

Vector Graphics: Image Tracing, Morphing Animator

You don't need to spend alot of time producing Quicktime animations!

Double Click on the "Intro" file.

This document contains:

- What is TRACER?
- Controls
- Description of a worked example
- Other programs
- Licensing

What is TRACER?

TRACER provides a useful tool for Quicktime development for cell-based animations. It uses VITMA (Vector graphics, Image Tracing Morphing Animation) to develop animated movies quickly for multimedia applications. Morphing, special effects animation can be applied to existing Quicktime movies.

Speed of development is TRACER's main benefit.

Clean line drawings can be traced from a PICT image to allow rapid development of high quality vector graphics. TRACER will morph from any TRACER-frame-of-vector-graphics (hereafter known as a "frame") any other to provide animation, morphing or special effects.

Features

- Animation in-fill between key frames.
- Morph animation from a frame to any other frame.
- Rapid development of vector graphics from bit mapped images.
- Ability to experiment with outline animations in "real time".
- Build up layers of animation to develop sophisticated multi-object movies.
- Easy-to-use drag-and-drop frame-copying and animation sequencing.

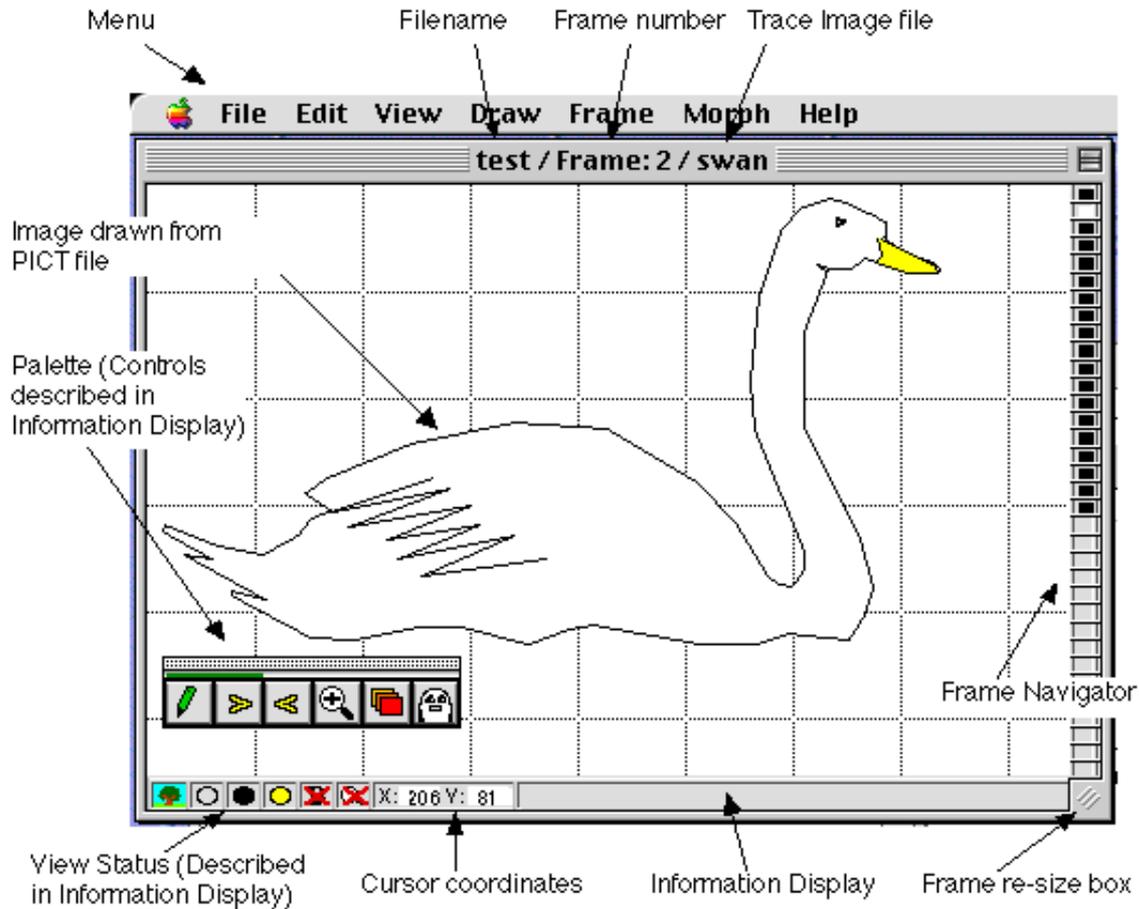
TRACER is full featured shareware and is not save-disabled.

Tracer outputs multiple files in PICT format. Separate programs (see below) allow development of Quicktime Animations and overlays on existing Quicktime movies.

Terminology

TRACER has 35 frames (key frames). Each frame are made up of points drawn together to form "contours". Contours can be colour filled to form a "filled shape". All frames use the same main window. The main window title gives the frame number.

A contour is a vector graphic containing straight lines or curves of a single colour. There is a limit of 600 points in a frame. Each frame can have a separate "Trace image" - the image is only used for tracing.



Controls

This section covers the Menus, Drawing, Morphing and Sequencing controls

File Menu

File Menu Commands	Action
New (<eth>N)	Open empty TRACER document.
Clear Frame	Clears current frame of all contours.
Clear Trace Image	Clears the image associated with current frame.
Close (<eth>W)	Close TRACER document.
Open (<eth>O)	Opens a TRACER file of frames.
Open Trace Image	Opens a PICT file for the current frame - this image is used for tracing only.
Save (<eth>S)	Saves a TRACER file of frames.
Save As	Saves all frames in a TRACER file with a new name.
Export Frame Image	Saves current frame as a PICT image (useful for "onion skinning")
Export Frame Data	Exports the current frame of data in ASCII.
Import Frame Data	Append exported frame data into current frame.
Quit (<eth>Q)	Quits the program.

Edit Menu

Undo (<eth>Z), Cut (<eth>X), Copy (<eth>C), Paste (<eth>V), Select All (<eth>A) and Clear with text fields.

Edit Menu Commands	Action
Undo (<eth>Z)	Restores drawing and removes last edit or contour addition. This is a single level undo. Frequent saves are recommended.
Cut (<eth>X)	Cuts selected contour (when contour first selected - "Drawing" below).
Copy (<eth>C)	Copies selected contour (when contour first selected).
Paste (<eth>V)	Pastes the contours in the buffer to the frame at exactly the same coordinates as the original selected contour.
Bring to Front (<eth>B)	Moves the currently selected contour to the front drawing position (see Structure and Append Contour commands).
Send to Back (<eth>K)	Moves the currently selected contour to the back drawing position (see Structure command).

View Menu

View Menu Commands	Action
Display Image (<eth>T)	Switch on or off image. This command helps with contour tracing with an image underneath.
Display Contour (<eth>D)	Switch on or off contours. This command helps with contour tracing with an image below.
Display Filled Shape	Switch on or off filled-shape viewing. This command is helpful for tracing and morphing - switch off for a smooth line graphic morph. By default this option is switched off.
Display Outline	Displays shapes with an outline colour (selectable in the Draw menu). Warning: filled shapes of a white colour are invisible unless this option is on.
Bold	Bold lines on or off. When Bold is off, all lines are one pixel wide. This command also available on palette where different line thicknesses can be selected.
Zoom In	View contours in finer detail. Command also available on palette where further zoom scales can be selected.
Zoom Out	Return to full size. Command also available on palette.
Grid	Switches on or off a grid for drawing assistance.

Draw Menu

Draw Menu Commands	Action
Pen (<eth>I)	Enables or disables Pen Mode which allows drawing. Cursor changes to Pen cursor. (See "Drawing" below). This command is also available from the palette.
Append to Contour	Resumes drawing, appending to the "front" contour (see Structure command).
Next Point (<eth>J)	Amend next point during Edit mode. (See "Drawing" below)
Circle /Polygon Tools	Changes the palette to the Draw Tool Bar. This allows squares, circles and regular polygons.
Fill Shape (<eth>Y)	Fills a shape formed from contour lines with currently selected colour. This option is best selected just before completing the contour or during Edit mode (see "Drawing" below). Note that this option is only available from the menu or using the Y shorthand (<eth>Y)
Arc (<eth>R)	Changes line type to one of two types of arc or a straight line based in Pen mode or Edit mode. (See "Drawing" below).
Colour (<eth>U)	Changes colour to one of eight colours within the frame's colour table: can be used in Pen mode or Edit mode. (See "Drawing" below) Colour can also be changed on the palette during pen mode.
Outline Colour (<eth>L)	Changes a filled shape's outline colour to one of eight colours: colour change can be seen on the palette during pen mode).
Invert	Inverts all contours in current frame along a vertical axis.
Mirror	Mirrors all contours in current frame along a horizontal axis.

Frame Menu

Frame Menu Commands	Action
Next Frame (<eth>=)	Move to next frame. This command is also available from the palette.
Previous Frame (<eth>-)	Move to previous frame. This command is also available from the palette.
First frame (<eth>1)	Go to first frame.
Last frame (<eth>0)	Go to last frame.
Frame Control (<eth>F)	Opens a window which allows drag and drop copying of frames, and drop changing of frame colour table, changing colours within tables and frame deletion. The cursor changes to indicate functions available (eg hand or pointer) (If the cursor does not change when over different parts of the window, click on the window header to make the window active).
Structure	Open structure window displaying sequence of contours in frame. The highest numbered contour is the front contour. This sequence is very important for animation. For animation frames the sequence of contours in both source and destination frames must correspond exactly otherwise morphing destroys the animation illusion.
Save Frame Size	The frame window size can be altered by dragging the window from bottom right hand corner. This menu option "remembers" the window size - this is very important if you plan to combine animations from different files! This information is stored when the data set is saved.
Restore frame size	This option restores the window size to the saved frame size.

Morph Menu

Morph Menu Commands	Action
Morph (<eth>M)	Morph current frame with next frame. This command is available from the palette (Morph icon). The speed of morph is determined by the speed of your machine, the complexity of the frame, whether shape fill is selected and the number of transitions within the morph. Only the latter is important as far as Quicktime is concerned. The other factors affect playback of morph sequences (such as the "Intro" file).
Sequence (<eth>E)	Open Sequence Control Drag and Drop Window. (See Sequence below).
Run Sequence (<eth>G)	Executes sequence control statements. This command is available from the palette (Robot icon). For long sequences, the control can be aborted by re-selecting the menu option. Sequences can be fast forwarded by depressing the SHIFT key. This removes any delays in the sequence and cuts the number of steps (transitions).
Output to file	Prompts for filename for output. All subsequent morphs are recorded if this option is selected again whereupon the animation is saved to a sequence of files. Use the PICT to Movie utility (or similar utility) to create QT movies.

Drawing

Modes

TRACER works in several Drawing Modes

- Selection mode - cursor is the usual arrow.
- **Pen Mode** - cursor is a pen - click to put pen down or form a point, double click (SPACE) for pen up. Enter and exit by Menu, <eth>I palette controls
- **Edit mode** - cursor is a cross, allows contour resizing, repositioning, colour change, shape fill, cut and paste. Enter by selecting a contour point. Exit by selecting blank space.
- **Point Edit Mode** - cursor is diagonal cross, allow point position changes, line-to-arc changes, colour changes and shape fill. Enter Edit mode from contour selected mode by clicking a point. Exit by clicking blank space.

Information messages and the different cursor will guide you through the Drawing Modes.

Creating Contours

Selecting the pen command from either the menu, <eth>I or by clicking the pen icon on the palette, starts Pen Mode and allows contour line drawing. The palette will change to show the pen X, Y position on screen and also allows changing the colour and thickness.

Mouse clicks provide break points on the contour. The Arc (<eth>R) command bends a contour line. DELETE removes the last line. The SPACE bar or a double-click ends a contour (pen up) and the next mouse click is pen down and so on, until the pen mode is cancelled (by <eth>I or clicking on the palette).

Contours can be "traced" over a base image - in fact, this feature will save a great deal of time and aid in producing good quality art work.

Resizing, Repositioning and Rotation

With the pointer cursor, contours can be selected, moved, rotated or re-sized. Selected contours can also be cut, copied or moved within the frame structure (i.e. moved to back or front).

To select a contour, either:

- click on a contour point, or
- encompass an area containing a contour by click and drag.

If you encompass all contours in the frame, this causes all contours to be selected (Same as <eth>A) and allows all contours to be resized, repositioned and rotated.

The cursor will change when it is positioned over any control point. The cursor will change to a diagonal cross when it is positioned over a control point. When a contour is selected, contour points are highlighted and a boundary box around the contour is displayed. The contour can be copied, moved to back or front. Holding down the mouse key when the cursor is on any corner of the boundary box (the cursor will be a diagonal cross) allows the contour to be re-sized. Holding down the mouse key when the cursor is on the boundary box edges allows the contour to be repositioned - the cursor will be a hand. Holding down the mouse key when the cursor is on the highlighted bottom circle on the boundary box allows the contour to be rotated - again the cursor will change, this time to a rotate symbol.

While the contour is selected its colour can be changed (<eth>U) or it can be switched to a filled shape (<eth>Y) or back to an outline shape.

Zoom

Zoom can be selected from the palette or menu - further zoom is possible, or back to standard size. Click on the palette direction icons will move the frame in the selected direction. (Filled Shape Display is automatically disabled during zoom movement but it can be re-enabled once you have scrolled to the area of interest).

Contour Changes

Having selected a contour, clicking on a contour point allows editing of the positions. The cursor will change to reflect Edit mode. The contour can be modified at that point. Edit mode will continue if points (on any contour) are selected (unchanged). Also while in this mode, the linedrawn before the selected point can be changed to an arc (<eth>R) or the whole contour's colour can be changed (<eth>U). The contour can be changed to/from a filled polygon (<eth>Y).

Edit mode is entered after resizing, repositioning or rotation, to perform another repositioning or rotation action, click on empty space and re-select the contour.

Other Controls

Other controls on the palette can change the frame to the next frame or previous or Morph forward. The Robot icon starts an animation sequence. (Sequencing is described below).

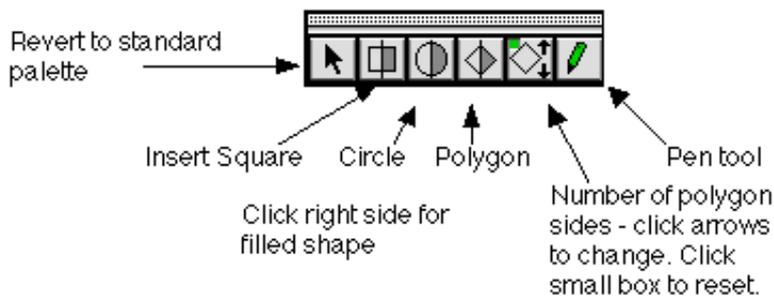
Hold the SHIFT key down, and further options are available:

- Display Circle/Polygon Drawing Tools (as per menu option). Described below.
- Go to first frame.
- Go to last frame.
- Mirror (as per menu option).
- Morph backwards
- Fast forward sequence.

Circle/Polygon Drawing Tools

The Palette also provides additional drawing tools:

- Outline/Filled Squares
- Outline/Filled Circles
- Outline/Filled Regular polygons
- The ability to change the number of points within the polygon: Pentagons, Hexagons, Septagons, Octagons etc up to 20 sided Polygons.



This palette is entered either via the palette which is displayed when the **SHIFT+D** key is pressed or from the **Draw/ Circle-Polygon Tools** Menu Option.

Sequencing

Sequencing is performed dragging and dropping frames within the Morph Sequence control window (Morph/Sequence Menu Option (<eth>E). Start a sequence of morphs from say, frame 1 to frame 5 to frame 2, hold the mouse down over frame 1, drag to frame 5 and release. Pick up frame 2 and drag it to frame 2. Control language statements will appear in the text field on the right hand side of the window. The sequence is played by the Morph/Run Sequence menu option (<eth>G) or Robot icon on the palette.

The number of transitions per morph is set by the scroll bar on the right. Adjust the bar before performing the drag and drop otherwise edit the **YYY** figure in the **@NN/YYY** command.

For most circumstances this is all you'll need. For those who need more precise control, there is a simple set of control instructions. A sequence control instruction statement looks like this:

```
@m01/05
```

which means morph from frame 1 to frame 5.

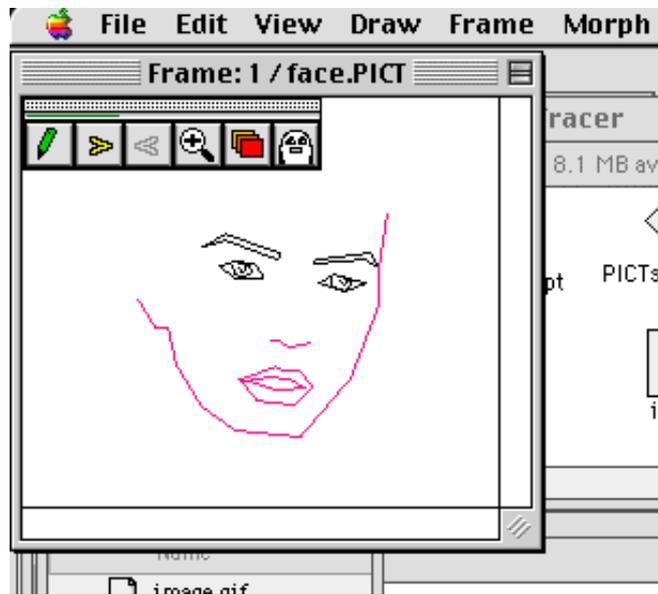
The sequence instructions exist in blocks of 255 characters and have the same general format:

```
@<letter><parameter>{/<parameter>}
```

and are separated by a colon ":" or end of block. The @ character is required before commands. If no @ is found the rest of the line in the block is ignored.

The list of commands are as follows:

Command	Action
@bNN	switch bold to thickness NN
@cNN/MM	Copy frame contents NN to MM. Used for creating temporary frames scaling, rotations and offsets.
@g	Do not display filled shapes during morph
@g01	Display filled shapes during morph
@mNN/MM	Morph from frame NN to MM
@oNN/YY	Offset frame NN by YY factor. Frame NN must be a copied frame (see @c command)
@q	Stops the control sequence.
@rNN/RR	Rotate frame NN by RR degrees
@rNN-RR	Rotate frame NN by -RR degrees
@sNN/YY	Scale frame NN by YY factor where 10=small and 90=large. (50 has no effect).
@tNN/YYY	Change number of transition steps on frame NN to YYY



Worked Example

1. Find a PICT file, such as a picture of a face, and load the image on frame 1.
2. Alter the size of the frame window to match the image.
3. Trace an outline of the main features: jaw-line, eyes, mouth, nose using the Pen (Draw Menu/Pen Item). (Remember the SPACE bar lift the pen between contours).
4. Select Frame Control (under the Frame Menu).
5. Click and drag frame 1 onto frame 2. Frame 1 is copied to Frame 2. Do the same for frame 3.
6. Close the window.
7. Move to frame 2 (using palette tool or Frame Menu/Next Frame)
8. Click on a point to enter edit mode. Move a contour.
9. Click on a point to enter edit mode. Change a point position.
10. Move to frame 3 and make further changes.
11. Select Morph Sequence Control window (Morph Menu/Sequence)
12. Click and drag frame 1 onto frame 2. Click and drag frame 2 onto frame 3. Click and drag frame 3 onto frame 1. Note sequence instructions appear in edit box on the right.
13. Close the window.
14. Click on the Robot Icon on the palette to view the animation sequence.
15. Select "Output to File" from Morph Menu. Enter the root file name and location the output PICT files will be saved. Each file's name will a three digit number appended.
16. Click on the Robot Icon again. Note the Window title reflects the output filename during the morph.
17. When the animation completes. De-select "Output to File" from Morph Menu.
18. Each animated PICT file can be viewed using SimpleText.
19. Load the PICT files into a Quicktime creation program such as PICTs-to-Movie or the Quicktime movie using Apple's Movie Player equivalent.
20. Alternatively add a background PICT or series of background PICTs Backgrounder (see below) before creating the Quicktime file.

Other Programs

Movie to PICT

To work upon existing Quicktime Movies, use Movie-to-PICT to generate the Quicktime Movie as a series of PICT files. Use selected images "key frames" within TRACER and build up animation and morph sequence with the number of transition steps to match the numbered files generated by Movie-to-PICT. Backgrounder and PICTs-to-Movie will rebuild the quicktime movie with your animation superimposed on any sound track is lost and would have to be re-dubbed by another software utility.

Backgrounder

TRACER produces Line drawings and simple filled-shape animation. To provide sophisticated animations

you can use "Backgrounder" which adds a Background picture. Instructions are provided in the program. The background does not have to be static, a moving background can also be added (for example, the files created by Movie to PICT). Indeed the output of backgrounder can be later used as its own input to allow multiple layers of animation.

Backgrounder relies upon sequence numbers for both moving background images and background images. The sequence numbers do not have to be aligned or even the same quantity. Experiment and see.

PICTs-to-Movie

PICTs to Movie is a Freeware package to convert the output of TRACER to a Quicktime movie. It is available as a separate product from the Info-Mac Archives and thanks go to David Rees to allow it to be distributed with TRACER. Comments about this program should be addressed to him. Despite what it says in the program itself, a more up-to-date address for David Rees is: "drees@altorsys.com".

System Requirements

TRACER will run on both 68xxx and PowerPC systems. It has been tested on MacOS System 8.0 and System 8.1. It requires at least 1.5MB RAM. TRACER requires a colour Macintosh (probably with a 13 inch monitor screen). Tracer produces lots of output files, it is recommended to delete these output files once you have finalised your Quicktime movie. If limitations within the software are stopping you, let me know and I'll see what I can do!

Bug reports are welcome. Please send them to etchelon@kagi.com.

Other programs you will need are: Apple's SimpleText to view output from Tracer and edit Quicktime Movies, you will require Apple Quicktime Movie Player. A paint program such as that provided by Apple-Works is also useful.

Licensing

TRACER is licensed for use for 30 days after which time you should be expected to pay a registration fee. The registration fee is low and easily paid through the Kagi payment system. Registration information can be found in the file "TRACERRegistration".

TRACER can be freely distributed providing that this file and all programs changed and also included in the distribution. The correction of this program cannot be guaranteed.

New versions can be found at:

<http://website.lineone.net/~andy.pritchard>

If you are pleased with any work you've developed using TRACER and want to share it with other TRACER users, send a TRACER file to etchelon@kagi.com and I'll publish my web page.

TRACER for Macintosh (c)1998 Andy Pritchard.

Splash screen art work by Andy Pritchard and Robert Covington.

Quicktime (c) Apple Computers.

PICTS to Movie (c) David Rees

Thanks

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