	mountain blue skier	50 100	100 200					
3	mountain blue skier	66.6666 133.3333	33.3333 66.6666					
4	mountain blue skier	100 150	200 300	1				
5	mountain blue skier	133.3333 200	66.6666 100					
6	mountain blue skier	166.6666 250	100 150					
7	mountain blue skier	200 300	200 400	1				
8	End of film. Running time is 0:00:07 (30)							

There is a big difference in the size, look, and feel of this expanded set. In the iconic format, the expansion still happens, but you can't see the new data values.

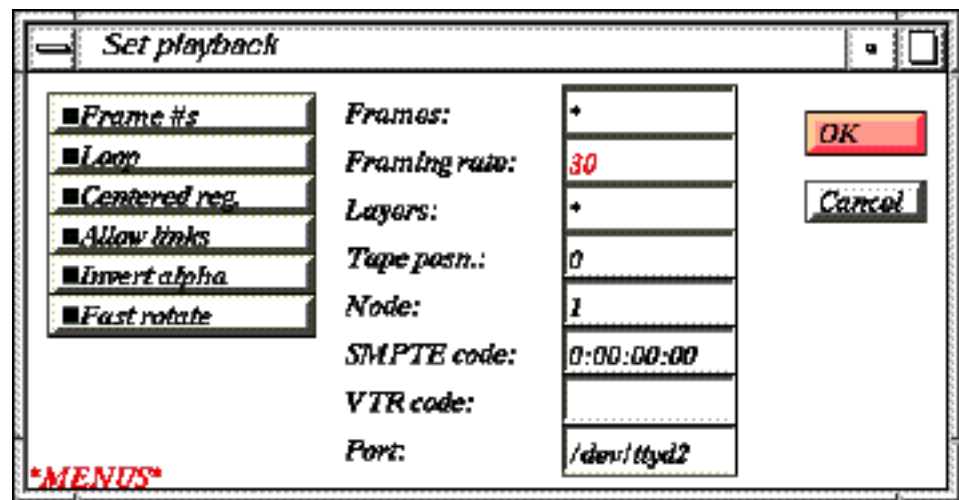
NOTE: Once something is expanded, you can't unExpand it, except immediately thereafter, using Undo from the Edit menu. If you have 7 frames, 3 lines each, that will always be 7 frames, 3 lines each. You can't change it back to one line, because these frames are now separate entities.

Check Exposure sheet

Whenever a frame is displayed or recorded, there may be certain errors which occur. Other possible problems of playback include bad interpolation sets (for instance, a spline with the wrong number of layers) and invalid parameters. Attempting to record overnight with an error in the Exposure sheet can cause a wasted night, and a wasted video disk. The Check Exposure sheet function immediately checks for all such playback errors, and reports any problems found. Multiple errors may be reported.

Set Playback

This function allows you to set all animation record, playback, and display parameters through its dialog:



Each of these controls gives you control over some aspect of playback, image composition, display, or recording. The following cards explain each function in detail.

Frame Numbers: With this preference on, your film will display a small box in the upper left-hand corner that gives the frame number and the elapsed time of each frame. With this preference off (the default), the frames are unencumbered.

Loop: With this preference on, your film will loop continuously, when played back on the screen using the Play or record function of the Animate menu, and when output using the Save as full-speed run function of the Animate menu. This is useful when testing a movement, or when preparing a demo to be shown over and over. If this preference is off (the default), your film plays only once. To get out of the loop, press escape.

Centered reg.: If this option is set, the (0,0) point of the each frame moves from the frame's upper left-hand corner to the center of the frame. If this option is not set, the (0,0) point remains in the corner.

Allow links: If this preference is on, links to other Exposure sheets are executed when encountered during the playback or recording of a film. If this preference is off (the default), links to other Exposure sheets are not honored during the playback or recording of a film. Links are never followed when editing a film or a frame.

Invert alpha: If this preference is on, the alpha channel of composited frames will be inverted.

Fast rotates: When on, this setting disables edge antialiasing during rotates.

Faster/Larger: When Larger/Faster is off, increased resolution takes increased time. For instance, 4:1 resolution takes 4 times as long as Normal resolution. If Larger/Faster is on, then 4:1 resolution will take 4 times as much memory, but very little more time. In general, you should see a 200% speed improvement using this switch.

Tape posn. field will be used to control the tape position. Or, for other hardware, SMPTE code is required to position the tape. For hardware that can work either way, either the SMPTE code or the Tape posn. field is used to control the tape position, arbitrated by the SMPTE coding preference.

The Tape posn. field is a count of the number of frames into the tape at which recording is to start.

The SMPTE code field is the SMPTE hour, minute, second, and frame numbers at which to start recording. Hours range from 0 to 23, minutes and seconds range from 0 to 59, and frames range from 0 to one less than the framing rate (0-29 for NTSC, 0-24 for PAL, and 0-23 for film).

SMPTE coding, the Tape posn. and SMPTE code fields control where recording will next start. If the hardware requires a specific frame number into the tape, then the Port preference controls which port is used in direct control of external devices.

The Frames field controls which frames will be shot or displayed. The range can be entered in a variety of forms. This is best shown by example:

* means to shoot or display all frames.

5 means to shoot or display only frame 5.

5-10 means to shoot or display only frames 5 through 10.

5- means to shoot or display starting at frame 5, and continuing on through the end of the film.

-10 means to shoot or display from the beginning of the film, but to stop at frame 10.

The Layers field controls which layers will be shot. The form of this range is the same as that of the Frame field.

The Framing rate field: Positive framing rates are stated in frames/second. Thus, a framing rate of 30 means that 30 frames/second will be shown. Negative framing rates are stated in seconds/frame. Thus a framing rate of -5 means 5 seconds/frame. A framing rate of 0 means that frames are to be shown on demand, i.e., once per mouse click. Thus, framing rates of 0 make The Animation Stand, or its full-speed run files act like a slide projector.

NOTE: A framing rate of 0 is also useful when you want to see small differences in animation. You can advance through a few frames one at a time to see what changed.

The Framing rate is also used when calculating new SMPTE codes. For example, if 30 frames are shot, and the framing rate is 30 frames/second, then 1 second has been shot. However, if the framing rate is 25 frames/second, then 1 second and 5 frames has been shot.

When shooting to video tape, video disk, or film, the framing rate is used only to calculate SMPTE codes and the running time of the animation. There is one exception to this: The Sony video disk recorder can be set into PAL or NTSC mode from the computer. The Animation Stand will set the Sony to NTSC mode when the framing rate is 30, and into PAL mode when the framing rate is 25.

This field can also affect the full-speed run playback, but only if the full-speed run was generated in the current execution of The Animation Stand.

You can handle slide shows in three ways:

- Set the framing rate somewhere between 5 and 12 seconds/frame (-5 to -12). The screen will display imposed frame after imposed frame, keeping each frame on the screen for the specified length of time.
- Set the framing rate at 30 frames/second, for example. When you want to display a frame for 10 seconds, give it a hold time of 300 frame times on the Exposure Sheet. Fades, wipes, and movements will proceed at a nice speed.
- Set the framing rate to zero to get the frames to hold until you click the mouse, which you can then use the mouse as an Advance Frame button (applies to both Play or Record and Save as full-speed run).

The Where menu controls where the output of the Play or Record function of the Animate menu will be sent.

64 bits: Note that shooting from the screen gives you 32 bit accuracy, even when the art is stored in 64 bits. To get fully accurate output, save your animation as RGB files, and have it shot by a film printer.

Normal: If this option is chosen, then the Play or Record function of the Animate menu will show the test run in the Current Frame window, with no special processing.

Full screen: If this option is chosen, then the Play or Record function of the Animate menu will show the test run on the full screen.

Lyon-Lamb , Diaquest, V/LAN, ARTI, & BCD: If any of these options is chosen, then the Play or Record function of the Animate menu will show each frame of the film, full screen, and send it to a controlled video tape recorder (VTR). The current Tape Posn. field or the SMPTE code field and the current VTR and Node number selections are used. The Framing rate is used in setting up the recorder.

GPI pulses: If this option is chosen, then the Play or Record function of the Animate menu will show each frame of the film full screen, and a single pulse of duration 9.3ms will be sent from the Port's data transmit pin. This is actually the normal transmission of a meta-delete character. If you use an Abekas A60 or A64 recorder, then you can connect the modem data transmit line to the recorder's GPI pin (and ground to ground). Set the recorder's macro to record a single frame. When The Animation Stand sends the GPI pulse, the data will be recorded. Similarly, the Hitachi time-lapse VCR can take a GPI pulse connection to its external trigger connection. Set its timing mode to 00 (on demand).

Sony disc: If this option is chosen, then the Play or Record function of the Animate menu will show each frame of the film, full screen, and send it to a Sony video disc recorder. The current Tape posn. field or the SMPTE code fields and the framing rate is used. The framing rate must be 25 or 30.

A66 serial and A66 serial 90%: Both of these settings use a serial cable to drive an Abekas A66 recorder. The A66 serial 90% setting also squashes the entire image to 90% vertical size before any resolution boost.

The What menu controls what is recorded.

Both is the default. It means that sight and sound are played back or recorded to files, and just the visual portion is recorded when using external devices.

Sight means that sight is played back or recorded to files or external devices.

Sound means that only the audio portion is played back or recorded to files.

The Edges menu controlling how edges will be processed during frame composition.

None: This selection turns off all antialiasing. When a new layer is added to a frame, no special action is taken.

True Antialiasing: This selection turns on true antialiasing. When a new layer is posted on top of another layer in a frame (during Play or Record, Save as full-speed run, et cetera, functions of the Animate menu), Each pixel position within the selection area stored within the layer is examined. If a pixel is seen to be part of a jagged edge (a “jaggy”), then that pixel is drawn at 50% transparency. This process is a time-consuming one, and can take 30 seconds per layer per frame on a plain Mac II, although the expected number is normally less. Use this function when the best edge-following correction of painted images (images stored as pixels) is required.

Maximum change: This type of antialiasing is processed once a frame is fully composited (during Play or Record, Save as full-speed run, et cetera, functions of the Animate menu). Use this function to limit the speed of signal voltage shifts in old video systems, or to perform a horizontal image smoothing operation. Each component of color is analyzed for each pair of adjacent pixels in each frame of the film. The difference in pixel RGB component values is limited to 128. Thus, if a frame has a white pixel followed by a black pixel, the white pixel value (255) will be displayed as white. The black pixel adjacent to it (value 0), if displayed as black, would mean a pixel-to-pixel value change of 255, which is over the limit. Thus, the black pixel is changed to conform to the limit, white (255) - 128 = gray (127).

64 bits: Again, maximum change is not very useful against 64 bit files. When this function is used, change is limited to 32,767.

Defocus: This type of antialiasing is processed once a frame is fully composited (during Play or Record, Save as full-speed run, et cetera, functions of the Animate menu). A slight defocusing is done. Use this function to make an image look as if it was shot to film, and then transferred to video. This will make output of The Animation Stand and images filmed appear to have come from the same medium, and will lead to very smooth special effects.

The Display menu controls how the contents of the Current Frame window are to be displayed.

Normal: When this option is selected, the frame will be displayed normally, showing exactly what is called for in the Exposure sheet.

Disabled notes: When this option is selected, the Notes field of the exposure sheet will have no effect for optical press emulation: The MATTE, FADER, and similar Notes commands will be ignored, but the FRAME and numeric commands will be effective.

Silhouettes: When this option is selected, the Current Frame will be drawn as picture silhouettes only. The frontmost picture will be drawn in black, and deeper cel layers will be drawn in increasingly light shades of gray. This allows you to set up movement quickly, without waiting for your artwork to be read from the disk or drawn. All artwork, except that generated by The Animation Stand and containing a select area will be drawn as a rectangle, showing the area covered by the cel. Picture files containing a select area will be drawn in the size and shape of the select area, allowing true silhouetting. This option also has the effect of the Disabled notes option.

Mask and Reversed mask: When Mask is selected, the Current Frame will be drawn as picture pure black mask silhouettes only. This allows you to set up masks, without having your background artwork ready. All artwork, except that generated by The Animation Stand and containing a select area will be drawn as a rectangle, showing the area covered by the cel. Picture files containing a select area will be drawn in the size and shape of the select area, allowing true silhouetting. These options also have the effect of the Disabled notes option. For the reversed effect, the mask area is drawn as white on black.

Notes=MINIMUM and Notes=WHITE: When this mode is selected, the current frame will be drawn in pencil test mode, where all layers without a Note will be brought in in MINIMUM or WHITE mode.

The Resolution menu controls the resolution of the Current Frame window. The menu contains options ranging from Normal through 256:1. Use increased resolution to get subpixel antialiasing and/or subpixel motion. Subpixel antialiasing and subpixel motion mean that images are drawn using 4 to 256 offscreen pixels per screen pixel, and then averaged down, to form the screen image. You get very clean antialiasing this way if your images were scanned in at higher than screen resolution, painted at higher than screen resolution, produced in a draw program (a program which mathematically defines edges), or if the image was drawn larger than needed, and is being brought in at less than 100% magnification. Subpixel motion means that movement rates are less likely to cause jitter, as coordinates are rounded off to halves, fourths, eighths, or sixteenths of a pixel, rather than to the nearest pixel coordinate. Of course, the higher the resolution, the better the image, and the longer frames will take to generate. Subpixel antialiasing here is in addition to any edge processing mode chosen in the Edge field of this dialog.

Normal: Selecting this option means that there is one pixel's worth of resolution (one off-screen pixel) for each pixel shown on the screen or in the Current Frame window.

4:1 (or 16:1, 64:1, or 256:1): Selecting this option means that there are 4 (or 16, 64, or 256) pixels' worth of resolution (4 [or 16, 64, or 256] off-screen pixels) for each pixel shown on the screen or in the Current Frame window. Drawings are made in the off-screen port, which in this case is 4 (or 16, 64, or 256) times as big as usual, and then reduced and at the same time averaged, for placement onto the screen or into the Current Frame window, at all times except during frame composition (exposure sheet set-up). Before running the film, set the Resolution to n:1. This setting only takes effect for playbacks, recordings, and prints made using the Play or Record function of the Animate menu. The Prepare full-speed run function doesn't use this method, and always behave as if Normal was selected.

The Size menu controls how the contents of the Current Frame window are to be displayed, as far as size is concerned. Several options appear on this menu, ranging from /16 to Normal. Use divisors to generate thumbnail views, get a quick representation of your work, and have artwork run quickly into and out of full speed run files.

Normal: When this option is selected, the frame will be displayed normally, showing exactly what is called for in the Exposure sheet.

/2 (and /4, /8, and /16): This option causes the frames to be drawn at half (and quarter, eighth, and sixteenth) the vertical and horizontal sizes, meaning that normal frames will be drawn in the upper-left-hand quadrant (or other portion) of the window or screen only. This is also equivalent to looking at everything at 50% (or 25%, 12.5%, or 6.25%) magnification.

The Interleave menu controls how field interleaving is to be performed.

None: This is the default setting. At this setting, Framing rate controls both the computational framing rate and the actual hardware framing rate. Each frame shot consists of two fields computed at the same time, for display at the same time. This is the ideal setting for computer monitors and film.

AB AB etc.: This setting performs standard field interlacing. First, a frame is computed, and all of the "A" fields are stored. These are computer lines 0, 2, 4, etc. These lines, in TV jargon, are known as lines 1, 3, 5, etc. Next, another frame is computed, and all of the "B" fields are stored. These are computer lines 1, 3, 5, etc., also known as TV lines 2, 4, 6, etc. The two fields are combined into a single frame, and then shot on a frame-by-frame basis. When interleaving is in effect, the Framing rate you enter is the number of frames computed per second. The number of frames shot per second is half that. For instance, to interleave for NTSC, set a Framing rate of 60 fps, which will compute 60 fields per second, and shoot it at 30 frames per second. The frames are shot two fields at a time, so there is no concern as to whether your recorder or controller can handle fields innately.

BA BA etc.: This setting is equivalent to the above, except that the field ordering is reversed.

Page Flip

This selection is available when there is more than one paint window open. On the full screen, all of the open paint documents are shown in sequence, one at a time, at the current framing rate, in the order the windows are displayed on the screen. In this way, The Animation Stand can act like page-flipping through a book on animation sketches.

Page flipping continues until you abort the process. Note that if your framing rate is 0, you will have to press the mouse button each time you want to see a new frame.

- Step 1 Open a new paint window.
- Step 2 Paint the number "3" into the window.
- Step 3 Open a second paint window.
- Step 4 Paint the number "2" into the window.
- Step 5 Open a third window.
- Step 6 Paint the number "1" into the window.
- Step 7 Press ALT-MINUS to set playback parameters.
- Step 8 Enter a framing rate of 1, for 1 frame per second.
- Step 9 Click OK.
- Step 10 Press ALT-, to flip the cells.
- Step 11 Press escape to stop.

Save As

This function allows you to save the contents of an Exposure sheet as a single file or a group of files. You are presented with a standard Save dialog. If you select Full-speed run, then the Save dialog determines the name of the file. For other formats, you are selecting the first file name, and subsequent files (for subsequent frames) will be named incrementally.

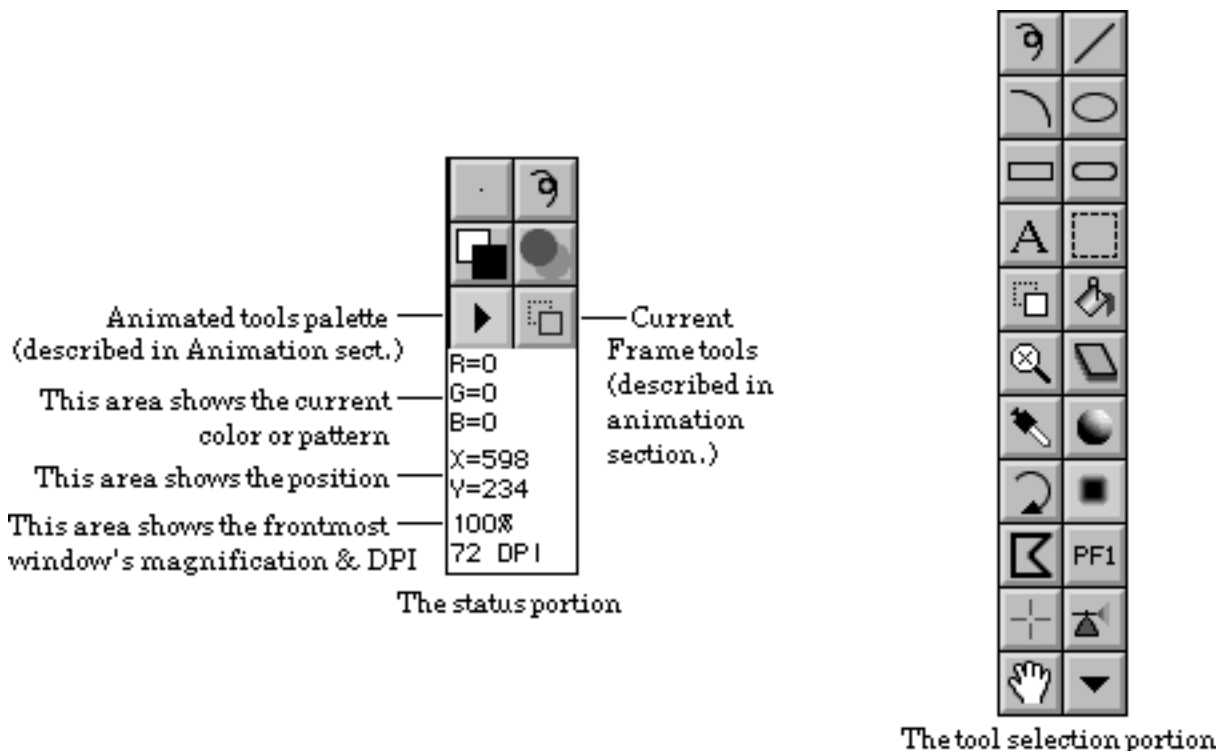
Full-speed run saves the file in a hardware-independent form, which will run extremely quickly. This format is saved in 32 bits, regardless of version.

Other formats all generate a group of files, one file per frame. You supply the first file name, and The Animation Stand numerically generates the rest. For instance, if you record a 100 file animation, and name the first file FRAME0001, then the last file will be named FRAME0100. If the first file is named FRAME1, the last will be named FRAME100.

64 bits: Only Animation Stand and RGB format are supported for output, as only these formats can hold the data.

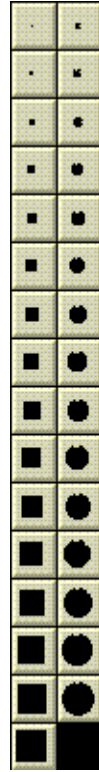
Paint

Painting is performed in paint windows, and is controlled by the Status window and the menus that pop up in the Status window. The remainder of this section defines the Status window, its subwindow, and what all of its various tools and modes can do for you.



Pens

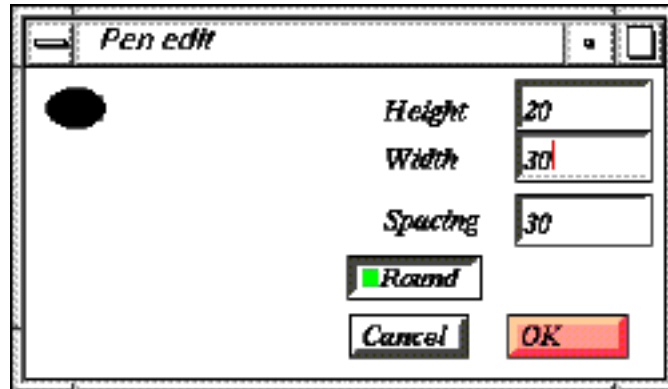
This position shows the current pen in use, and controls a pop-up list used to select and edit pens. The palette which appears is:



Clicking on any of the selections selects the pen shown. You can edit a pen by center-clicking on any cell but the last.

The last cell is the special pen cell. Center-clicking on that cell will transfer the contents of the clipboard into the special pen cell and select it as the current pen.

When editing a pen (note that you can't edit the last pen), you will see the following dialog:



Pen Height and Width can be entered in pixels, inches, feet, millimeters, centimeters, meters, or picas.

Spacing (also pixels, English, or Metric measurements) determines the spacing (from upper left corner to upper left corner) of the pen images when using one of the Dotted Draw tools.

When Round is on, the pen is circular or oval. When off, it is square or rectangular.

Palette



This is actually a pop-up control and a pair of status indicators: The foreground color/pattern (here show in black, the default foreground color) indicator, and the background color (here shown in white, the default background color) indicator.

Clicking in the color box brings up the palette subwindow. The palette subwindow is divided into two sections, the selector area, which normally contains the palette, and the Palette mode control box, containing 6 buttons:



Each of the buttons leads to a different sub-section of the palette:



Foreground color palette: When you click on this button, the palette area shows a list of colors, as shown above.

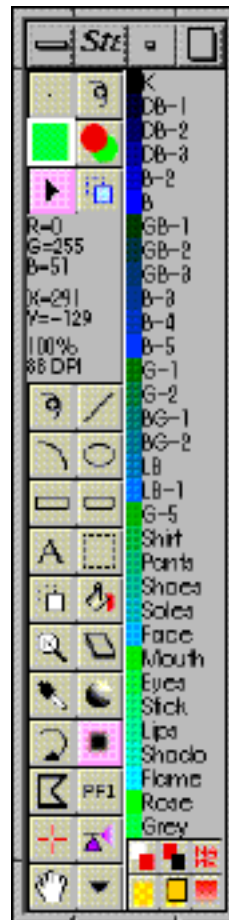
Clicking on any of the colors will select that color at the current foreground color. Center-clicking on any of the colors will edit that color, using the color picker defined below, allowing you to set RGB and Alpha values for the color.



Background color palette: When you click on this button, the palette area shows the list of colors again. This time, clicking on any of the colors will select the color as the background color.



Named colors: When you click on this button, the palette area will show the color selection. This time, there will be names with each color, and colors will be displayed 32 at a time:



Clicking on this button again will show the next 32 colors in the list, looping back to the beginning of the list after all 256 palette entries are shown. Clicking on a color or its name selects the color as the foreground color. Center-clicking on a color allows you to edit the color and its name. Center-clicking on a color name allows you to change the name.



Patterns: When you click on this button, the 32 entries of the current pattern set are displayed:





Pattern edit: If you leave the pattern edit mode, you can return to it with this button. It brings up a 600% magnification of the pattern:



Clicking on a pattern element changes that portion of the pattern to the current draw color.



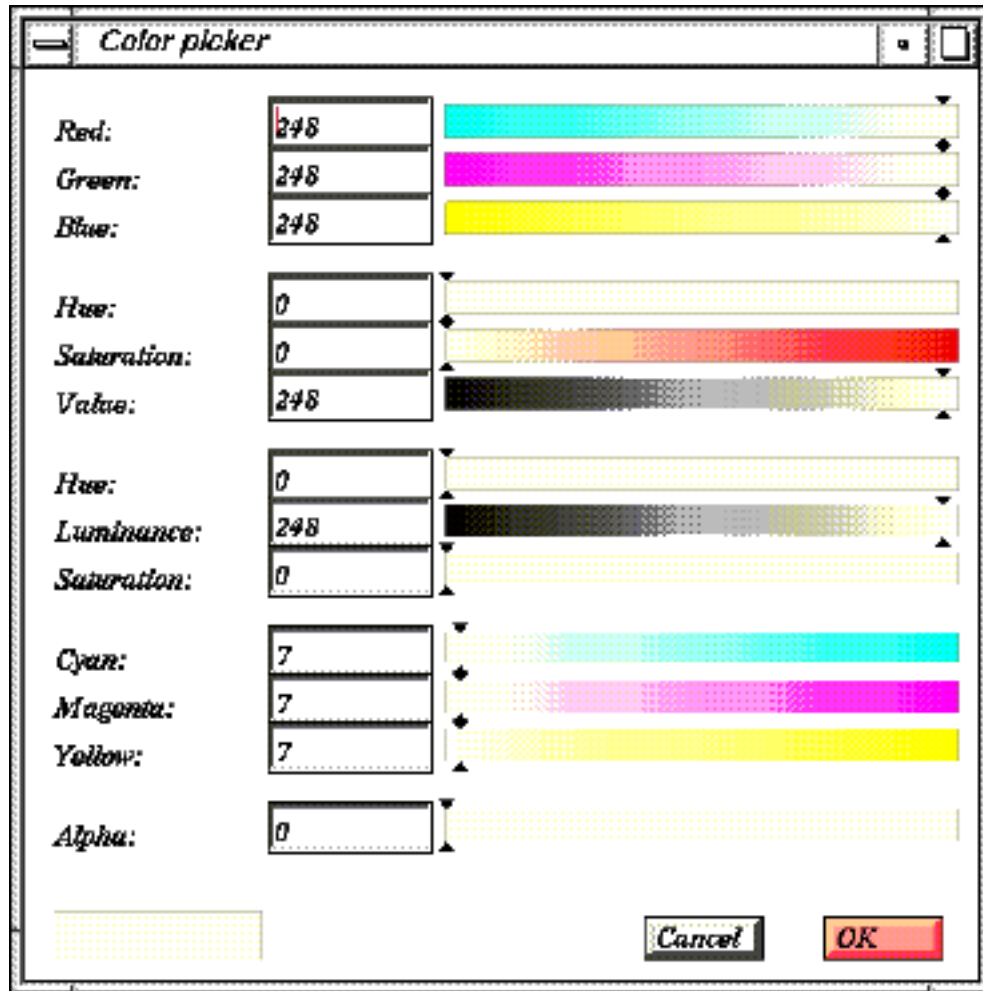
Mixing palette: Clicking on this last button brings up a white area. If you move the mouse into this area, you will see the cursor change into a syringe. Clicking in this state picks up the color under the cursor as the current draw color. If you hold Shift while clicking, you airbrush the current color into the area, creating spreads of that color. This spread is calculated at 32 bits, regardless of the monitor type in use. Holding Shift and center-clicking clears the spread area. Center-clicking without Shift selects the color into the background.



Once the pattern editor is used, you can save the pattern by selecting the color store tool, and clicking on a pattern cel. This tool can also be used to store a color into the palette.

When you save a document, or use Save as when no document is up, you can save palettes and/or patterns using the Save all, Palette only, or Pattern only buttons.

Color Picker



32 bits: The color picker lets you choose a color in RGB, HSV, HLS, and CMY spaces simultaneously. You can enter values numerically, where 0 indicates the lowest possible value, and 255 is the highest value. You can also use the sliders. The black triangles show you the current setting, and the colors of the slider indicate the color you will get by moving the box on the slider to a particular location. The color box at the lower left is the current color. There is one alpha slider, as all color spaces use alpha (transparency) the same way.

64 bits: The color picker lets you choose a color in RGB, HSV, HLS, and CMY spaces simultaneously. You can enter values numerically, where 0 indicates the lowest possible value, and 65,535 is the highest value. You can also use the sliders. The black triangles show you the current setting, and the colors of the slider indicate the color you will get by moving the box on the slider to a particular location. The color box at the lower left is the current color. There is one alpha slider, as all color spaces use alpha (transparency) the same way.

Tools

This position shows the current tool in use, and controls a pop-up window/menu to select and edit tools.

Modes

This position shows the current paint mode, and controls a pop-up list in the Status window to select and edit the modes. Select a mode by clicking on it. Edit a mode by center-clicking.

These modes can be divided into functional groups, and are explained individually and in groups:



Normal mode: New items are painted exactly as shown



Add and Subtract modes: The new paint's RGB values are added to or subtracted from the existing paint's RGB values.



Blend mode: The new paint's RGB values are blended (in a weighted blend) with the old paint's RGB values.



Oil mode: This mode blurs the edges of new paint, mixing in slightly with the existing paint, giving the feel of oil paint.



Minimum and Maximum modes: The Minimum mode compares the color of each pixel of the new paint with the color of each pixel of the old paint. For red, green, and blue (independently), the minimum value is taken, possibly resulting in a third color. For Maximum, the opposite is true.



And, Or, and Exclusive or modes: Each of these modes is an arithmetic mode. And is black if black is painted over black, white otherwise. Or is white if white is painted over white, black otherwise. Exclusive or is black if black is painted over white or white is painted over black, and white if black is painted over black or white is painted over white.



The Watercolor ramp modes: Each of these modes washes new paint over old paint, running from 100% opacity to 100% transparency. The opaque end is at the top, bottom, right, or left, as shown by the black portion of the mode's icon.



User-defined watercolor mode: This mode is initially a ramped wash, varying between opacity and transparency four times horizontally, with no variance vertically. However, the real purpose of this mode is to let you establish your own transparency/wash type.



Circular wash mode is another form of watercolor wash. This wash is 100% opaque at the center, and transparent at the edges, using a spherical fall-off pattern (which is most like the "real world") or a conical fall-off pattern (which artists seem to like more). This mode can be edited.



Partial color modes: Center-clicking this mode gives a dialog in which you can choose to use the Hue and/or Saturation and/or Value and/or Lightness of your draw color or pattern, without modifying the other color components. This mode is useful for coloring and decolorizing an area. The default setting for this mode is to use Hue only. Hue only is useful for coloring, as is Hue+Lightness. Saturation only is useful for decolorizing. The other settings may or may not be useful to you.



The Palette cycle mode fills the area you are painting without regard to the color or pattern you have currently selected, and fills the object painted with colors from the palette. It paints the outer edge or ring of pixels in the painted shape, and paints those pixels with the first color from the palette. The next row of pixels in is painted with the second palette color. The next row of pixels in is painted with the third palette color. This process continues until there are no more pixels to paint. If the number of colors in the palette is exhausted before The Animation Stand runs out of pixels to paint, then it starts from the beginning of the palette again. Thus, if there are 256 colors in the palette, the object painted must be at least 513 pixels wide before a color would be reused. When text is entered in this mode, the outer row of pixels is one color, and the inner row of pixels (you seldom see a font with any portion more than three pixels across) is a second color.



Gel mode: This mode paints like using gel layers. The RGB values of the new and old paint are multiplied (independently in red, green, and blue). Thus, black over black gelled with anything is black, and white gelled with anything is that color, but (for instance) 50% gray gelled with anything is that color grayed down by 50%.



The **Select mode** draws with selection, rather than paint. Anything covered by the "paint" will be added to the selected area, but not in any way modified. Once an area selected, you can use various modification tools and menu selections to affect the selected area.



The **Undo mode** undraws, rather than draws. Anything covered by the new "paint" is undone with data from the Undo buffer (the default setting), or from the original disk file (the alternate setting). Any changes made by this mode are permanent. The settings can be changed by center-clicking the mode icon.



The **Protect mode** draws with protection, rather than paint. Anything covered by the "paint" will be added to the protected area, but not in any way modified. Once an area protected, you can't change anything in it, until you unprotect it using Unprotect from the Effects menu.



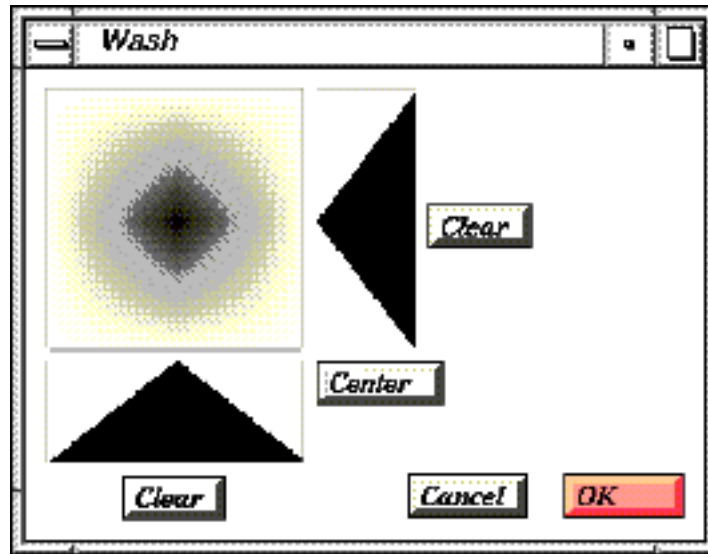
The **Encrust mode** draws into the current document with image from another document, rather than new paint. You can use this mode to airbrush in another image, or a host of other effects. Before you can use this mode, however, you must set up a source document for the current document using the Encrust menu in the Source window dialog of the Options menu.

Blend edit

When you center-click the Blend mode icon, the Blend Edit dialog appears, allowing you to set the blend percentage. A blend percentage of 100 means that new paint is opaque, and a blend percentage of 0 means that new paint will not appear. The default setting is 50%.

User-defined wash edit

When you center-click the User-defined wash mode icon, the User wash Edit dialog appears, allowing you to set up how this wash works:



The boxes on the side and bottom are called “histograms,” and they display your current color usage. If the curve of your color use extends up (in the lower box), or to the left (in the box at the right), then more of your current paint color or pattern is used. Use the histograms to specify your opacity pattern. You can draw in these histogram boxes directly, and every time you do, the large display box will update to show the result. If you hold down Shift as you draw in the histogram boxes, the line you draw will be perfectly straight.

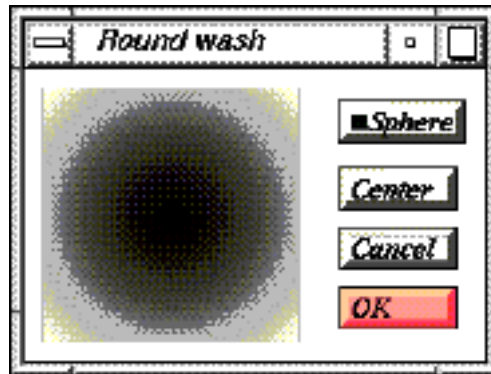
The large square shows you the pattern you are creating. If you click in this square, you will get an even wash based on this point. The type of wash is a “2D spike” curve.

Clicking on the Center button is just like clicking in the exact center of the large box. It sets up a perfectly centered “spike” wash.

Clicking on the Clear button sets all values in the histogram nearest the button to the 100% opaque values. When one of the histograms is completely at 100%, user-defined washes will be much faster than otherwise.

Circular wash edit

When you center-click the Spherical or Conical wash mode icon, the Circular Edit dialog appears, allowing you to set up how this wash works:



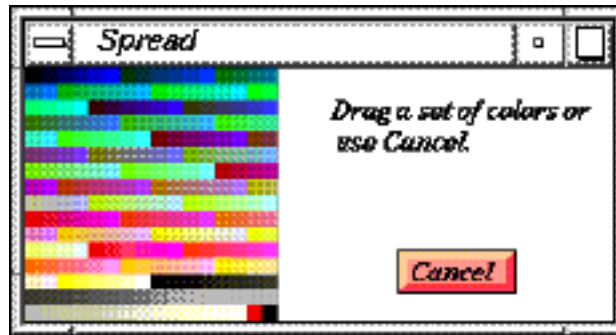
Using the box, you can edit these modes to specify the relative location of the central point of the wash. For instance, you may not wish the wash to radiate out from a point that is dead-center (the default setting), but from a point that starts in the upper left-hand corner of the wash. Click the mouse on a spot in the large box or "bull's eye" from which you would like the opacity of the wash to radiate.

The Center button presents you with an alternative. Pressing this button is equivalent to clicking in the exact center of the wash-controlling box.

The Sphere checkbox allows you to switch between a conical fall-off pattern (looks best), and a spherical fall-off pattern (more "real worldly").

Palette cycle edit

When you center-click the Palette cycle mode icon, the Palette cycle Edit dialog appears, allowing you to set up how this wash works:



The set of colors currently selected for use in the Palette Cycle mode is flashed, just to let you know what you are dealing with.

Let's say you want to fill newly painted items, cycling through the palette, but that you only want to use the 5th through the 8th colors in the palette. Mouse down on the 5th color in the palette. Still holding down the mouse button, drag the mouse to the 8th color on the palette, and release. At this point, the dialog vanishes. You can cancel without selecting a color range with the Cancel button.

There are several interesting types of color cycles to try here. For each of these, you must first set up the palette, and then edit the Palette Cycle mode.

- Set up a wide range of cells containing the rainbow. This will lead to objects being filled with some or all of the rainbow.
- Set up a narrow range of cells containing the rainbow. This will lead to objects being filled with many little rainbow bands.
- Set up eight to sixteen cells with similar metallic looks, but not arranged in any order. Use these to give objects a burnished look.
- Set up a range of cells in an RGB spread between two somewhat similar colors. This will give you what appears to be a region-following wash.

Undo mode edit

When you center-click the Undo mode icon, you are presented with an alert, allowing you to choose Undo mode, where the drawn area will be replaced by older work from the Undo buffer, or the Revert mode, where the drawn area will be replaced by older work from the disk file.

Use HSV mode edit

When you center-click the Use HSV mode icon, you are presented with an alert, allowing you to choose the partial color mode you wish to use. The buttons have the following meanings:

- Hsv Draw hue only, and leave saturation and value unaffected.
- hSv Draw saturation only, and leave hue and value unaffected.
- hsV Draw value only, and leave hue and saturation unaffected.
- HSV Draw hue and saturation, leaving value unaffected.
- HsV Draw hue and value, leaving saturation unaffected.
- hSV Draw saturation and value, leaving hue unaffected.
- Hls Draw hue only, and leave luminance and saturation unaffected.
- hLs Draw luminance only, and leave hue and saturation unaffected.
- hls Draw saturation only, and leave hue and luminance unaffected.
- HLs Draw hue and luminance , leaving saturation unaffected.
- HLS Draw hue and saturation , leaving luminance unaffected.
- hLS Draw luminance and saturation , leaving hue unaffected.

Free draw tools

You can use the free draw tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the Free draw tool list appears in the Status window. To select and use a tool on the Free draw tool list, click on the desired tool.

Each of these tools draws a line wherever you draw with the mouse or a tablet. The tools other than the pencil use the current color or pattern, brush shape and size, and take tablet pressure into account. The pencil tool always draws a 1x1 line.

The tools shown dotted (the second and fourth) draw by stamping pen images. The distance between the pen images are controlled by editing individual pens.

Selecting a "cross" tool constrains movement to one of the axes.

The last tool in this set is the line painting tool. It uses a brush three times as large as specified, without pressure sensitivity, and in paint-over (maximum) mode. Use it for painting over lines to get color lines.

Arc tools

You can use the arc tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the Arc tool list appears in the Status window. To select and use a tool on the Arc tool window, click on the desired tool. Tools can be edited by center-clicking them.

There are really three tool groups here:



The arc tool draws a quarter of an oval. Mouse down and drag the mouse to another position. An arc will form stretching from the starting to the ending mouse position. If you use the center mouse button or the second tool in this pair, the arc will be constrained to a quarter of a circle.



The 3-point arc tool allows you to modify the arc you paint. Mouse down to begin defining a line. At this point, the tool seems just like the Line tool. If the center mouse button is used, the line is constrained to the horizontal or vertical axis. Release the mouse. The cursor now appears in the shape of tweezers. Move the tweezers to an area of the arc and depress the mouse button. Move the mouse up and down. The line then becomes an arc, and moves in the direction in which you are moving the mouse.



The Spline tools in some ways behave as a set of tools, and in some ways behave as a single tool with 5 modes. Splines in The Animation Stand differ from splines in other programs, so let's start at the beginning. A spline set is a set of spline curves which are being edited. While a spline set is being edited, its colors and patterns, line sizes, and position are not firmly defined. Each of the points, lines, and curves can still be affected without affecting the underlying document, since the spline set is still riding over the document. Each of the spline curves in the spline set (one or more) contains a start point and an end point, shown in red. These points are called on points, since the curve must touch on that point. A spline curve may also have additional on points, through which the curve is obliged to pass, and on which the curve may make an angle turn. Additionally, spline curves tend to have off points, shown in blue. The curve must approach an off point, but generally will not touch it. These points are also known as "gravity points". Points actually on the spline curve are shown in the current draw color or pattern. Also, lines from control point to control point are shown in cyan.

The first tool, showing a line between two red points establishes a new spline curve in the spline set. Choose this tool and drag out a line. As soon as the line is created, you are switched to the third spline tool, which establishes new off points.

The second tool, showing a line and an additional red point is used to create new on points within a spline. Mouse down on a line, and drag to a new position. The curve will pass through this new point.

The third tool, showing a line and an additional blue point is used to create new off points within a spline. Mouse down on a line, and drag to a new position. The curve will pass near this new point, but will probably not touch it. Also, a new set of cyan lines will form to show the connections between this control point and its neighbors.

The last two tools are used to delete and move points, respectively.

When you choose a non-spline tool, the spline set is locked into place, and becomes a part of the document. The spline tools can be selected using the letters Z, X, C, V, and B once a spline set is started. These letters correspond to the first through fifth spline tools.

All of the multi-click curve tools draw their curves as a large number of small, straight lines. You can edit the tools (using center-click) to change the number of line segments in an arc section.

Rectangle tools

You can use the rectangle tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the Rectangle tool list appear in the Status window. To select and use a tool on the Rectangle tool list, click on the desired tool.

Mouse down to establish a corner (or center for centered tools [those showing a cross in their center]), and drag to establish another corner. Depending on the tool selected, you will get a rectangle or square, outlined or filled.

Holding down Shift will fill the item, even if you are using an outline tool. The center mouse button will constrain the item to a square. Holding down ALT will center the item being drawn.

Text tool

The text tool allows you to add text to your document. Once the text tool is in use, clicking anywhere in the text edit area allows you to edit your text edit. Clicking outside the text edit area (above and/or to the left) ends the current text edit and begins another. The Edit, Font and Size menus can affect all or part of the text being edited.

While the text tool is in use, ALT-Shift-V will insert the name of the current window into the text edit.

Movement tools

You can use the movement tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the Movement tool list appears in the Status window. To select and use a tool on the Movement tool window, click on the desired tool.



Use the Move tool whenever you wish to move a selected area or to offset the entire document. With it, you can drag the selected area to a new location, where it will float until some action requires it to drop back into the document. Newly uncovered areas are replaced with the background color. If the center mouse button is used, the area is copied, rather than moved.



Use the Copy tool to copy, rather than move a selected area.



Resizing tools resize the marked area of the document, or the entire document, if there is no selection active. Whenever either resize tool is active, the Status window shows the horizontal and vertical magnifications in percent of original size, displayed in green. Thus a display of H: 100% V: 100% means that the area is unchanged, while a display of H: 200% V: 100% would mean that the area has doubled its size in the horizontal dimension only. The center pixel of any marked area does not move. Grab any other pixel and drag it to a new location, squashing or stretching the selected area.



The magnification tool works as above, except that the area is magnified equally in its horizontal and vertical coordinates, maintaining its aspect ratio.

Magnification tool

Use this tool to change the magnification of a document at a default of four times the previous power, up to one pixel. This tool can be used to enlarge or reduce.

To enlarge around a particular pixel or location, click on that location. A new window is opened into the document, with the clicked point in the center of the new window. Two windows into the same document are now open. The magnification shows in the Status window.

You may now arrange the windows so that you have a normal and 400% view into the same area of the document. If you draw into one of the windows, you'll see the change occur in both windows, because these windows are connected to the same document. You may magnify as many times as you wish. No matter how many times you magnify (and, therefore, no matter how many windows of the same document are open), a change made in one window in a document occurs in all of the other windows into the same document.

All pens, tools, colors, and patterns work in the magnification windows.

When done, close the magnification window.

You can edit the amount of magnification performed by the magnification tool by center-clicking the tool icon. An edit appears, asking the power of future magnification, 12.5%, 25%, 50%, 200%, 400% (the default), or 800%.

If you center-click the document, the effect of the Magnify tool is reversed, changing magnification to reduction, and vice versa.

Color tools

You can use the color tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the Color tool list appears in the Status window. To select and use a tool on the Color tool list, click on the desired tool



The Syringe tool: Selects foreground and background colors, as well as selects source ranges for the RGB and HSV block change functions.



The RGB & HSV spread tools: Create a palette spread



The Color wheel tool: Pick a color



The Color store tool: Save a color or pattern



The Brush loader: Load a brush from a document



The Art Director tool: Annotate a style sheet



The Pick Color tool: Pick a palette color by name

Syringe

You may have a complex painting and wish to find out what color is used on a particular part. You can use the Syringe tool to find out the exact color contained in a pixel, and at the same time select it as your current color. Note that this tool also has an effect on the Change RGB block and Change HSV block selections of the Effects menu.

- Step 1 Click on the Syringe tool.
- Step 2 Move the mouse into the document area. Notice that the cursor becomes a syringe.
- Step 3 Locate the syringe on the area whose color you wish to determine and click the mouse. Alternatively, you may hold the mouse button down, and the Status window will update each time the cursor passes over a new color.

32 bits: Notice that the Status window then tells you which color is selected, as R (red), G (green), and B (Blue) component values, each between 0 (OFF) and 255 (100%). You may now paint with this color. If the color is opaque, the color numbers are shown in black. If the color is fully transparent, the color numbers are shown in red. For partially transparent colors, the displayed numbers will be somewhat red.

64 bits: Notice that the Status window then tells you which color is selected, as R (red), G (green), and B (Blue) component values, each between 0 (OFF) and 65535 (100%). You may now paint with this color. If the color is opaque, the color numbers are shown in black. If the color is fully transparent, the color numbers are shown in red. For partially transparent colors, the displayed numbers will be somewhat red.

The Syringe tool is a “one-shot” tool. That is, The Animation Stand reverts back to the tool you were working with before you clicked on the Syringe tool as soon as the tool is used. Thus, you can be painting with the Free draw tool, for instance, use the Syringe tool to pick up a color, and then immediately continue using the Free draw tool without reselecting it.

Center-clicking will load the color as the background color.

Once you have loaded a color as your current color with this tool, you may then use the Palette Store tool to store the color into your palette. This step is not required to draw with the color; it is only used to save it. Once the color is in your palette, you may ALT-click it into your user-tool palette.

RGB and HSV spread

The RGB and HSV spread tools appear as a RGB and HSV spreads from green to red. They are immediate action tools which create an RGB or HSV spread between any two palette cells. When you click on a spread tool. The following dialog box displays:



If you drag a set of colors on the palette, all colors in the set between the first dragged color cell and the last dragged color cell will be “spread” from one color to the other, much like smearing paint across a palette.

If you choose this tool in error, you can abort the process by clicking Cancel when the dialog appears

Color picker

The Color Wheel tool allows you to select a color, whether or not the color is on the palette.

Store tool

The Color/Pattern Store tool allows you to store colors into the Color Palette, and to store patterns into the Pattern List.

Storing a Color into the Color Palette

- Step 1 Click on the Color/Pattern Store tool. The Palette window displays, whether or not it had previously been displayed.
- Step 2 Click on a Color cell. That cell will be replaced by your current paint color. If your current color is a pattern, then the last actual color you had selected is stored into the palette cell clicked.

Storing a Pattern into the Pattern List

- Step 1 Click on the Color/Pattern Store tool. The Palette window displays, whether or not it had been previously displayed.
- Step 2 Click on a Pattern cell. That cell will be replaced by the pattern currently being edited. If no pattern is being edited, then that Pattern cell will be replaced by another copy of the last pattern to be edited. If no pattern has been edited, then the clicked pattern cell becomes an all-white pattern. When the pattern is stored into the Pattern List, the pattern edit in progress is considered ended, and the pattern edit portion of the Palette window is again hidden.

Brush loader tool

This tool, in the image of a brush, is used to load a special brush into the Special brush cell of the Pen window, and at the same time, select an item as a brush.

- Step 1 Open a window containing your brush or brushes, normally the document Special pens. Alternatively, you could create a new document and draw a brush.
- Step 2 Select the Brush loader tool.
- Step 3 Click on the image of a brush.
- Step 4 Go back to your old document.
- Step 5 Draw with your special brush.

Art Director tool

This tool is used to annotate a style sheet with the color names used.

- Step 1 Paint a style sheet.
- Step 2 Name all your colors, using the expanded form of the palette window.
- Step 3 Click on the art director tool.
- Step 4 Go back to your old document.
- Step 5 Drag a line from a colored area to a blank space. A line is drawn, and the name of the color is placed at the end of the line. Your current pen size and font specifications all have effect.

Pick Color tool

This tool is used to pick a color by name.

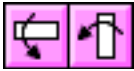
- Step 1 Click on the Pick Color tool. A dialog appears asking the name of the color.
- Step 2 Enter the name of the color you want, as it appears on the palette in the expanded, named form, and click OK. Case is irrelevant. This will be your new current color.

2D distortion tools

You can use the 2D distortion tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the 2D Distortion tool list appears in the Status window. To select and use a tool on the 2D distortion tool list, click on the desired tool. Tools can be edited by center-clicking on them, whether they appear on the 2D distortion tool window, or on the Status window.



The Rotation tools will rotate the selected area (or the entire document, if there is no selected area). The area will rotate around its central pixel. When you mouse down over the selected area, a “clock face” display appears, showing the selected amount of rotation. Drag the mouse around the clock face to establish a rotation angle. The current amount of rotation appears in the Status window. Release the mouse to rotate the object. Using the tool showing the degree symbol, the rotation is always an integer number of degrees. The center mouse button will constrain movement to 15° increments.



The flip tools will immediately flip the selected area (or document) in the indicated direction.



The Bend tools will bend the selected area (or document). Mouse down on or near the selected area. An outline will form showing how the area will be bent. Drag the mouse around to create the desired bend, then release the mouse button.



The Twist tool allows you to twist a selected area about a vertical line, twisting the object as little or as much as you like. Mouse down on or near the left or right edge of the selected area. As you drag the mouse, you will see a criss-cross pattern. This shows how the object will be twisted. As you drag the mouse towards the top of the selected area, the twisting effect becomes more and more pronounced. As you move to the bottom of the selected area, the twisting will reach exactly 180°. Extending the mouse below the bottom of the selected area will result in a twist of less than 180°. When you release the mouse button, the actual twist will take place.



The Tilt tools allow you to tilt a selected area (or document). Mouse down in the selected area, and drag the mouse up and down (or left and right). As you do, an outline will show the prospective tilt, and the status window will show the angle. When you release the mouse button, the tilt will occur.

Polygon tools

You can use the polygon tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the Polygon tool list appears in the Status window. To select and use a tool on the Polygon tool list, click on the desired tool. Tools can be edited by center-clicking on them.



The polygon tools paint either a closed or an open polygon. Click the mouse button to begin drawing the polygon. As you move the mouse, a line drags with it. Each time you click again, you establish another point in the polygon. To end the polygon, double-click a point, or click once on the point that started the polygon.



The blob tools are much like the free draw tools, except that when you mouse-up, the area is closed and/or filled: Mouse down, drag out an outline, and release the mouse.



The Regular Polygon tools draw outlined or filled equilateral polygons, hexagons, by default. Mouse down on the point which is to be the center of the polygon. As you drag the mouse, a polygon will form, with the center of the polygon staying where you first moused-down, and one of the vertices always under the cursor. To edit the tools to draw polygons other than hexagons, center-click on the tool's icon. You may then enter the number of sides.

Registration tool

This tool allows you to set the registration point of a painting. Click in the document at the new registration point location. The registration point is used to control where items are placed using the Top and Left fields in the Exposure sheet. It is also the center of magnification for the Mag and V.Mag fields, and the center of rotation for the °R field.

Once the registration tool is used, all documents display their registration points. You can stop the registration point display by center-clicking this tool.

Scroll tool

The scroll tool is used to scroll the document. One means of moving the contents of a window about is to adjust the scroll bars. A second means is to use the Scroll tool. You may click and drag a pixel in the window to another location, scrolling the window. This does not alter the contents of a document, only how the document is displayed.

Line tool

The Line tool allows you to paint a straight line that can be stretched and moved. The center mouse button constrains the line to the horizontal or vertical axis.

Oval tools

You can use the oval tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the Oval tool list appears in the Status window. To select and use a tool on the Oval tool list, click on the desired tool.

Mouse down to establish a corner of an invisible rectangle defining an oval (or center for centered tools [those showing a cross in their center]), and drag to establish another corner. Depending on the tool selected, you will get an oval or circle, outlined or filled.

Holding down Shift will fill the item, even if you are using an outline tool. Using the center mouse button will constrain the item to a circle. Holding down ALT will center the item being drawn.

Rounded rectangle tools

You can use the rounded rectangle tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the Rounded rectangle tool list appears in the Status window. To select and use a tool on the Rounded rectangle tool list, click on the desired tool. Tools can be edited by center-clicking on them.

Mouse down to establish a corner (or center for centered tools [those showing a cross in their center]), and drag to establish another corner. Depending on the tool selected, you will get a rectangle or square, outlined or filled.

Holding down Shift will fill the item, even if you are using an outline tool. Using the center mouse button will constrain the item to a circle. Holding down ALT will center the item being drawn.

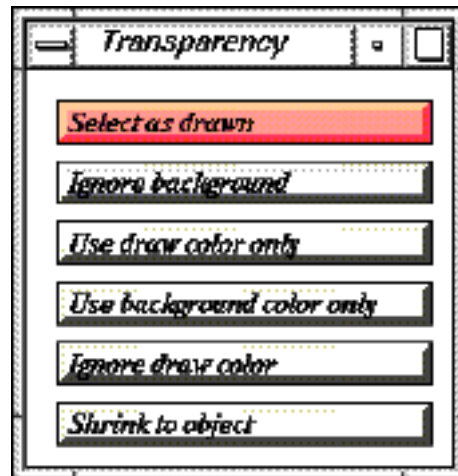
Editing these tools allows you to define the curvature of the corners. You can enter the curvature in pixels, or as English or metric units.

Selection tools

You can use the selection tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the Selection tool list appears in the Status window. To select and use a tool on the Selection tool list, click on the desired tool. Tools can be edited by center-clicking on them.



Each of these tools is used to select some or all of the document. The standard marquee tool selects a rectangular area. The lasso tool allows you to draw out a selected area. The Select Entire Document tool (a document in a select box) immediately selects the entire document. The polygonal selection tool works like the polygon tool, but selects, rather than fills an area. If you select an area without using Shift, that area is selected, and any previous selection area is discarded (just the selection area, not the contents). If you use Shift, the new selection is added to the old selection area. If you use minus, the new selection is subtracted from the old selection area. Normally, each of these tools selects as explained above. However, you can edit each of these tools to modify the selection process. If you center-click on one of these tools, you are presented with an alert:



Select as drawn: This button affects the tools so that they immediately select exactly what you ask for.

Ignore background: This button causes The Animation Stand to ignore the current background color when selecting the area. Every color which is the same as the background color is excluded from the selection.

Use draw color only: This button causes The Animation Stand to ignore everything but the current draw color (or last draw color, if the current draw “color” is a pattern) when making the selection.

Use background color only: This button causes The Animation Stand to use only pixels of the current background color in making the selection.

Ignore draw color: This button causes The Animation Stand to ignore every pixel of the current paint color (or last paint color, if the current paint “color” is a pattern) in making its selection.

Shrink to object: This button uses another type of background transparency in making its selections. When this mode is selected, the Marquee, Lasso, and Polygonal Select tools first let you draw out the shape to be selected. When you release the mouse button, The Animation Stand looks at the pixel on which you moused down. That pixel, and all adjoining pixels of the same color are excluded from the selected area. Thus, the effect is that the selected area will “clamp down” or “shrink onto” objects within the drawn selected area. When this button is used in conjunction with the Select Entire Document tool, area, the pixel at the upper left-hand corner of the document is excluded from the selection area, as are all adjoining pixels of the same color.



The **Expand** tool immediately causes the selected area to expand by one pixel. You can edit this tool to expand by some other number of pixels, or set it to contract by some number of pixels by entering a negative number.



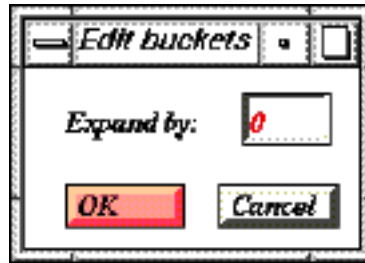
The **Shrink** select tool is the same as the standard selection marquee, except that it always uses the **Shrink to object** method, but without an expansion area.

Paintbucket tools

You can use the Paintbucket tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the Paintbucket tool list appears in the Status window. To select and use a tool on the Paintbucket tool list, click on the desired tool



The first bucket is called **Paint Bucket**. It takes the current color or pattern and floods from the point the mouse touches down to all contiguous points of the same color, much like pouring paint into an area. This tool is affected by the **Color slop** setting of the Preference dialog of the Options menu. This tool, like the other paint bucket tools, may be edited. Center-click on this tool to bring up the edit:



Expand by controls how the paint will flow. When **Expand by** is set to 0, paint flows where it normally would. If **Expand by** is set to 1, paint will flow 1 pixel past where it otherwise would, and so on for higher numbers. You may also use units, such as mm. This setting is most useful for painting scanned documents, where grayscale line quality is used. To effectively paint under a line, and take its quality into account, set your mode to **Minimum** (fastest) or **Gel** (most accurate), and **Expand by** to 1 (or in some cases 2). The paint will flow past the line, but go “under” it, since the line will be protected by the **Minimum** mode.



The second paint bucket is the Bounded Fill tool. Rather than filling the contiguous area of the same color, the Bounded Fill tool uses the paint color or pattern to fill up to, but not including, the boundary color. Select a boundary color by clicking in a palette or pattern cell. Then, select a fill color or pattern by clicking in another color or pattern cell. Next, click in the document area. The cursor is, at this point, a paint bucket, with a painted-in boundary. The Status window displays a circle of the current color or pattern surrounded by corners of the boundary color:



The last color or pattern selected is the paint color. The one before that is the boundary. Thus, the paint color and boundary color may be chosen before, after, or before and after choosing the Bounded Fill tool. You can't use a pattern as a boundary, since no pixel contains a pattern—all pixels are pure color. As with the Paintbucket tool, this tool is affected by the Color slop setting.



The third paint bucket is the Fill Selected Area tool. This is an immediate action tool; that is, it immediately fills the selected area. If there is no selected area, it fills the entire document.



The fourth bucket is called the Fill with Protection tool. It pours an “enamel” over the area you are painting, in the same manner as the Paint Bucket tool, to prevent the area from further modification. For instance, if you click with this tool in a blue area, that entire blue area will have “enamel” painted over it. No further modification will be possible on that area until you remove the “enamel” by using Unprotect from the Effects menu. The protected area displays with a flashing border. This let you know that the enamel is there. You may protect as many areas as you like. However, when you unprotect the areas, all the areas are unprotected together. As above, the Color bits setting is germane.



The next bucket is called the Fill with Selection tool. It adds the area of color to the selection area, in the same way as the Fill with Protection tool adds an area to the protected zone.



The last bucket is called the Paint behind bucket. It is equivalent to the standard bucket, except that it always paints in the Paint behind (minimum) mode, and always expands one pixel, unless more pixels are selected.

The next four paintbuckets are used for auto-painting. Auto-painting allows you to paint a series of outlined or scanned cells, and save them, as one smooth-flowing, continuous operation. Since this is best described as a whole, we will show the various tools involved, give their names, and then describe auto-painting as a set of operations, rather than describe the uses of individual tools.



The Delete Bucket tool.



The Move Bucket tool.



The Edit Bucket tool.



The Auto-Paint tool.

Normally, you will use Auto-painter to paint a large number of cells all at once. The more you do at one time, the more efficient things will be. To draw your cels, draw a large number of cels on registered paper, and then scan the cels in. Take note of your scanner setting. When drawing or scanning, assign sequential names. For instance, we might do Fawn01 (or Fawn1) through Fawn72.

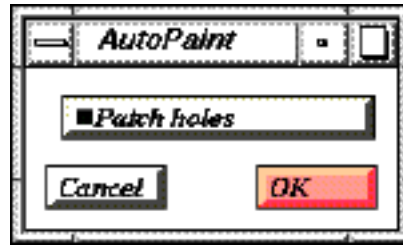
If this is your first time though this, or even the second, you may want to use the shell to make a copy of the whole group of drawings, since Auto-paint is going to rewrite all of the cels.

Do the following for each cycle of cels:

- Step 1 Use ALT-O to open the first cel of the cycle.
- Step 2 Use the regular old draw tool to close any gaps in the lines. You may also color lines.
- Step 3 Paint the character as you normally would, but use only the Paintbucket tool. You may use any combination of colors, patterns, modes, and overfill settings. Note that if you Undo anything, you will have to explicitly delete something later, but we'll get to that, too.
- Step 4 Save this cel and go on to the next one using Next cel (ALT-8).

- Step 5 Do the following for each subsequent cel in the cycle:
- Step 5a The cel has already appeared. Use the draw tool to fill in any holes in the lines. You may also color lines.
- Step 5b Now, let's take a look at where the automatic buckets will fill. Select the Move buckets tool. The Edit buckets tool or the Delete buckets tool will also do, but they're not as safe. A diamond shape will appear in each location you previously painted. On subsequent cels (numbers 3 and on), these will be corrected for area motion and distortions. If, for any reason, the paint indicators have a problem, you can correct them:
- If the bucket marker is in the wrong place, you can drag it to a new location, using the Move buckets tool. Mouse down on the bucket marker and drag it to a new location.
- If the bucket marker is for an area which no longer appears, use the Delete bucket tool to delete it from the paint list, by clicking on a bucket marker. The bucket marker will vanish.
- If a new area has appeared, don't worry about it yet.
- If you want to change the color, mode, pattern, or over-fill setting of a marker in the list, set up as you normally would; then click a marker with the Edit bucket tool.
- Step 5c Click on the Auto-paint tool (the pink immediate action tool of the set). There will be a pause, and all pre-existing areas of the document will have been painted.
- Step 5d Use the normal Paintbucket tool to paint any newly appearing areas. These areas will be added to the paint list for the next cel in the cycle.
- Step 5e Advance or finish with Next cel (ALT-8).
- Step 6 Use Clear all from the Edit menu to clear the old auto-paint list out of memory. Be sure you have no documents open at this point.
- Step 7 Go back and start the next character cycle, or you're done!

Center-clicking on any bucket except Delete Bucket gives you the option patch holes before painting:



Center-clicking on the Delete Bucket deletes the entire auto-paint list.

You can switch between the tools used in batch painting by using A, S, D, and F.



The last paint bucket is the "Alpha inversion" paintbucket. It translates shades of gray into alpha, and alpha into shades of gray, antialiasing or reverse aliasing in the process. The effect of this is that if you scan a document in at 72 DPI gray scale, set your paintbucket expansion to one pixel, and then click in the background, you will get a black background, which is alpha-transparent. The fall-off on this alpha channel will result in a perfect compositing look when the document is later brought into the exposure sheet using the COMPOSITE Notes command.

Eraser tools

You can use the eraser tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the Eraser tool list appears in the Status window. To select and use a tool on the Eraser tool window, click on the desired tool.



The Eraser tool erases what it touches and replaces it with white. The eraser tool paints white squares, 15x15 pixels. If you move the eraser too fast, some areas might not be erased. This method of erasing gives you slightly more control of fine movements, but cuts down on the ability to paint broad lines quickly. If you need to paint great swaths of 15x15 pixel lines, use a 15x15 pen, the Free Draw tool, and white paint. If the center mouse button is used, this tool is constrained to the horizontal or vertical axis. If you center-click the Eraser tool, the entire document will be erased.



The Magic Eraser tool erases the last change you made to the document (other than a change made by the Magic Eraser tool). The Magic Eraser tool is a special form of Undo. As such, the effect of the Magic Eraser tool can't itself be Undone.

Step 1 For example, paint two squares of different colors in your document, the corners of which overlap slightly:



Step 2 Click on the Magic Eraser tool. The cursor will appear as an eraser with a starburst in the center, reminding you which tool you are using.

Step 3 Point the mouse at the upper left-hand corner of the uppermost square.

Step 4 Press down on the mouse button and slide the mouse diagonally through the squares.

Step 5 Release the mouse.

The first-painted square will not be affected. The second-painted square will be erased, showing both white and the first-painted square behind it:



This erasing is actually accomplished by doing an Undo, like the Undo from the Edit menu, but the undone area, rather than being the entire document, is only the area swept out by the Magic eraser tool.

If the center mouse button is used, this tool is constrained to the horizontal or vertical axis.

Center-clicking the Magic Eraser tool is equivalent to selecting Undo from the Edit menu.

3D tools

You can use the 3D tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the 3D tool window appears.

To select and use a tool on the 3D tool window, click on the desired tool. Tools can be edited by center-clicking on them, whether they appear on the 3D tool window, or on the Status window.

User-defined sphere

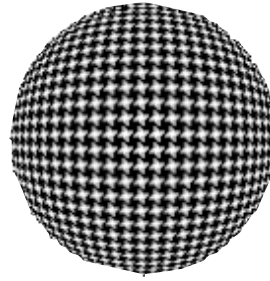
This tool allows you to “wrap” a selected area of the document onto a created sphere, which you manually define.

Think of “wrapping” a sphere like taking a basketball and shrink-wrapping it with a piece of cellophane.

Let's create a background with which to wrap a sphere.

- Step 1 Start with a fresh document.
- Step 2 Select a pattern from the Palette window.
- Step 3 Select the Marquee tool from the Tool window.
- Step 4 Select a small square in the center of your document, taking up a few square inches at the center ninth of the screen.
- Step 5 Select the Fill Selected Area immediate action tool to fill this selected area with the selected pattern.
- Step 6 Select the Wrap onto User-defined Sphere tool.
- Step 7 Move the cursor, which now appears as a pointing finger, to the center of your selected and filled area.
- Step 8 Mouse down in the center of the area and drag out a circle which covers only about half of the selected area.
- Step 9 Now let the mouse go. The Animation Stand will wrap the pattern into the shape of the sphere you drew. The result will be displayed when done. Also, the Status window shows a count-down in red. This is the number of scan lines left in the computation.

At this point, the result should look something like this:

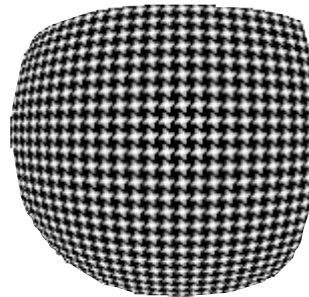


Note that the result of the wrap is still selected.

Step 10 Now, let's undo the effect of the wrap. Press ALT-Z to reverse the effect of the wrap.

Step 11 Select the Wrap onto User-defined Sphere tool again.

Step 12 This time, mouse down in a corner of the document, and drag the circle out as large as it will get before releasing the mouse. The Animation Stand will now attempt to wrap this small bit of pattern onto a rather large sphere. The result will be that there is not much distortion. The selected area maps itself as best it can to where the marked portion would have been had it been a part of an infinitely large select area, something like this:



This effect can be used to generate reflections on soap bubbles and the like.

Step 13 Select the Magnify tool.

Step 14 Click on a portion of the wrapped area. There are two interesting things to note when the new magnified window opens up. First, note that the flashing effect of the select area carries with the document. Each window into the document has the same selected area. Also, note that in some places, the lines of the pattern appear to have been smudged, or brought partially out of focus. This is because of antialiasing. Antialiasing is a process whereby the image is painted in such a way as to avoid sharp edges.

The Animation Stand performs such painting by calculating where the light for each pixel came from, and then painting that pixel. Thus, objects are actually painted as multifaceted objects, one facet per pixel. While the computation is taking place, the number of lines left to compute will be displayed in the Status window in red.

Other user-defined

Like the sphere wrapping tool, there are tools to wrap an area of the document onto cylinders, cones, and oblate spheroids. Except for the shapes that they draw (obvious from the icons), the operation of these tools are identical to the operation of the User-defined Sphere Wrap tool.

Fold onto cube

These tools fold a selected area onto the sides of a cube, the sides of which are one-half of the maximum of the original area's height and width, for the tool without the orange cross in it (which may leave white space), or one-half of the minimum of the original area's height and width, for the tool with the orange cross in it (which may exclude more of the original image).

- Step 1 Select an area with the Marquee. If you wish to duplicate the entire document onto the cube (meaning that some of the document will be lost off the edges), do not form a selected area.
- Step 2 Select this tool. Notice that the cursor now appears as a finger.
- Step 3 Mouse down in the document. A square will appear in the document, and a pair of angles (in blue) at the bottom of the Status window. As you move the mouse down and/or to the right (without letting go of the mouse button), the square will appear to actually be a cube, which rotates under mouse control. The angular measurements in the Status window give you reproducibility, where "R" stands for the degrees the cube has rotated to the right, and "D" stands for the degrees the cube has rotated downwards.

NOTE: Since the rotation of the cube is limited to 0 to 90°, you will only see one, two, or three sides of the cube. You will never see a fourth side.

Step 4 Drag the cube into a desired position.

Step 5 Release the mouse.

The selected area will fold itself around the cube. The number of lines left to compute will be displayed in the Status window in red.

NOTE: Because some of the painting is a folding operation, part of the painting will be lost.

NOTE: If the selected area is not square, holes will be left in the final cube.

Copy onto cube

The Copy onto Cube tools are equivalent to the Fold onto Cube tools, except for two differences. First, the formed cubes are as large as the selected area, rather than half as large, and second, the selected area is stamped onto each face of the new cube, rather than folded onto the cube.

Extrude—Relight

This tool is used to

- change a 2D picture into a lighted 3D item. It applies the lighting, as set to the selected area, and
- apply an additional light to generally round objects.

Step 1 Set up your lighting. There are two ways of doing this. One way, and by far the simplest at this point is to edit the lighting by center-clicking on the User-Defined Sphere tool, clicking on the 50/50 button, and then by clicking OK.. Alternatively, read ahead to the Lighting Edit description in the Editing Tools section later in this chapter, and then come back to this point.

Step 2 Select an area with the Marquee or Lasso tool.

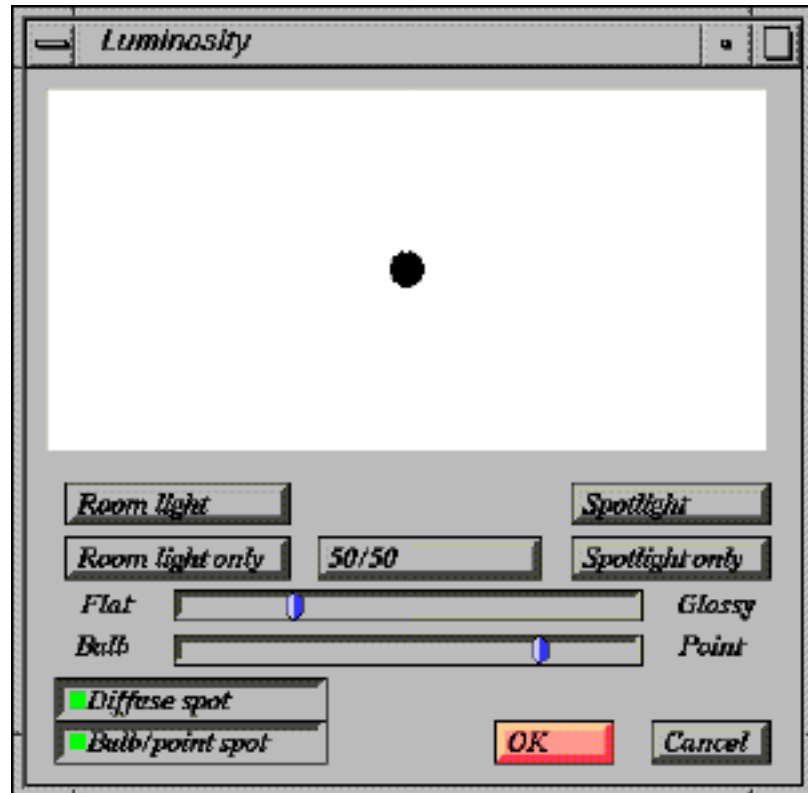
Step 3 Select the Relight tool. This is an immediate action tool, so the effect will begin right away. The lighting set up in step 1 will be applied to the area. Everything inside the selected area will be considered part of the object, and everything outside of the area is outside of the object. The shape of the select area is analyzed to determine what the object must look like in 3D. The model used for this process works best for living things. Thus, applied lighting on people and fruit will work well. Applied lighting on cars and toasters will not. The number of lines left to compute are displayed in red in the Status window.

Best-fit tools

For each of the user defined 3D tools (sphere, cylinder, cone, and oblate spheroid), there is an equivalent Best-fit tool. The best fit version of each of these tools will immediately (without further user interaction) wrap the selected area (or document) onto the largest sphere (or cylinder, cone, or oblate spheroid) onto which it will fit. Generally, this means that for something N pixels across, the new object will be about 35% smaller.

Lighting edit

When you center-click on one of the 3D tools, the following dialog appears:



The “map”: This drawing is a Mercator map of the object’s view of a light source. The white rectangle denotes the edges of the object’s field of view, and the black circle represents the direction from which the light is originating. You can use the mouse to drag this lighting source to various positions. As you drag the lighting source around, the current right ascension and declination (angular measurements used for view angles) are displayed in blue in the Status window. When the black circle is at the center of the ellipse, lighting comes from directly in front of the object. When the black circle is at the left or right of the ellipse, lighting comes from directly behind the object. When the black circle is half-way in from the left of the ellipse, lighting is from the object’s left. When the black circle is half-way in from the right of the ellipse, lighting is from the right of the object. When the black circle is at the top of the ellipse, lighting is from above the object. And when the black circle is at the bottom of the ellipse, lighting is from below the object. The color of the ellipse, while white now, actually indicates the color and brightness of the room lighting. The color of the small circle, while black now, actually indicates the color and brightness of the spotlight, or lighting source.

The Room light button allows you to set the room light color yourself by bringing up the Color Picker.

The Spotlight button allows you to set the spot light color yourself by bringing up the Color Picker.

The Room light only button is a preset, which sets the room light color to white and sets the spot light color to black. When this button is selected, and the lighting color is white, The Animation Stand has a special case, which allows it much faster operation.

The 50/50 button sets the room light and spot light colors to 50% gray.

The Spotlight only preset button sets the room light color to black and the spot light color to white.

Diffuse spot: When this checkbox is checked, a normal diffuse lighting component is used; that is, the object will show diffused lighting from an infinite distance. There is absolutely no reflection or glint from the bulb seen from this lighting component. This is the type of lighting you see when you look at the moon.

Bulb/point spot: When this checkbox is checked, a glint or glare is applied; that is, there is glare from the direction of the light source, in the color of the light. The amount of glare also depends on the flat/glossy setting (explained below). The glossier an object is, the more glare the object reflects.

Flat/glossy slider: This item controls glossiness of the object. Fully flat means that the object reflects light back only to the extent that the illuminating red lighting matches the object's red values, that the illuminating green matches object green, and blue for blue. Fully glossy means that the object reflects all light, without regard to the object's own color. Real world objects tend to be in the 25% to 75% glossy range.

Bulb/point slider: This item controls the size of the reflected light source, if the light source is to reflect back at all. When the light source setting is at the left, a rather large and indistinct bulb reflection is used. When the slider is at the right, a sharp point glare reflection is used. You have a wide range of reflections to work with here, and as usual, 25% to 75% settings will probably seem most real-world.

Pixelization tools

You can use the pixelization tool shown on the Status window by clicking on it and releasing the mouse button very quickly. If you mouse down on this position and hold, the Pixelization tool list appears in the Status window. To select and use a tool on the Pixelization tool list, click on the desired tool. Tools can be edited by center-clicking them.



The Blur tool immediately blurs the selected area, by averaging nearby pixel values. This tool can be edited to take a varying number of pixels into account.



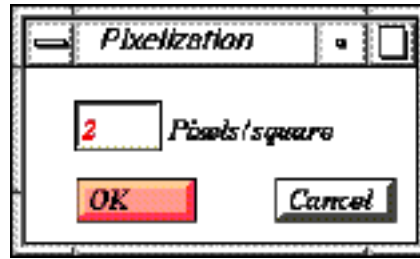
The Smudge tool works like a finger on charcoal, and allows you to blur an area using the current pen nib as the size and shape of the smudging tool. The best pen size seems to be from 5 to 11 pixels across. You'll have to experiment to see which pen nib suits your taste for this tool. Every place you paint is smudged in the direction of motion. If the center mouse button is used, this tool is constrained to the horizontal or vertical axis. This tool can be edited to take a varying number of previous pixels into account.



The Pixelize tool takes an area and reformats the color in the area to make it look like the area contains giant pixels of various colors. The number of pixels in a "giant pixel" is controlled by editing this tool.

The Blur, Smudge, and Pixelize tools can be edited as follows:

Step 1 Center-click on the Blur tool. The following dialog appears:



The normal setting here is 2 pixels per square; that is, a distance of pixels is considered in computing the effect of each of the tools. For example, setting this number to 3 would mean that a distance of 3 pixels would be considered in computing the effect of the Blur, Smudge, and Pixelization tools on the selected area.

Step 2 Enter the new value.

The Blur tool uses this number as follows: At a setting of 1, only one pixel is considered, and no real blurring takes place. At a setting of 2, another ring of pixels is considered. That is, the central pixel is considered, along with a second band. At a setting of 3, a third band is considered. All of the pixel values in the considered range are averaged to produce the resultant pixel. Thus, the higher this number, the more blurring occurs.

NOTE: As you double this setting, the Blur tool will take four times as long to function.

The Smudge tool uses this number as follows: At a setting of 1, only one pixel is considered, and no real smudging takes place. At a setting of 2, another set of pixels is considered. At a setting of 3, a third set is considered. All of the pixel values in the considered direction of motion are averaged to produce the resultant pixel. Thus, the higher this number, the more smudging occurs.

NOTE: As you double this setting, the Smudge tool will take twice as long to function.

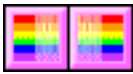
The Pixelize tool uses this number as follows: At a setting of 1, squares one pixel across are painted, and no real pixelization takes place. At a setting of 2, squares two pixels across are painted. At a setting of 3, squares three pixels across are painted. All of the pixel values in the square are averaged to produce the resultant painting. Thus, the higher this number, the more pixelization occurs.

NOTE: As you double this setting, the Pixelize tool will take 1.4 times as long to function.

Step 3 To complete this edit and allow the Blur or Pixelize Selected Area tool to operate (if selected), click OK. To complete this edit, but to prevent the Blur or Pixelize tool from operating, press center-click OK . To abort this edit but allow the Blur or Pixelize Selected Area tool to operate with the old values, click Cancel. To abort this edit and prevent the Blur or Pixelize Selected Area tool from operating, center-click Cancel.



Water-drop smudge acts like dripping or injecting water from a moving dropper or syringe onto your document., giving an effect like real water. You can edit this tool, too. Select Wet, Medium, or Dry.



These two tools, Decrease saturation and Increase saturation, each increase or decrease the saturations of the colors in the selected area. If there is no selected area, they affect the entire document.



This tool, Invert luminosity, acts on the selected range, or on the entire document if there is no selected range. Each pixel affected has its value inverted. Thus, light colors change to dark colors, and dark colors change to light colors. This is not like making a negative, since the hue and saturation remain unchanged by this process. This technique is extremely useful in changing lightened highlights to darkened highlights, or vice versa.

PF tools

You can use the PF (programmable function) tools, which appear on the keyboard as F1 through F6.

PF tools are tools which you can write in The Animation Stand's PF language, or get from someone else. Just what happens when you press a PF key or draw with it may vary, since PF tools can be completely redefined.

The PF tool language is described in a separate section. Note that no programming is required to use The Animation Stand, unless you want to establish your own extensions to the program.

Airbrush tool

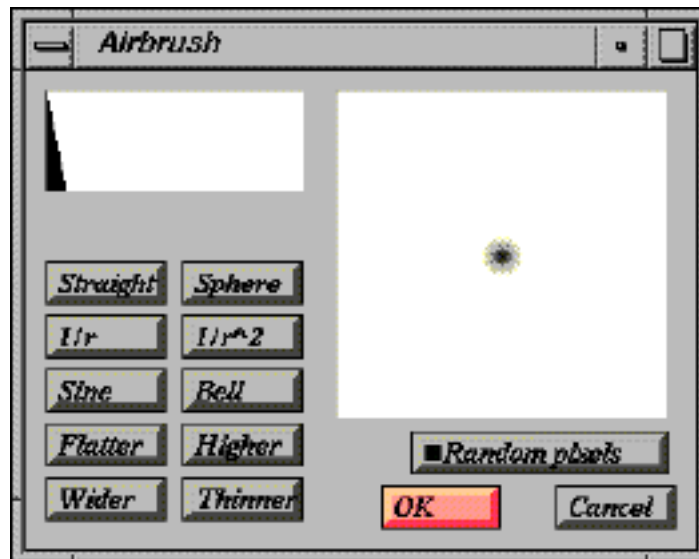
The Airbrush tool spray paints using a realistic airbrush effect, or using a pixel-spray, using the current color or pattern and pen shape and size.

If you leave the mouse in one place, a lot of paint will build up. If you move the mouse slowly, you will paint with a very dark and thick airbrush line. If you move the mouse quickly, you will paint with a light and thin airbrush line. If you move the mouse too quickly, you will paint a series of dots.

If the center mouse button is used, this tool is constrained to the horizontal or vertical axis.

For other airbrush effects, use Airbrush Edit, obtained by center-clicking this tool's icon.

The Airbrush tool can operate in two basic modes. In its pixel mode, it sprays pixels randomly into the area allowed by its nozzle (pen) shape and size. In its modeled mode, it paints using a mathematical model of how paint is to flow, in atomized form, from an Airbrush nozzle. The dialog window for this edit is shown below:



The large box shows you the actual size, shape, and pattern of the spray-can in use (unless you have random pixels).

The smaller box allows you to define, by hand, what sort of fall-off pattern is to be used. The bottom of this box represents no paint flow. The top of the box represents the fastest possible paint flow. The left side of the box represents the paint flow under the Airbrush's nozzle. And the right side of the box represents the paint flow 127 pixels away from the Airbrush's nozzle. Each time you draw in this box and release the mouse, the large box will update to show you the current fall-off pattern from the Airbrush. Note that wide patterns take a long time to draw into the document. If you hold down Shift while drawing, the mouse's path will define a straight line in this control box, rather than a curve. To try that, start drawing in this box, then hold down Shift, then draw some more, then release Shift, draw some more, and then release the mouse button. Drawing in this control box turns off the Random pixels setting.

When Random pixels is on, the Airbrush paints by placing randomly placed pixels within the confines of the Airbrush nozzle, as defined by the current pen. Since this type of painting is a "normal" painting operation, the current mode setting is in effect. When this control is off, the fall-off pattern, as shown in the Airbrush dialog window has effect, superseding any modes in effect. This box is turned off by all other controls in the dialog.

The Straight button loads a straight fall-off pattern into the fall-off histogram. Note that this fall-off is probably too wide for normal use, and should be thinned before use.

The Sphere button loads a spherical fall-off pattern into the fall-off histogram. Note that this fall-off is likely too wide for normal use, and should be thinned before use.

The $1/r$ button loads a curve where the paint density is inversely proportional to the distance from the nozzle into the fall-off histogram. This fall-off is probably too wide for normal use, and should be thinned before use.

The $1/r^2$ ("One over R squared") button loads a curve where the paint density is inversely proportional to the square of the distance from the nozzle into the fall-off histogram.

The Sine button loads a sinusoidal fall-off pattern into the fall-off histogram. This fall-off is probably too wide for normal use, and should be thinned before use.

The Bell button loads a bell-curve into the fall-off histogram. This type of curve most closely approximates how real paint leaves an Airbrush. For many uses, the bell-curve drawn by this button is a bit wide, so you might want to thin the curve before use.

The Flatter button flattens the fall-off histogram. The effect of this is that the paint will flow more slowly from the Airbrush.

The Higher button amplifies the fall-off histogram. The effect of this is that the paint will flow more quickly from the Airbrush.

The Wider button widens the fall-off histogram. The effect of this is that the area painted by the Airbrush will be wider, without affecting the flow rate at the center of the pattern. Note that some of the fall-off curve (the portion at the right) may be lost when this button is clicked.

The Thinner button thins the fall-off histogram. The effect of this is that the area painted by the Airbrush will be thinner, without affecting the flow rate at the center of the pattern. This button will be used several times, under normal use, just after pressing one of the preset buttons.

All of the buttons turn off the Random pixels setting.

User toolbox

Mousing down here brings up an empty toolbox area on the status window, called the user toolbox. It is called this because its 32 empty slots are available for you to configure your own tools into. To bring a tool, mode, pen, color, or pattern into the user toolbox, just hold down ALT and click the item into the user toolbox. You can remove items from the user toolbox using ALT too—just ALT-click the item.

Opticals

An optical press is a device used for creating optical and special effects, usually by projecting light through frames of one reel of film, through the frames of a second reel of film (getting a filtering, gel, or matting effect) onto a third, target, reel of film, exposing that target reel. This is called a stage of the optical press. The target reel may then pass into another stage, where more reels of film expose onto it, creating double exposures, glows, and mattes. The Animation Stand contains a complete optical press emulator.

In the Exposure Sheet, the Notes field can be used for more than notes to yourself. If the first word (starting in the first character position) of the Notes field is all in upper case, then that word is actually a command to The Animation Stand. Most of these commands perform “optical printing” functions, or functions that would normally be performed on an optical press.

In the examples that follow, the spreadsheet version of the exposure sheet is shown. This is so that you may see all of the data in use. In the iconic form, optical Notes commands appear as their icon (if no file is used in the layer), or as a red box around the layer’s thumbnail picture.

Backgrounds

If ALPHA-BG is entered into the Notes field of the first layer of a frame, then the entire background of the frame is set to alpha. This means that all otherwise undrawn areas will be alpha. On some cards, this means that there will be video transparency, and on others, it just means that there will be an alpha output. To use alpha blanking in this manner, you must be using a true 32 bit display card, and not just a 24 bit display card. No file name is used.

If BLACK-BG is entered into the Notes field of the first layer of a frame, then the entire background of the frame is set to black. No file name is used.

Antialiasing

Each of the antialiasing functions helps in compositing one layer (saved using the Save area function of the File menu) over the frame so far. These antialiasing techniques assume that some sort of antialiasing has occurred to the edge of the image being composited before this step. Thus, they are all second-chance functions, and are not as good as COMPOSITE or COMPOSITE*. Remember: The longer you put off edge-antialiasing, the better the look you get.

DARKEST assumes that the outer edge of the layer being composited is mostly dark, or that white is insignificant in the edge.

DARKEST BLEND is equivalent to using DARKEST and BLEND at the same time.

LIGHTEST assumes that the outer edge of the layer being composited is mostly light, or that black is insignificant in the edge.

FADED assumes nothing, and fades the edge in, Quantel style.

Boolean modes

When AND is placed into the Notes field of a layer, it changes how the layer is drawn. Normally, new information is just drawn over the old. When AND is used, the file for the current layer is rendered as a picture, and then "anded in" to the existing picture. Areas outside the layer's file are not affected.

Similarly, OR causes new data to be "orred in".

XOR causes new data to be "exclusive orred" in.

Transparency modes

When BLACK is used, new files are read in over old ones, with the exception that all pixels which are black (exactly black) will be transparent.

Similarly, WHITE causes all white pixels to be read as transparent.

BLACK-ONLY causes all pixels except black to be considered transparent.

BLUE and GREEN emulate bluescreen and green-screen. The Sloppiness value controls color comparison. Shadows cast onto the blue or green screen will be shadowed onto the composite image.

Blending

The BLEND Notes command causes the new layer to be blended in with the existing frame, just as if it were being pasted in with the paint side's Blend mode. Like the Blend mode, it uses the current blend level, which is 50% by default. You can use BLENDLEVEL to set The Animation Stand's blend level setting to some other percentage. Just put BLENDLEVEL in the Notes field, and your percentage in the magnification field (with nothing in the picture field), usually on a layer just before the layer using the BLEND Notes command.

Frame Label	File	Top	Left	Hold	Mag	V. Mag	R	Mod. Notes
1	background				50			BLENDLEVEL
	foreground			1				BLEND
2	Move, 5 frames							
7	background				33.333			BLENDLEVEL
	foreground			1				BLEND
8	End of film. Running time is 0:00:07 (30)							

The example above uses the file Foreground at 50% and 33% blend levels, respectively.

Matting

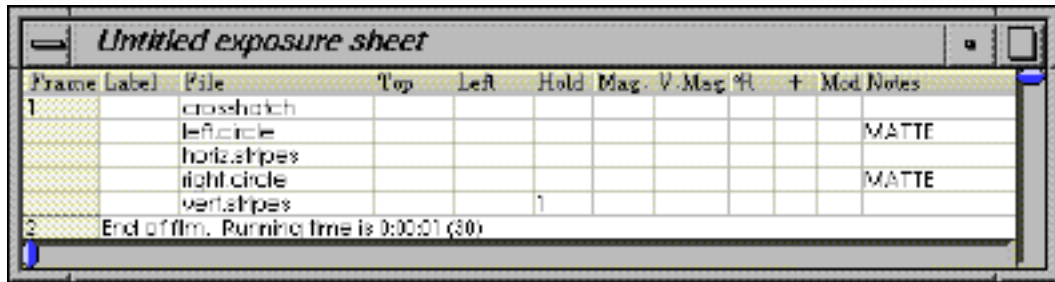
Matting is a process whereby various portions of various pictures are composited onto a single frame. In simple matting, various portions of one image are used, and portions not used from the first picture are taken from a second picture. The portions taken are controlled by “mattes”. These two portions are taken together to form a final image.

In complex matting, various portions of various images are taken. The portions taken are controlled by mattes. The final image is a composite of all of these.

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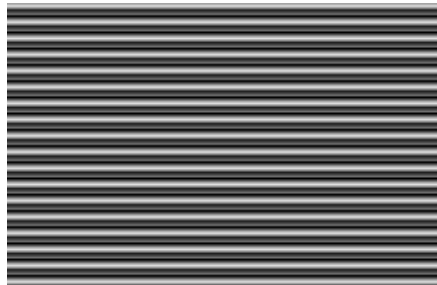
All of this is best shown by example: Shown below is a frame from an Exposure Sheet, the constituent layers, and the final result.

Exposure Sheet frame:

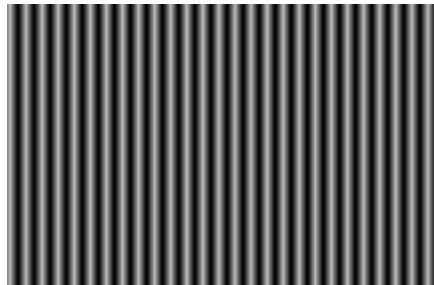


Frame	Label	File	Top	Left	Hold	Mag.	V. Mag.	%	+	Mod	Notes
1		crosshatch									
		leftcircle									MATTE
		horizontalstripes									
		rightcircle									MATTE
		verticalstripes			1						
2	End of film. Running time is 0:00:01 (30)										

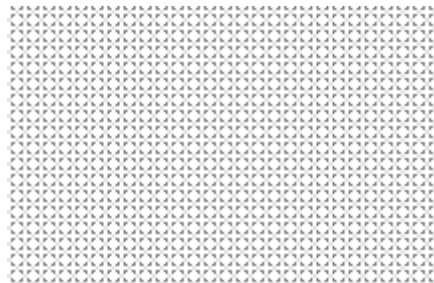
Horizontal stripes:



Vertical stripes:



Crosshatch:



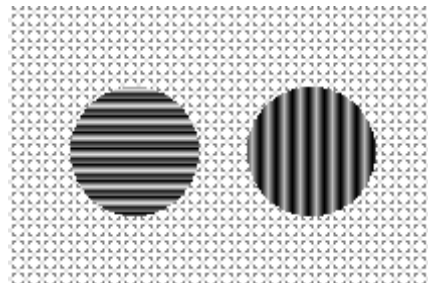
Left circle:



Right circle:



Final result of the combination of the three mattes:



MATTE may not be mixed with FADER within a single frame.

Matting, as described, involves all layers of the frame. However, you can tell The Animation Stand to compute the frame as specified so far, and then composite more layers onto the frame normally, by specifying COMPUTE in the Notes field. To use this feature, call out your matte as you normally would, then code COMPUTE, and then composite additional frames onto your frame. This functionality is known as "nested opticals".

Alpha compositing

When 3D programs, PhotoShop, and certain other programs generate an image into a picture file, they often write an alpha channel into the file. The purpose of this alpha channel is to state, on a pixel by pixel basis, whether each pixel is a part of the image, and if so, to what degree. Thus, using the alpha channel for this purpose, The Animation Stand can perfectly and very rapidly composite an image from one of these programs, complete with edge antialiasing. This antialiasing is completely separate and disjoint from all other forms of antialiasing, subpixel resolution, or edge processing.

Just place the word COMPOSITE in the notes field, and the layer will be read using its alpha channel to control antialiasing. COMPOSITE* is to be used with files from programs which use an inverted alpha channel. If COMPOSITE BLEND or COMPOSITE* BLEND is used, the current blend level is also taken into account.

Paint Effects

When paint effects are placed into the Notes field, the layer is not used. The frame, as it exists so far, is image-processed.

DECLUTTER examines the frame for black specs, which are removed.

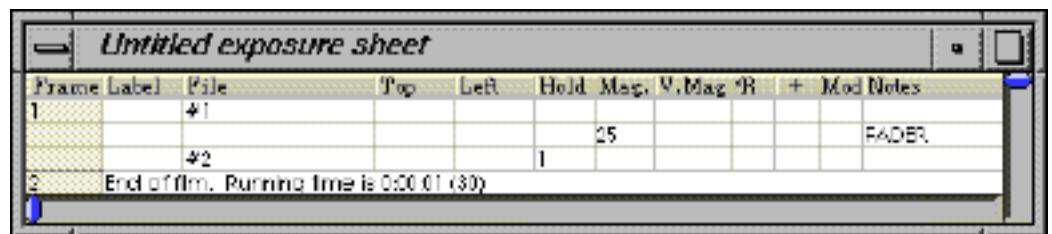
PATCH examines the frame for holes in lines, which are patched, and white specs, which are removed. This occurs only during playback.

LEGALIZE examines the frame, pixel-by-pixel for colors which are not NTSC-legal. Each such color is remapped to the nearest available NTSC-legal color.

Faders

This optical Notes command gives you direct control over fades, and allows you to have action proceed while a fade occurs. In a FADER layer, the Mag. field is used to control the blend percentages. The image list specified above the FADER layer is taken at a fade or blend level as specified in the FADER layer, and the image list specified afterwards is taken at 100% less that amount, much like a double exposure.

This is best shown by example. In the following frame, #1 is taken at 25% value, and #2 is to be taken at 75% value. This is equivalent to being 25% through a fade set, or a 1:3 double exposure.



Frame Label	File	Top	Left	Hold	Mag.	V. Mag.	R	+	Mod	Notes
1	#1				25					FADER
2	#2			1						End of film. Running time is 0:00:01 (30)

FADER may not be mixed with MATTE or with another FADER within a single frame.

Cross-fading, as described, involves all layers of the frame. However, you can tell The Animation Stand to compute the frame as specified so far, and then composite more layers onto the frame normally, by specifying COMPUTE in the Notes field. To use this feature, call out your cross-fade as you normally would, then code COMPUTE, and then composite additional frames onto your frame. This functionality is known as nested opticals.

Focusing effects

The focusing effects are used to emulate the rack focus effects possible on a true multiplane animation stand.

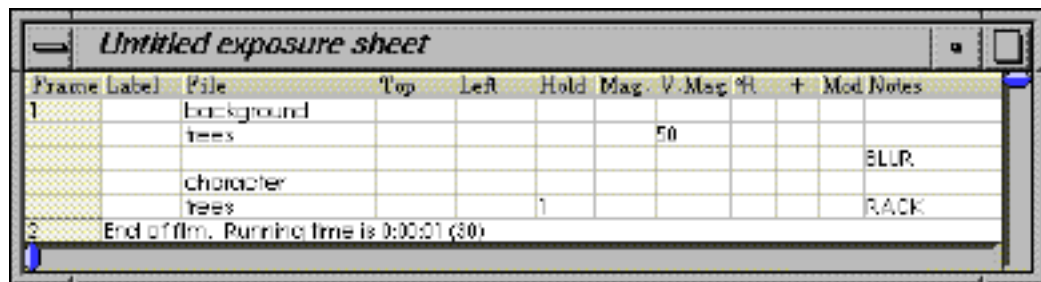
The BLUR command blurs all of the frame composited so far. It appears in the Notes field on its own layer. The Mag. column is used to control the amount of blurring. A value of 0 represents the minimal amount of blurring. Values of 1 through 3 are most useful.

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The RACK command blurs a foreground layer in over the frame as composited so far. Bring in the layer as normally specified, and place RACK in the Notes column. The alpha channel and saved area both serve to limit the area of the cel file which is blurred and composited when RACK is used. The amount of blurring is set by the current pixelization level, which can be set using the edit of the pixelization tools, or using the PIXLEVEL Notes command.

The PIXLEVEL Notes command sets the current pixelization level on the fly. As it is encountered, the value of the Mag. column is retained as the new pixelization level.

The following frame composites a background layer, some trees, and a character. Everything but the character is defocused:



Frame	Label	File	Top	Left	Hold	Mag.	V. Mag.	%R	+	Mod	Notes
1		background									
		trees					50				
		character									BLUR
		trees			1						RACK

End of film. Running time is 0:00:01 (30)

Frame moves

The **FRAME** and **# Notes** commands are used to change the coordinate system of the frame. All of the remaining layers following the **FRAME** command, up to and including the last layer of the frame, are offset by the **Top**, **Left**, **Mag**, and **V.Mag** amounts specified in the **FRAME** command. Thus, if a **FRAME** command is used in a **Move**, all of the layers following the **Move** will be moved. This is useful for entering “camera moves” — moving the animation camera while the cel art goes through its motions.

For example, the following two scenes are equivalent, since panning is accomplished either through movement of the individual layers, or through panning of the entire frame.

Frame	Label	File	Top	Left	Hold	Mag.	V.Mag	R	+	Mod	Notes
1		background	10	20							
		trees	30	40	1						
2	Move,	10 frames									
12		background	50	40							
		trees	70	40	1						
13	End of film. Running time is 0:00:12 (30)										

and

Frame	Label	File	Top	Left	Hold	Mag.	V.Mag	R	+	Mod	Notes
1		background	10	20							
		trees	30	40	1						
2	Move,	10 frames									
12			40	40							FRAME
		background	10	20							
		trees	30	40	1						
13	End of film. Running time is 0:00:12 (30)										

The following two scenes are equivalent, since zooming (or trucking) is accomplished either through movement of the individual layers, or through zooming of the entire frame.

Frame	Label	File	Top	Left	Hold	Mag.	V.Mag	%R	+	Mod	Notes
1		background	10	20							
		trees	30	40	1						
2	Move, 10 frames										
12		background	20	40		200					
		trees	60	80	1	200					
13	End of film. Running time is 0:00:12 (30)										

and

Frame	Label	File	Top	Left	Hold	Mag.	V.Mag	%R	+	Mod	Notes
1		background	10	20							FRAME
		trees	30	40	1						
2	Move, 10 frames										
12		background	10	20		200					FRAME
		trees	30	40	1						
13	End of film. Running time is 0:00:12 (30)										

You can enter field positioning short-hand into the Notes field, too. The basic format of this short-hand is:

#fields distance direction-distance direction (basis)

The fields and basis arguments tell the virtual camera how many fields to show in the field of view. For instance, if you enter

#8 0N-0W (16)

this means that you want to zoom in to 8 visible fields, out of a possible 16. This is the same as coding a FRAME command with a magnification set at 200%. And, so that all items can be handled in numeric fields for interpolations, The Animation Stand will convert # commands to FRAME commands. If you omit the basis argument, 12 is assumed. Thus,

#9

is equivalent to

#9 0N-0W (12)

or a FRAME command at 75% magnification.

You can move the camera up and down, or left and right using distances, and N, S, E, and/or W. For instance,

#6 2N-3E

zooms in on your frame 200%, and at the same time moves the "camera" 2 fields North (up) and 3 fields East (right).

Gels

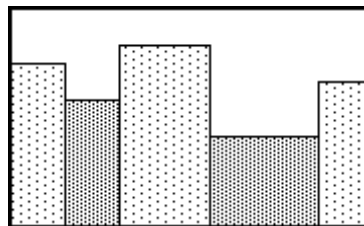
This command allows the use of "filters" or "gels". The best example of this type of effect is a character's point of view while putting on some sunglasses.

If a cel layer is used normally as a layer in a cell, then all "painted" areas in the cell completely replace corresponding portions of the frame's contents. When a layer is marked as a gel, by placing GEL in the Notes field of the layer, then the layer is used as a gel or a filter, rather than an overlay.

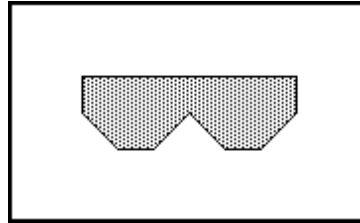
Thus, in the following frame, we have a scene, and some sunglasses:

Frame Label	File	Top	Left	Hold	Mag	V. Mag	%	+	Mod	Notes
1	background									
	sunglasses			1						GEL
2	End of film. Running time is 0:00:01 (30)									

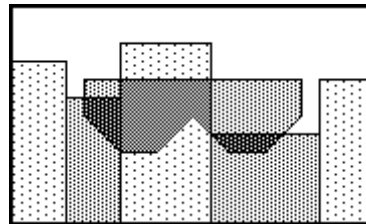
Background contains:



Sunglasses contains:



The result of this gelling or filtering effect is:



By placing OVER-GEL in the Notes field, you will get the same effect, except that only the immediately-preceding cel will be affected.

Glow

With the GLOW Notes command, you can add a glow or light to a frame. For dull or slight glows, paint the glow as a dark color on a black background. For very bright glows, paint the glow as a bright color on a black background. Then, bring the file in as a layer, and place the word GLOW in the notes field.

By placing OVER-GLOW in the Notes field, you will get the same effect, except that only the immediately-preceding cel will be affected.

The BACKLIGHT Notes command emulates a backlighting effect. Place BACKLIGHT in the Notes field of the layer, and the layer will be backlit. So that backlights can be used in the most types of ways possible, the BACKLIGHT Note only places the backlight fringe. To get the fringe and the image, use BACKLIGHT and a second layer without. The extent of the glow is controlled by the current pixelization level (PIXLEVEL command and pixelization tool edit). The saved area and alpha channel both control the “cutout” size and shape.

Memory control

When you place the LOAD command into the Notes field, the meaning of the layer completely changes. The file called out in such a layer is not used to build the picture. Rather, it is used to load an image into a holding area in memory, and all operations involving that file will occur much more quickly, at the cost of available memory. When you use LOAD without a name, the holding area is emptied. This command can't generate an error message, it is an advisory command, telling The Animation Stand to use memory in a certain way, but only if it can.

This command can greatly speed output. For instance, let's say that you will use background BG from frames 100 to 199. In frame 100, use LOAD to load BG into memory, speeding operations. At the end of frame 199, or the beginning of frame 200, use LOAD to clear memory.

Maximum & Minimum

MINIMUM and MAXIMUM modes are Mac arithmetic modes. In this case, the file called out in the layer is composited over the existing frame. On a pixel by pixel basis, the new layer is composited on the existing frame, taking the minimum or maximum of the RGB values of the respective pixels. There is no direct correlation between this effect and any real-world effect.

Off

When OFF is placed into the Notes field, the layer is not used. Using OFF, you can temporarily turn off a layer. When you want to use that layer again, remove the OFF command.

PF-keys

Any of the commands PF1 through PF6 will invoke a compiled PF-key function, passing it the Top, Left, Mag, and V.Mag values.

Picture only

When this Notes command is used on a layer, the selection area stored with the layer will not be used to antialias the layer. The picture component only will be used. This is useful if the layer is not to be modified by edge processing, or as a speed boost if you know beforehand that edge processing will have no effect on a layer; for instance, true antialiasing on a square object.

Shadow

This command does not apply a shadow to a layer; rather, it uses the layer, as and where specified as a shadow. It does this by (a) considering only the outline of the layer, as defined by the Save area command from the File menu, (b) calculating where this goes using the Top, Left, Mag, and V.Mag fields, and (c) using the layer as if it were a gray gel. The density of the gel is controlled by the BLENDLEVEL command.

Subtract mode

With this Notes command, you can add a shadow or stain to a frame. For dull or slight stains, paint the stain as a dark color on a black background. For very striking stains, paint the stain as a bright color on a black background. Then, bring the file in as a layer, and place the word SUBTRACT in the notes field.

Game compositing

You may bring a layer in as a "game layer". A game layer is a layer which maintains a black outer boundary, and also maintains the internal lines. A game layer may not take on any new colors when growing or shrinking. To enforce these rules, code GAME in the Notes field of the layer. Game layers are controlled by their saved area. GAME is ignored for layers which were not saved with Save area. An alternate method, GAME2, simply insures a black boundary on the characters, and processes much faster.

Programming

Introduction

IT'S NOT REQUIRED THAT YOU LEARN THE PROGRAMMING LANGUAGE TO USE THE ANIMATION STAND. THE INFORMATION IN THIS CHAPTER IS ONLY USEFUL IF YOU ARE GOING TO ADD YOUR OWN TOOLS OR EFFECTS.

Note: In all of the following examples, [and] denote optional portions of a construct. For instance "X [Y]" could mean "X" or "X Y".

This chapter shows you how to write your own paint tools for The Animation Stand. Once your tools are created, you can use them yourself, as well as distribute these tools to others.

It is assumed that you know some computer language, and have programmed before. The language used here is very simple.

Normal Sequence

- Step 1 Decide what the PF key is supposed to do & design your application.
- Step 2 Open a new text window.
- Step 3 Code your new tool.
- Step 4 Compile the code, assigning it to one of the PF keys.
- Step 5 Save the PF key text.
- Step 6 Optionally, save the compiled PF key code in with your preferences file.

Running PF-Key Programs

Various types of actions occur in a program, and all of these actions occur in response to some sort of stimulus. Each time the tool is invoked, a variable, REASON, is set. It is set to 0 for press, 1 for ALT-press, 2 for use, and 3 for use from the exposure sheet.

Your PF-key program may have a section which is invoked when the tool is selected. You would use this sort of code to implement an immediate action tool, a tool that does something with an ALT-press, or perhaps something we haven't even imagined.

PF-key programs may also have a section that is executed when the mouse is used within a document. You would use this to implement "normal" tools.

Note that since you can have both a “tool pressed” code section, and a “mouse clicked” code section, so that your PF-key tools can be at once immediate action and “normal” tools.

Editing

Step 1 Open a new window as you would a window in any text editor. Use New text from the File menu to Open a new window directly, or use ALT-O to Open an existing text file.

Step 2 Use normal text editing. All of the normal functions, such as clicking, dragging, and using the sliders work here as you might expect. All of the items in the Edit menu have their normal functions.

Step 3 All of the normal File menu functions having to do with file dispositions can be used to save the file.

Note that the entries and changes you make have no effect until you compile the program.

Compiling

Under the Options menu is the Compile command. When you use Compile, your program will be compiled. If there are any errors, the first error will be shown to you, and compilation will stop. In this case, fix the error and compile again. If all went well, the following will appear:



Press one of the F keys, or click Cancel.

Saving the PF-Key Program Code

There are two items of data associated with PF key code: The textual PF key program text is stored in a text file. The compiled PF key program is saved as a separate item, whenever you use PF keys only or Save all from the Save or Save as dialog.

Normally, you will save all of your preferences by having a set of PF key files compiled, then with no other files Open, use Save all to save all of your preferences, patterns, palette, and PF keys, but no document.

Variables

As with any computer language, this language has variables. Variables are storage locations for numbers. Each variable has a name. These names are from one to 255 characters long. The first letter of a variable must be a letter, while the following characters may be letters and/or numbers, but there must be no intervening blanks or other characters in the name. The capitalization of a variable is irrelevant.

Each variable may contain an integer value., and occupies static, uninitialized storage.

In addition, the variables SPOTRA and SPOTD contain the current spotlight angles, in degrees. If you change these values, you are actually changing the spotlight angles, and TOP, LEFT, MAG, and VMAG contain exposure sheet fields, when a PF-key program is called from the exposure sheet.

There is one additional restriction on the names of variables. Variables may not share the names of statements or of functions. Thus, you cannot name a function LINE, because there is a statement by that name. You cannot name a variable SIN, because there is a function by that name.

Comments

A comment is a portion of the program that the compiler ignores. You use comments to leave reminders to yourself or others on how portions of the program work, or why they are written the way they are. In The Animation Stand, comments begin with ; and continue until the end of the line, no matter what is inside the comment.

Spacing and Capitalization

Spacing is irrelevant. Anywhere this manual shows a space or a carriage return, one or more spaces, tabs, comments, and/or carriage returns may be used. Additionally, there are places in which no space is shown in examples where there could be spaces.

Capitalization is irrelevant. In these examples, everything is shown in upper case. This is for clarity only. You may use upper and/or lower case interchangeably in all variable names and statement names.

Computations

To set a variable to a value, code

```
variable = expression
```

This leaves us with the question of what an expression is. An expression is a constant, or a more complex expression, such as $7*ABS(X/Y)+1$

Statements

Rather than just list out the statements, we have listed them in functional categories. Each category leads to an article which describes all the statements in that category. If you are going to do PF programming, it is probably best to read through this section once, from front to back, and then use this section for reference.

In many of the statements that follow, there will be a requirement for a point or a rectangle. A point is a horizontal coordinate, a comma, and a vertical coordinate. A rectangle is a top coordinate, bottom coordinate, left coordinate, and right coordinate, all separated by commas. If the top & bottom or left & right coordinates are reversed, they are handled as if in the right order. Horizontal coordinates are zero at the left edge of the document, and increase to the right. Vertical coordinates are zero at the top edge of the document, and increase as you go down. Rectangles include their own top & left coordinates, but exclude their bottom and right coordinate. Thus, if top is 0 and bottom is 100, the rectangle is 100 pixels tall, occupying lines 0 through 99.

Cursor handling

The cursor handling routines are used to hide and/or show the cursor.

HIDE hides the cursor from view. The cursor will not be seen again until either the PF key program terminates, or the SHOW statement is executed. HIDE statements have no effect if the cursor is already hidden.

SHOW makes the cursor reappear, if it was invisible.

Color handling

Several statements allow you to change the current color.

LOADCOLOR is used to load the color of a particular pixel in the document as the current PF key program's color. The format of this statement is:

```
LOADCOLOR point
```

If the coordinates specify a pixel that is not in the document, the color loaded is white.

LOADOLDCOLOR is similar to **LOADCOLOR**, except that the pixel value is loaded from the Undo area.

RGB is used to set the current color to a particular RGB value. The format of the RGB statement is:

```
RGB red component, green component, blue component
```

32 bits: The requested color is used. The allowable ranges for each of the components are integers between 0 and 255, inclusive. Negative numbers will be used as zero. Numbers higher than 255 will be used as 255.

64 bits: The requested color is used. The allowable ranges for each of the components are integers between 0 and 65,535, inclusive. Negative numbers will be used as zero. Numbers higher than 65,535 will be used as 65,535.

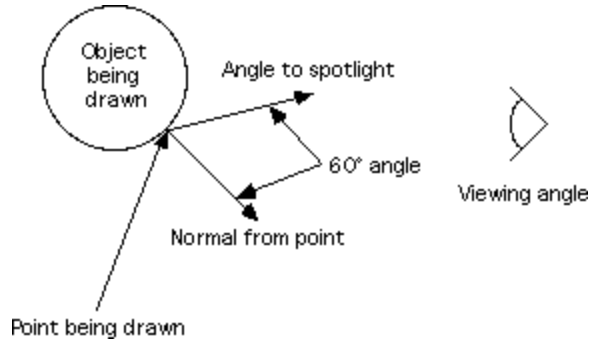
SETPIXEL is used to set a particular pixel to the current color. The format of this statement is:

```
SETPIXEL point
```

The pixel coordinates follow the rules from above, with two exceptions. The pixel is only set on the offscreen version of the document, not on the screen. If the coordinates specify a pixel not in the document, nothing is done.

LIGHTING is used to set a particular pixel to the current color, and to apply the current lighting conditions at the same time. The format of this statement is:

```
LIGHTING point, directed_cosine_in_hundredths
```



The pixel coordinates follow the rules as above. You must also supply the directed cosine between the vector normal to the surface of the plane of the pixel, and the vector from the pixel to the lighting source. Unless you are very familiar with solid trig, this is best shown by example. Let's say that we want to paint the pixel at 72,144, and that pixel is supposed to be blue. We somehow decide that that pixel represents a portion of the surface of an object, and that that object is slanted 45° down as the user views it, but is not slanted in the left-to-right direction. Let's assume that the light is coming from 15° of declination, 0° right ascension. This would mean that a line coming off the surface of the object at that point is 60° off from the direction of the incident light. The cosine of this angle is 0.5.

32 bits: Thus, to paint this pixel, we would use

```
RGB 0, 0, 255
LIGHTING 72, 144, 50
```

64 bits: Thus, to paint this pixel, we would use

```
RGB 0, 0, 65535
LIGHTING 72, 144, 50
```

USERCOLOR is used to set the current color or pattern back to the state it was in before the PF-key function began execution.

Environment control

The environmental control statements allow you to control the painting environment, allowing you to choose modes, pens, where to paint, and the like.

MODE allows you to set the painting mode to be used when painting lines, rectangles, circles, et cetera. The format of this statement is:

MODE *n*

The argument specifies the mode's icon position in the Mode window, 0 to 30. If the number is <0 or >30, Normal Mode, (mode 0) is used. If you do not specify a mode, then the PF key program uses the mode already selected by the user.

PEN allows you to set the pen size & shape to be used when painting lines, rectangles, circles, et cetera. The formats of this statement are:

PEN *height, width*

and

PEN *diameter*

A pen of the specified height and width or diameter is used for painting. The minimum pen height, width, and diameter are each one pixel, if zero or negative values are specified, 1 will be used. PF key programs begin execution using the current user brush or pen.

SCREEN causes painting performed by the **OVAL**, **RECT**, **FRAMEOVAL**, **FRAMERECT**, and **LINE** statements to be painted on-screen only. When PF key programs begin execution, all of their painting is on-screen only. Thus, nothing painted by the listed commands has any effect on the document. Painting occurs in the frontmost window only. The **SETPIXEL** command is not affected by this statement, as it always paints into the off-screen memory holding the document.

OFFSCREEN causes painting performed by the **OVAL**, **RECT**, **FRAMEOVAL**, **FRAMERECT**, and **LINE** statements to be painted to the off-screen document memory only. When PF key programs begin execution, all of their painting is on-screen only. If any painting occurs, the document will be updated when execution ends. The **SETPIXEL** command is not affected by this statement, as it always paints into the off-screen memory holding the document.

BOTH causes painting performed by the OVAL, RECT, FRAMEOVAL, FRAMERECT, and LINE statements to be painted to the off-screen document memory, as well as to the frontmost document window. When PF key programs begin execution, all of their painting is on-screen only. If any painting occurs, the document will be updated when execution ends.

Direct painting

All of these statements paint something. Depending on the current settings, the painting will be done on the frontmost window, or into the off-screen memory. If any painting occurs, the document will be updated when execution ends.

Experienced programmers: When painting into the current document window, the positions of the scroll bars, the position of the window, the size of the window, obscured portions of the window, portions of the window hanging off the screen, portions of the window spanning multiple screens, and magnification are all handled for you. When you paint, you may just assume that you are painting into the off-screen buffer, since there is no difference in the way you paint.

All of these statements use the current pen setting, the current color or pattern, and the current mode. These settings all start out as the user setting, but can be modified by the PF key program.

If any of the offscreen painting is made outside of the document, or onscreen painting is made past the visible portion of the window, that portion of the painting is ignored.

LINE is used to paint a line between the points you specify. The format of this statement is:

LINE starting point, ending point

The coordinates specified are the coordinate of the upper left-hand corner of the pen. The pen extends downward (by the pen height or pen diameter) and to the right (by the pen width or pen diameter) from this point.

RECT is used to paint a filled rectangle. The format of this statement is:

RECT rectangle

If a filled rectangle is painted with a special pen, or brush as the current pen, then the current color is used to fill the rectangle, and the pen shape is ignored.

FRAMERECT is used to paint an outlined rectangle. The format of this statement is:

```
FRAMERECT rectangle
```

OVAL is used to paint a filled oval. This statement is similar to RECT, except that in OVAL, the coordinates define the boundaries of the oval.

FRAMEOVAL is used to frame an oval. This statement is similar to FRAMERECT, except that in FRAMEOVAL, the coordinates define the boundaries of the oval.

UPDATE is used to update the frontmost window to agree with the off-screen version of the document. If any painting occurs, all windows of the document will be updated when execution ends.

Flow control

The flow control statements each allow you to execute, conditionally execute, or re-execute a portion of your program.

IF allows your program to make decisions. The format of this statement is:

```
IF expression
  statements
[ ELSE
  statements]
END
```

In the first format shown, the expression is evaluated. If it is true (it has a nonzero result), then the first statement or group of statements (whatever is between the expression and ELSE) is executed, and the second statement or group of statements (between ELSE and END) are ignored. If the expression evaluates false (to a zero value), then the reverse occurs; the first group of statements is ignored, and the second group is executed.

In the second format shown, the statement or statements are executed only if the expression has a true (nonzero) result. If the expression is false (zero) then nothing happens, and execution continues with whatever follows the END statement.

For example, the following sets X equal to the greater of Y and Z, and beeps if Y is used:

```
IF y>z
  x = y
  BEEP
ELSE
  x = z
END
```

This could just as well have been written as

```
if Y>Z X=Y beep else X=Z end
```

As another example, the following code beeps if X is nonzero:

```
IF x
  BEEP
END
```

WHILE allows you to have one or more statements executed a number of times. An expression is used to control the loop. The format of this statement is:

```
WHILE expression
  statements
END
```

The following steps are followed by The Animation Stand:

- Step 1 The expression is evaluated. If the value is false (zero), then execution of the loop is over, and the statement after END will be executed. If not, Step 2 follows.
- Step 2 The statements within the loop are executed.
- Step 3 If escape is pressed, execution of the loop terminates, and execution continues after the END statement. If not, execution continues at Step 1.

For example,

```
WHILE x=1
  statements
END
```

Here, the loop will execute while X is 1.

LEAVE ends execution of the innermost loop containing it.

For example, in

```
WHILE x=1
  WHILE y=1
    statements
  LEAVE
  END
END
```

LEAVE will leave the inner loop each time it is executed, continuing execution between the two END statements. The outer loop will continue to execute. Thus, in this example, the outer loop will execute, but the inner loop will never complete.

DONE ends execution of the PF key program.

For example, in

```

WHILE x=1
  WHILE y=1
    statements
  DONE
END
END

```

DONE will terminate execution of the entire program. Thus, in this example, nothing will complete.

Other statements

These are the statements that fit into no well-defined category.

BEEP causes the system bell to sound, unless the system sound has been turned off from the control panel. In that case, the menu bar will flash.

CLEARSELECT causes the select area (the area surrounded by the “marching ants”) to be cleared.

SELECT adds a rectangle to the select area. The format of this statement is

```
SELECT rectangle
```

SAVE saves a portion of the document as an area, replacing the previous undo area. The format of this statement is

```
SAVE rectangle
```

Operators

In The Animation Stand, there are monadic operators (which act on one number), and dyadic operators (which act on two numbers).

Monadic operators

These operators act on a single number, which appears to its right. For instance, -1.

- negates the value to its right, exactly as in normal arithmetic.
- ! takes the logical compliment of the value to its right. The logical compliment of zero is 1. The logical compliment of all other numbers is zero.

These operators are evaluated before the dyadic operators, and are evaluated right to left. For example:

```
x = 0
y = 5
z = -!x + y
```

In this case, !X is evaluated to 1, and -1+Y is 4. If we wanted to change the order of evaluation, this could be done with parentheses:

```
z = -(x + y)
```

Here, X+Y is evaluated to 9. !9 is 0, and the result is 0.

Dyadic operators

These operators act on two numbers. For instance, X-1.

- | results in zero if both of its operands are zero, and a nonzero value otherwise. Thus, it is called “or” since it is “true” (a nonzero value) if either of its operands is “true”, and “false” (zero) otherwise.
- & results in a nonzero value if both of its operands are nonzero, and zero otherwise. Thus, it is called “and” since it is “true” (a nonzero value) if both of its operands are “true”, and “false” (zero) otherwise.
- <=, >=, <, >, =, and <> each result in a nonzero value if the relation is true, and zero otherwise.
- +, -, *, and / each represent the standard arithmetic operators.

`%` represents the arithmetic modulus operator. The modulus of two numbers is computed by dividing the first number by the second number, and rather than returning the result of the division, return the remainder. Thus,

$$a \% b$$

is equivalent to

$$a - \text{INT}(a / b) * b$$

Order of precedence

The Animation Stand's programming language follows the same rules as standard algebra. When an expression is evaluated, the following steps are followed:

- Step 1 Evaluate everything in parenthesis and function arguments as separate expressions.
- Step 2 Evaluate the function results.
- Step 3 Evaluate the results the monadic operators, proceeding right to left.
- Step 4 Evaluate the results of `*`, `%`, and `/`, proceeding left to right.
- Step 5 Evaluate the results of `+` and `-`, proceeding left to right.
- Step 6 Evaluate the results of `>=`, `<=`, `<`, `>`, `=`, and `<>`, proceeding left to right.
- Step 7 Evaluate the results of `&`, proceeding left to right.
- Step 8 Evaluate the results of `|`, proceeding left to right.

For example, in

```

a = 1
b = 2
c = 3
d = 4
e = 5
f = 6
g = 7
z = a<>b & c<>d | e=f & g=a*b+c*d

```

The evaluation goes through the following steps:

```

z = 1<>2 & 3<>4 | 5=6 & 7=1*2+3*4
- ! z = 1<>2 & 3<>4 | 5=6 & 7=1*2+3*4
*/ z = 1<>2 & 3<>4 | 5=6 & 7=2+12
+- z = 1<>2 & 3<>4 | 5=6 & 7=14
=<>... z = nonzero & nonzero | 0 & 0
& z = nonzero | 0
| z = nonzero

```

Functions

Niladic functions

Niladic functions appear in usage to be variables. To get the value of a niladic function, just use its name. For instance, to set X equal to the value of the MOUSEPRESSURE function, just code

```
x = MOUSEPRESSURE
```

All of these functions are used to return some sort of status information.

MODE returns the current mode number, 0 to 23.

MOUSEPRESSURE returns a nonzero value when the mouse button is down and the stylus is not in use, or when the stylus is in use and at full pressure. This function returns 0 when the stylus is below its threshold pressure while in use. The function returns values between 1 and 255 for pressures between the stylus' threshold and maximum pressures. These values are returned whether or not the Pressure affects flow or Pressure affects width items are set from the Preferences dialog.

MOUSEX reports the mouse's horizontal position within the window. The position reported is the number displayed in the status box after X=. This function also takes note of the mouse's vertical position within the window. The vertical position is noted, but not yet reported.

MOUSEY reports the mouse's vertical position within the window. The position reported is the number displayed in the status box after Y=. The position reported is not the current position. Rather, it is the position of the mouse the last time MOUSEX was called. This is so that coordinates will be reported in consistent pairs. Thus, calls to MOUSEX and MOUSEY should occur with MOUSEX first, and normally in pairs. Do not use MOUSEX and MOUSEY together within a statement that requires several arguments, such as LINE and OVAL, each of which take four arguments. There is no guarantee which of the arguments will be interpreted first. Thus, rather than

```
LINE 0, 0, MOUSEX, MOUSEY
```

use

```
x = MOUSEX
y = MOUSEY
LINE 0, 0, x, y
```

DOCHEIGHT reports the document (not window) height, in pixels. Thus, the number reported is the number of the first line of pixels past the extent of the document.

DOCWIDTH reports the document (not window) width, in pixels. Thus, the number reported is the number of the first column of pixels past the extent of the document.

PENHEIGHT reports the pen height, in pixels. If the pen is round, this is the same as the pen diameter.

PENWIDTH reports the pen width, in pixels. If the pen is round, this is the same as the pen diameter.

PENROUND returns a nonzero (true) value if the pen is round, and zero (false) if it is not.

MODE reports the number of the current painting mode, 0 to 31.

SELECTTOP returns the number of the first line of pixels in the select area. If there is no select area, this function will return zero.

SELECTBOTTOM returns the number of the first line of pixels not in the select area, actually the number of the line of pixels just past the last line of pixels in the select area. If the select area is empty, this function returns zero.

SELECTLEFT returns the number of the first column of pixels in the select area. If there is no select area, this function will return zero.

SELECTRIGHT returns the number of the first column of pixels not in the select area, actually the number of the column of pixels just past the last line of pixels in the select area. If the select area is empty, this function returns zero.

BLENLEVEL returns the current Blend level setting of the Blend Mode. This value is set in the blend dialog, which appears when the Blend Mode is edited. The result will be between 0 and 100.

PIXLEVEL returns the current Pixelization level setting. This value is set in the Set Pixelization dialog, which appears when the Blur, Pixelize, or Smudge Tool is edited.

32 bits: RED returns the value of the Red component of the current color, if there is one. If the “current color” is actually a pattern, a negative value is returned. Normal results are between 0 and 255.

GREEN returns the value of the Green component of the current color, if there is one. If the “current color” is actually a pattern, a negative value is returned. Normal results are between 0 and 255.

BLUE returns the value of the Blue component of the current color, if there is one. If the “current color” is actually a pattern, a negative value is returned. Normal results are between 0 and 255.

64 bits: RED returns the value of the Red component of the current color, if there is one. If the “current color” is actually a pattern, a negative value is returned. Normal results are between 0 and 65,535.

GREEN returns the value of the Green component of the current color, if there is one. If the “current color” is actually a pattern, a negative value is returned. Normal results are between 0 and 65,535.

BLUE returns the value of the Blue component of the current color, if there is one. If the “current color” is actually a pattern, a negative value is returned. Normal results are between 0 and 65,535.

? returns a random number, somewhere between zero and 255. All numbers are equally as likely.

REASON returns the reason the PF-key program was run, 0 for tool selection, 1 for tool edit, 2 for tool use, and 3 for use from the exposure sheet.

Monadic functions

Each of the monadic functions consists of a function name, and then an expression in parenthesis. Each of these functions performs a standard mathematical function. As in standard mathematics, all trigonometric functions use radians, rather than degrees.

For example, to set X to the absolute value of Y, use

```
x = ABS(y)
```

ABS(x) returns the absolute value of a number.

SIN(x) returns 100 times the sine of the angle in degrees.

COS(x) returns 100 times the cosine of the angle in degrees.

Dyadic functions

The dyadic functions break down into two categories. Some (POWER, MIN, MAX, and ATAN2) function mathematically on a pair of arguments. The form of these functions is:

```
function name(first argument, second argument)
```

Other functions (INSELECT and INMASKED) determine attributes of a point. The format of these functions is:

```
function name(horizontal coordinate, vertical coordinate)
```

POWER(b,p) raises its first argument to the power specified by the second argument. For instance,

```
POWER(x, 3)
```

raises X to the third power.

MIN(x,y) returns the lesser of its two arguments.

MAX(x,y) returns the greater of its two arguments.

ATAN2(x,y) takes two arguments. The first argument is proportional to the sine of some angle, while the second argument is proportional to the cosine of the same angle. This function returns the angle which generated the two arguments, in degrees.

INSELECT(x,y) returns a nonzero (true) value if the point specified is in the select area (the “marching ants”), and zero (false) if not.

INMASKED(x,y) returns a nonzero (true) value if the point specified is in the protected area (the “flashing”), and zero (false) if not.

Sample programs

The distribution tape contains several sample programs.

Reference

Key functions

<u>Key</u>	<u>Meaning</u>
Esc	Cancel or Stop
Tab	Use Syringe tool
Delete	Clear area
Caps Lock	Suspend updates of Current Frame Window
Shift	Add to area or first alternate function
-	Subtract from area
Left mouse	Select item when clicked
	Select sub-item menu when held
Middle mouse	Second alternate function or Edit item
Right mouse	Menu
Ctrl	Hide cursor
A	Select Paintbucket tool
S	Select Delete bucket tool
D	Select Move bucket tool
F	Select Edit bucket tool
Z	Select Start spline tool
X	Select Add on-point tool
C	Select Add off-point tool
V	Select Delete spline point tool
B	Select Move spline point tool
ALT	Invoke menu item
ALT-A	Select all
ALT-C	Copy
ALT-D	Merge
ALT-E	Expand
ALT-F	Field guide
ALT-G	Change text fields
ALT-Shift-G	Change numeric fields
ALT-H	Resize
ALT-J	Play or Record
ALT-K	Compile
ALT-L	Add layers
ALT-M	Save animation (Save as from Animate menu)
ALT-N	New cel window
ALT-O	Open
ALT-Shift-O	Open as palette
ALT-P	Print exposure sheet

ALT-Q	Quit
ALT-R	New film/current frame windows
ALT-Shift-R	New text window
ALT-S	Save
ALT-V	Paste
ALT-Shift-V	Paste file name
ALT-W	Close

Key functions (continued)

ALT-X	Cut
ALT-Y	Unprotect
ALT-Shift-Y	Discern line
ALT-Z	Undo
ALT-1	Set new cel size
ALT-2	Preferences
ALT-3	Set DPI
ALT-4	Snap to grid
ALT-5	Visible grid
ALT-6	Lightbox
ALT-8	Next cel
ALT-Shift-8	Previous cel
ALT-9	Play sound file
ALT--	Set playback
ALT-=	Save area
ALT-[Check exposure sheet
ALT-]	Paste before
ALT-Shift-]	Insert
ALT-`	Declutter
ALT-;	Generate hard alpha
ALT-,	Page flip
ALT-/	Generate soft alpha
ALT-\	Set alpha to white

Sony recorder status codes

<u>Response</u>	<u>Meaning</u>
1	Operation complete
2	Communications error
3	Lid open
5	Frame not found
6	No frame number
7	Mark return (should not occur)
10	Executing
11	Can't execute
-128	Not a real error code, but indicative of an improper baud rate setting in the recorder. Turn the recorder off, set it to 9600 baud, and turn it on again.

Note that when a failure occurs, The Animation Stand may be unable to switch the recorder back to E/E mode, so in single monitor configurations, you might not see error codes. In this case, your only hint will be that the system stops running. To alleviate this situation, and to see the resulting error message, you will have to return the recorder to manual operation, set E/E mode, and then return to remote operation.

Lyon-Lamb controller status codes

<u>Response</u>	<u>Meaning</u>
?	Invalid VTR type or numeric transmission
A	Unexpected command termination
B	Lost VIFC during preroll
D	Recording finished
E	Preroll complete
F	Frame located (should not occur)
G	Ready for Grab program (should not occur)
H	Ready for SMPTE Grab (should not occur)
I	Acknowledgment
K	Frame too far for search
M	Preroll failed
N	Frame not found/missing VIFC
O	Timed out waiting for computer
P	Ready to accept programming
Q	Ready for SMPTE programming
R	Ready
S	Playback done/rewound (should not occur)
U	Ready for pure time code (should not occur)
V	No input video
X	Record cut-in
Y	Record cut-out
Z	At signal (should not occur)

Lyon-Lamb controller initialization codes

<u>Response</u>	<u>Meaning</u>
A3	Ampex VPR-3
A6	Ampex VPR-6
A8	Ampex VPR-80
AB	Abekas A60
AT	Ampex VPR-80 w/SMPTE
H3	Hitachi HR-230
JU	JVC CR-850 series, PR-900 E
JV	JVC BR-S810E, S811U
P5	Panasonic AU60, AU650
P6	Panasonic AU660
P7	Panasonic AG-7550
PS	Panasonic AG-7500
S5	Sony VO-5850, 5850P
SB	Ampex CVR-40, Sony BVW-40
SC	Sony BVH-2000 series
SD	Sony BVH-2500
SF	Sony BVH-3000
SG	Sony BVU-950
SH	Sony BVU-950 w/SMPTE
SL	Sony LVR-5000 (use direct connection, rather than controller)
SM	Sony VO-9850, 9850P
SN	Sony VO-9850 w/SMPTE
SP	Ampex CVR-70, 75, Sony BVW-70, 75, PVW-2800
SR	Sony DVR-1000
SS	Sony DVR-10
SU	Sony BVU-800 series
SV	Sony BVU-800 series w/SMPTE

Common questions

Still have some questions? You may find the answer here.

Why doesn't my program start? It just says something about a serial number. This is indicative of running on the wrong machine or installing the wrong tape. Reinstall, and try again. If there is still a problem, call your dealer, or Linker Systems at 714-552-1904.

What is the limit on the number of files and their combined size? You may use 32,767 files in any one Exposure sheet, with no size limit. Any number of Exposure sheets may be linked together.

Which file types can be read? Our own, plus TIFF, Targa, and virtually every Unix format.

What is the best way to antialias all the cels? See the article on high-resolution painting & scanning.

How do I set up Chroma Key? Chroma Key is a hardware function. You'll have to check your hardware manuals for that. To set up Alpha Blanking, choose alpha as your background color. You may also have to do certain hardware-related functions.

How do I generate Super-Black or Sub-Black? These are both a name for an NTSC composite signal value which is represented by a negative luminosity value. The usage of superblack is often to control matting. In the digital setting, we generally use the alpha channel. See above. Depending on your hardware configuration, you can use the alpha channel to (a) control mixing within the computer, (b) use an alpha output line to control your studio mixer, or (c) use an encoder to translate alpha to superblack.

When I move one layer over another layer, the foreground layer has a white, rather than transparent, background, obscuring my background layer. How do I correct for this? In each layer of the Exposure sheet in which the file name appears, place the key-word WHITE in the Notes field.

If I have a character going through motions, where is the best place to put the character's registration point? Depending on the type of action, between the eyes, at the heart, or at the soles of the feet.

Can I transfer an image to a matte? Yes, but don't. Use the Faded Edges or True Antialiasing modes in the Set Playback dialog of the Animate menu.

When I use a smooth Move, why does my image seem to jitter? You need higher resolution.

Why doesn't The Animation Stand do automatic inbetweening (tweens)? There's no substitute for a good artist.

Why do antialiased images created in PhotoShop have a white fringe? PhotoShop delivers a perfect visual image, and a perfect antialiased image. Unfortunately, what you need is a perfect antialiased image and an edge-biased visual image. Do the biasing yourself by painting your PhotoShop document on a background almost the same color as your image. For instance, if you're painting black text, paint it on a 99.5%-black background.

Which scanner should I use? For finished art, use a flatbed or auto-feed scanner. If you use a flatbed scanner, any one will do. It's nice to have variable scan resolution. Also, glue a set of Acme pegs onto it, using rubber cement. You may have to drill holes in the cover. If you want a nice, fast bulk-load scanner, use the Fujitsu M3097G.

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