



How to Convert Your Studio to an Automated  
Powerhouse — A Step-by-step Guide  
The Animation Stand™





How to Convert Your Studio to an Automated Powerhouse  
A Step-by-step Guide  
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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](mailto:linker@linker.com).



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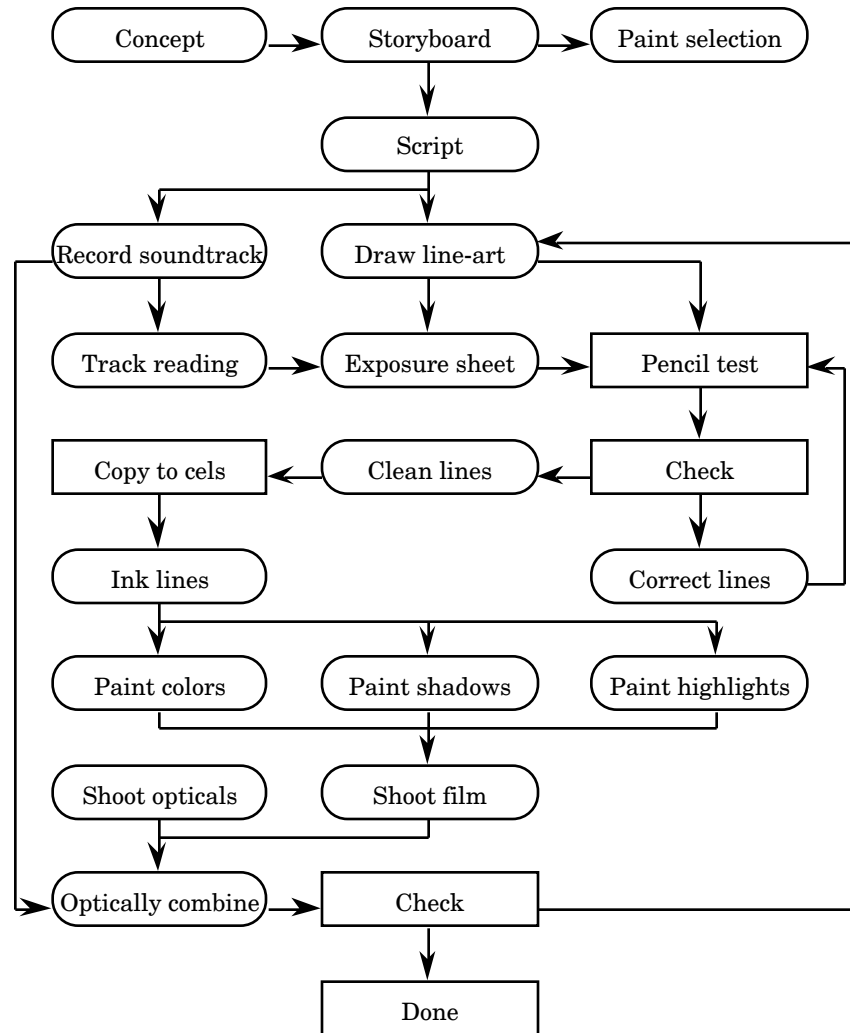
# The Basis Model: A Conventional Studio

Let's start out with the general concepts, and then get down to specifics...

## The Steps in a Standard Animation Studio

The following 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 (a test of the animation, generally using only pencil lines), to get an idea of what the final product will look like, and how the characters move. Optical press (effects added in an optical press, where images from multiple reels of film are combined) and other special effects (such as blurring and glows) may be added by specifying them on the exposure sheet. Last, the final result is placed on tape or film.

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In the above flow chart, and in all the subsequent charts shown, ovals indicate artistic steps, and rectangles indicate technical steps. Arrows indicate the flow of work. As we cover and complete various steps, we'll show you the progress of the work as it stands, with completed steps shown grayed out.

### 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.

### Cel (Character) Art

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

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. Using The Animation Stand, all of these chores are handled immediately, and you see the result in the Current frame window. You'll can get a more detailed explanation of the exposure sheet later. The Exposure sheet Window has three possible views. In the spreadsheet 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 iconic view, you get thumbnail sketches of the background and each cel layer used in each frame listed, left to right. In the grid view, you get names of the cels, listed left to right. You can cycle between these 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.

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### Writing Optical Notes

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

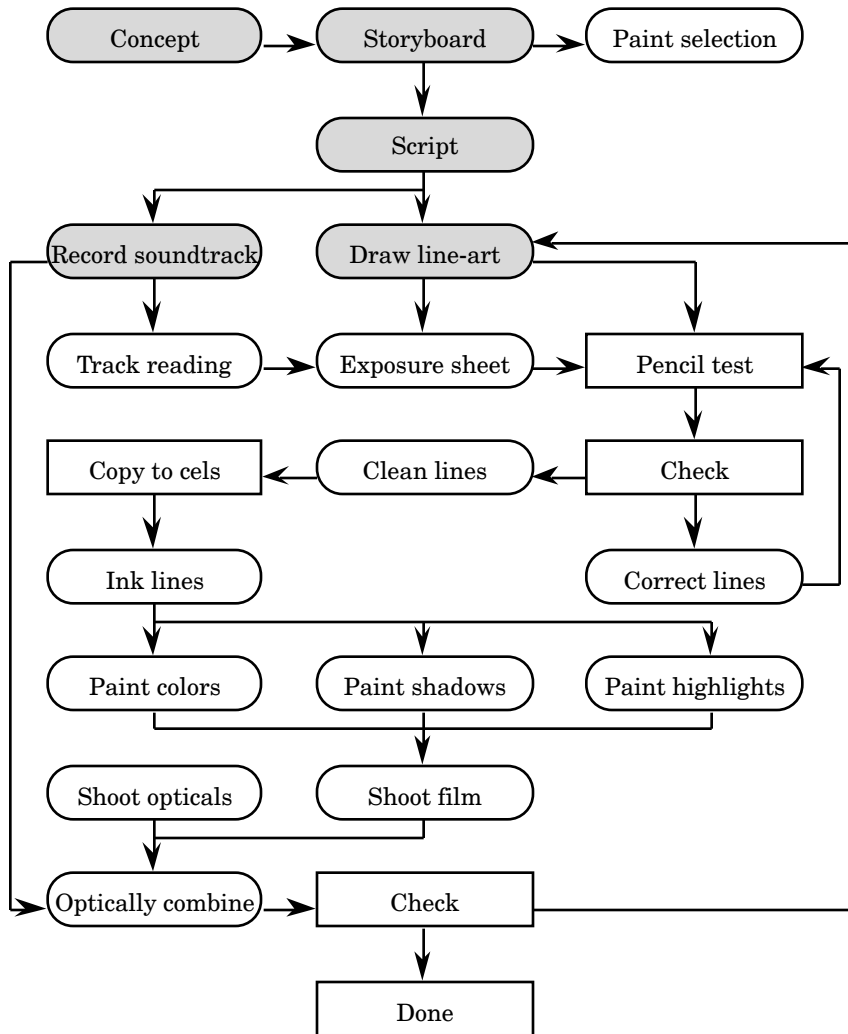
### Output

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

**What a Computer Can & Can't Do for You**

There are certain steps in animation which must be done by an artist, or the results will not be artistic. These steps we do not attempt to change; and we won't impose any rules which would rob you of your artistry. There are other steps which any technically competent fool could do. That's where the computer comes in. The computer is a very fast, very accurate idiot, and very good at math. It will do exactly what you tell it to, and no more.

The goal we've taken in The Animation Stand is to automate the non-artistic processes, and leave the artistry to you. So, as we begin our animation project, there are five steps which are going to be the same, whether or not The Animation Stand is used. These steps are Concept, Storyboard, Writing the script, Drawing the line art (first cut), and Recording the soundtrack. Before we go on, let's assume that these steps are complete:





# Planning Your Hardware

Not every computer in the studio must be identical. Each should be tailored to its job. We have identified three classes of machines. The first is the master station.

The master station is the station that can do everything. You really only need one of these in a studio, unless there is more than one major product being produced at the same time. The master station can be used for scanning, direction, paint work, and final composite and lay-out.

The directors' stations can handle everything except scanning and lay-out. Normally, figure that 25% of the stations will be directors' stations, including the master station in this count.

Paint stations cost less, and have only what hardware is required for ink & paint work. Normally, figure that 75% of the machines will be paint stations.

## Which Computer?

The Animation Stand runs on the Macintosh, Silicon Graphics Unix, and Windows NT operating systems, across the range of processors supported by these systems. So, if you already have a computer that runs one of these operating systems, stick with it. If you have some of one and some of another, stick with those, too. The Animation Stand can share files across networks of disparate processors.

If you're still deciding which computer to get, there are a variety of ways, but the two major ways are (1) getting a machine that will run all the software you want, and (2) getting the machine that has the best price/performance ratio. We can't tell what other software you're interested in, but we can tell you which machine gives you the best price/performance ratio when running The Animation Stand: PowerPC Macintosh.

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### Master Station

There are a number of concerns for this processor, so we'll list them out in the form of a table. All of the items shown are recommended configurations. Feel free to get more or better, or to cut down a bit for cost reasons, if required.

<u>Item</u>	<u>Mac</u>	<u>SGI</u>	<u>NT</u>
Processor	604e	R/4000	P6 or Alpha
Memory	32Mb	48Mb	64Mb
Serial ports	1 (built-in)	2 (built-in)	2
Parallel ports	0	0	1
Disk	2Gb	4Gb	4Gb
CD	1	1	1
Floppy	1 (built-in)	0	1
Wacom tablet	1	1	1
Mouse	1-button (std)	3-button (std)	3-button
Scanner	1	1	1
SCSI I/O	1 (built-in)	1 (built-in)	1
Ethernet	1 (built-in)	1 (built-in)	1
Lay-out unit	1	1	1
Net backup	1	1	1
Sound I/O	1 (built-in)	1 (built-in)	1
Monitors	2 12"	1 21"	1 12", 1 14"
Display cards	2 (built-in)	1 (built-in)	2
Software	T.A.S. ScanLink	T.A.S.	T.A.S. ScanLink

**Directors' Stations**

As above, all of the items shown are recommended configurations. Feel free to get more or better, or to cut down a bit for cost reasons, if required.

<u>Item</u>	<u>Mac</u>	<u>SGI</u>	<u>NT</u>
Processor	604e	R/4000	P6 or Alpha
Memory	32Mb	48Mb	64Mb
Serial ports	0	1 (built-in)	1
Parallel ports	0	0	1
Disk	1Gb	2Gb	2Gb
CD	1	1	1
Floppy	1 (built-in)	0	1
Wacom tablet	1	1	1
Mouse	1-button (std)	3-button (std)	3-button
Ethernet	1 (built-in)	1 (built-in)	1
Sound I/O	1 (built-in)	1 (built-in)	1
Monitors	2 12"	1 21"	1 12", 1 14"
Display cards	2 (built-in)	1 (built-in)	2
Software	T.A.S.	T.A.S.	T.A.S.

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### Paint Stations

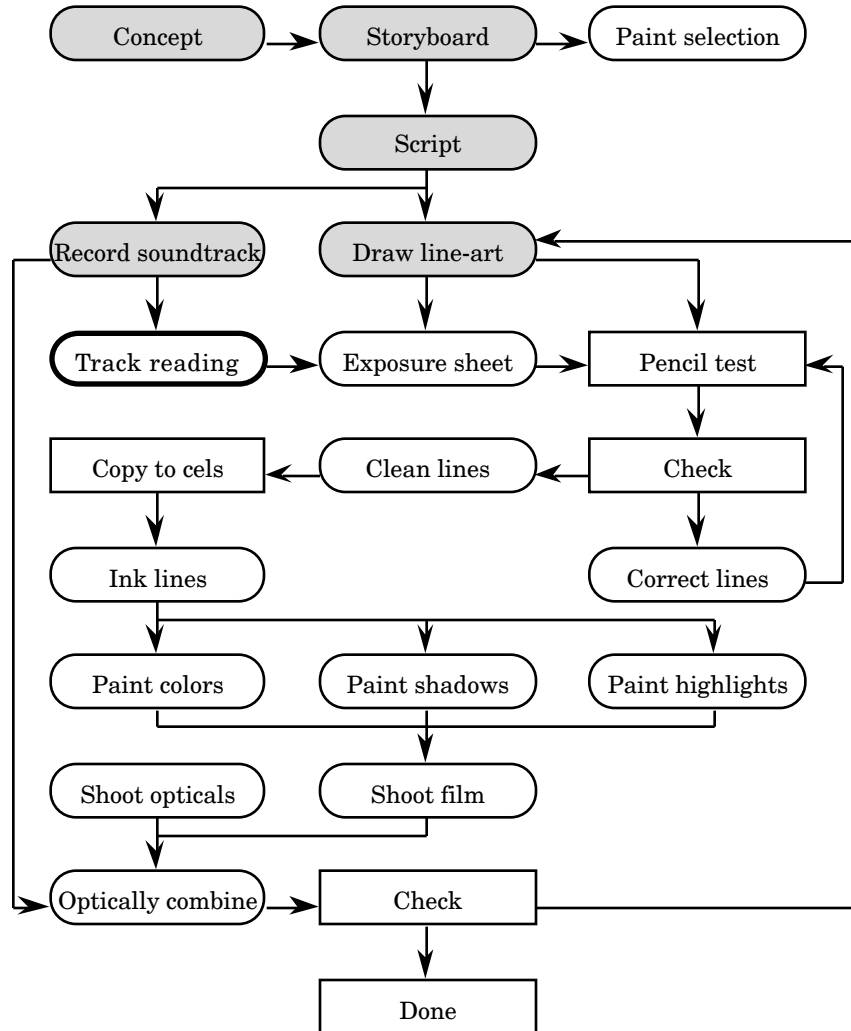
As above, all of the items shown are recommended configurations. Feel free to get more or better, or to cut down a bit for cost reasons, if required.

<u>Item</u>	<u>Mac</u>	<u>SGI</u>	<u>NT</u>
Processor	604e	R/4000	P6 or Alpha
Memory	24Mb	24Mb	32Mb
Serial ports	0	1 (built-in)	1
Parallel ports	0	0	1
Disk	500Mb	2Gb	1Gb
CD	1	1	1
Floppy	1 (built-in)	0	1
Wacom tablet	1	1	1
Mouse	1-button (std)	3-button (std)	3-button
Ethernet	1 (built-in)	1 (built-in)	1
Monitors	1 12"	1 17"	1 12"
Display cards	1 (built-in)	1 (built-in)	1
Software	Ink & Paint	Ink & Paint	Ink & Paint



# Track Reading

In this chapter, we will handle reading the meaning of the sound track, or track reading, to help out the process of laying out the exposure sheet:




### Set the Framing Rate

Before we can begin working on the production, we have to tell the system what our framing rate will be. For those who don't know, the following are the standard framing rates:

- 24 Film Frame
- 25 PAL (European) TV Frame
- 30 NTSC (American) TV Frame
- 50 PAL TV Field
- 60 NTSC TV Field, HDTV Frame


The Animation Stand assumes that you are working at 30 FPS (frames per second). If you are working at some other speed, you'll have to set the framing rate. For example, let's say we want to set the framing rate to 24 FPS.

Step 1 Bring up the Set playback dialog:

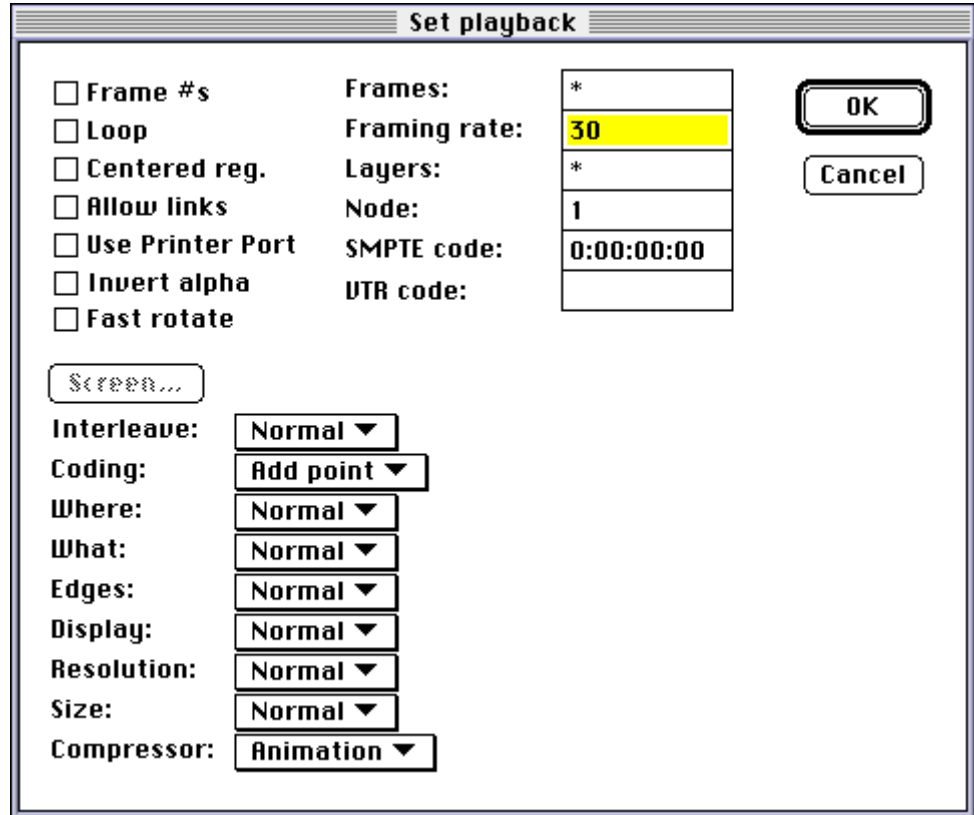
Mac: Use the mouse button to pull down the Animate menu, and select Set playback... from the menu, or hold down  and press the minus key.

SGI: Use the right mouse button to display the menus, move to the Animate menu, and select Set playback... from the menu, or hold ALT and press the minus key.

NT: Use the left mouse button to pull down the Animate menu, and select Set playback... from the menu, or hold down ALT and press the minus key.

In the future, I'll just say "Select Set playback... from the Animate menu. The function-key equivalent is minus." On the Mac, function keys always use the  key as their indicator. On the SGI, the indicator key is always ALT. On NT, the rules are a little more complicated. If the function key is 0 through 9, or A through Z, the Ctrl key is used, but if the function key is a special character, for instance minus or comma, the ALT key is used. This sort of difference is forced on us by the various operating systems, but otherwise, we have striven to keep the products extremely similar.

The dialog appears (Mac version shown):



Step 2 The Framing rate field is already selected. Enter the new framing rate, 24, in this case.

Step 3 OK the dialog by pressing the Return or Enter key. On the Mac, you may also click on OK, or on the SGI or NT systems, left-click on OK.

In the future, I'll just say "OK the dialog."

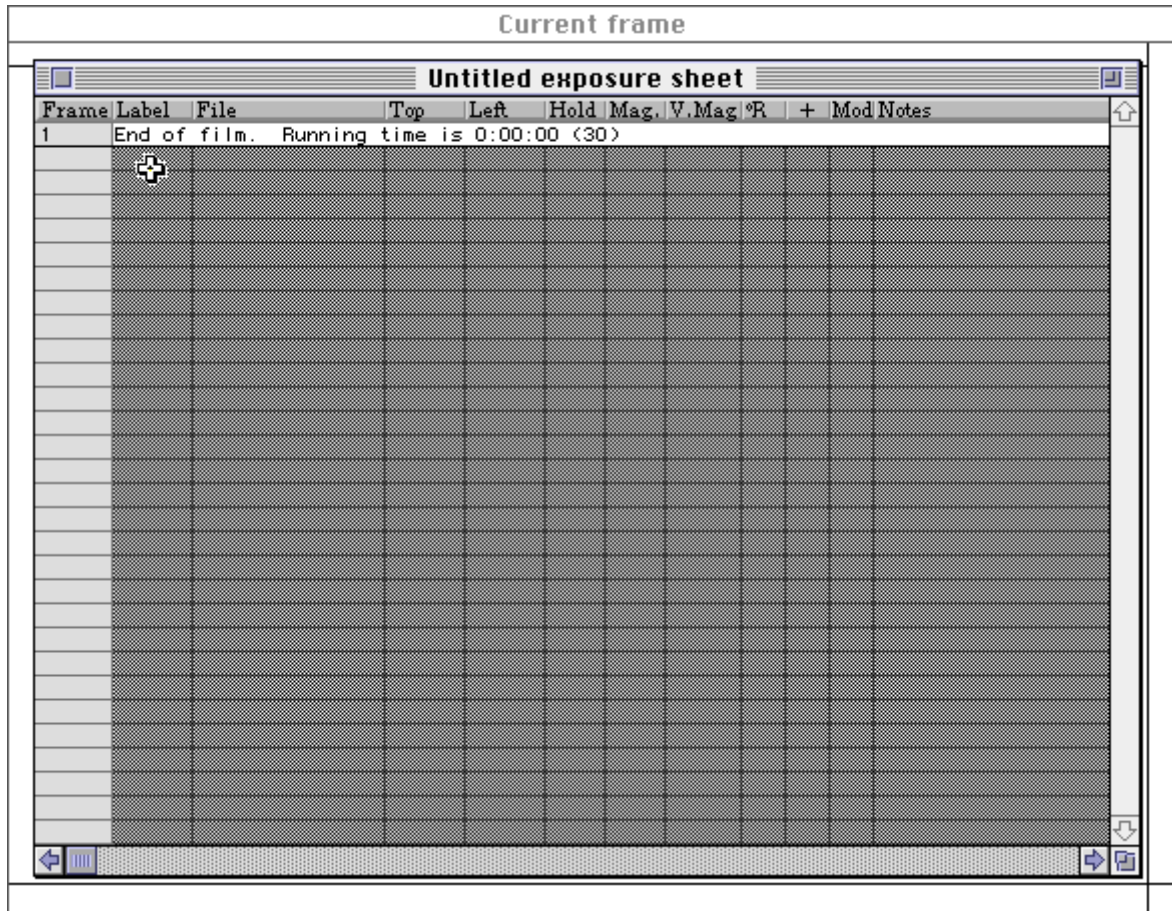
The Animation Stand needs to know your framing rate to work with sound, because it's going to show you the sound frame by frame, and let you perform all operations on the sound on a frame by frame basis.

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### Make a New Exposure Sheet

Why are we creating an exposure sheet here? When we read a sound track, we're using that information to annotate an exposure sheet, so that we'll know exactly how many in-betweens we'll need, and to otherwise help guide the action. So, we need a big, blank exposure sheet here to annotate.

Step 1 Create the exposure sheet by selecting New film from the File menu, or by using function key R. An exposure sheet appears:

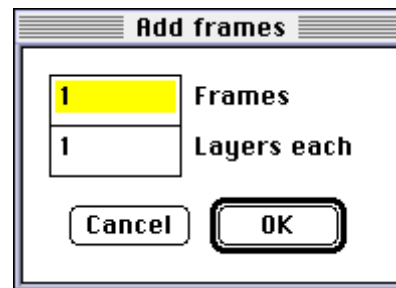


Step 2 Right now, the only thing in the film is the End of Film marker: Our film is empty. We need to add some space in front of the End of Film marker. To do this, we must first select it.

Mac: Click on the "1" in the Frame column, or anywhere in the End of Film marker.

Other: Left-click on the "1" or in the End of Film marker. In the future, for left-click, I'll just say "click". I'll specifically call out center or right clicks.

Step 3 Select Add layers... from the Animate menu, or use function key L. The Add layers dialog appears:



Step 4 Determine the number of frames you need in the exposure sheet, and enter that amount. When in doubt, don't worry. You can enter the exact number, enter a number too high and remove some later, or add too few and use the Add layers function again later.

When you enter the frame count, you can enter in three ways. You can enter a number of frames, for instance, entering "100" means 100 frames. You can also enter a SMPTE count, using hh:mm:ss:ff. Of course, you can also shorten this to mm:ss:ff or ss:ff. For instance, "4:10" would mean 4 seconds and 10 frames. Last, you can enter feet'frames. For instance "4'10" would mean 4 feet (of 16 frames each) and 10 frames. Any time The Animation Stand wants a time or frame count, you can enter your data in any of these formats.

Step 5 Press Tab to get to the Layers each field.

Step 6 Enter the number of layers in each frame. Because we may want a separate camera control layer and sound track layer, it is often best to account a layer for each of these. Again, the number entered here does not need to be exact. We can add or delete (or leave unused) layers at any time.

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- Step 7 OK the dialog. The new layers are added to the exposure sheet.
- Step 8 The exposure sheet is not yet in the format most conducive to working with sound. To do that, we want it in the studio format, rather than the full-data format it's in now. To get there, click twice in the header bar at the top of the exposure sheet. The first click will change the sheet to iconic mode, and the second will change it to studio format. If you click a third time, you'll be back in data format, thus allowing you to switch formats any time you like.

## Opening, Viewing, & Hearing the Sound

To work with a sound, we first have to bring it into the application.

**Step 1** To open the sound file, select Open... from the File menu, or use function key O. A file open window appears. Since the open windows are system dependent, we won't show one here.

**Step 2** Select a file type:

**Mac:** On Mac, you never select a file type, since the system knows the file types. We won't mention selection of file types again on the Mac.

**SGI:** If the file ends with .snd or has .snd. in it, you do not need to select a file type. If the file does not have a type marker, you need to click the Sound button.

**NT:** In NT's Open dialog, there is a file type menu. This menu will start out showing Pictures. With the left mouse button, select Sounds.

**Step 3** Select the file you want:

**Mac:** Double-click the file you want.

**SGI:** Left-click the file you want.

**NT:** Left-double-click the file you want.

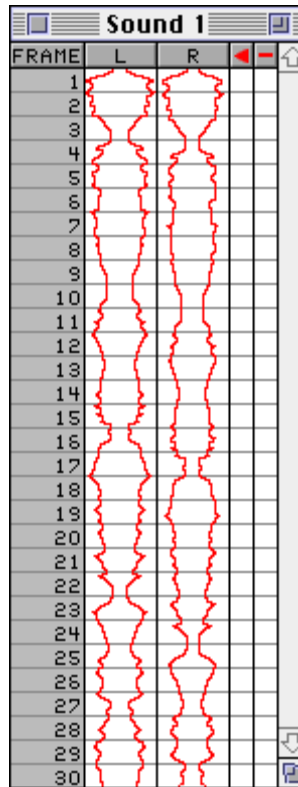
The Open dialog disappears, and a sound window appears

Instead of going through the Open process, Mac and NT give you the option of dragging a sound file icon onto the Status window. The Status window is the window that The Animation Stand maintains at the left side of the screen. (It contains all the tool icons.)

If you just want to hear the sound, without doing anything else, the Mac allows you to double-click it from the finder.

When the file opens, its window appears:

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The window has a header at the top, showing the fields: Frame, Left channel, Right channel, Beats, and Scrub. The frame field numbers each frame of sound. The left and right channels show the sound's waveform. If there is only one channel, it will appear in the Left column, and the Right column will be blank. If the Right column has a red line down the middle, stereo is present, but the right channel is silent.

To hear the sound file, select Play sound file from the Animate menu, or use function key 9. While the sound plays, you will see a red bar move down the Scrub field. This shows you exactly what portion of the sound is playing at any time.



## Scrubbing Sounds

You'll note that when The Animation Stand plays the sound file, it moves a red bar through the scrub field. This shows what portion of the sound file the program is playing at that instant. Since you can't take notes that fast, we need a way to break the sound down.

You can play a portion of the file by mousing down in the scrub field on a particular frame, and pulling down. For instance, if you mouse down in the scrub field for frame 10, and slowly move the mouse downward, you will hear frame 10, then frame 11, and so on. If you mouse down in the scrub field for frame 10 and jerk the mouse down 24 frames (in less than 24 frame times, or 1 second) you will hear those 24 frames played in 1 second. If you move up and down in this field, you will hear that area of sound repeatedly.

This process is equivalent to scrubbing the tape back and forth across the read head, except that there is no temporal or directional distortion.


Now, we get to the meat of the matter. It's time to read the track and annotate the exposure sheet.]

- Step 1      Create a new exposure sheet, as shown above.
- Step 2      Add layers to it, as shown above.
- Step 3      Change the sheet's display to studio format, as shown above.
- Step 4      Next, we need to synchronize a sound file to our exposure sheet. We do this by entering the sound into the exposure sheet, into some layer of the exposure sheet, in the frame in which the sound is to start, usually frame 1. For instance, you might decide to put the sound into frame 1, layer 1.
  - Mac:        Double-click a layer in the exposure sheet, in whatever frame you chose.
  - Others:    Center-click the layer.

The Open dialog appears.
- Step 5      Select the sound file to be brought into this position. Alternatively, on the Mac and NT systems, you can just drag a sound file into an exposure sheet cell. Now the file is in the exposure sheet, but not yet open as a sound window.

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Step 6 Now, we'll take a short-cut to open the sound file into a sound window.

Mac: Hold down  and click on the sound file's name in the exposure sheet.

SGI: Hold down ALT and click on the sound file's name in the exposure sheet.

NT: Hold down Ctrl and click on the sound file's name in the exposure sheet.

The file is now open in its own window. The first frame shown in the sound file's window will be the same frame as it appears in the exposure sheet. For instance, if the sound file is loaded into the exposure sheet [starting] in frame 10, then the first frame of the sound window will also be frame 10.

Step 7 Scrub the sound, and determine the frame number of a particular sound, or sound of interest.

Step 8 Click on the exposure sheet to make it active.

Step 9 Click in the Dialog field for the frame in which the sound appears, and enter the text. For instance, if in scrubbing, you heard a bang in frame 13, you might go to the dialog field in frame 13 of the exposure sheet and enter "bang".

Return to step 7 until you have all the sounds you need from this file entered into the exposure sheet.

Step 10 Close the sound file window using Close from the File menu, or using function key W.

Return to step 4 while there are still sound files to enter into the exposure sheet.

Step 11 We should save this sheet now, so we can use it later. Select Save from the File menu, or use function key S. A Save dialog appears.

Step 12 Assign the exposure sheet a name and OK the dialog.

Mac: Enter the name, and click OK. A discerning "Save what" dialog will appear. Click on Document only.

SGI: Enter the name, ending in .XSH, and click on Exposure sheet.

NT: Enter the name, and click OK. An extension of .XSH will be used.

Step 13 To print the exposure sheet, select Print from the File menu, or use function key P.

## Marking Beats

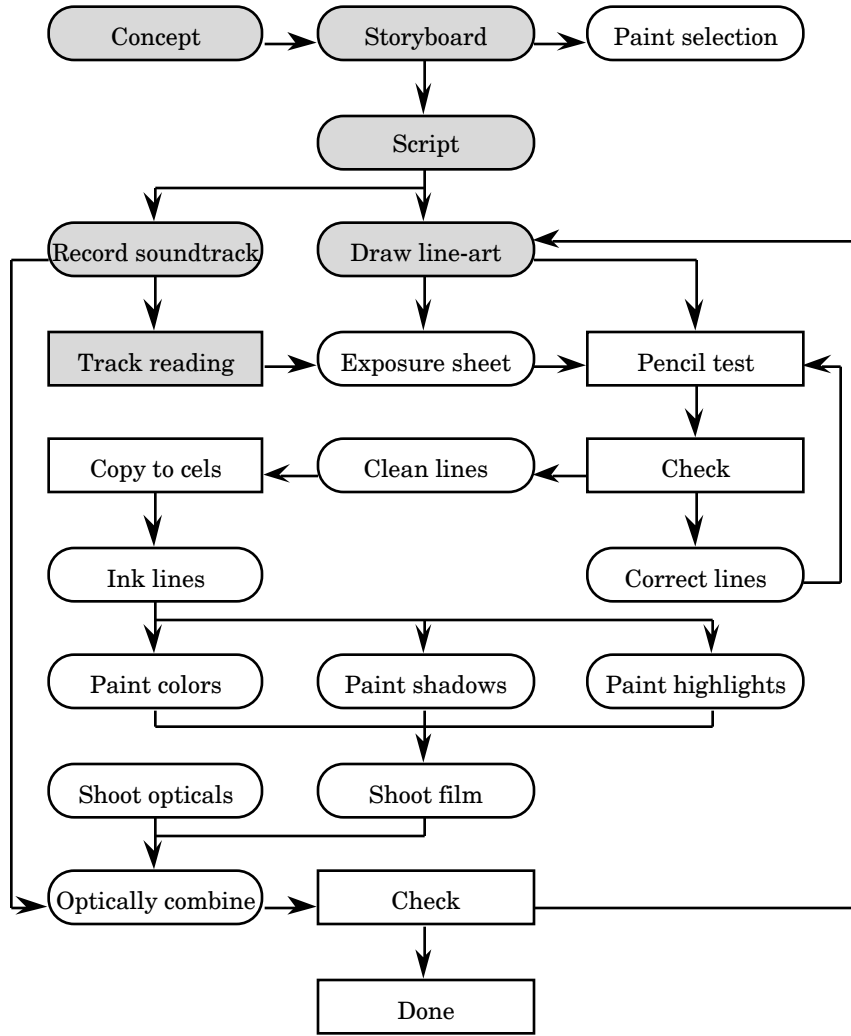
Beats are places in the sound where something significant happens. Using The Animation Stand, you can mark these beats in the sound file, and save this beat annotation by saving the file.

To mark an individual beat, click in the beat field for a particular frame. The beat field is between the right channel and the scrub field. It shows a triangular beat mark which is added or removed by clicking in a given position.

To mark beats while the sound is playing, press the spacebar once at each beat.

Seeing Sounds

As strange as this sounds, after only a few hours of working with this type of sound display, you will begin to recognize wave forms, and no longer need to do a lot of scrubbing, and may not need to do any at all. All of this reduces track reading to a simple, straightforward task:



# Drawing & Scanning Your Lines

At this point, based on our previous work-flow diagram, you probably expected to go on to creating the exposure sheet; but in computer animation, we really have to have the drawings in the computer at this point for things to make sense. Thus, we will add the step of scanning; but don't worry—this will save us several steps later. One obvious step is copying the lines to cels. Once the line art is scanned into the computer, we can print cels at any time: As lines, as colored lines, as painted cels, or as fully shaded cels.

### The Two Types of Scanning

In a real production, you have to set up your scan parameters, scan, and get on with the project. However, since we're just learning, and not yet even setting up, we have time to discuss the two major options, black-and-white versus grayscale scanning. On the chance that you need to get going on your production right now, read this chapter, but skip the "grayscale" option and go straight on to the "black and white" scan option.

In black and white scanning, we scan the document at high resolution, but only using pure black and pure white. The advantage here is that there are no "edge effects" (we'll get into that later) to deal with, but the disadvantage is that the images tend to be rather large, and take a tiny bit more time to composite.

In grayscale scanning, we scan the document at a lower resolution, using shades of gray. Note that not all scanners can do this. This allows us to take edge effects into consideration, which is required if we want a pencil (rather than pen) look, or in other cases where line shading is important. The advantage to grayscale scanning is that the images are smaller and composite faster, but may be edge effects we'll have to compensate for. More on that later.

Color scanning is required for painted backgrounds, or if you are compositing already-painted cels. If you are compositing against a live-action background, do not scan photo-rotos. Instead, load the entire film or tape as a QuickTime movie (or series of RLA files, on the SGI), and composite fully digitally. Note that not all scanners can handle color.

Which one to use? Before production begins, try both black and white and the grayscale techniques on just a few frames, say 1 frame from each of three scenes. If one looks better than the other, use that. If they look the same, just pick one.

## Setting Up Black & White Scan Parameters for Cel Art

There are two ways to scan: Using ScanLink™ and using other scan software. Since we make ScanLink, we'll describe that. Some of the scanning concepts, such as brightness, are universal, and appear in just about any scanning program. Others, such as line patching, are unique, and may not appear anywhere else.

Setting up you scan parameters requires knowledge about your scanner, your production, your computer, and about your paper.

First, let's consider DPI, or dots (pixels) per inch. Here, we must first know the number of dots across the paper. Here are the factors:

- Step 1      The basic number of dots across the paper will be the number of dots across the production. The number of dots across the production is simple to calculate. For TV, each given tape format has a given number of dots across. For instance, in NTSC β-Cam, the screen image is 648 x 486 pixels, so we have 648 dots. For film, we are dealing with the film printer's concept of dots across a frame. On some film printers, you get to tell the printer, while on others, they tell you. The most common number of dots across are 1,536, 2,048, and 4,096, although 1,024 and 8,192 are also available.
- Step 2      Next, we need to know the zooming factor. Let's say we're dealing with a 12 field basis (12" paper), and the camera is set to 12 field (field of view of 12", or 100% apparent magnification). We're at 1:1, so there's no need to apply any correction factor to our dot count. However, if we zoom in on a piece of art, we need to multiply the zooming factor. If we come in 2:1, which is the same as 200% magnification, or 6 field, we need to multiply by that factor of 2 ( $2:1=2$ ;  $200\% \div 100\%=2$ ;  $12f \div 6f=2$ ). In our example, that's  $1,536 \times 2 = 3,072$  dots.
- Step 3      Next, we need to apply an antialiasing, or super-scanning factor. This takes extra information from the paper, which will be used to clean up the image later, giving us a more natural look. For fine resolution, multiply by 2. For super-fine resolution, multiply by 4. Normally, you'll use 2 here. In our example, this gives us  $3,072 \times 2 = 6,144$  dots. If the drawing will only be used for pencil testing, and will never be used for anything more, skip this step.

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- Step 4 Next, we need to apply a limiting factor. This factor applies only to Macintosh, and should be alleviated in a future version of the Mac OS or by future versions of The Animation Stand, but for now, characters which are to be flat shaded have a limit of 16,368 pixels across, and characters which are to be smooth shaded have a limit of 4,092 pixels across.
- Step 5 Divide the number you got (for instance, 6,144) by the number of inches (for instance, 12, giving 512 DPI for this example). The number you get may be much lower than you'd expect if you've done print jobs, so don't be too surprised.
- Step 6 Again, we need to apply a limiting factor, this time for the limitations of the scanner. Scanners have only certain DPIs at which they can scan. For instance, some scanners scan at 75, 150, 200, 240, 400, and 800 DPI only. On such a scanner, you can't scan at 512 DPI. In this case, we would have to switch to 800 DPI. On other scanners, you can use anything between 100 and 400 DPI. In this case, you'd be stuck with 400 DPI. Most scanners, however, allow you anything between 50 and 800 DPI, or even 1,600 DPI. You don't actually have to check these numbers in ScanLink, as it will correct DPI values to legal values without complaint.



Now, we're ready to start the scanning process.

Step 1 Choose Scan... from the File menu. The Scan dialog appears:

The Scan dialog box contains the following elements:

- Scanner:** HP (dropdown menu)
- Depth:** Black & white (dropdown menu)
- DPI:** 72
- Hold:** 1
- Intensity:** 128
- Contrast:** 128
- Multiple scans
- Clean up
- OCR
- Register
- Center of left peg hole at:** 108, 588
- Clipping levels:** A horizontal slider bar.
- Scan:** Full (button)
- From bottom:** 0
- From left:** 0
- Height, -:** 0
- Off bottom:** (input field)
- Width:** 864
- Name, if any:** (input field)
- Buttons:** Learn, Scan, Cancel

Step 2 Select the scanner you're going to be using from the Scanner menu.

You have the option of having ScanLink track registration holes for you. If you are not going to have ScanLink spot registration holes (for instance, you are using a peg bar), skip to step 11.

Step 3 Place a blank piece of paper in the scanner.

Step 4 Click Learn. The computer will scan the sheet and decide on the paper size. If the machine does not beep, and changes the paper size fields and the registration point fields, you're fine. Skip to step 7. If it beeps, you have to enter these fields manually.

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- Step 5 Manual entry of paper size: You can either enter the paper size in the From bottom, From left, Height, and Width fields, or just click on Full. The Full button tells the scanner to scan its full flatbed size. The From bottom field tells the scanner how many pixels, mm, inches, cm, picas, or feet to skip scanning at the bottom of the paper. For instance, if we wanted to scan starting 1" from the bottom of the page, at 72 DPI, we could enter 72, 1", 0.083', 25.4mm, 2.54cm, 0.025m, or 6pi. Similarly, the other three fields define the other scan size restraints.
- Step 6 Manual entry of peg information: You also need to enter the distance from the bottom of the scan to the center of the peg holes. This does not have to be an exact number, but it should be correct to 1/8" (3mm). This value goes in the second Center of peg hole field. You also need to enter the distance from the left side of the scan to the center of the left peg hole. Again, there is some tolerance, and this number goes in the first Center of peg hole field.
- Step 7 You also need to enter the amount of image to clip out after the peg hole recognition step, so that the peg holes will not be retained in the computer's files. This value goes into the Off bottom field.
- Step 8 Click on the Register checkbox to turn it on. This will have the computer spot registration holes for you. Note that to use registration, the scanner must be able to see black behind the paper. On some scanners, you will need to affix a piece of electrical tape approximately 1cm x 2cm behind the scan position used for the registration hole area. On other scanners, you may have to disassemble the feed mechanism and spraypaint large portions of the scanner black. If you do not turn this setting on, you will also have to scan one drawing at a time (see next step), and use a peg-bar.
- Step 9 Click on the Multiple scans checkbox to turn it on. This tells ScanLink to keep scanning until the scanner runs out of paper. Of course, you need a sheet feeder to make this work.
- Step 10 Enter the numbering scheme into the Hold field. For instance, if the drawings are numbered c1, c2, c3..., the drawings are numbered by ones. Enter a 1 into the Hold field. If the drawings are numbered c1, c3, c5..., the drawings are numbered by twos, and you would enter a 2.

- Step 11 Enter the DPI, as computed above.
- Step 12 Click on Clean up to turn on the clean-up functions. These functions declutter the image, removing black dirt specs from the image, and patch lines, which means that ScanLink will remove white specs in black areas, and patch almost-closed lines for you. The only reason you would not turn this checkbox on is to save a little time while you are scanning documents that will only be used for pencil testing.
- Step 13 Enter the name of the first item to be scanned. For instance, in the above examples, the first drawing was to be numbered c1. In this case, you would enter c1 into the Name field. Alternatively, instead of entering data into the Name and Hold fields, you could use OCR. This feature allows you to have the computer read the drawing names directly from the paper, and skip entering Name and Hold. See the reference manual for a full description of OCR.
- Step 14 Place your paper into the scanner.
- Step 15 Click on Scan or press Return or Enter. The computer will scan until it runs out of paper, or scans its single sheet, if no feeder is in use.
- Return to step 13 until the project is scanned.

### Setting Up Grayscale Scan Parameters for Cel Art

Grayscale scanning is much like black and white scanning, with just a few differences:

Select Grays from the Depth menu.

The Intensity and Contrast fields have effect on most scanners. These work the same way they do in you TV. 128 is a middle setting with 0 or 1 being the low end, and 255 being the high end. On some scanners, 0 has a special meaning.

The Clipping level slider has significance, too. This bar has two sliders on it. One starts at black, and the other starts at white. These are used to reject certain grayscales. If you move the left slider in, then there will be a range of blacks and dark grays to the left of the slider. All of these blacks and dark grays will be treated as 100% black. Similarly, if the right slider is moved in, all the light grays and whites to its right are treated as 100% white. This allows you to ignore certain minor variations in ink & paper color and lighting.

In step 3 of the determination of scan DPI, leaving the number as it is gives us fine resolution, and doubling the number gives us super-fine resolution. This means that we will be scanning at half the DPI of black and white scans.

In step 4 of the determination of scan DPI, the Macintosh limit will always be 4,092 pixels, as we will always be using 32-bit painting.

### Setting Up Color Scan Parameters for Backgrounds

Color scanning is much like grayscale scanning, with just a few differences:

Select Color from the Depth menu.

Skip step 3 of the determination of scan DPI entirely.

## Where to Put the Files

You should have a folder or directory called Art. In Art, have a folder for each project. In those folders, have a folder for each scene. You may want to have folders in the scene folders for layers, but again maybe not. This will depend on the length of the scene and the number of layers. Place the scans in these folders. Try to give the cels simple names.

On the Mac, all the files will be stored as Picture (PICT) files.

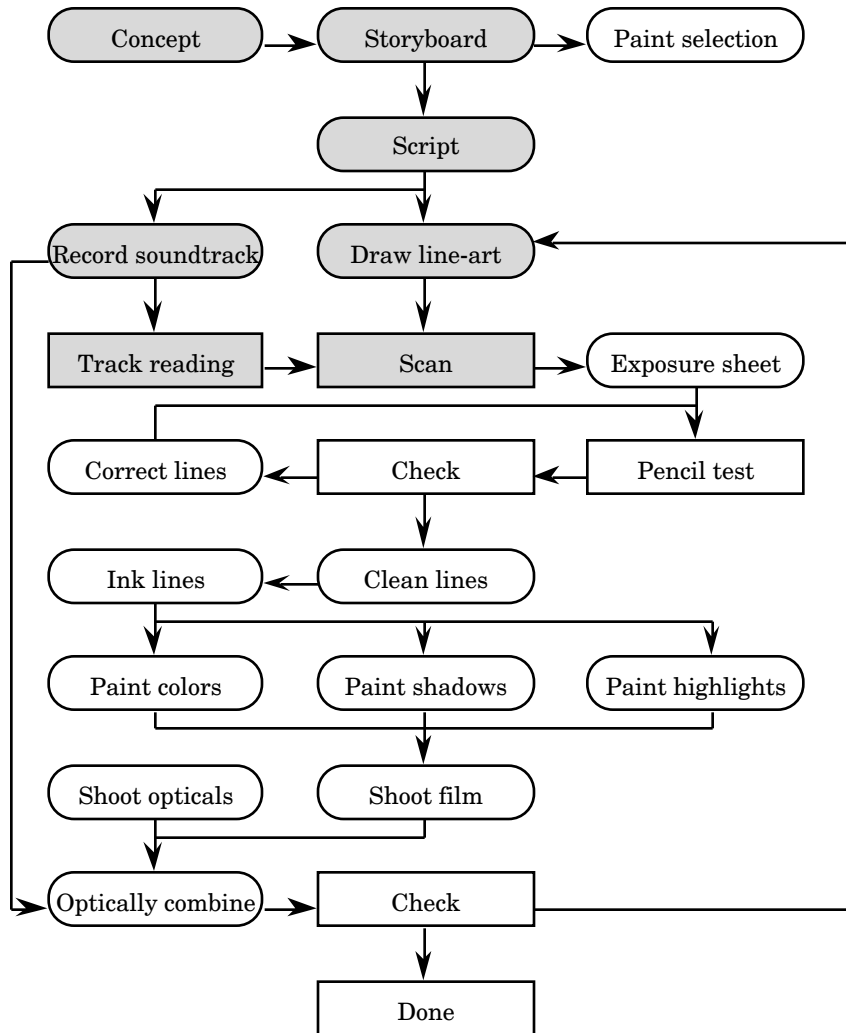
On the SGI, all the files will be stored as T.A.S. files, so you should end the file names with ".TAS".

On NT, the files will be stored as TAS files if you specify a .TAS extension or no extension, and in some other format if you specify another extension from the following list:

.BMP	Bitmap
.TGA	Targa
.TIF	TIFF
.RLA	Wavefront RLA

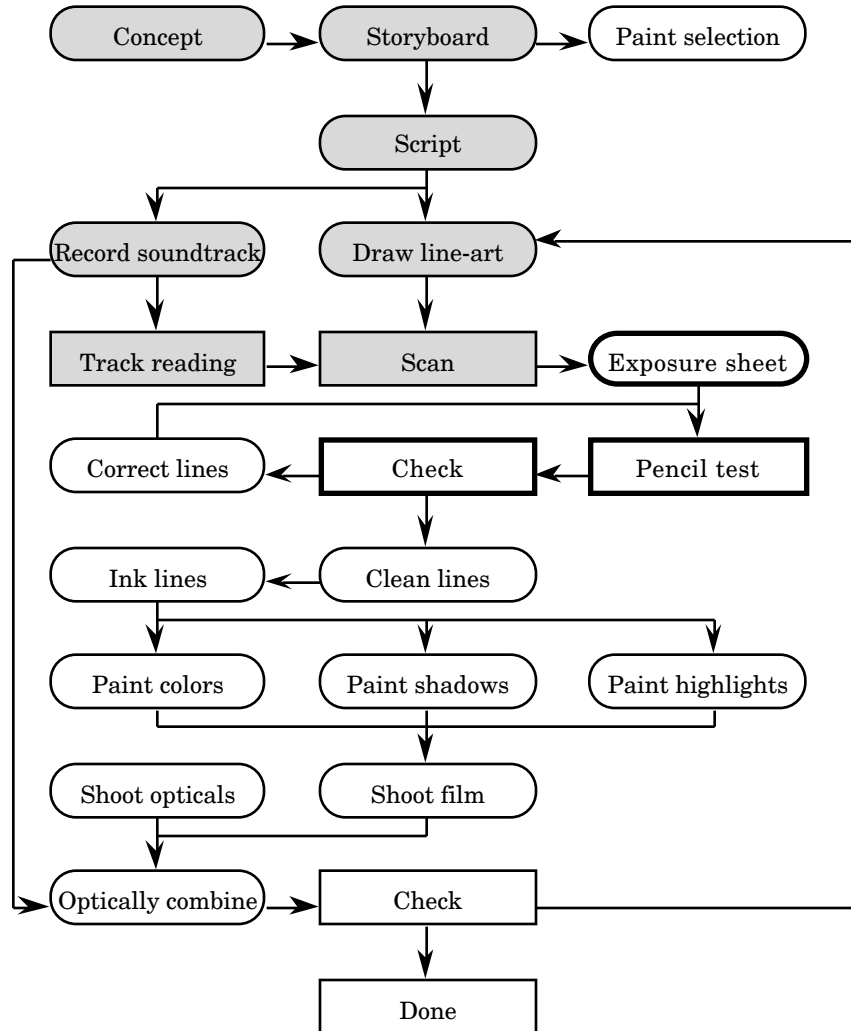
Having added (and handled) scans, and removed copying to cels (since that's now just a print command), our new flow chart is...

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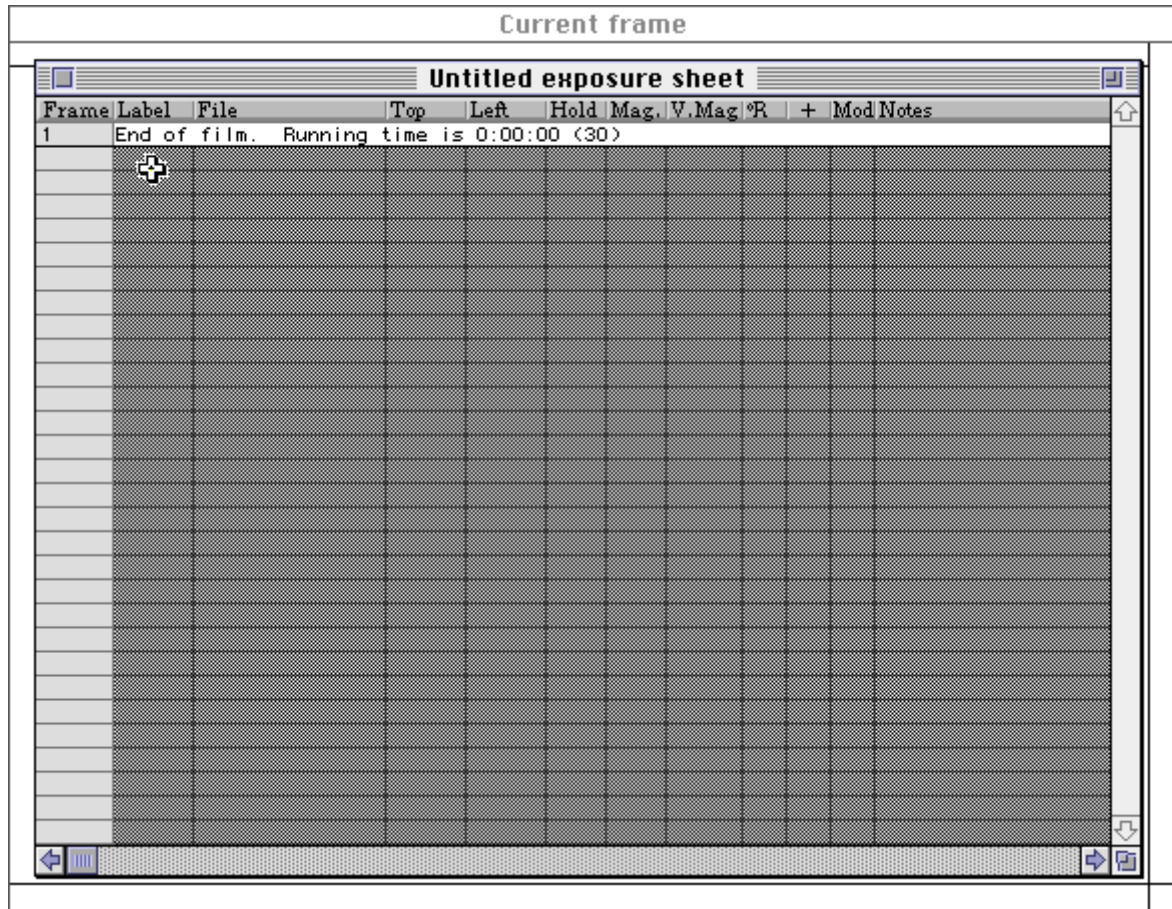
# Producing a Pencil Test

The three steps directly involved in producing a pencil test are (1) coding the exposure sheet, (2) producing the pencil test, and (3) checking it:



**Concept: The Exposure Sheet Window & the Current Frame Window**

When you create a new exposure sheet, two windows appear.



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.

The exposure sheet can appear in three forms. In the spreadsheet format (default), frames are displayed top to bottom, and within the frames, cel layers are displayed top to bottom. In the iconic and studio formats, frames are still listed top to bottom, but layers within the frames are listed left to right. In this document, I'll be using the studio format for descriptions.

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 first selected frame, 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.

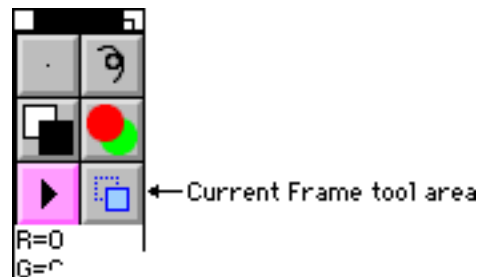
At the top of the current frame window is a controlling area which shows which layers are selected for modification in the current frame window, as a series of file (drawing) names, highlighted for selected layers.

All 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.

In the Status window, there are sets of tools which can be used to affect the current frame window and the exposure sheet. The tools which control the exposure sheet are accessed via the pop-up icon:



Next to this icon is another icon, showing the current tool in use in the current frame window. It leads to a window of tools, too.




In this section, I'll first show you how to create the bare minimum exposure sheet, using the absolute fewest number of techniques, and then add techniques one at a time. Each new technique will require you to remember a little bit more, but will also save you some time; so whether or not you want to read into those techniques is up to you.

**Setting Up for Pencil Testing**

There are really two concepts in building the basic exposure sheet: Setting up the overall parameters, and building the sheet. Let's start with the parameters:

**Step 1** We need to set our framing rate, and a number of other playback parameters to optimize for pencil testing. We're actually going to start before we start running The Animation Stand. The very first step is to optimize the screen for the fastest possible playback.

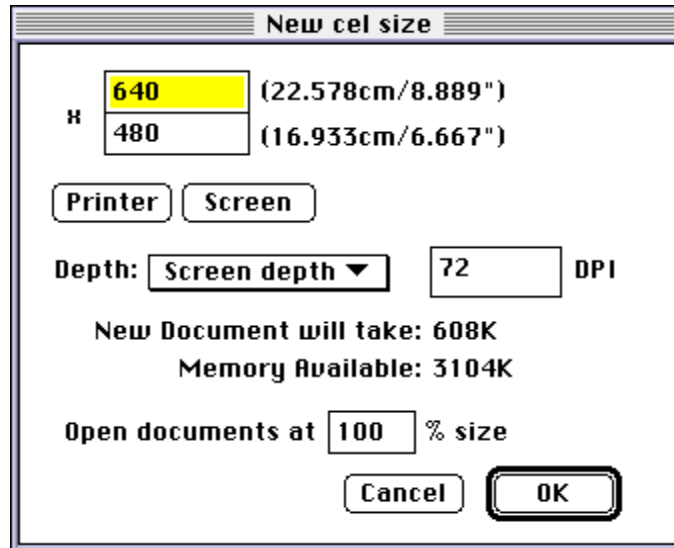
**Mac:** Invoke your Monitors control panel (which may have another name). It may vary from system-version to system-version, but on my Mac, I need to select Control panels from the  menu, and then double-click the Monitors control panel item. Then, I select my main screen, and set its depth to Black and white if you scanned in black and white, and 256 colors if you scanned in grayscale with a 256-color scanner, or 16 colors if you scanned in grayscale with a 16 color scanner, and its Color/ Grays selector to Grays. Close the control panel and the control panel window.

**SGI:** This step is not required.

**NT:** From the program manager, open the Main window, and from there, open Control Panels item. From there, open the Display item. From there, click List all modes. From that list, select black and white, or the lowest number of colors available. If modes, rather than number of colors are listed, choose VGA if you scanned in black and white or 16 grays. If you scanned in 256 grays, choose Super VGA or SVGA. OK the modes dialog and the Display dialog, and then close the various windows.

**Step 2** Start The Animation Stand. If running on the SGI, use the 32-bit version, tas.

Step 3 Select Set new cel size... from the Options menu, or use function key 1 to get our first Dialog. We're actually going to have to go through a few to get optimal pencil-test performance.

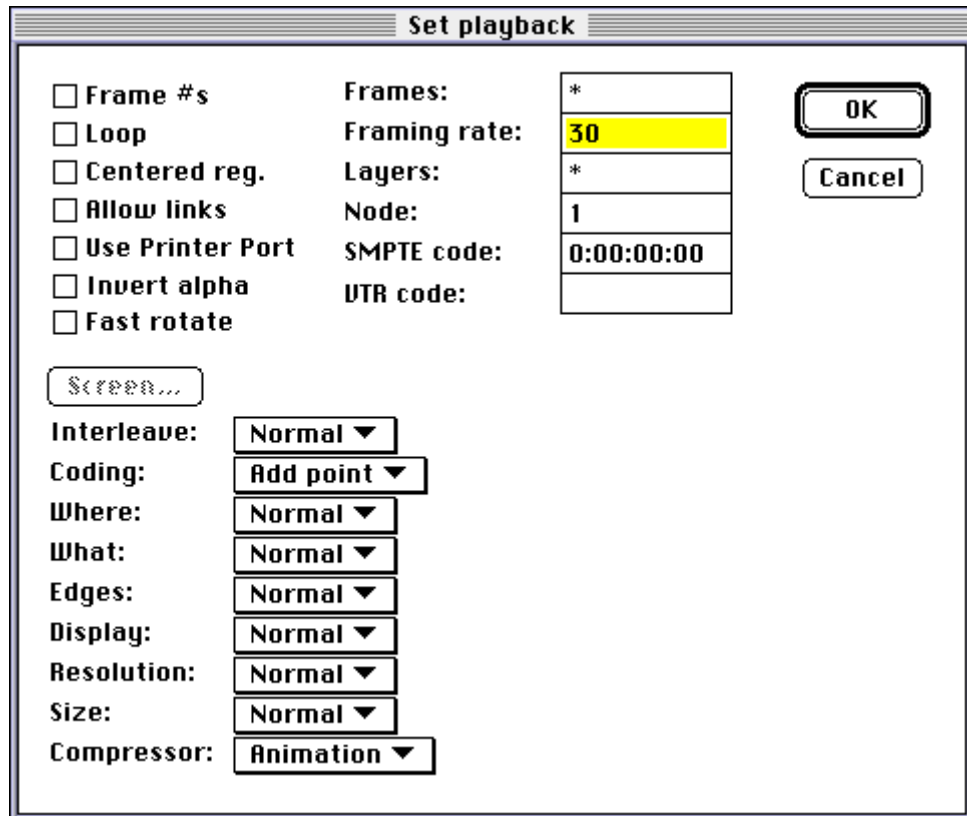


Step 4 Enter the width and height into the top two fields. For instance, 648 x 486 for NTSC  $\beta$ -Cam, or perhaps 1536 x 1k for film.

Step 5 OK the dialog.

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Step 6 Select **Set playback...** from the **Animate** menu, or use function key minus:



Step 7 Turn on **Frame #s**, so that we will see frame numbers in the pencil test playback, making corrections easier.

Step 8 Turn on **Loop**, so that we can loop the test, and be more able to observe errors.

Step 9 Enter the framing rate, if other than 30 FPS.

Step 10 Select **Full screen** from the **Where** menu, so that when we play back a test, we won't have the computer interface obstructing our view.

Step 11 Select **Notes=WHITE** from the **Display** menu if the scans were scanned as black and white, or **Notes=MINIMUM** if the scans were grayscale.

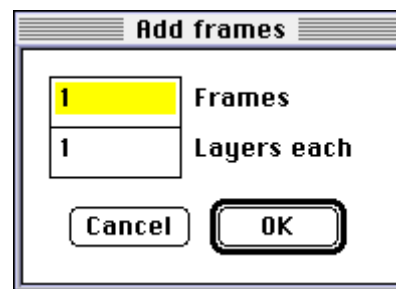
Step 12 If, when calculating the scan DPI, you doubled the scan resolution for antialiasing (or other) purposes, you must select  $\div 2$  from the **Size** menu. If you quadrupled the DPI, select  $\div 4$ . If you are using film resolution, and your output is larger than the screen, you'll have to reduce the image size even further.

Step 13 OK the dialog.

### Building a Basic Exposure Sheet

Now, we're ready to set up the actual exposure sheet. Normally, you will have one sheet per scene, but the actual arrangement is up to you. Below are the instructions for the exposure sheet. You will go through these steps once for each sheet.

- Step 1 Select New film from the File menu, or use function key R. A new exposure sheet appears, with a current frame window behind it.
- Step 2 Set the sheet into studio format by clicking in the header bar ("Frame Label...") twice.
- Step 3 So far, we don't have room on the exposure sheet for anything. We need to create some blank spaces. Click on the End of Film marker to select it.
- Step 4 Choose Add layers... from the Animate menu.



- Step 5 Enter the number of frames to add. When in doubt, guess high.
- Step 6 Tab to the next field.
- Step 7 Enter the maximum number of layers in the scene; guess if you don't know.
- Step 8 OK the dialog. Now, you've got a sheet with a certain number of frames, numbered 1 through whatever, and a certain number of layers, numbered BG, 1, 2, 3, etc. So far, all the exposure sheet cells are blank.

The positions of items in this exposure sheet mirror the positions in a paper sheet: One frame of final product per line, one layer of

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background or animation per column. For each cell in the exposure sheet to be filled in, use either steps 9 and 10 or step 9a.

Step 9 We need to tell The Animation Stand to edit the cell in question.

Mac: Double-click the exposure sheet cell. The Open dialog appears.

Others: Center click the cell.

Step 10 Find the file you want, and double-click it.

Step 9a You may be able to drag items into the exposure sheet:

Mac: You may drag a file or "file promise" from the Finder, Find File, or any other drag-aware program directly into any exposure sheet cell.

SGI: Dragging is not available.

NT: You may draw a file from the File Manager, or any other drag-aware program directly into the exposure sheet.

As I mentioned before, these are the bare minimum steps; we'll get more efficient a little bit later in this chapter.

To add more room in a sheet later: You can add more room before any frame, or before the End of Film marker by clicking in the Frame column, at the left of the sheet, and then invoking Add layers..., or you may add one frame at a time, by center-clicking (double-clicking on the Mac) in the Frame column at the left of the exposure sheet.

To remove a portion of the sheet later: You can remove a group of frames by clicking and dragging through a group of numbers in the Frame column at the left of the sheet, and then pressing the Delete or Clear key. If there's just one frame to delete, you can just click, rather than click and drag. If you want to remove a particular layer, click on it, and press Delete or Clear.

## Taking Our First Look

Now that we've completed our first sheet, its time to take a look at it. First, let's save it. Also, it's a good idea to save a sheet in progress from time to time. We suggest saving every 10 minutes.

- Step 1      Select Save from the File menu, or use function key S. The Save dialog appears.
- Step 2      Enter a name. On SGI and NT, you should use the .XSH extension. Of NT, you get it automatically.
- Step 3      OK the dialog. On Mac, you'll also have to click on Document only when the Save what dialog appears.

Now, we can safely proceed.

- Step 4      Select Play or record from the Animate menu. There will be a pause while some items are preloaded into memory for speed. Then, playback will begin. Since we selected looping, the playback will go on indefinitely.
- Step 5      Press and hold down Escape to stop the playback.

Playback in this manner may or may not be at the required speed. Remember, it's just compositing when you ask, so you're looking at the actual composite speed. I'll have more on real-time playback later.

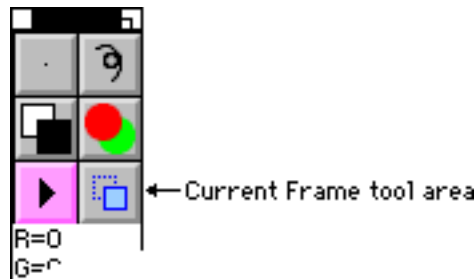
## Looking at Individual Frames

Once you've looked at your test, you will probably have a few frames you'd like to look at more closely. You can use the exposure sheet to examine individual frames. Here's how:

- Step 1 If the exposure sheet is not the frontmost document, click on it to bring it forward.
- Step 2 Click on a frame, anywhere in the frame. The current frame window will display that frame.

You can also use the current frame window to display frames.

- Step 1 If the current frame window is not the frontmost document, click on it to bring it forward.
- Step 2 Next, we will need the current frame window's toolbox. If you look to the left, at the Status window, you will see the icon of the Current frame window tool in use:



Although we can access tools as if in a menu, for these purposes it will be better to pop these tools up as a toolbox:

- Mac: Mouse down on the current frame tool area, and then draw the mouse through the drag bar of the tool window that appears, changing it from a menu to a window.
- SGI: Click in the current frame tool area, displaying the current frame tools in the toolbox at the right of the window.
- NT: Right-click in the current frame tool area, bringing up the current frame toolbox.



Step 3

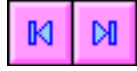
Now, you can click the playback icons to move about:



Rewind brings you to the first frame in the exposure sheet.



Fast forward brings you to the end of the exposure sheet, namely the End of Film marker. You can then back up to see frames at the end.



Step back and Step forward each step forward or back one frame.



Play plays the film from the current point.

### Moving, Resizing, Squashing, Stretching, & Rotating Cels Using the Exposure Sheet

If all of your cels are always set on the same pegs, and there is never any movement from 0-0, you can skip this section; but if things are going to move, read on.

This section shows how to modify the position of art under the camera from the animating director's point of view, namely, from the exposure sheet.

In a conventional exposure sheet, there is just one positioning column, and the camera man is supposed to understand or guess which layer or layers the move is meant to control. Unfortunately, when working with computers, we don't have the luxury of allowing the machine to make artistic decisions. For that reason, each layer in our exposure sheet has a number of positioning columns. To work with the positioning columns, it is better to work in the full data view of the exposure sheet. To get from the studio view of the sheet to the full data view, click once in the heading bar at the top of the sheet. (Later, when we want to get back to the studio view, click twice in the heading bar.) Now, rather than listing layers from left to right, The Animation Stand lists the layers from background to foreground.

Now, you get a number of columns of data on each layer:

Frame	Label	File	Top	Left	Hold	Mag.	V. Mag	%R	+	Mod	Not
1		floor			1						

The Frame field shows which frame we're on, and is used in selecting frames and layers. The Label field we've already discussed in regards to sound. The File field represents the sound file in use, or the background or cel layer file in use for this item. The Hold field represents the number of times we will shoot the frame. Thus, you can adjust timing by changing the Hold field. A blank Hold field (actually, a value of 0, which is not displayed) means that the layer is not the last layer in the frame. The + and Mod fields are used in cycling, and will be discussed later. The Notes field has two uses. First, you can put any sort of notes into the Notes field you like, and second, any special effects or compositing requests are placed into the Notes field in all capitals, so that the computer can carry out these requests.

The Top and Left fields control how far from the top and left of the frame the drawing is displayed. If you leave these two fields blank (actually, values of 0, which are not displayed), the drawing's top edge will appear at the top of the frame, and the drawing's left edge will appear at the left edge of the frame. When you enter numbers into these fields, as pixels, picas (pi), metric (mm, cm, m), or English measure (" , '), the item in the layer will be moved. Use negative numbers to move up or left.

Actually, we are not directly controlling the placement of the drawing's top left corner. We are controlling the registration point, which is normally in the top left corner. More on registration points later.

The Mag and V.Mag fields control magnification, squash, and stretch. Normally, these fields contain 100 and 0, respectively. It is important to remember that when the magnification field contains 100, it will not be displayed, and that when V.Mag contains 0, it will not be displayed. How you use these fields depends upon what you're doing.

**Magnification:** You can enlarge a layer by setting its magnification (Mag field) to larger than 100%. You can reduce a drawing by setting its magnification to less than 100%. V.Mag is not used.

**Squash & stretch:** You can squash and stretch an object by setting its vertical and horizontal magnification numbers separately. For instance, let's say we wanted to show a character twice as tall and half as wide as he normally is. We would set the Mag field (horizontal magnification) to 50, and the V.Mag field (vertical magnification) to 200. On NT, you can get mirror-imaging in the vertical or horizontal dimensions by setting Mag or V.Mag to a negative number.

You can rotate a cel by setting its °R field. °R is the number of degrees the object is rotated about its registration point. Positive numbers are clockwise, and negative numbers are counter clockwise.

Each time you finish making a change, the current frame window updates to show that change. You can force an update by clicking in the Frame field.

## Changing a Registration Point


There are two ways in which a registration point might be somewhere other than the corner of the drawing: You can set it, or ScanLink may have set it. Remember that if you scan with Register selected, the registration point will be moved the center of the left Acme hole.

There are some important differences between setting a registration point and moving a drawing. If a drawing appears just once, and you move the registration point down 1", that's the same as moving the drawing up 1" in the exposure sheet. But, if the drawing appears more than once, changing the registration point will affect how the drawing is placed each time the drawing is placed.

It affects resizing, squashing, stretching, and rotation in that these effects all occur about the registration point.

Set the registration as follows:

Step 1 Open the image file:

Mac: -click the file's name in the exposure sheet. The file opens into a paint window.

SGI: ALT-click the file's name.

NT: Ctrl-click the file's name.

Step 2 Click on the registration point tool in the status window:



Step 3 Click in an area in the paint document to establish a registration point there. A crosshairs appears. Also, note that as soon as you make the change, the current frame window will update, if it uses this drawing.

Step 4 Save the file again, using Save from the File menu, or function key S.

Step 5 On Mac, you'll also have to click on Document only when the Save what dialog appears.

## Moving, Resizing, Squashing, Stretching, & Rotating Cels Using the Current Frame Window

This section will deal with making changes to the animation from the cameraman's point of view. When you look at the current frame window, you are looking through the camera. Your final presentation, tape, or film will consist of exactly what you saw in the current frame window.

The current frame window also allows you to change what you see. The window consists of two portions. Across the top are numbers, each one representing a layer. In the bottom portion (approximately 95% of the window), you see the camera's view.

To make any changes, you must first select one or more layers. You can select a single layer by just clicking on it. Selected layers turn yellow. You can select multiple layers by holding down Shift and clicking on additional layers. You can also turn on or off layers by pressing keys 1 through 9. If you click a white layer, it turns yellow. Click a yellow layer, and it turns red. Click a red one, and it turns white again. These colors indicate the selection mode:

White: Not selected.

Yellow: Selected. Any tool you use will affect the drawing in the frame shown. Normally, this is the selection type used.

Red: Selected over time. Any tool you use will affect the drawing in the frame shown, and in all other frames selected (yellowed) in the exposure sheet. If you've got just one frame selected in the exposure sheet, then red selection is the same as yellow.

At this point, the various current frame tools will select how the mouse will affect the current frame window's view:



Move allows you to move the selected layer(s) about in the frame.



Copy is the same as the Move tool, except that only one layer (the last one selected) is moved, and the layer is copied.



Stretch modifies the V.Mag field. Mouse down in the content area, and drag to reshape the layer(s).



Resize modifies the Mag field. Mouse down in the content area, and drag to resize the layer(s).



Rotate modifies the °R field. Mouse down in the content area, and drag to rotate the layer(s).

### Automatic File Entry Using 0, +, and -

Earlier, I had you filling in the exposure sheet cel by cel, frame by frame. You were probably thinking that there must be an easier way, and you'd be right. This section and the following will give you ways that are easier, in many circumstances.

Let's say that you have an animation that has a background, named BG, and a foreground item named FG, with the files actually named FG1, FG2, and FG3. Here's one way of setting up the sheet, as described above:

- Step 1      Edit frame 1, layer BG to specify file BG (or drag)
- Step 2      Edit frame 2, layer BG to specify file BG (or drag)
- Step 3      Edit frame 3, layer BG to specify file BG (or drag)
- Step 4      Edit frame 1, layer 1 to specify file FG1 (or drag)
- Step 5      Edit frame 2, layer 1 to specify file FG2 (or drag)
- Step 6      Edit frame 3, layer 1 to specify file FG3 (or drag)

Simple in concept, but a bit time-consuming. When a layer is selected, either because you just edited the cell, because you clicked on it, or because you dragged something into it, you can use the 0, +, or - keys to copy the item down to the next frame. 0 keeps the name as it was; + (actually, you don't have to shift, so we could call this the = key) adds 1 to the name; and - subtracts 1 from the name. On SGI and NT systems, it's the name that's changed, not the extension.

For instance, adding 1 to XYZ1 gives XYZ2. Adding 1 to XYZ9 gives XYZ10. Adding 1 to XYZ09 also gives XYZ10. Adding 1 to XYZ1A gives XYZ1B. If the name ends in a special character or Z, you can't add 1 to it. Subtracting 1 from XYZ10 always gives you XYZ09. Subtracting 1 from XYZ1B gives you XYZ1A, but subtracting 1 from XYZ1A gives you XYZ1.

We can use these keys to simplify our example. This time, we can use:

- Step 1      Edit frame 1, layer BG to specify file BG (or drag)
- Step 2      Press 0 twice to copy BG into the BG layer of frames 2 and 3.
- Step 3      Edit frame 1, layer 1 to specify file FG1 (or drag)
- Step 5      Press + twice to copy FG2 and FG3 into layer 1 of frames 2 and 3.

## Multiple File Entry in the Open Dialog

There's another way to speed entry: Using function keys in the Open dialog to fill out more cells in the exposure sheet. Again, I'll use the same example:

Let's say that you have an animation that has a background, named BG, and a foreground item named FG, with the files actually named FG1, FG2, and FG3. Here's one way of setting up the sheet, as described above:

- Step 1      Edit frame 1, layer BG to specify file BG
- Step 2      Edit frame 2, layer BG to specify file BG
- Step 3      Edit frame 3, layer BG to specify file BG
- Step 4      Edit frame 1, layer 1 to specify file FG1
- Step 5      Edit frame 2, layer 1 to specify file FG2
- Step 6      Edit frame 3, layer 1 to specify file FG3

This time, we'll use the special keys to simplify the work load:

- Step 1      Begin the edit of frame 1, layer BG. When you select the file, hold down the Shift key. This will select the file BG into the correct position, and start an edit on the same layer in the next frame (still the BG layer, but now for frame 2) and leave the Open dialog window open.
- Step 2      Shift-select the BG file again.
- Step 3      Select the BG file a third time, this time dropping it into frame 3.
- Step 4      Begin the edit of frame 1, layer 1. This time, hold down a special key while selecting FG1:

Mac:      Option

SGI:      ALT

NT:      Ctrl

The special key will cause the open dialog to go down the sequence of cels, FG1, FG2, FG3... until it runs out of files in the sequence, or runs out of space in the current layer to put them.

### Specifying Sequences & Cycles

Very often, we have simple sheets, where everything follows a particular pattern. For instance, let's say we have a 30 frame sheet. The background for each of the 30 frames will be BG, and the background will be unmoving. The character layer will be CHAR1 through CHAR30, but not all of the drawings are used. We're using CHAR1, CHAR3, CHAR5, CHAR7, CHAR9, CHAR10, CHAR13, and then CHAR14 through CHAR30 on twos. And in front of it all will be a dancing bug, moving from left to right (with slow in and slow out, of course), cycling BUG1 through BUG5.

As we've seen above, you could use the direct entry method to specify all 90 items, one by one, and position the bug in 30 frames, one by one (eyeballing in the current frame window, or with your calculator in the full data view in the exposure sheet window), or you could use the 0 and + keys to speed your work, but there is a way to greatly speed the process up. The following step by step guide shows how we would make a sheet for this example.

- Step 1      Create the exposure sheet using New film from the File menu, or function key R.
- Step 2      Put the sheet in the studio view, if it's not already there by clicking twice in the heading bar.
- Step 3      Create a new, empty frame by center-clicking (double-clicking on Mac) the End of Film marker.
- Steps 4-6   Enter BG, CHAR1, and BUG1 into the BG, 1, and 2 layers of the sheet, by center-clicking (double-clicking on Mac) the lays' cells in frame 1 and selecting them from the Open dialog. Now, you've got one frame created.
- Step 7      Either through the exposure sheet's data area or in full data view, or through the current frame number, we have to place the bug in his initial position for frame 1.
- Step 8      Because this bug cycles in 5 drawings, switch to the full data view (by clicking in the header bar at the top of the exposure sheet window), and enter 5 into the Mod field for the bug layer.
- Step 9      We could go on to create 29 more frames this way, but it would be better to have the machine help us out. The next step is to duplicate this first frame for us, so that we can make modifications. Mouse down on the 1 in the Frame field at the left of the BG layer, and move the mouse down to the Frame field corresponding to the bug layer, selecting all three layers.



- Step 10 Select Copy from the Edit menu, or use function key C to copy the frame into the clipboard.
- Step 11 Select Paste before from the Edit menu, or use function key ] to paste in a new copy. We use Paste before, rather than Paste, because Paste replaces our selection with the new data, rather than just inserting the data. Now, we have frames 1 and 2, both identical copies.
- Step 12 What is now frame 2 will become frame 30 later, when we add some frames between frame 1 and this frame. So in frame 30 (still numbered frame 2), change the + field for the CHAR1 layer to 29. When The Animation Stand decides which file to use in this position, it will use CHAR1+29, or CHAR30, which is the file we wanted to use in this position.
- Step 13 Still on frame 2, change enter 29 into the + field of the bug layer. This says that we're going to use the original drawing of the bug, and advance 29 times, but repeat after 5 (from the Mod field).
- Step 14 Use the exposure sheet or the current frame window to place BUG5 in its terminal position. You now have two completed frames.
- Step 15 Here's where the shortcut happens: Click on the exposure sheet pop-up icon:



The exposure sheet tool set appears:

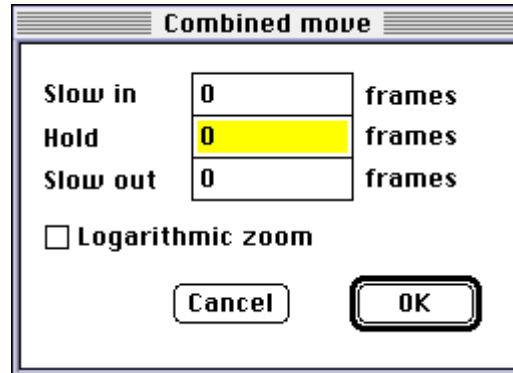


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- Step 16 Drag the Move tool (pictured below) onto the first layer of frame 2, indicating that we're inserting a move between frame 1 and what is currently frame 2.



The Move dialog appears:



- Step 17 Our next step is to enter the timing values here. Since we're adding 29 frames after frame 1 (including frame 2 or 30), the numbers entered into this dialog should add up to 29. For a purely linear move, you would enter 0 for Slow in and Slow out, with a Hold time of 29 (or 1:05 or 1'13, if you're so inclined); but since we want some slow in and slow out, I think that Slow in and Slow out values of 6 would be nice, which leaves us with a Hold time of 17. Then, OK the dialog.
- Step 18 Your move is made, but now appears as a Move marker. You can consider yourself done, or you can expand the Move marker to individual frames by clicking on the Move marker, and then selecting Expand from the Animate menu, or using function key E.

## The Pantograph Move

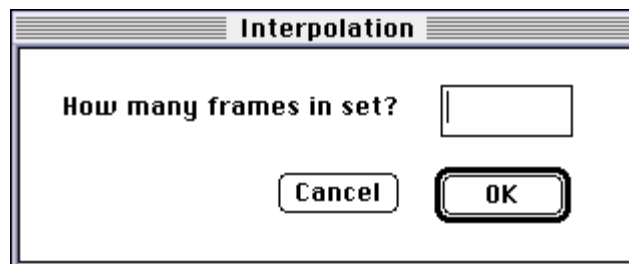
There are also other, special types of moves. A Pantograph moves allows us to set up a specific move, over a series of frames. The move can be controlled either by placing a marker controlling where the background and each cel will be in each frame, or you can set up paths in the "follow me" mode, where you show it the path and the timing. (We'll also handle spline moves later on, where just one or two [or more] control points will control an entire range of motion.)

Using a pantograph move is much like using the Move tool, with some changes at the end:

- Step 1 Set up the exposure sheet, including the before and after frames.
- Step 2 Drag the Pantograph tool onto the first cel of the ending frame:



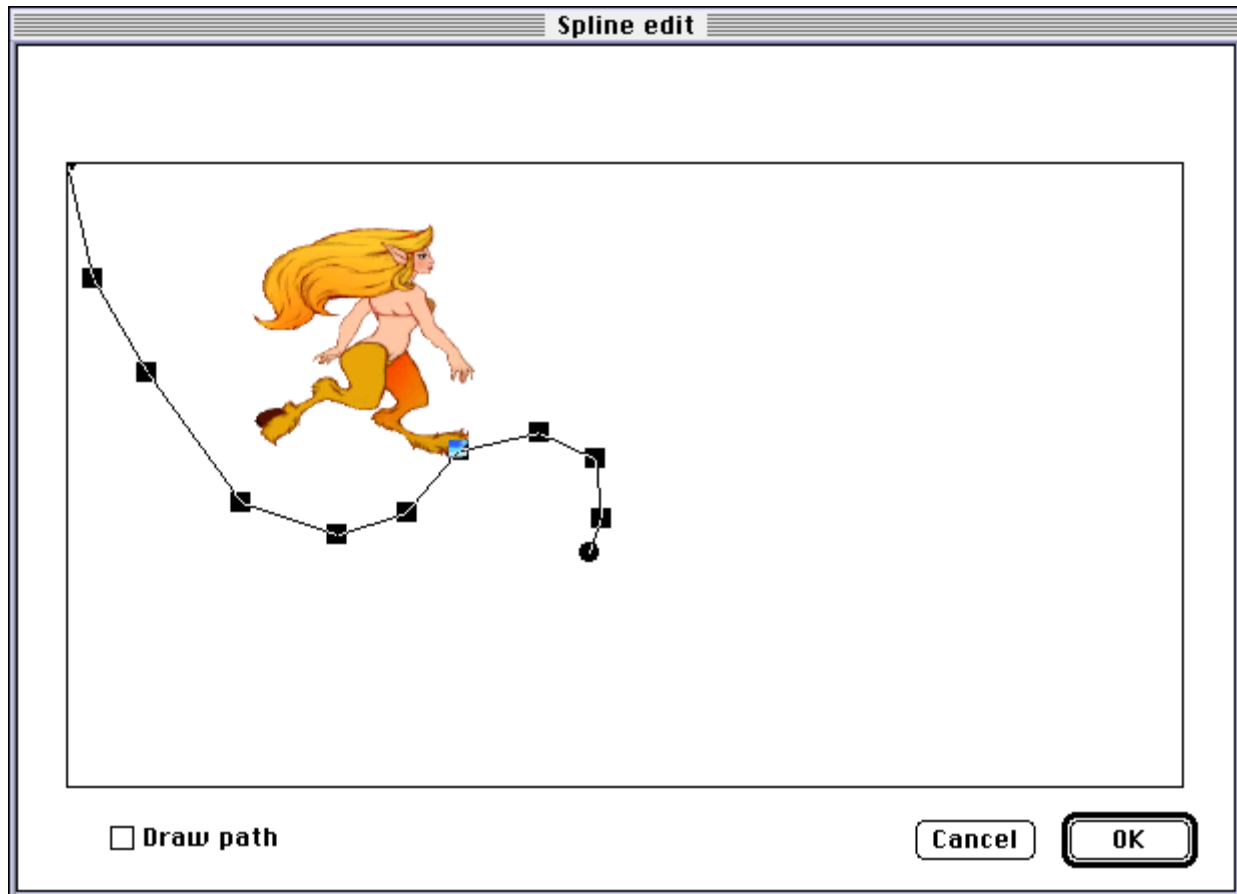
A dialog appears asking how many frames are to be in the move:



Enter some number of intermediate (or "in between") frames, not the total number of frames involved in the movement.

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Step 3 OK the dialog. This dialog will disappear and the Pantograph dialog will appear:



Step 4 Move the shoot points to the positions you'd like them: The circles represent points which cannot 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.

If there is more than one layer in the set, there is also a layer menu, which allows you to choose which layer will be affected.

## The Spline Move

A spline move is similar to a pantograph move, except that in this case, we have only a few control points, and the computer draws a smooth curve for us. There's less control, and less work. This technique is not available in conventional animation, but it can be a time-saver over pantograph or manual entry methods.

Using a spline move is much like using the Pantograph move tool, with some minor changes:

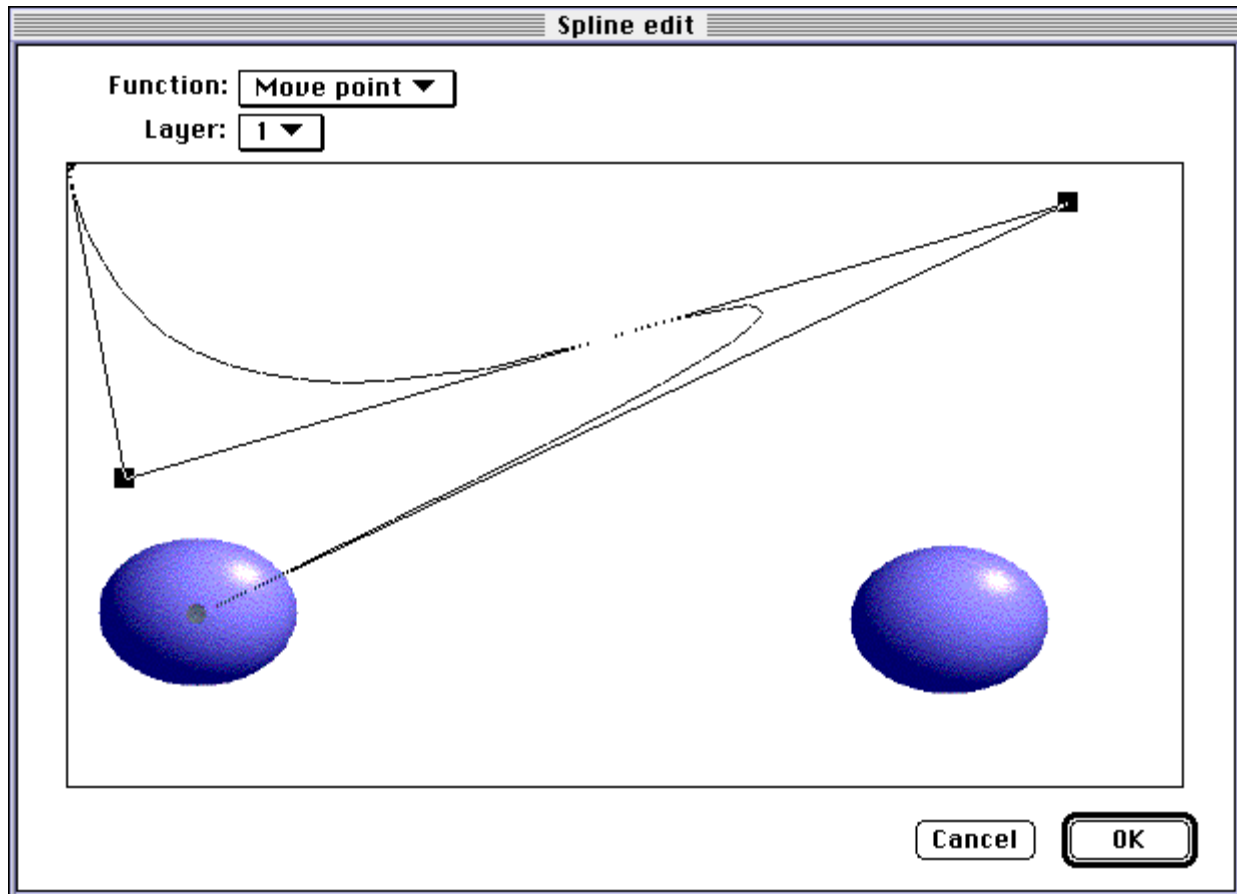
- Step 1 Set up the exposure sheet, including the before and after frames.
- Step 2 Drag the Spline tool onto the first cel of the ending frame:



The Interpolation dialog appears asking how many frames are to be in the move.

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Step 3 Enter the number of intermediate (in-between) frames, and OK the dialog. The Spline dialog will appear:



Step 4 Again, you have to set up the control points: The circles represent points which cannot 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 function). All of these functions are available from the Function menu.

If there is more than one layer in the set, there is also a layer menu, which allows you to choose which layer will be affected.

## Real-Time Playback

So far, the view you've has of the animation has been limited to a very slow playback rate: The actual time it takes to composite each frame. Depending on your machine, it may have been able to show the work at the proper speed, but it's unlikely. To get a useful look, you have to prepare a real-time file, and then play that file back. This is done with a full-speed run, or a QuickTime movie file.

Full-speed run files will show every frame of the film on the screen. If they fall behind, they will attempt to catch up. If any one frame was as late as 4ms (0.004 seconds), you will get an alert on the screen warning you of this. Here's the machine-specific small print:

- Mac: For most work, this is your best real-time format. Looping is not required in most cases. Be sure to use real memory, rather than virtual memory. You can control this with the Memory control panel. Also, make sure as much space as possible is allocated to the program. The more memory, the better it runs.
- SGI: Use this format. Since the SGI is a virtual memory system, have looping on. The first time the system plays the file, it may be a bit slow, but it should catch up on the second run-through.
- NT: Full-speed run is not available. Use the simple playback function.

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QuickTime movie files also attempt to show every frame, but there is a difference in how QuickTime handles speed problems. QuickTime always remains real-time on the sound track. It keeps the picture track real-time, too, but if it falls behind, it will leave one or more pictures out, to catch up. This will have the visual effect of freezing the picture for an instant. Also, QuickTime movies are not as efficient at full-speed run files under most circumstances. However, if a full-speed run file gets too large, it becomes very slow, while a large QuickTime movie still plays well. Again, here's the machine-specific small print:

Mac: If you have a QuickTime accelerator card, you should use that packing format. Also, you can use various video edit systems to output the QuickTime file directly to tape.

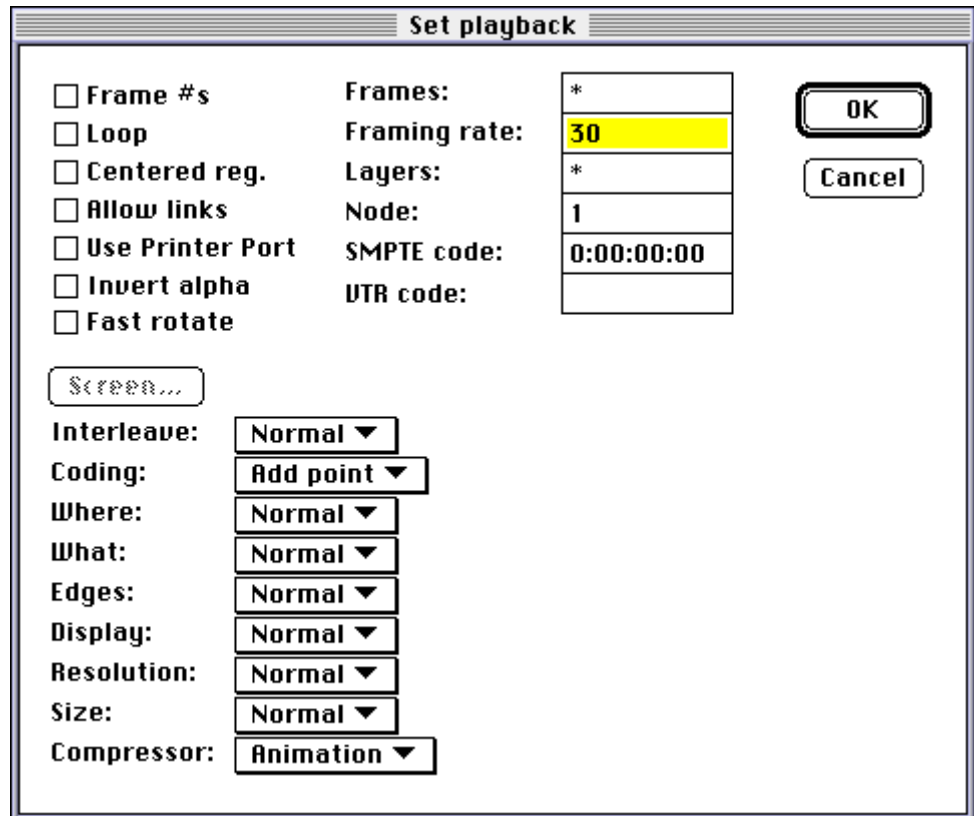
SGI: QuickTime output is not available.

NT: QuickTime output is not available as of this writing, but we are expecting Apple to provide for this facility shortly. Read this section through, as what applies to QuickTime will also apply to AVI files. We'll cover QuickTime as we expect it to work, since it will likely be in place by the time you read this.

Now that you've gotten the basics, we can go ahead and see the final product.



Step 1 Select Set playback... from the Animate menu, or use function key minus. The Set playback dialog appears:



Step 2 Set the Framing rate, if you have not already done so.



Step 3 Turn on Loop, if you haven't done that.

Step 4 If you're using QuickTime, set the Key frame rate field to 8. Don't worry if you don't see this field. It will likely be gone in future versions.

Step 5 If you're using a QuickTime Codec card, select the name of that card from the Compressor menu.

Step 6 Also if you're using QuickTime, set the Compression slider all the way to Accurate.

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- Step 7      How you generate the file will depend on your machine:
- Mac:        Select Save as Full-speed run... or Save as QuickTime movie... from the Animate menu, or use M or \, respectively.
- SGI:        Select Save as Full-speed run... from the Animate menu, or use ALT-M. When giving the file name, it's best to use the .FSR extension.
- NT:        Select Save as... from the Animate menu, or use Ctrl-M. When giving the file name, use .MOV for QuickTime output (when available) or .AVI for AVI file output (if and when available).
- Step 8      To play the file back, open it. If you're on an AV Mac, you can use the video out jack to make a VHS or S-VHS copy at the same time.

**Laying Out to Film, Tape, or Video Disk**

This section is for those who need to lay out a 100% frame-accurate version of their work, with absolutely no rough-cut timing artifacts.

- Step 1      Bring up the Set playback dialog using Set playback... from the Animate menu, or use function key minus.
- Step 2      Select what type of hardware you'd like to use from the Where menu.
- Step 3      If you are using a Lyon-Lamb or VAS device, or a Sony laser disc, you must pick a coding method from the Coding menu.
- Step 4      Enter a tape position into the SMPTE field. The exception to this step is a device in step 3 in VIFC mode. In that case, you'd use a frame count in the Tape posn field.
- Step 5      If you're using a V/LAN video controller network, you'll have to enter the node number of your chosen V/LAN receiver into the Node field.
- Step 6      OK the dialog.
- Step 7      Save your exposure sheet. Feel free to save early and often, but step 8 requires it.
- Step 8      If your sheet is set at 24 FPS, but your equipment runs only at 30 FPS, we need to convert the exposure sheet to 30 FPS. We do this by selecting 3/2 frame pulldown from the Animate menu. Remember not to save this modified exposure sheet, unless you want to work at 30 FPS for the remainder of the project,
- Step 9      Select Play or record from the Animate menu, or use function key J.

Exception: From any type of machine, if you are using a Perception board, save to it as .RLA files. If you are running on a network, save to the perception board over the network. It will appear as a disk from Mac, SGI, and NT.

### Frame Move Notation

Sometimes it is easier to move the camera around than it is to move the art. To make this kind of thing easier, we provide two methods of moving the camera around in The Animation Stand.

First, there is the FRAME command. When we're not using the FRAME command, the background goes in the first layer (called "BG"), and the cel layers start in the next layer (called "1" and so on). Using the FRAME command, we place a camera icon in the first layer (BG), the background in the next layer (1), and cel layers starting in the next layer (2 on). The camera icon shows up in the data view as "FRAME" in the Notes field.

You get the camera icon into the layer by dragging it from the exposure sheet tool window, or center-dragging (option-dragging on the Mac) it to a layer to place it into that layer in all frames. Once this icon is in place, any move you make to the FRAME layer is like moving the camera. So, if we set magnification to 200%, then all the layers show up at 200%. The same holds for movements and rotations.

A second method to control positioning is with frame notation. This is best used from the full data view. In this method, you enter frame move notation. Here's how it works: You enter frame move notation into the Notes field. When you leave the field (by pressing Enter, or whatever), the action takes effect. The notation is best shown by example. Let's say you enter "#12 1N-2W". This means that the camera is to stay at 12 fields (we use a 12-field basis), and move its view 1 field north (up), and 2 west (left). If we wanted to zoom in at the same time, we might code (for instance) "#8 1N-2W". If we wanted to use some other basis, such as a 16-field basis, we would enter "#8 1N-2W (16)".

## Viewing Just a Piece of the Animation

So far, I've shown how to check an entire exposure sheet all at once, or check a single frame. But what if you just want to check a portion of the animation? Easy!

Go back to the Set playback dialog, and you'll find two controlling fields, Frames and Layers. Each of these field contain an asterisk, meaning all fields and all layers. In each of these fields, you can also enter a range. For instance, if you entered "20-50" into the Frames field, and "2-" into the Layers field, this would mean that playback would show only frames 20 through 50, and that each frame would omit the first (background) layer, and show layers starting at the second.

## Field Guides

You can call up a field guide at any point by selecting Field guide... from the Options menu, or use function key F. Enter the number of fields in the guide.

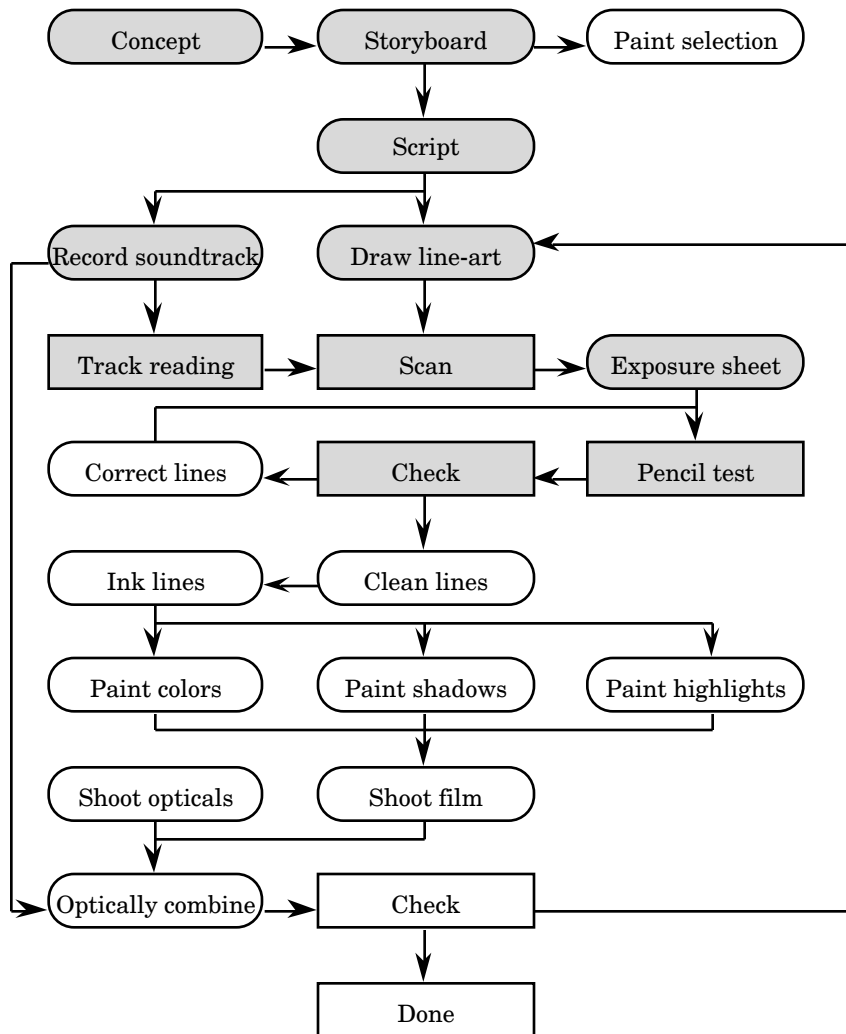
You can dismiss the field guide by entering 0.

## But Wait, There's More!

All that's been shown here is a direct carryover from conventional techniques. In the reference manual, you'll find many more techniques and tools.

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Here's where we stand now:



# Correcting & Cleaning Lines

Normally, in animation studios these two steps can be handled separately, or in combination. Since, for the most part, cleaning up is handled automatically by fine-tuning the scan parameters, we'll skip that step and concern ourselves with correcting lines. Any cleaning still to be done can be handled as a correction.

## Loading a File

The first step in modifying the lines of a cel is to get the cel into the computer's memory. There are two ways to do this. If there is an exposure sheet open, and file name appears on the sheet, you can hold down the function key (⌘ for Mac, ALT for SGI, and Ctrl for NT), and click on the file name. Alternatively, you can select Open... from the File menu, or use function key O, and select the file that way. On Mac and NT systems, you also have the option of dragging the file onto the Status window.

### Turning on the Light Table

Let's say you are going to modify FROG5, and you'd like to see FROG4 and FROG6 at the same time, for reference. Here's what you'd do:

- Steps 1-3 Open FROG4 through FROG6.
- Step 4 Click on the FROG5 window, so that it becomes the frontmost.
- Step 5 Select Light table... from the Options menu, or use function key 6.
- Steps 6-7 Select FROG4 from the Light table A, and FROG6 from the Light table B menu.
- Step 8 OK the dialog.

When you want to eliminate the light table effect (you can close the file without this step, if you want):

- Step 1 Select Light table... from the Options menu, or use function key 6.
- Step 2 Click on None.

### Selecting a Pen Nib

When you draw, you draw with the currently selected pen nib. This nib is shown as the upper left icon in the Status window. The default is a single pixel pen, which is fine for most purposes. If you need a thicker line, follow these directions:

- Mac: Mouse down on the nib icon. A menu window appears, showing various preset nib sizes. Drag the mouse to one and release the mouse.
- SGI: Click on the nib icon. A list of various nib sizes appears on the right side of the Status window. Click one.
- NT: Right-click on the nib icon. A menu window appear, showing various preset nib sizes. Right-click on one of them.



## Erasing Old Lines

This is pretty easy, too.

Step 1 Select the eraser tool:



Step 2 Erase with it.

## Adding New Freehand Lines

Another easy one.

Step 1 If you have a pressure-sensitive tablet, you might want to turn off pressure sensitivity. If you leave it on, pressing harder or lighter will make thicker or thinner lines, with darker or lighter coloration. Bring up the Preferences dialog by selecting Preferences from the Options menu, or use function key 2.

Steps 2&3 Turn off the Pressure affects width and Pressure affects flow checkboxes.

Step 4 OK the dialog.

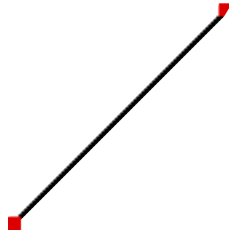
Step 5 Select the draw tool:



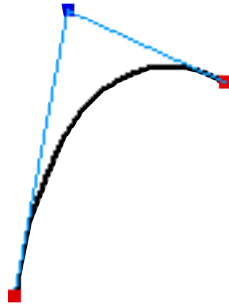
Step 6 Draw with it.

## Adding New Curves

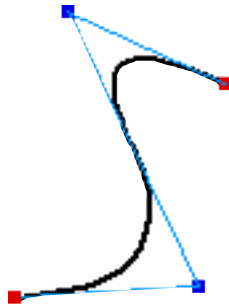
There's a type of curve, called a "spline" curve, which is much like drawing with a "French curve" tool. In concept, each spline curve is made up of one or more segments. Each of these segments has two fixed end points, and one or more "control" points. A segment with only two control points is a straight line:



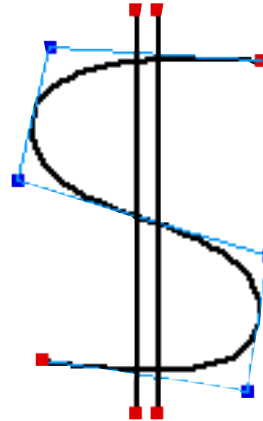
A segment with one control point arcs towards the control point:



A segment with multiple control points arcs towards each of them:



You can use multiple fixed and control points to design any number of figures. For instance:



The thick lines shown will be dropped into the document when we finish editing the curve. The width of these lines is controlled by the selected pen nib size. The lighter lines show how the fixed points and control points connect, and will not be made part of the document. Control points show as blue boxes, and fixed points show as red boxes. Neither of these items will be dropped into the document, as they are only used for control during the drawing stage.

To use these tools, bring up the Curve tool window, controlled by the Curve icon:



Mac: Mouse down on the Curve icon, and move the mouse through the drag bar, tearing off the window.

SGI: Click on the Curve icon, placing the curve tools in the right side of the Status window.

NT: Right-click on the Curve icon, bringing up the Curve tool window.



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Here's how each of the tools work:



This is the first tool you'll use for making a spline. Each time you draw with it, it will draw a new, unconnected segment. The segment will have two new fixed points at its ends.



This tool adds a new fixed point wherever you use it in the document.



This tool adds a new control point wherever you use it in the document. When you use the first spline tool, that tool will automatically switch you to this tool, since adding control points is what you'll do in 99% of the cases.



This tool deletes whichever control or fixed point you click on.



This tool allows you to mouse down on a control point or fixed point and drag it about.

### Rerunning the Pencil Tests

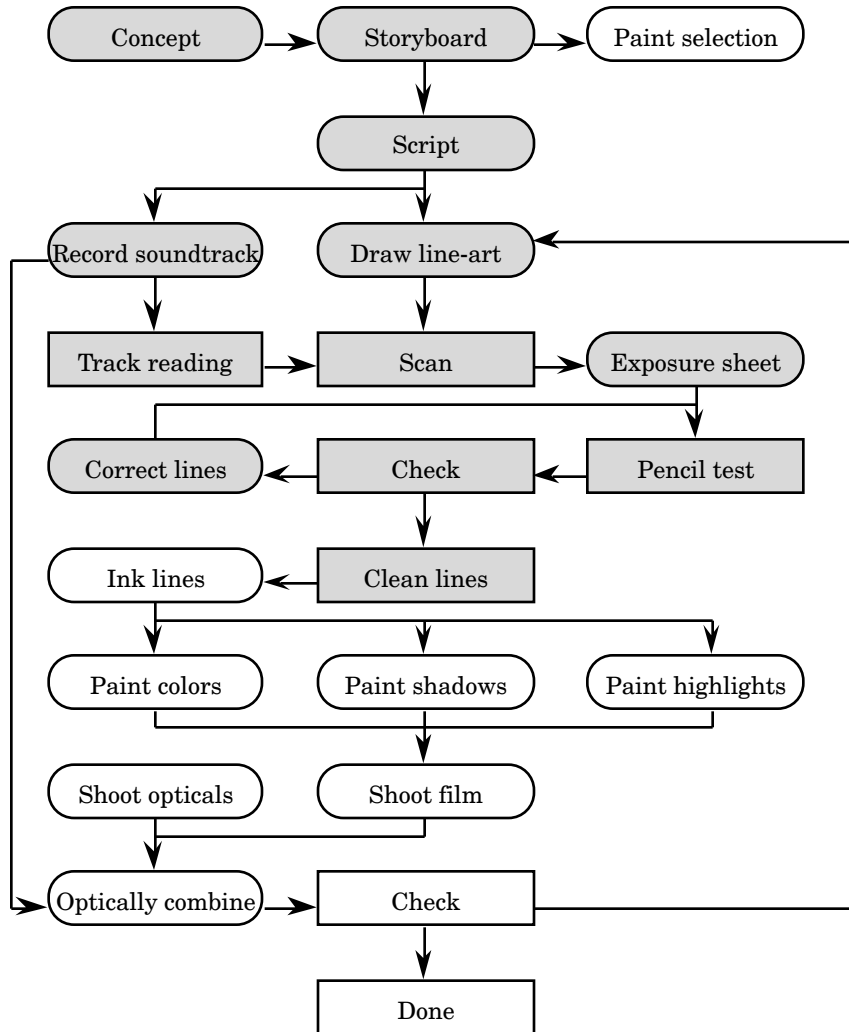
Here's where things get extremely nice: To rerun the pencil test, just bring up the exposure sheet (if it's not already up) and use function key J to run it or shoot it again, or one of the "Save as" functions to save out a QuickTime movie, Full-speed run, or series of pictures.

If you had the exposure sheet open while you were modifying files, then you probably saw the frames change as you made modifications to the file, or as other people on your network modified the files.

**But Wait, There's More!**

Again, we've covered very few of the retouching functions in The Animation Stand. Consult the reference manual for a full list.

Here's our standing on the project so far:





# Building the Palette

We need to handle the palette before we go on to any ink or paint steps. At some studios, you have a palette once and for all, and that's it. At other studios, you develop a palette for each project. Either way, you'll need a palette at this point.

### The Default & Prebuilt Palettes

Each time you mouse down on the foreground color marker:



You'll see the palette appear:



From this palette, you can pick the next color you're going to use. When you first run the application, The Animation Stand will use a default palette. On the Mac, this is the System color palette. On SGI and NT, it is a maximally-spaced palette.

In case you'd like to use other palettes, we've included those for you, too. To get to those:

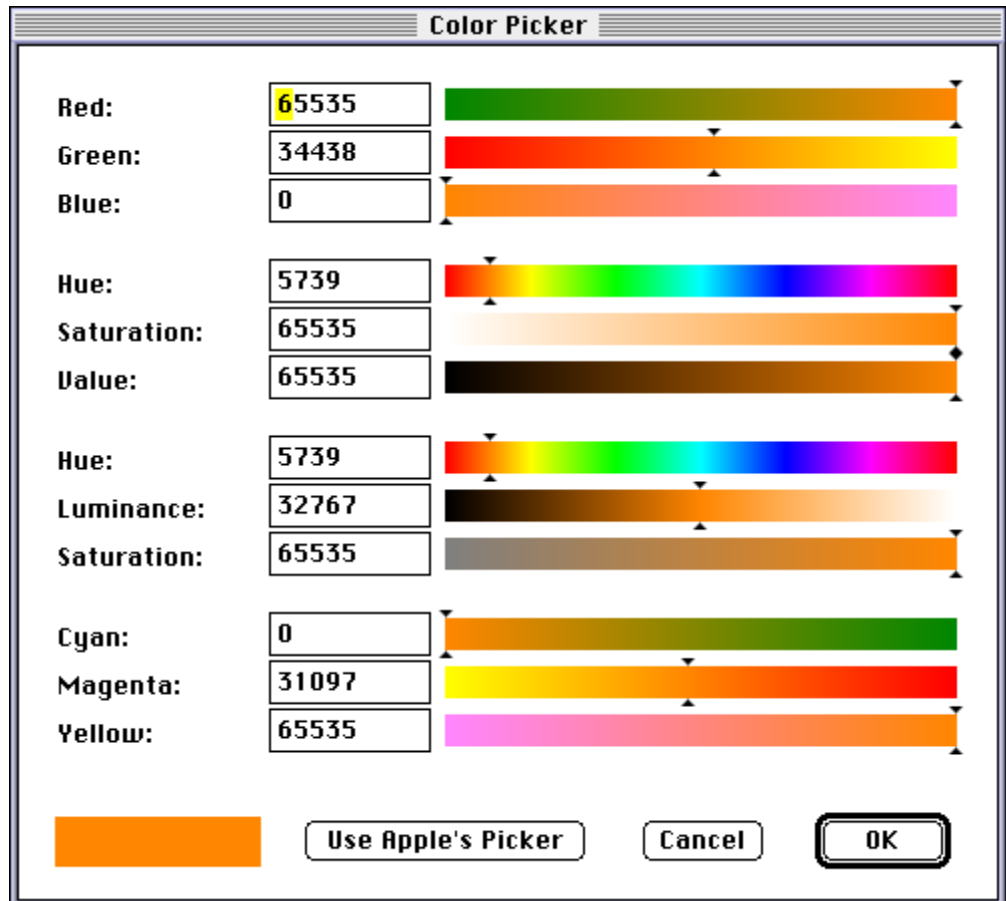
- Step 1      Select Open... from the File menu, or use function key O. The Open dialog appears.
- Step 2      Get to the palettes directory:
  - Mac:        Select Palettes.
  - SGI:        Maneuver to directory /usr/TAS/Palettes.
  - NT:        Maneuver to directory C:\TAS\PALETTES.
- Step 3      NT only: Set your file type filter to Palettes.
- Step 4      Open any of the palette files you find there.



## Building a Custom Palette

Almost certainly, you will want to build a custom palette. Here's how:

- Step 1 Bring up the standard or current palette, as shown above.
- Step 2 Pick a palette cell you'd like to change. Center-click it. (on the Mac, double-click it.) The color picker appears:



Don't panic! It only looks complicated. The color picker allows you to modify your colors, while showing you a lot of information.

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Step 3 Enter or modify your color for this cell. Here's what the various controls do:

Red, Green, & Blue entry fields: These fields take a color level. On the Mac and SGI 64-bit versions, these numbers range from 0 to 65535. On the SGI 32-bit and NT versions, these numbers range from 0 to 255. 0 is the minimum value, meaning no red, green, or blue. The highest value represents the component (red, green, or blue) at 100% intensity.

The Red, Green, & Blue sliders: These sliders allow you to set the color intensity graphically. The colors along the bar show you what color you'll be on if you move the slider to that position.

Other color sets: Each of the other triples allow you to modify the same color, using different color spaces. Hue/Saturation/Value is the color scheme used on the standard color wheel. Hue/Luminance/Saturation is the color model used in NTSC TV. It's best to keep saturation under 75% for broadcast NTSC TV. Cyan/Magenta/Yellow is used in print work. The black component is computed for you.

At the lower left is a box containing the current color.

On Mac, there will be a button allowing you to substitute one of the Mac standard color pickers for this color picker.

On SGI, there will be an additional slider which controls the transparency level of the color. This transparency level is not used directly in painting, but is kept for later use in the compositing stage.

Step 4 OK the dialog, changing the color.

Step 5 Repeat the process at step 2, until you've created the colors you need.

Step 6 Select Save as... from the File menu.

Step 7 Enter the file name you'd like to assign to the palette and OK the dialog:

Mac: Use any name you like. OK the dialog. You will be presented with a second dialog, asking what to save. Select Palette only.

Sgi: The file name should end in .tas. Click on the Palette only button to save the file.

NT: Use any name you like, but the name must end in .TPT. OK the dialog.

You can also load colors from scans:

Step 1 Open the scan.

Step 2 Select the eyedropper tool:



Step 3 Use it to select a color by clicking on it.

Step 4 Select the color store tool:



Step 5 Click on a palette cell.

You can use this technique for some palette cells, and the color picker for others, if you like.

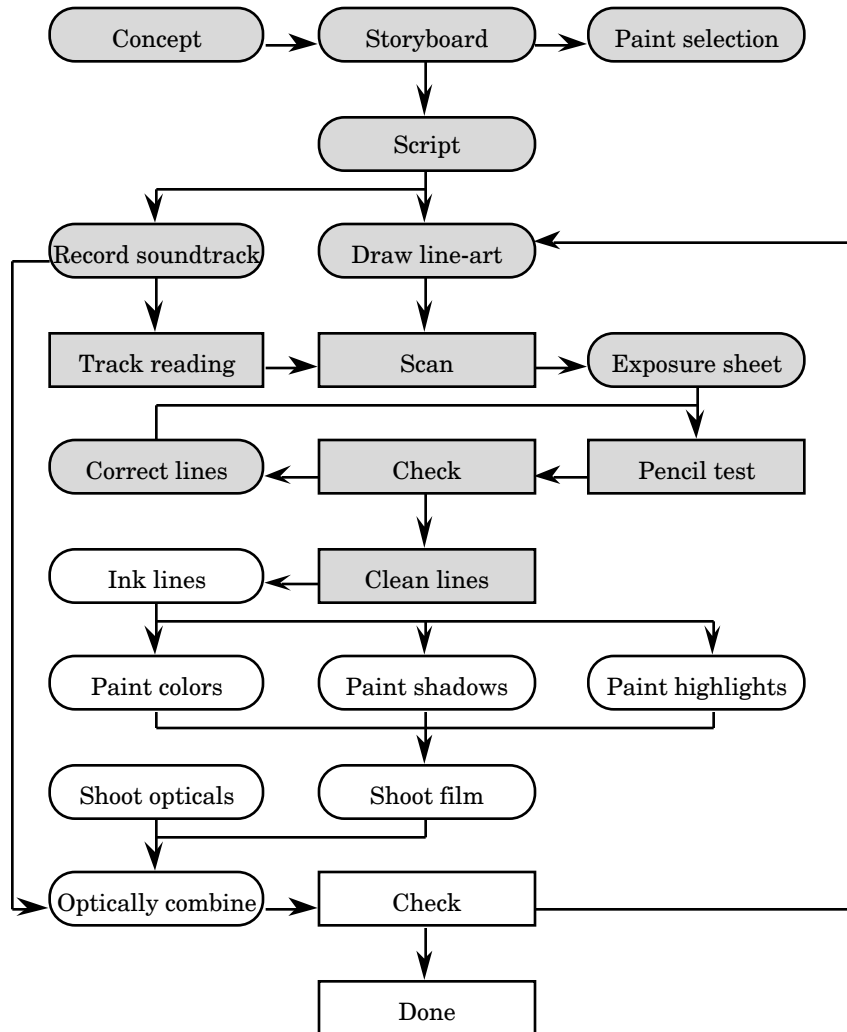
### Screen Palettes, Printer Palettes, & Film Palettes

The computer screen produces its own light. Print media reflect ambient light. Movies absorb light from a tungsten bulb. Unfortunately, this means that colors in each medium will look different. Many companies use one, two, or three palettes; one for each medium they use. You don't need to worry about this in the paint stage, but be aware that you may need additional palettes later to make everything look perfect.

## But Wait, There's More!

As you might expect by now, there are many more palette functions than I've shown here. Read the reference manual for more information.

Here's our current status:



# Ink

We'll handle inking in a separate section, since not all of you will be using colored lines.

There are two reasons to use colored lines. One is a purely artistic reason: You like to compliment colored areas with a certain color of line. The second reason is self-colored lines, usually to separate out an area in shadow, or a shaded or highlighted area. Either way, the same technique is used to highlight the lines.

## Overall flow

Normally, we'll be going through groups of cels, inking them all at once. Here's the general flow, for each group to be inked:

- Step 1      Open your palette.
- Step 2      Use the Open dialog to open the first cel in the sequence.
- Step 3      Ink the cel using one of the techniques below.
- Step 4      Invoke the Next cel function from the File menu, or use function key 8. This will save the current cel, close it, and open the next cel in the sequence. If you are at the end of the sequence, no cel will be opened, and you're done. If there is more to do, the cel opens, and we return to step 3.

Inking All the Lines in One Color

Follow these steps to set all the lines to one color:

Step 1 Select the color from the palette.

Step 2 Select the Lightest color mode:

Mac: Mouse down on the Mode icon, which appears on the Status window as a green circle over a red circle:



And drag to the Lightest color mode icon, which is a pink circle covering a red circle:



SGI: Click the Mode icon, then the Lightest color icon.

NT: Same, but use right-click.

Step from now on, any time a tool, color, mode, or nib is to be selected from a list menu, we'll skip the description of how to drag, click, or right-click.

Step 3 Pick Select all from the Edit menu, or use function key A.

Step 4 From the Paintbucket list (on the Status window):



pick the Paint selected area tool:



It will immediately color all your lines.

## Inking Lines Separately

When you need to ink just a few lines, or lines in different colors, follow these steps for each line:

- Step 1 Pick the color from the palette.
- Step 2 Pick a pen nib approximately the same width as the line.
- Step 3 From the Draw tools list:



(gray tool with a black squiggle)

Select the Line draw tool:



(gray tool with a red squiggle)

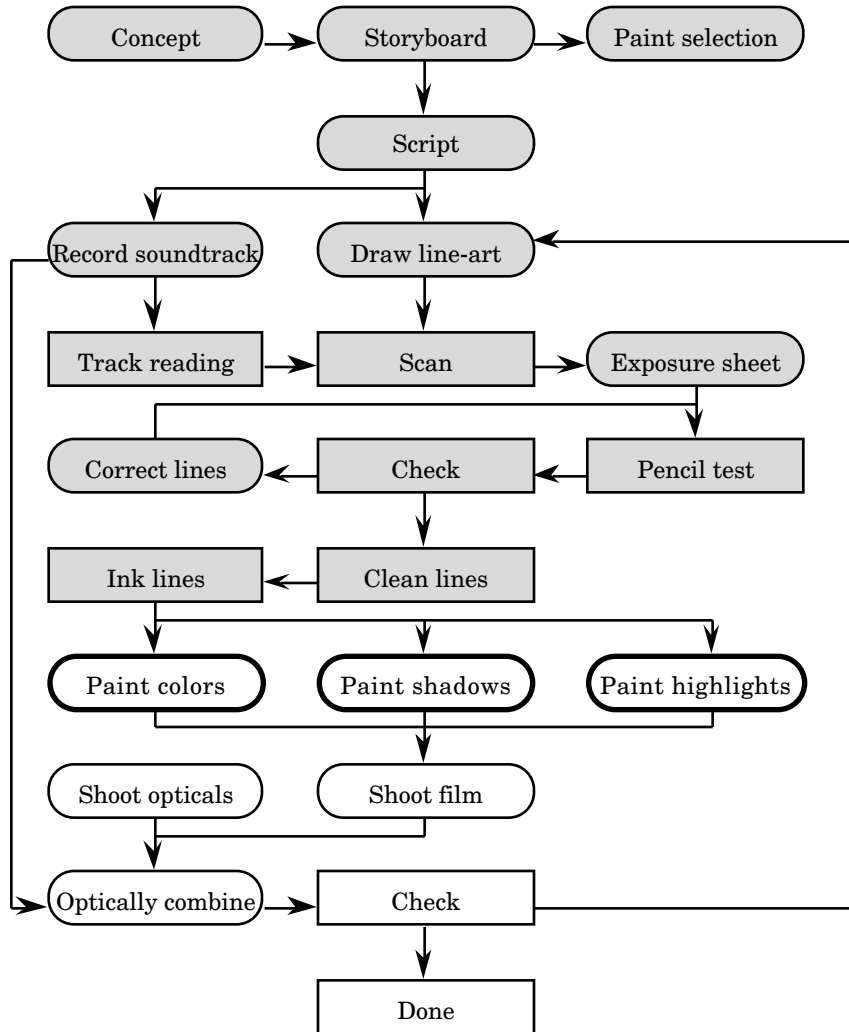
- Step 4 Draw over your lines. As you draw, you will see a line being drawn 3 times as large as your selected nib. This is so that you don't have to be careful about covering the line. When you release the mouse, portions of this colored area you've just draw which cover the existing line are retained, and portions which fall on white disappear. If you slop over the wrong area, don't worry — Just use Undo from the Edit menu, or function key Z.





# Paint

At this point, we're ready for paint. But, because of the way paint and shade interact in *The Animation Stand*, we'll handle several painting steps at once:



### General Flow for Manual Paint

Normally, we'll be going through groups of cels, painting them all at once. Here's the general flow, for each group to be inked:

- Step 1      Open your palette.
- Step 2      Use the Open dialog to open the first cel in the sequence.
- Step 3      Paint the cel using one or more of the techniques shown below.
- Step 4      If you never use white as a paint color, and you scanned your lines using pure black and white, skip ahead to step 8. If you use white, or used grayscale lines, you'll have to establish a selected area, or the computer won't know the difference between white that counts as paint and white that does not. From the Selection tools list:



Pick the Shrink to fit tool:



Step 5 If there are no enclosed white areas, skip ahead to step 7. An enclosed white area generally occurs when a character puts his hands on his or her hips, or holds something. For example:



©Allied Visual Artists

This character has four enclosed areas. There's one between the hair and the neck, one between the elbow and the back, and two at the feet. Here, we need to drop the white area out. From the Paintbucket tools, pick the Paint with selection tool:



Step 6 While holding down the minus key, click in the enclosed white areas, one at a time. Each time you do, the minus key indicates that the white area needs to be subtracted from the currently selected area. Continue this process until there are no enclosed white areas.

Step 7 You must save this area explicitly. Use Save area from the file menu, or use function key =.

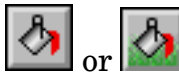
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- Step 8 Invoke the Next cel function from the File menu, or use function key 8. This will save the current cel, close it, and open the next cel in the sequence. If you are at the end of the sequence, no cel will be opened, and you're done. If there is more to do, the cel opens, and we return to step 3.

### Flat Shading

Flat shading means that the entire shaded area is the same color.

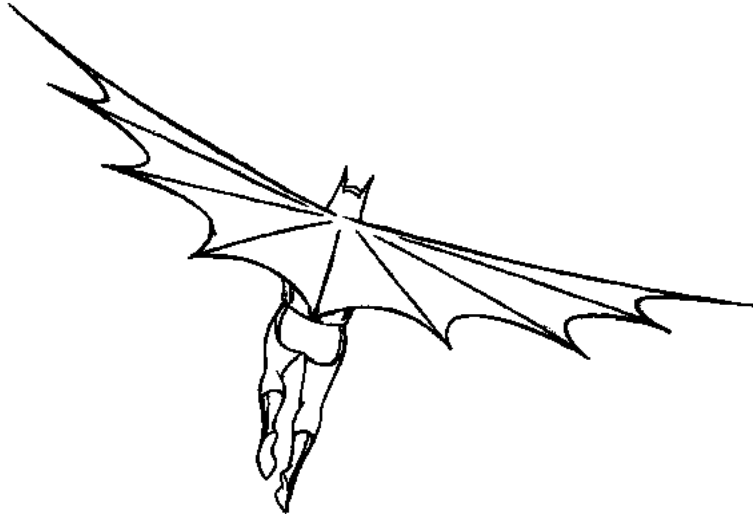
- Step 1 Select the appropriate paint tool. Use the standard paint-bucket for art scanning in black-and-white, and the Edge-filling paintbucket for work scanned in grayscale



- Step 2 Click in each area to be painted.

**Nailing Those Annoying Little Enclosed White Areas**

Sometimes, a drawing will have a line that results in areas which are very small, either intentionally, or because two lines are very close:



©Time-Warner, Inc.

Here, intentional areas occur at the ribs and boots, and unintentional areas occur at the cape pleats:



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You can take care of the unpainted white areas all at once.

Step 1 Select your paint color from the palette if you have not already done so.

Step 2 Select the Darkest color mode from the mode list. This icon is a red circle covering a pink one:



Step 3 Select a medium-to-large size nib from the pen nib list.

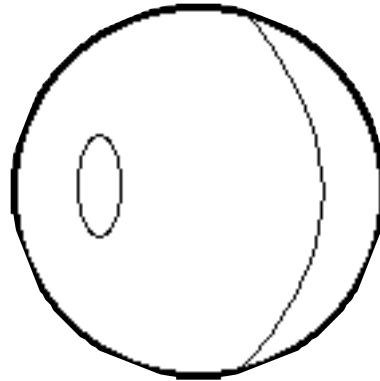
Step 4 Slop color onto the white areas. Don't worry about areas already painted, or the lines. When you release the mouse, the extra paint will disappear. Again, if you slop too far, you can Undo.

**Line-Controlled Highlights & Shadows**

Here, we start with a drawing with lines showing where the shades and highlights go, and work from there.

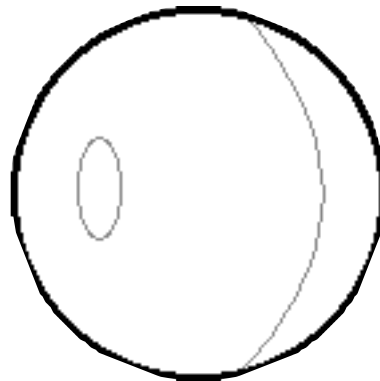
Step 1 Open your palette.

Step 2 Open the drawing:



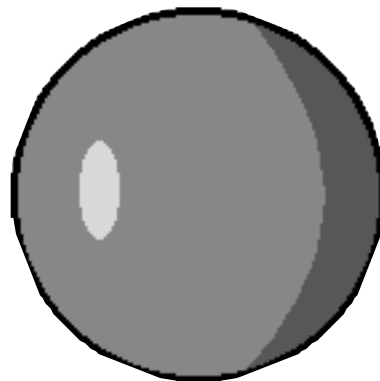
Step 3 Select the line-coloring tool.

Step 4 Color your lines with an adjoining color:



Step 5 Select the Paintbucket tool.

Step 6 Paint in the appropriate colors:



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Step 7 Pick the Lasso tool from the selection tools:

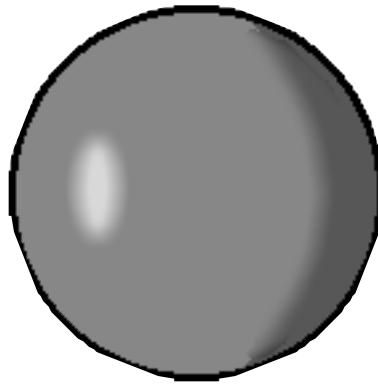


Step 8 Select an area around the inside lines, by drawing a selection line around the painted edge.

Step 9 Center-click (or option-click on the Mac) the blur tool:



This brings up a dialog asking how far to blur. For this example, I've entered 5 and got this:



On subsequent uses, you can just click the tool, to proceed without edit.

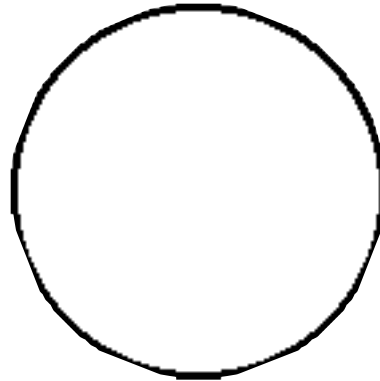


## Wash-Controlled Highlights & Shadows

This technique uses the equivalent of a watercolor wash to control how to highlight.

Step 1 Open your palette.

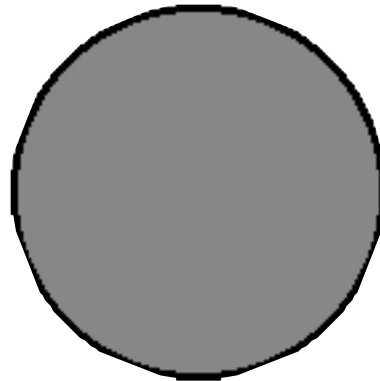
Step 2 Open the drawing:



Step 3 Select the Paintbucket tool.

Step 4 Select the base color.

Step 5 Paint in the base color(s):



Step 6 Bring up the Modes window for editing. This only has to be done once, in many circumstances:

Mac: Mouse down on the Modes icon in the Status window, and when the window pops up, drag through the window's drag bar, tearing it off.

Sgi: Click on the Modes icon in the status window, bringing up a mode list in the right side of the window.

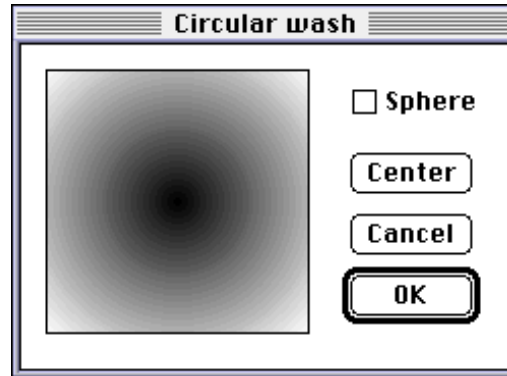
NT: Right-click the Modes icon in the Status window, bringing up the Modes window.

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Step 7 Center-click (double-click, on Mac) the Spherical wash mode icon:



This brings up the mode's edit dialog:

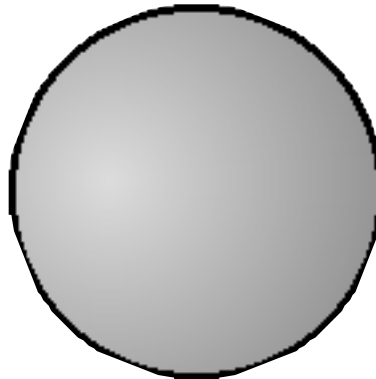


Step 8 Click towards the left side of the wash's display area, shifting the highlight to the left. This matches our previous examples.

Step 9 OK the dialog.

Step 10 Pick a highlight color from the palette.

Step 11 Paint into the document, applying the highlighting:

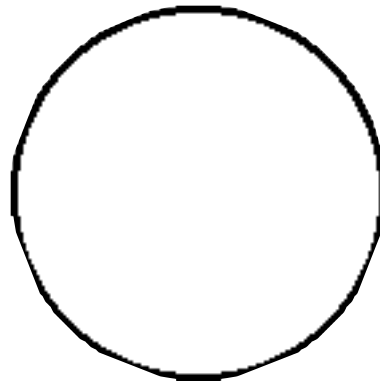


**3D Highlights & Shadows**

This technique uses the equivalent of lighting to control how to highlight and shade.

Step 1 Open your palette.

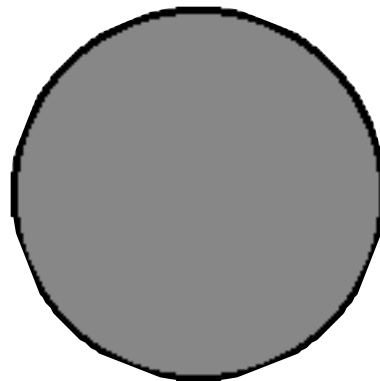
Step 2 Open the drawing:



Step 3 Select the Paintbucket tool.

Step 4 Select the base color.

Step 5 Paint in the base color(s):



Step 6 Pick the Fill with selection tool from the Paintbucket list:



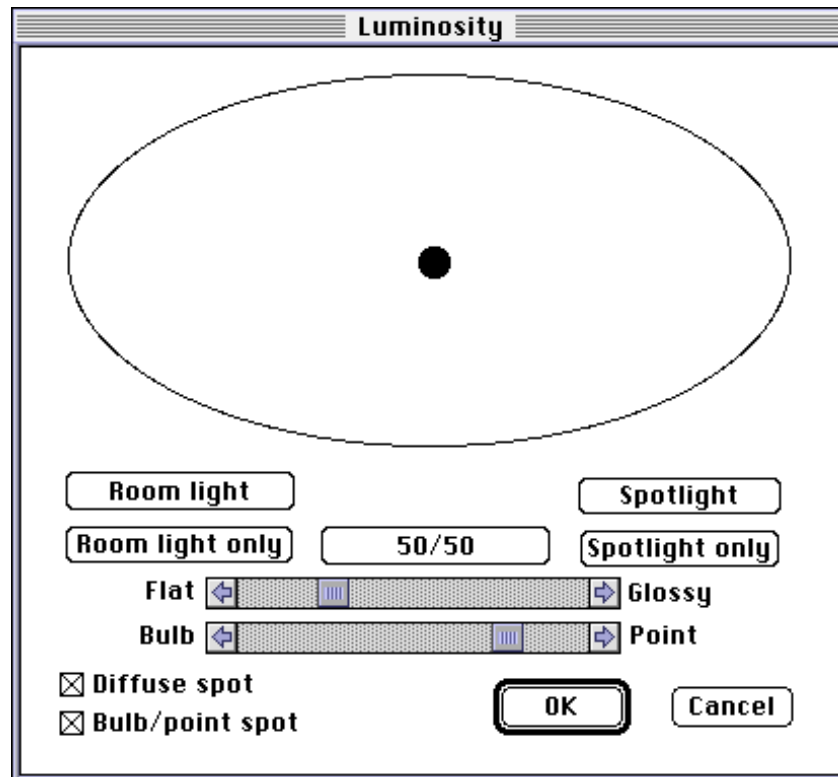
Step 7 Click it in an area to be shaded. Alternatively, you could use other selection tools, such as Lasso. You can make your selections cumulative by holding down the Shift key.

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- Step 8 Center-click (or double-click on Mac) on the Sphere tool to edit 3D lighting:



The 3D lighting dialog appears:



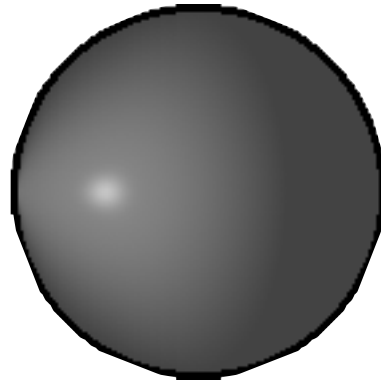
Although a lot appears on this dialog, there's not much we really have to concern ourselves with right now. A complete description of the lighting dialog appears in the reference manual.

- Step 9 Click on the 50/50 button, which tells the system that we want half room lighting and half spot lighting.
- Step 10 The large oval controls where the light strikes the area. If you move the small spotlighting circle up, the light comes from the top. Move it down and the light comes from the bottom. Move it left or right, and the lighting source moves to the left or right, eventually looping around behind the object. While you move the light source, the light's coordinates are displayed in the Status window. For this example, I used a right ascension of 45°, and no declination.
- Step 11 OK the dialog.

Step 12 Select the Relight tool from the 3D tools:



It immediately relights your selected area:



## Automatic Painting

So far, everything has been done manually. That is, you tell the computer to do a single operation, and it does it. However, things are better than that. Using Auto-Paint, you can paint large numbers of cels quickly.

Here's the flow of work in Auto-Paint:

- Step 1      Open the palette as you normally would.
- Step 2      Just to be safe, select **Clear all** from the **Edit** menu. This clears any instructions we may have inadvertently left around for Auto-Paint.
- Step 3      Open the first cel in the sequence.
- Step 4      Paint it up as you normally would.
- Step 5      Use **Next cel** to go on to the next cel. Of course, when you run out of cels, no new cel will open, and you're done.
- Step 6      Select the **Move** bucket from the **Paintbucket** list:



Over each previously painted area, diamond-shaped paint chips appear. Each of these paint chips remembers the paint color used in that position, the mode used, and certain other factors.

- Step 7      If the paint chips are all still over the same areas they had been over in the previous cell, skip to step 9. However, they might not be. One by one, drag each of the paint chips into the areas they should paint. If you used washes or the like, there will be a paint chip for each color painted into the area.
- Step 8      If there are any paint chips for areas which no longer appear, select the **Delete** bucket tool:



And click on each of the extra paint chips to delete them.

Step 9 Click on the Auto-Paint tool:



Each of the paint chips will, in order, repaint this cel like the last one.

Step 10 Select the regular Paintbucket:



And paint any newly-appeared areas. Return to step 5 while there is still work to do.

### Working Close-In

At any time, you can zoom in on a piece of work to get a closer look by following these steps:

Step 1 Click on the Magnifying glass tool in the Status window:



Step 2 Click in the document. The document zooms into that point in a new window. (Except on NT, where the document zooms within the window.)

Step 3 Do whatever work you have to do.

Step 4 Close the window. (Except on NT, where you center-click to zoom back out.)

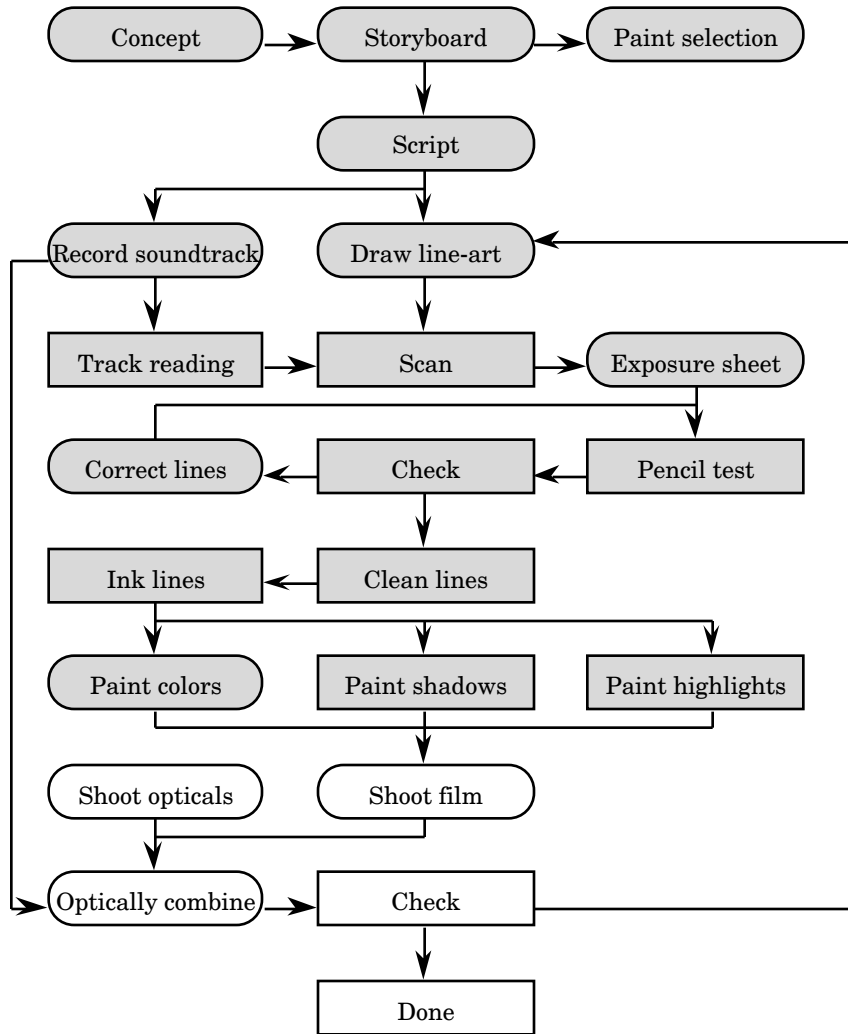
### Making & Using Character-Model Palettes

There's another type of palette which we haven't yet used: The character model. Here, you paint a small version of your character and save it like a normal cel file. Later, to use it as a palette, select Open as palette... from the File menu. The file will appear as a floating palette window, and you can select colors directly off of it. If you need to edit this palette later, use a normal Open... to access it for edits.

But Wait, There's More!

So far, we've touched on only the smallest fraction of The Animation Stand's paint component. There are a huge number of paint tools, most of them with editable features, and a large number of modes. Plus a large number of features in the Options and Effects menus.

Here's our standing, so far, after changing shading to a simple step:





# After Painting

Now, there's a little clean-up work to do. We need to make some changes to the exposure sheet. Namely, we need to bump up our resolution so that everything is clean and moves well, and we need to account for our compositing techniques.


Step 1 Open the exposure sheet, if it's not already open.

Step 2 Each cel scanned in black and white and saved with Next cel, but without Save area needs the WHITE note in the Notes field. Bring up the animated tools palette by clicking on the animated tools icon:



Step 3 Drag the White transparency mode onto a particular cel in the sheet:



Or hold down  on Mac, ALT on SGI, or Ctrl on NT, and drag the White transparency mode onto a cel in the sheet. In this latter case, it will affect all items in that column of the exposure sheet.

Step 4 Each cel scanned in grayscale (and thus saved with Save area) needs the Darkest line method (DARKEST in the Notes field). The easiest way to do this is to switch to the full data mode, and enter DARKEST into each of the Notes fields.

Step 5 Pick Set playback... from the Animate menu, or use function key minus to bring back the controlling dialog.

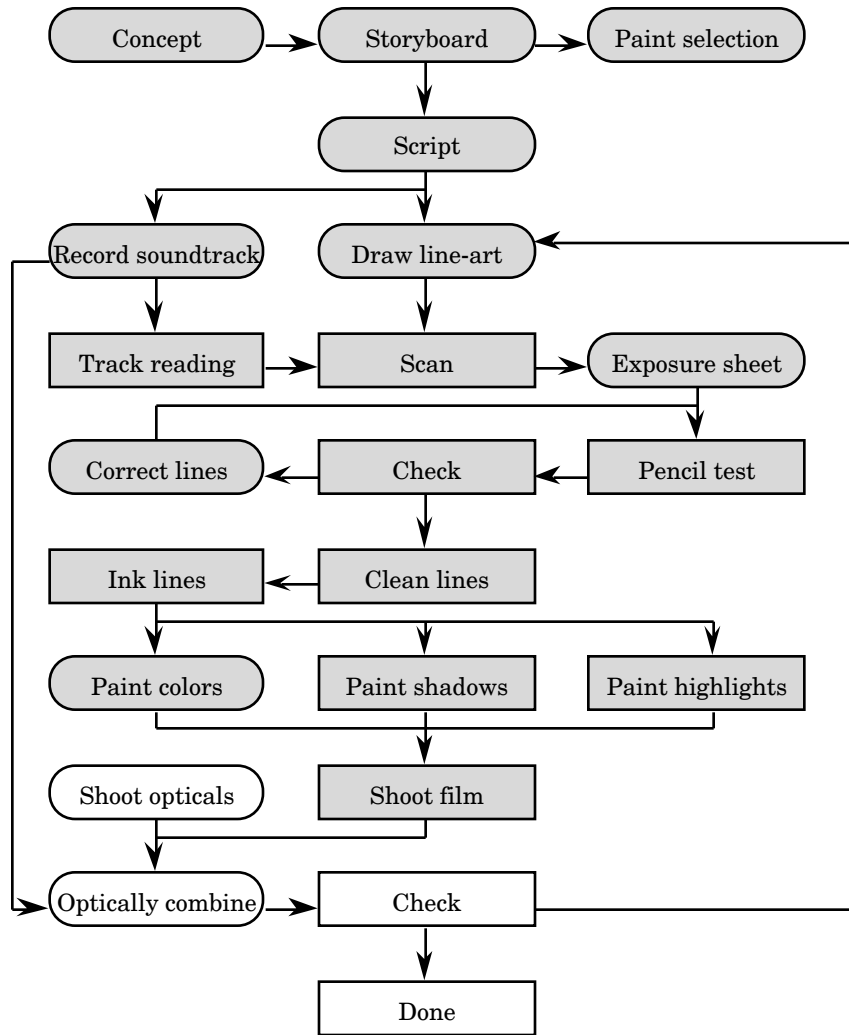
Step 6 Pick 4:1 from the Resolution menu.

Step 7 Turn off Looping and Frame numbers.

Step 8 OK the dialog. Now, you're ready for final.

Step 9 If you feel like it, pick Play or record from the Animate menu, or use function key J. The painted film, without special effects, will play or record.

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# Special Effects

There are a large number of special effects that The Animation Stand can perform for you in a single command. Most of these effects fall into animation stand effects, multiple head optical press effects, or video effects categories, but some are hard to categorize.

Among the more recognizable effects The Animation Stand performs are (in no particular order) live action compositing, drop-out of certain colors (such as white or black), edge clean-up, green-and blue-screen, colorization of lines (for pencil tests), fades & blends, wipes, matting, color correction, focus effects, gels, double-exposures, and drop-shadows.

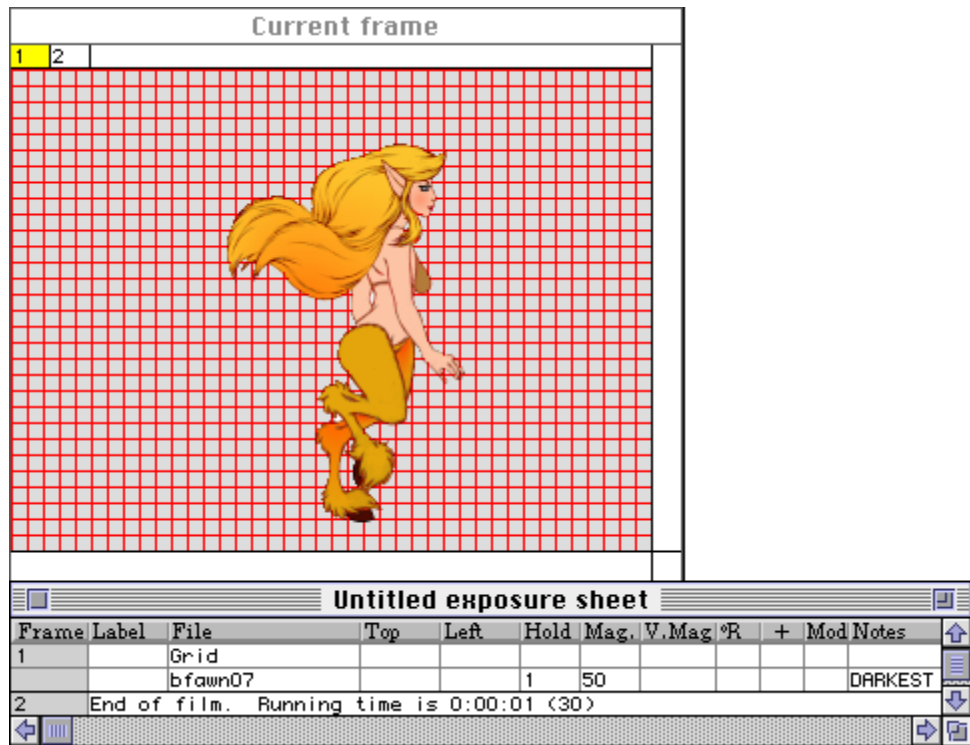
Below, I'll give two examples of optical effects.

### Effects from the Current Frame Window: Dropping a Shadow

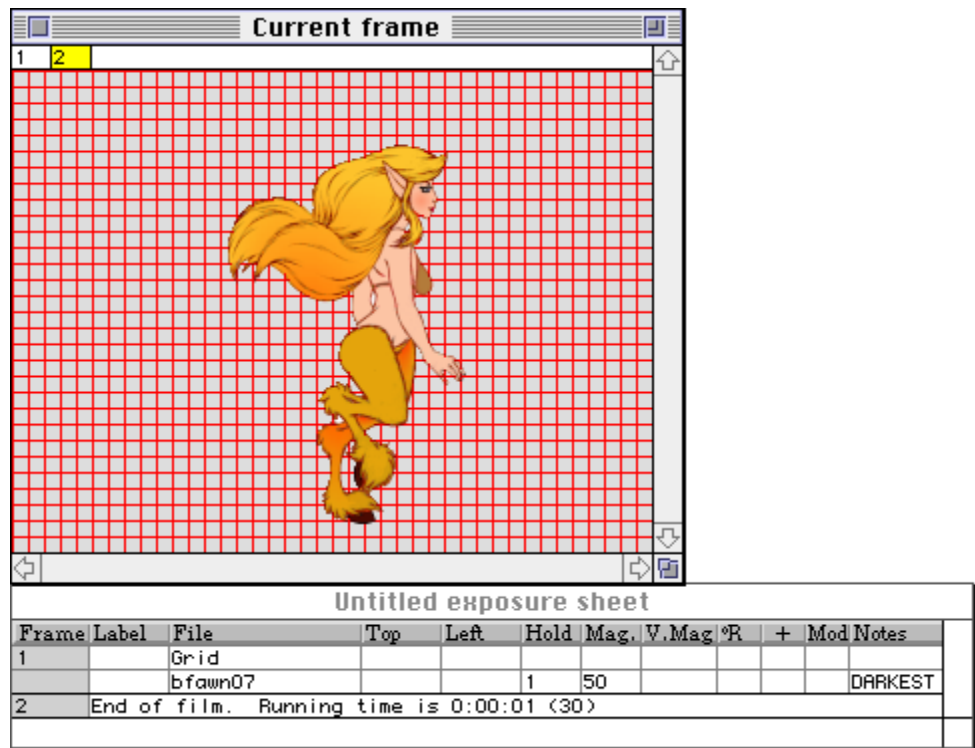
The Animation Stand can drop a shadow for you. Like most effects, shadowing needs to know where the character's edge is. This means that if the character or cel was not saved using Save area, it needs it. You can always go back to the cel (for instance, by holding **⌘**, **ALT**, or **Ctrl** and clicking its name in the exposure sheet) and resave it using Save area.

Let's take as an example a character over a background, and we want to add a shadow. I'm going to show these examples in full data mode so that you can see everything that happens.

Step 1 Set up the basic frame.



Step 2 Go to the current frame window. Since we want to apply a shadow to the Fawn07 cel, and that cel is in layer 2, click on layer 2 to select it if it is not already selected.



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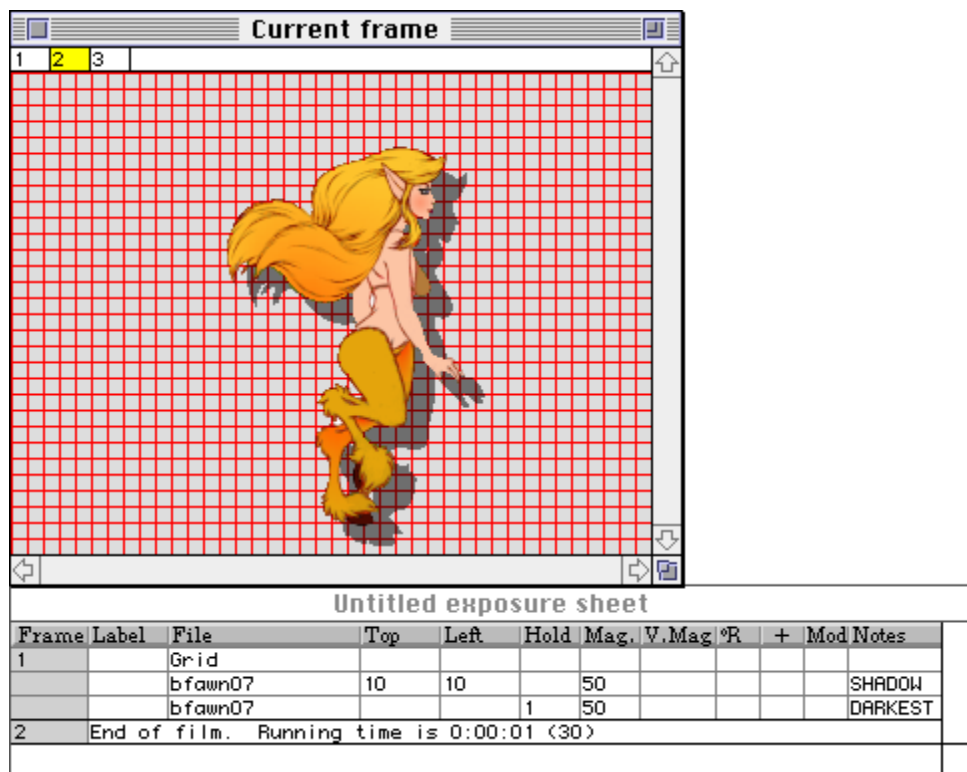
Step 3 From the frame tools:



Pick the shadow tool:



It will immediately apply a shadow, but not necessarily at a size or position we'd like. The new shadow is created just behind the art, in this case, at layer 2. The art jumps to layer 3. Layer 2 remains selected, so it's the shadow that's now selected.



Step 4 Pick the Squash & stretch tool from the frame tools list:



Step 5 Mouse down and drag up, changing the vertical size of the shadow. When it's a good size, let go.

The screenshot shows a software window titled "Current frame" with a red grid background. A yellow-haired character is positioned on the grid, with a dark shadow cast behind her. Below the grid is an "Untitled exposure sheet" table.

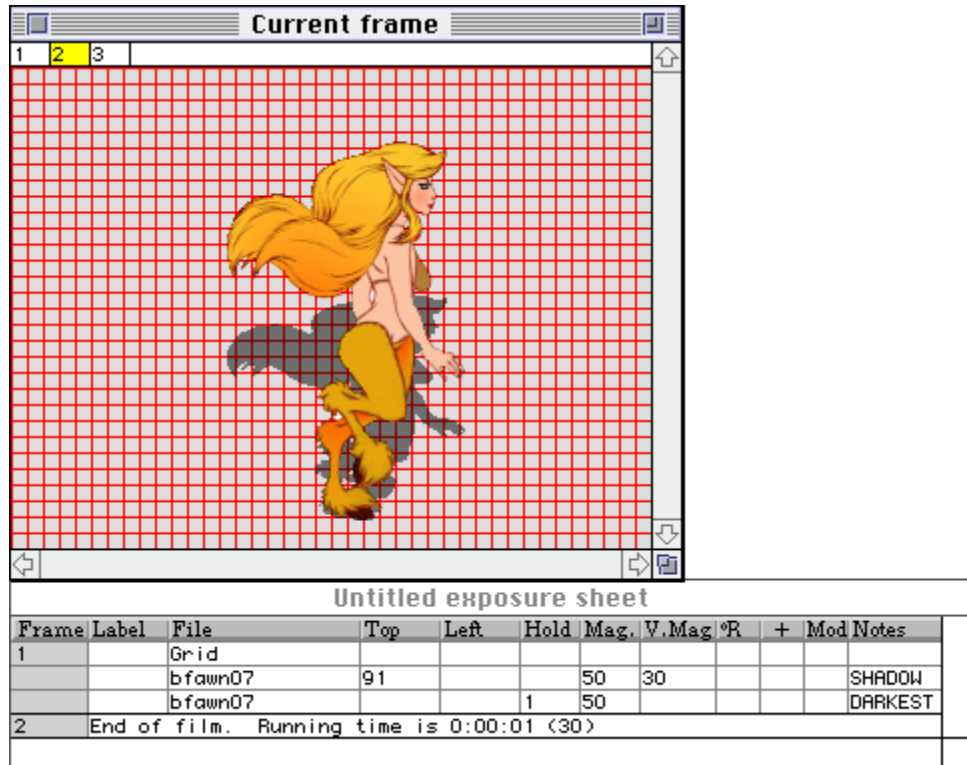
Frame Label	File	Top	Left	Hold	Mag.	V.Mag	%R	+	Mod	Notes
1	Grid									
	bfawn07	10	10		50	30				SHADOW
	bfawn07			1	50					DARKEST
2	End of film. Running time is 0:00:01 (30)									

Step 6 Select the Move cel tool from the frame tools list:



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Step 7 Move the base of the shadow so that it is coincident with the bottoms of the feet.



### Effects from the Exposure Sheet: Double-Exposure

Let's say we want to do a double-exposure between image "A" and image "B". Using conventional equipment, we'd take the "A" and "B" reels, put them into an optical press, and print it to a new reel of film.

Here, we place both the "A" and "B" images into the exposure sheet, in the same frame, and drop the double-exposure icon onto the "B" layer (or code GLOW into the Notes field in the full data view):



### Now What?

Use Play or record again. You're done!