

Anim3D

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Chapter 1

Anim3D

1.1 Anim3D

Anim3D v1.4
REAL-TIME 3D VECTOR MOVIE PLAYER
BY
MICHAEL GEORGE 1994

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1.2 About this Archive

This is the first public release of Anim3D.

I wrote it at the beginning of the year, but because I was doing my final year at university I didn't get around to releasing it until now!

Everything is copyright of me 1994, but can be freely distributed so long as the archive is kept intact and unchanged.

You are not allowed to make any profit by selling it... only a reasonable fee for disk copying should be charged.

This program is CoolWare! Send me an e-mail saying 'Cool' if you like it :-)

The

icons
are for use with
MagicWB
which is why the colours look a bit

funny on a normal Workbench.

1.3 The icons used by Anim3D

The icons provided are in the XEN style used by MagicWB. To see them in the correct colours you will need Workbench to use the MagicWB palette.

The Amigaguide and drawer icons have come from Martin Huttenloher's MagicWB (v1.2p).

The Anim3D icon and config icons have come from Osma Ahvenlampi's TauIcons archive (fifth release).

The icon for anims was also constructed from two of his icons... I hope he doesn't mind!

1.4 About Magic Workbench

MagicWB is a set of replacement icons and backgrounds created by Martin Huttenloher which vastly improve the look of the Amiga Workbench.

He has created a special colour scheme for these icons and if your Workbench isn't using the correct colours you will not benefit from the intended look of the icons. If you have not seen MagicWB, then you ought to get hold of it and consider registration.

1.5 What Is Anim3D

Anim3D is my first Amiga program longer than a few dozen lines of code and was mainly to teach myself how to program a 'real' application for the Amiga. Basically it plays vector movies that are written in a special programming language that I designed.

The original idea was:

"Wouldn't it be neat if vector demos could be created and played using a standard program, use the screenmode that you wanted, were smoother on faster machines and multitasked properly?"

After all, we can't impress PC users from fast animation 'cos they have faster processors, but we can beat them by making something totally impossible through Windows ;-)

Anim3D is a real-time vector movie player for Workbench 3 machines. It has three main features which I think most Amiga software (and demos) should have nowadays:

- 1) It is extremely friendly to the OS and multitasks properly; I've played animations whilst downloading files on the modem and been playing a tracker module so I think I can safely say this :-)
- 2) Animations are played at the SAME speed whatever the machine is... slower machines just have a lower frame update rate. This works fine because the display is double-buffered (as you'd expect) so there are no half drawn screens to be seen.
- 3) It can use any of the display modes available on the machine; the same image is displayed on the screen whatever the resolution. This allows those lucky A4000/040 owners to display anims in mega hi-res while running at the same frame rate that an A1200 might run in lo-res.

It also makes use of a special dithering method that I worked out which gives the appearance of more shades of each colour without slowing screen rendering down. This does however require more chip memory than normal.

I have designed a language for creating these animations and some simple demo anims have been included to give you an idea of what it can do. Take a look at the animation files by all means (they are only ASCII text), but I wouldn't try writing your own without any documentation!

1.6 What Use is Anim3D?

Well, as it is Anim3D is really just to show people what I managed and inspire them to try things for themselves or better still, better me. :-)

It is also to add to the collection of OS legal demoish type things. I have no time to extend it at the moment, but do intend on using the knowledge that I have gained in writing it to create something bigger and better in the future.

I have many other projects that I want to do first though!

1.7 Machine Requirements

The machine requirements for Anim3D are:

- 1) Kickstart 3.0 or higher.
This is because Anim3D uses many of the features added in KS 3 such as system friendly double buffering, the ASL screen mode requester and interleaved screens.
- 2) Enhanced chipset.
This is not a necessity for Anim3D, but I had to use the ECS registers for defining blit sizes (the normal BLTSIZ reg isn't capable of big blits for some of the ECS/AGA screen modes and would need to do them in two goes).
This could be fixed reasonably easily, but I have not time to do it right now.
- 3) A 68020 or higher.
Everything has been optimised for 32 bit machines.

It is has currently been tested on:

A1200 with 2Mb Chip + 4Mb Fast RAM. (KS 39.106, WB 3.0)

A1200 with 40MHz 68EC030, 2Mb Chip + 4Mb Fast RAM. (KS 39.106, WB 3.0)

A3000 with 2Mb Chip + 8Mb Fast RAM. (KS 40.70, WB 3.1)

A3000T with 2Mb Chip + 8Mb Fast RAM. (KS 40.70, WB 3.1)

A4000/030 with 2Mb Chip + 4Mb Fast RAM. (KS 39.106, WB 3.0)

A4000/040 with 2Mb Chip + 8Mb Fast RAM. (KS 39.106, WB 3.0)

All AGA modes have been tested on my A4000/030 and Microvitec Cubscan 1440 monitor.

I have also discovered that Anim3D does not work for Picasso modes because Picasso does not support interleaved bitmaps. Other 3rd party boards may do but I have no access to them. If you do find it works on your graphics board then please tell me!

1.8 installation

Installation is really simple.

- 1) Extract this archive onto your HD.
This will create a folder called Anim3D which contains everything.
- 2) Add this line to your user-startup:

```
PATH <pathname> add
```

(where pathname is the full pathname of the Anim3D folder).

3) Reboot (or make sure the PATH line in your user-startup is executed).

1.9 loading

Anim3D can be started from the shell or Workbench. Starting from Workbench is the easiest method...

Starting from Workbench

There are two ways:

- 1) Double-click on Anim3D's icon.
- 2) Double-click on the icon of an animation to load it and Anim3D. (you must have Anim3D added to your search path - see installation above).

Starting from Shell

```
type: Anim3D [animation]
```

(where 'animation' is an animation to be loaded - optional).

1.10 Using Anim3D

Using Anim3D

Hopefully the UI should be pretty straight forward, but here is a brief run-down on the options available:

Menus

ANIMATION

Load... Load an animation.

Play Plays the currently loaded animation.

Movie Info... Shows information about the loaded animation.

About... Information about Anim3D.

Quit Exits Anim3D.

SETTINGS

Load... Load a settings file.

Save Saves the current settings.

Save As... Save the current settings under a new name.

The settings are all shown on the UI; the screen mode, display window, playback speed etc.

Gadgets

Anim... Used to load an animation.
Screen... Used to select the display mode.
Dithering Dithering ON/OFF.
Patterns The number of shades of each colour provided by dithering.
Window The display window type: full screen, centred window or defined window.
Left, top Top left corner of display window.
Width, height Size of the display window.
Speed The playback speed of the animation - normal, faster or slower.
Factor The factor by which the animation is speeded up/slowed down.
Task Pri The task priority of Anim3D whilst anims are played.
Play Play the animation.
Pause Pause the animation.
Stop Stop the animation.
Quit Exit Anim3D.

*** USEFUL HINTS ***

When playing animations, use the keyboard shortcuts to control the UI...
'P' to pause/restart the animation and 'S' to stop it.

You can also load animations by double clicking on their icon because Anim3D supports tooltypes properly.

Error reports

There are lots of them in the code. If an error occurs you will be notified by a standard

```
error requester  
and hopefully not a software failure!
```

Creating animations

I don't expect you to try!
I have provided a few simple animations to give an idea of what my system is capable of.

1.11 Error requesters

All error requesters tell you exactly what the problem was (maybe too exactly because they were for me), but the general types of errors possible are:

Start-up Errors

Failure to open libraries

Likely to be because you have a machine with less than OS3.0

Machine doesn't meet system requirements

You don't have a 68020 or the ECS chipset.

Not enough memory to create the user interface
Try quitting another application.

Errors Loading/Saving Configuration Files

Couldn't open file
The file does not exist.

Unrecognised token
There is an error in the file.

Couldn't open file for saving
Another application has a lock on the file.

Errors in Animation Files

File couldn't be opened
The file doesn't exist.

Memory allocation failure
Try quitting another application/commodity.

The animation requires a newer version of Anim3D
Get the newer version of Anim3D.

Unexpected end of file
The file is truncated.

Error in the animation
There is a syntactical error in the animation file.

Errors Playing Animations

The definition of the display region is invalid
Normally happens after changing display mode

Too many shades for each colour are being used
A combination of screen colours & dithering

Not enough screen colours to represent all colours used in the animation
Use more screen colours

Not enough memory for bitmaps etc.
Try quitting another application

Couldn't open screen
Either there is not enough memory for the screen bitmap or
you have loaded a config file which specifies a screen mode not available
on your system

Bitmaps couldn't be interleaved
Usually due to memory fragmentation.
Try using 'Avail Flush' from the Shell.
The other possible reason is trying to use a 24-bit graphics board

Consistency Checks

While using the UI to change the task priority Anim3D checks that the user enters a valid value. If an invalid value is entered the default warning tone is sounded and the previous setting restored.

This is extended for the display region values so that entering values in the width and height settings automatically updates the top left co-ordinate if necessary.

1.12 Development System

Anim3D was developed on the following system:

Hardware

Commodore Amiga 4000/030:

25Mhz 680EC30 CPU
25MHz 68882 FPU
2Mb Chip RAM + 4Mb Fast RAM
Kickstart v39.106
Workbench v37.67

Microvitec Cubscan 1440 (14" multi-sync monitor)

Software

SAS/C v6.51 - SAS Institute 1994
Devpac Amiga v3.04 - Hisoft 1993
Amiga Developer Update for 3.1 - Commodore 1993

1.13 The Future of Anim3D

Future improvements

I have a long list of possible enhancements to Anim3D for when I get the time to start developing it properly - some of these follow...

Firstly, major algorithmic and code optimisation. ;-)

Secondly a nice GUI for creating and editing animations.

Plus:

FPU support.

Support for 24-bit boards (this could mean major speed increases).

Improvements to screen rendering:

- Changing light source colour.
- Multiple light sources.
- Self illuminating objects - lights etc.
- Objects which change shape - morphing.
- Simulation of different materials by adding specular reflection.
- Use of copper bars for effects like sunset.
- Scrolling bitmap backgrounds for mountain ranges etc.
- Star fields in the background - like jump to hyperspace in Star Wars!
- Texture mapping of surfaces onto objects.
- Simplified use of ray-casting for shadows, transparency and reflections (dream on!)
- A module player for soundtracks.
- Sound effects.

Enhancements to the animation language:

- Simulation of object properties - mass, friction, inertia etc.
- Control of objects using the joystick.
- Allow use of variables and constants.
- Include macro capabilities.
- Conditions - if...then, while...do etc.
- Simple maths functions.
- Collision detection.
- Simple harmonic motion (could just use the Sine function).
- Attraction of objects due to mass.

I read the Amiga User Interface Style Guide the other day and have realised a few points that I do not adhere to:

- I should use the default screen font for the UI.
- Button imagery should reflect a keypress when using keyboard shortcuts (not actually possible at the moment using GadTools I don't think).
- The UI should appear in the current portion of an autoscroll screen.
- The UI should be designed to fit on a 640 * 200 screen.
Ooops... doesn't quite, but everything is visible and usable. ;-)

There are various other minor changes which are hardly worth listing and some internal changes that would reduce rounding errors etc.

1.14 About the Author

I got my first Amiga (an A500) just before I went to Loughborough University to do my Computing degree in 1990 and have loved the Amiga ever since.

I learnt alot about the Amiga after getting an A1200 when it came out and when I started programming soon upgraded to my current A4000/030.

As I said earlier this is my first real Amiga program and I'm fairly happy with it. :-)

You can expect more stuff from me in the future (some development utilities and other miscellaneous things).

If you want to contact me, then my e-mail address is:

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I can be written to by snail-mail at:

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Feedback would be appreciated, but please understand that I don't intend on doing any work on this again for quite a while! I will take note of what you say though and keep it in mind with future development.

1.15 Thanks go to...

Thanks go to:

Everyone who has tested Anim3D on their machines for me:

CIX users: Toby Simpson, Matthew Likierman, Richard Hobbs and Simon Pietroni.
Lee Sanders, sysop of Mostly Harmless.

Martin Huttenloher for his MagicWB icons.
Osma Ahvenlampi for his TauIcons collection.

The SAS Institute for their great C compiler.

Commodore for bringing the brilliant Amiga range to the public.

Everyone who has written utilities which I use for the Amiga.
