

akMPEG

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REVISION HISTORY

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Chapter 1

akMPEG

1.1 akMPEG_Documentation

akMPEG V4.30 (5.2.2000)

- SHAREWARE -

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A PerSuaSiVe SoftWorX PRODUCT.

Needs Kickstart V3.x
GUI created with StormWizard 2.0

Actively supports PowerPC (TM) via powerUP (TM)
and ppc.library (or -emulation V0.6b+)

<Commercial> BTW: What is SViewIV ? </Commercial>

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Please visit:

WWW Support Site
<http://www.ar-kleinert.de> (AWeb-II)

Simon Edward's Image Engineer WWW Site
<http://www.amigaworld.com/support/imageengineer/>
(Image Processing program produced by Simon Edwards)

1.2 copyright

The program akMPEG in this version and its documentation files are (C)opyright 1999 by Andreas R. Kleinert. All rights reserved.

The right of using this program is granted to you by paying the SHAREWARE-fee of 25 DEM (15 U\$) [email shipment], respectively 30 DEM (20 US) [snail mail shipment] or equivalent (e.g. in Euro) to the author.

You will receive a personal KEYFILE.
See registration form for details.

This software is based in part on the work of the MPEG Software Simulation Group.

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Should any of the listed terms and clauses within this document not be valid in conjunction with the law of certain countries this does not affect the validity of the other clauses.

1.3 disclaimer

The author takes no responsibility for any results of the use of this program.

This software is provided "AS IS" and there is no warranty of any kind, so that you use this software at your own risk.

The author reserves the right to discontinue development of the program.

1.4 distribution

Registered users which paid the SHAREWARE-fee get the rights described on the registration form.

The REGISTERED version of akMPEG MUST NOT be redistributed.
The Distribution of Keyfiles is FORBIDDEN.

The following only applies to the unregistered evaluation (EL) version of akMPEG:

The program akMPEG in this version is freely distributable (SHAREWARE).

You may copy it, if the copyright notice is left intact and all of its parts are included in the distribution. This program must not be included in commercial packages or commercial program collections without my written permission. This program must not be sold in any way, but it is allowed to take a nominal fee including the costs for copying.

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By using or distributing this program you automatically agree to all of the above conditions and terms.

1.5 purpose

akMPEG is a program that has been designed to play MPEG animations on CyberGfx or compatible systems with a 68030 or greater CPU. Recommended is at least a 68030-50 or 68040-25 CPU.

There are PPC versions available as well (040+PPC or 060+PPC).

It allows several ways to replay animations:

- in an overlay window on any kind of CyberGfx screen (requires cgxvideo.library and a graphics card capable of Overlay)
- in a normal window on any kind of a 16/24 bit deep CyberGfx screen
- on a 16/24 bit deep CyberGfx screen (auto-selection)
- grayscale on a 8 bit deep AGA or CyberGfx screen (requires OS 3.1)
- (create an uncompressed RAW file as output and play it later)

Please note, that conventional color 8 bit screen or window displays (CyberGfx or AGA) are not supported due to speed reasons (the window of the 24 bit player simply will stay empty).

Using the juggling-gigs.mpg animation from the Aminet CDs (showing Urban Mueller juggling with harddisks) on a CyberStormPPC system equipped with 68040-25 and PPC604e-180 the following results have been achieved with akMPEG 2.60 (but please note, that as with akMPEG4 V4.01 the codec has been switched and results will differ):

800x600 8/16/24 Bit CyberGfx WB Screen (CV64/3D):

```

-----
      mpOV      9.222222 FPS   040-25      (sometimes 9.576923)
      PPCmpOV   62.250000 FPS   PPC604e-180 (sometimes 83.000000)

Own screen (24/8 Bit CV64/3D)
-----
      mp24sc    5.533333 FPS   040-25      (sometimes 5.659091)
      PPCmp24sc 41.500000 FPS   PPC604e-180 (sometimes 49.800000)

      mp8sc     10.375000 FPS   040-25      (constantly)
      PPCmp8sc  83.000000 FPS   PPC604e-180 (sometimes 124.500000)

```

Display disabled

If display has been disabled completely, the V2.60 values for PPC oszilate between 83 and 124.5 FPS (no idea, why) and the 68k delivers ~10.4 FPS for Overlay/Gray and ~6 FPS for any 24 Bit display.

So, if you have a faster/slower graphics card, you may estimate the max. possible FPS rate from these values.

Basically it shouldn't matter whether the original or the emulation ppc.library is being used. I've been extensively using both without problems, while the numbers above have been taken with the original.

NOTE: although MPEG files with audio part basically are supported, there's not audio support yet.

There's MPEG-1 (ISO/IEC IS 11172-2) video bitstreams and MPEG-2 ISO/IEC DIS 13818-2.

As with akMPEG4, the player does support "MPEG system" animations as well as normal animations without audio.

1.6 installation

Even if you use the supplied Installer-Script, you should read the following notes. If you do not own the standard Installer-Program you should read them even more carefully and follow the instructions given.

Note: Should after starting the installer script appear an error message "Can't find program 'Installer'" (or similar), you have to enter the correct path to your Installer program via the Workbench menu Icon/Information.

If you own a KeyFile, place it to "S:", or place it elsewhere and change the environment variable "KEYPATH" to the corresponding directory.

Needed Workbench Resources

HardDisk-Users won't perhaps have to install any additional Workbench Resources to their HardDisk.
 Disk-Users will have to copy the following libraries into their "LIBS:"-Directory, if these not already do reside in ROM (may depend on the version of the operating system):

- gadtools.library V37+ (V39 versions recommended;
- asl.library V37+ it's really time to upgrade
- utility.library V37+ to OS 3.1)
- workbench.library V37+
- icon.library V37+

Users of OS V2.04 or greater should also install the following libraries:

- amigaguide.library V34+
 (please avoid using V34 - it's known to cause problems)

Other needed Resources

You will also need to have the following libraries installed (compare system requirements):

- cybergraphics.library V40+
- cgxvideo.library V41+ (only for Overlay-Support)

GUI has been designed with StormWizard 2.0, so this program needs "wizard.library" V37+ (you can find a copy on Aminet under "biz/haage/WizardLibrary.lha").

For PowerPC support (optional modules) the following libraries are needed:

- ppc.library V45+ (V46+ recommended)

For asynchronous IO the following library is needed:

- asyncio.library V39+

Note, that both, the 68k and PPC players will make use of asyncio.library and that normal dos.library calls will be done, if it can't be found.

1.7 updatenote

General

~~~~~

Although the akMPEG archive does contain most of the needed parts, you might wish to get updates sometimes.

The newest version usually can be found on Aminet under Aminet:gfx/show/akMPEG4.LHA

## 1.8 usage

The GUI is quite self-explaining:

- PPC support can be switched on or off (when available)
- B- and P-Frames may be skipped (default is "do not skip")
- looping is possible (default is "only play once")
- 16 bit overlay, 24 bit window, 24 bit screen and 8 bit screen (gray) display is possible

The MPEG players are external programs, that are run asynchronously. So it is possible to play more than one animation at once. Or utilize PPC and 68k at the same time. However, it is not possible to open more than one overlay window at once (all except the first one will show "Please wait..." until the resources again are free).

One may also start the external player tools from Shell (PPC version is named similarly, with "PPC" as prefix).

The syntax can be requested by starting with "?" as the only parameter. It's the same for both programs:

```
akmp [-display=(ov|24|24sc|8sc|file)] [-nop -nob] [-audio] [-novideo]
      [-pubscr=pubscreenname] [-loop] [-fps=rate] [-tolerant] anim.mpg
```

Replay can be aborted via the player windows' close-gadget  
- the gadget is present in the on-screen replay modes as well, although it may not be visible there (click at upper left corner).

Unless "loop" is specified, the animation only will be played once. With "loop", it will be played "endless" (well, until someone hits the close-gadget).

Example display parameters for different replay modes:

```
(PPC) akmp -display=ov anim.mpg      Overlay
(PPC) akmp -display=24 anim.mpg     16/24 Bit Window
(PPC) akmp -display=24sc anim.mpg   16/24 Bit Screen
(PPC) akmp -display=8sc anim.mpg    8 Bit grayscale Screen (requires OS 3.1 !)

(PPC) akmp -display=file anim.mpg   will write RAW data to vmem:anim.mpg.raw
                                   (loop mode is disabled, then)
```

Unless specified otherwise, "ov" is the default setting for display.

That's it, basically :-)

### Tooltypes

-----

```
DEF_DIR      default directory
PUBSCR_OV    public screen name for overlay window display (mpOV)
PUBSCR_24    public screen name for 16/24 bit window display (mp24)
```

## Predecoding

-----

Predecoded files are written to VMEM: - make sure, there's enough space available there. You shouldn't let it point to RAM: in any case, however in certain special configurations (with more than ~128 MB RAM and a relatively slow hard drive and CPU) it may make sense. Give it at least 50-80 MB.

## Overlay Support

-----

With an installed cgxvideo.library you can make use of the overlay feature of any graphics cards that supports overlay (through this library, that is).

The CV64/3D supports video overlay, unless the driver's MULTIMEDIAMEM setting has been changed, so that the 1 MB of texture/overlay memory is being utilized for conventional display. One overlay "window" at a time is possible.

With the BVision/PPC (which perhaps also applies to the CyberVision/PPC) it has been reported, that adding the tooltype VLAYER=DESTRUCTIVE to the BVision Monitor Driver will enable overlay support through cgxvideo.library, at least with CyberGraphX V4.1 (the commercial release). This seems to require a 16/24 bit screen with these cards.

It's highly recommended to make use of overlay when available, since it will allow for fastest and smoothest replay on your respective card.

## RAW files (MPRAW format and audio streams)

-----

RAW YCbCr video (MPRAW) files need to have the .raw extension, pre-extracted audio streams need to have the .aud extension (where you BTW should be able to play .aud streams with any other standalone MPaudio or MP3 player as well). VMEM: assign is needed.

Creating video raw file only:

```
akmp -display=file anim.mpg
```

(writes to VMEM:anim.mpg.raw)

Creating video raw and predecoded audio files:

```
akmp -display=file -audio anim.mpg
```

(writes to VMEM:anim.mpg.raw and VMEM:anim.mpg.aud)

Creating predecoded audio file only:

```
akmp -display=file -novideo -audio anim.mpg
```

(writes to VMEM:anim.mpg.aud only, all frames are skipped)

Where .aud files are "normal" audio streams.

---

Specs of .raw files are as follows:

| Offset | Type/Content            | Meaning                     |
|--------|-------------------------|-----------------------------|
| \$000  | UBYTE [5] = "MPRAW"     | ID                          |
| \$005  | ULONG                   | width                       |
| \$009  | ULONG                   | height                      |
| \$00a  | UBYTE [256]             | original MPEG path+filename |
| \$10d  | UBYTE [width*height]    | Y                           |
|        | UBYTE [width*height/4]  | CR                          |
|        | UBYTE [width*height/4]  | CB                          |
|        | [...next n-1 frames...] |                             |

Basically, only frame data (YCbCr planes for frame #0 to #n) and dimension information is stored.

Audio data and further information may be fetched from the original MPEG file.

Handling: the decoder will stop as soon as there's no more "full frame" available (EOF or file truncated).

Note: shouldn't be a problem to write a MPEG splitter, that simple cuts off the header and then splits the rest of the file into something like Frame001.Y, Frame001.U, Frame001.V etc.

## 1.9 evaluationrestr

This is the evaluation version of akMPEG, which is SHAREWARE.

- in the unregistered version, MPEGs show vertical stripes when being replayed (except with the grayscale player)
- registered version shows filename instead of Copyright

MPEGs with black vertical stripes may look "darkened" compared to normal replay (I'd assume that's an optical effect).

## 1.10 history

Note: there most likely won't be any hand-optimized 68k assembler version of akMPEG (don't ask - I won't do it). It isn't focussed to 68020/AGA systems anyway. Nevertheless I've tried to do some assembler optimization at least for the YUV/RGB conversion part, but it simply was slower than the highly optimized compiler generated output of SAS/C (which was to be expected). Perhaps there could be some benefit by re-writing the core MPEG codec in pure assembler, but there are several reasons not to do this: despite the fact, that this is too much work for too few registrations, the other point simply is, that I'd like to keep the code portable and PPC is more interesting, anyway (at this place greetings to this italian guy who's constantly

requesting 040-060/AGA players with various features, while writing letters under at least 6 different pseudonyms).

V4.30 (5.2.2000):

- added optional "tolerant" error handling that allows to skip unknown packets in any case
- adjusted GUI accordingly
- .readme file was outdated
- slightly fixed docs
- PPC: non-async IO was (strange, but true) slower than before; again went back to SAS/C's buffered IO

V4.24 (1.2.2000):

- fixed a few typos and other mistakes in the docs
- there was a bug in skipping certain start codes when audio was switched off (did not happen in V4.10) (-> Sven Ottemann)
- added size and assignment note about VMEM: (note: the installer script will not add/modify VMEM: for you, because this only will complicate stuff. Installer scripts for akPNG/akJFIF and/or SViewIV will take care of this, though.)

V4.23 (31.1.2000):

- fixed problem with 0x112 code in system streams (I thought I already did this for V4.02, but obviously forgot that particular one) (-> Frank Mariak, for V4.01)
- added documentation of -novideo option and described how to create .aud and .raw files from the Shell (this may be useful if you're running a presentation system, i.e. a CD-32, based on various scripting stuff)

V4.22 (31.1.2000):

- a few resources would not have been freed when the close-gadget was hit for replay interruption (-> Erwin Pfister)

V4.21 (28.1.2000):

- now able to skip some more unknown start codes (instead of exiting silently ;)
- various other small fixes

V4.20 (28.1.2000):

- fixed audio decoding
  - we now make use of a method called "SCB" (scattered buffering) for audio, which means, that audio needs to be pre-extracted to a separate stream, from where it then will be played (if the video player is too slow, this will mean scattering)
  - fastest replay is achieved, when a PPC does the video decoding while the audio is fetched from a file (fetching both from a file seems to be slower yet - depending on the IO media - although there is asyncio)
  - changed GUI functionality accordingly
  - hope that all audio layers are properly supported (could only test a few)
-

## V4.10 (21.1.2000):

- added support for writing RAW output files (predecoding) and playing these like regular MPEG files. Also added file format description.
- unreleased

## V4.06 (18.1.2000):

- added experimental audio support to PPC version as well. It's really bad on my 040-25. Maybe it works better elsewhere. Let me know.
- added asynchronous IO to PPC version as well

## V4.05 (12.1.2000):

- added experimental audio support to 68k version, using mpega.library and AHI (thanks to Thomas Wenzel for hints and improving my code); it won't give sufficient results for slow CPUs yet (e.g. on 040-25), but of course it can be switched off...  
If you like to test the audio support:
  - grab the newest mpega.library from Aminet (either 68k or PPC version)
  - grab the newest AHI V4.x from Aminet or Martin Blom's WWW site
  - install both of them
  - use the AHI preferences program to set the default audio mode
  - akMP will be using that one on unit 0

## V4.04 (11.1.2000):

- 68k IO was buggy (did not appear with all streams), non-async 68k IO even was really broken (-> Sven Ottemann)
- async IO speed up (buffer sync)

## V4.03 (10.1.2000):

- PPC version was broken due to a typo (#ifdef \_\_PPC\_ instead of #ifdef \_\_PPC\_\_) [ Murphy's 99th law: untested code is \*always\* broken ] (-> Sven Ottemann)

## V4.02 (9.1.2000):

- fixed problem with 0x1b7 and 0x113 codes in system streams (-> Frank Mariak)
- on certain error exits, the display window wasn't closed and the related resources would not have been freed (-> Sven Ottemann, Frank Mariak)
- added asynchronous IO support (68k only)

## V4.01 (28.12.99):

- switched to new codec; this now is akMPEG4
  - MPEG-2 now is supported, but audio still won't be played
  - the skipping of B and P frames had to be added to the codec: results may differ from the old one slightly, but everything seems to work fine so far
-



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When reporting any bugs, please don't forget to include a detailed description of the bug and tell me, if it is reproduceable or not. Please also mention the version number of akMPEG you used and describe your system configuration (Amiga model 500/.../4000T-060, Kickstart/OS, RAM, HardDisk, special configurations).

## 1.12 thanks

Thanks go to (in order of appearance ;-)

=====

(some of these people did register, others did make suggestions/bug reports - how about you ?)

|                    |                   |                   |
|--------------------|-------------------|-------------------|
| - Georg Rottländer | - Frank Mariak    | - Don Paul        |
| - Tom Lively       | - Jon Peterson    | - Jonathan Hart   |
| - Wilhelm Bumes    | - Gerard Cornu    | - Sven Ottemann   |
| - Thomas Wenzel    | - Sigbjorn Skaret | - Peter Habermehl |
| - Erwin Pfister    |                   |                   |