

RiVA

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Chapter 1

RiVA

1.1 RiVA v0.1 --- AmigaGuide Documentation

RiVA v0.1

MPEG Video Player for AGA and Picasso96

Written by Stephen Fellner

Additional code by László Török

Disclaimer Don't let this scare you off :-)

Introduction A few words about RiVA

Features What it CAN do

Limitations What's still missing

Performance Just how fast is it ?

Requirements What you need

Installation No install script ?

Usage How to get it going

Registration Support the concept of shareware.. ;-)

Current bugs All currently known bugs

History RiVA myths :-)

Future What's coming...

Author All about me :-)

1.2 Disclaimer

Disclaimer

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1.3 Introduction

Introduction

Foreword

RiVA is an MPEG Video Player developed for the Amiga. RiVA differs from other MPEG players in that it is the only one developed in 100% assembly language.

The playback speed of RiVA is considerably higher than any other MPEG player currently available for the Amiga.

The development of RiVA started in 1997, most arithmetic was developed during 1998. I was unable to write the complete MPEG decoder/parser until the MPEG-1 ISO documentation (ISO 11172) was sent to me by László Török (author of MooVid Professional) in December 1998. Two weeks after receiving the ISO documents, RiVA was born.

It took me only two weeks to have the first running prototype, which was already faster than any of the other players :-). After that, I started optimizing it, and removing a lot of hardcoded stuff to bring it into the shape it's currently in.

Although RiVA is highly optimized, it doesn't mean that I have finished optimizing it. I'll keep going back and optimizing parts of the code as I

get new ideas. In fact, there are already many improvements planned, for instance an integrated 2D-IDCT algorithm which is expected to give up to 30% speed increase, as well as faster and less accurate IDCT methods for slower Amigas.

The current version is far from complete, and has many missing features.

Take a look at what's still **missing** and what is **yet to come** .

I wish you much joy in using this program, and I hope you enjoy it as much as I do :-)

Aims/Goals

My main goal with RiVA is to develop a general video player for the Amiga so that all Amiga users can enjoy the latest in digital video technology. MPEG has been accepted as the video compression standard today, with many variants available, including CDi, DVD, DV, etc. It is a real shame that the Amiga, the computer platform which started the digital video revolution, doesn't have good software for handling MPEG digital video. The C implementations are only examples of how to decode MPEG video and are not supposed to be used as a standard decoder on a dedicated computer system.

RiVA was developed especially for the Amiga, and it was designed to fully utilise the capabilities of this wonderful platform.

Currently only a 68k version is available, but a PPC version is planned (yes, also coded in assembly!)

1.4 Features

Features

- RiVA can play any standard MPEG-1 Video Sequences.
 - Full Picasso96 support (not emulated CyberGraphics)
 - Support for the PIP hardware of PicassoIV and CV64/3D! (under Picasso96)
 - Support for CyberGraphics
 - AGA support (currently only grayscale, a fast 18bit mode coming soon!)
 - The very best chunky-to-planar algorithms for maximum AGA performance!
 - Akiko support on a CD32!
 - Fast playback (it really is fast, check out the **speedtests** !!!)
 - High quality playback: RiVA uses high precision arithmetic to provide excellent playback quality in both grayscale and colour!
 - Fast frame skipping (of P/B frames, as these are currently not decoded)
 - Fast loop playback (perfectly smooth looping, no delay at the end of loops)
 - Written in pure 100% Assembly language!
 - Specially written to utilise the advanced pipeline caching of the 68060!
-

1.5 Limitations

Limitations

These are the current limitations of RiVA:

(Expect this list to shorten very rapidly! ;-)

- No System Stream support (Only standard MPEG-1 Video Sequences are played)
- No Audio playback
- No P/B frames are played. (See NOTE.1)
- No Async I/O (See NOTE.2)
- No GUI (usable only from shell)

NOTE.1: RiVA is NOT a XingPlayer. It will play any MPEG-1 file!

However, non-intra coded frames (P and B frames) are currently skipped and only intra coded frames (I frames) are decoded.

(Support for P and B frames is on the way...)

NOTE.2: Currently RiVA will load the entire MPEG into memory, and play it from there. Therefore, if you have bigger MPEGs than free memory, you will not be able to play the entire MPEG file. However, RiVA will attempt to allocate the biggest available memory block, and load as much of the file in as possible, so that at least you can play part of those huge MPEGs.

An Asynchronous I/O will be added in the future.

Demo Limitations:

The demo version only plays in grayscale. If you want colour playback, you must [register](#) RiVA.

Also, please note that colour playback is not as fast as grayscale playback.

To avoid disappointments, take a look at the [speedtests](#) .

1.6 Performance

Performance

Two MPEG files have been tested, Grand.mpg is 160x120, mgs_launch is 320x240.

The results are sorted performance-wise, ie. fastest on top, slowest at the bottom.

Machine: A4000 68060/50 (Cyberstorm MKII) with PicassoIV GfxCard

Grand.mpeg:

- Colour PIP:

RiVA PIP: 61.8 FPS

Osiris overlay: 37.3 FPS

AmiPEG PIP: 24.6 FPS

Ripley PIP: 23.1 FPS

- Gray PIP:

RiVA gray PIP: 74.4 FPS

AmiPEG gray PIP: 24.7 FPS

- Colour Screen:

RiVA p96: 47.3 FPS

mpeg_play 1.04 picyuv: 30.2 FPS

mpeg_play 1.04 village24: 25.6 FPS

- Gray Screen:

RiVA p96/gray: 87.8 FPS

mpeg_play 1.04 gray8: 32.9 FPS

mgs_launch.mpg:

- Colour PIP:

RiVA PIP: 22.9 FPS

Osiris overlay: 11.9 FPS

Ripley PIP: 11.3 FPS

AmiPEG PIP: 10.0 FPS

- Gray PIP:

RiVA gray PIP: 26.0 FPS

AmiPEG gray PIP: 12.7 FPS

- Colour Screen:

RiVA p96: 15.7 FPS

mpeg_play 1.04 village24: 9.4 FPS

mpeg_play 1.04 picyuv: 7.7 FPS

- Gray Screen:

RiVA p96/gray: 32.9 FPS

mpeg_play 1.04 gray8: 10.6 FPS

COMMENTS: I think the results speak for themselves, the average speedup over the other players on a 68060 is about 2-3 times!

MACHINE: A4000 68040/25 (A3640 rev3.1) RetinaBLT Z3 GfxCard

Grand.mpeg:

Colour 24bit Screen:

RiVA 12.7 FPS

aMiPEG 1.1 8.5 FPS

mpeg_play 1.03 (village24) 8.2 FPS

Ripley ~5.2 FPS

Osiris 4.5 FPS

Gray 8bit Screen:

RiVA gray (cfxcard) 23.0 FPS

RiVA gray (AGA) 21.3 FPS

aMiPEG 1.1 gray (gfxcard) 17.0 FPS

aMiPEG 1.1 gray (AGA) 11.3 FPS

mpeg_play 1.03 (gray8 AGA) 11.0 FPS

Ripley grey ~6.3 FPS

mgs_launch.mpg:

Colour 24bit Screen:

RiVA 4.6 FPS

mpeg_play 1.03 (village24) 2.6 FPS

aMiPEG 1.1 2.5 FPS

Ripley 1.5 FPS

Osiris 1.5 FPS

Gray 8bit Screen:

RiVA gray (gfxcard) 9.8 FPS

RiVA gray (AGA) 8.2 FPS

aMiPEG 1.1 gray (gfxcard) 5.5 FPS

mpeg_play 1.03 (gray8 AGA) 3.8 FPS

aMiPEG 1.1 gray (AGA) 3.5 FPS

COMMENTS: Speed difference on 040 is not as dramatic as on 060, RiVA is typically between 35% to 80% faster on my 040/25. However I think this is due to the slow fastram access with the A3640, so speedup should be much more dramatic on other 040 boards!

MACHINE: A1200 68040/40 (Blizzard A1240) AGA Only

mgs_launch.mpg:

Grayscale:

RiVA (gray on AGA): 13.32 FPS

mpeg_play 1.04 gray8: 6.67 FPS

AmiPEG1.1 gray: 6.07 FPS

Ripley gray window: 3.09 FPS

COMMENTS: On this 1200/040, RiVA is 2x faster than its closest rival.

1.7 Requirements

Requirements

Minimum Configuration:

- An Amiga with AGA (ie. A1200 or A4000) or a graphics card.
- Kickstart 3.0 or higher (and CyberGraphics/Picasso96 for graphics cards)
- A 68020 processor (no FPU needed)
- 512k of memory (plus some more to load MPEG files into)

Recommended Configuration:

- A graphics card with Picasso96 (and preferably one with PIP hardware)
- A 68060 processor (you really need this for smooth fullscreen playback)
- Lots of memory, preferably more than your biggest MPEG file :-)

1.8 Installation

Installation

RiVA does not need any installation, just copy it into your C directory or any other place you like.

1.9 Usage

Usage

USAGE:

```
> RiVA <filename> <options>
```

Currently RiVA can only be started from shell by typing its name followed by the name of the MPEG file, and any options.

EXAMPLE:

```
> RiVA RAM:Test.MPG GRAY24 LOOP VERBOSE
```

This will play the file RAM:Test.MPG in grayscale on a 24-bit graphics card screen (if available) and keep looping until a CTRL+C, then display some information about the MPEG file, playback time, speed, etc.

OPTIONS:

Note that where the options are separated by commas, it means that all listed

option names refer to the same option. Eg. it doesn't matter if you type CGX or CYBERGRAPHICS, they both have the same effect. The reason for this is to make the user's job easier when specifying commands, eg. you don't have to worry about typing GRAY or GREY, they'll both be recognised by the program.

FILE

- Name of file to play

PIP,P96PIP

- Use PIP (Picture In Picture) hardware.

P96,PICASSO96

- Use Picasso96 graphics system.

CGX,CGFX,CYBERGFX,CYBERGRAPHICS

- Use Cybergraphics system.

VGA,MULTISCAN

- Use Multiscan Productivity screen on AGA.

PAL

- Use PAL screen on AGA.

RTG,AKIKO

- Force OS RTG rendering routines.

NOIDCT

- This option is for speedtesting purposes only. It disables the Inverse Discrete Cosine Transform algorithms to allow speed measurements without IDCT, so the CPU usage of the IDCT routine can easily be calculated.

GRAY,GREY

- Enables grayscale playback

GRAY24,GREY24

- Uses a 24-bit screen on VGA-based graphics cards to allow 256 shades of grey, like on AGA. This might be desired as on VGA-based graphics cards, only an 18-bit palette is used in 8-bit modes, giving only 64 shades of grey. This option gives only a slight speed decrease on zorro3 systems, but I would expect a much more dramatic speed decrease on zorro2-based graphics cards.

This option is irrelevant on AGA machines, because AGA uses a full 16M palette.

LOOP

- Enables loop playback.

VERBOSE

- Displays some information about the MPEG being played and gives some statistical feedback (ie. playback speed etc.)

1.10 Registration

Registration

When you register RiVA, you will receive the full version which has colour playback.

(NOTE: Colour Playback on AGA isn't finished yet, so AGA users should probably wait for a newer version.)

To register, please fill out the included registration form, and post it with the registration fee to the following address:

Stephen Fellner
38 La Rosa Street
Green Bay
Auckland 7
NEW ZEALAND

Here is a list of currencies and the amount required as the registration fee which will be accepted:

15 USD (US Dollars)
25 DEM (Deutsche Mark)
25 NZD (New Zealand Dollars)
25 AUD (Australian Dollars)

Only cash is accepted, no cheques, bank transfers or money orders...

Note that the exchange rates change all the time, so sometimes you may find it's worth using one currency rather than the others...

DO NOT USE COINS! Only use bank notes, and always put the money between a few pages of paper so that it is not obvious that there is money in there, otherwise, your registration may get lost.

Please print out and fill in the included registration form, then include it with your registration fee. If you do not have a printer, simply write down the required information on a piece of paper.

After your registration was received, the full version will be sent to you in the form you have specified in your registration form. Typical delivery time using conventional snail mail is between 1 and 2 weeks. When using email, the program should be sent to you on the same day of receiving the registration fee.

Please don't forget to include a blank floppy if you wish the program to be snail-mailed to you on a floppy disk. And remember, floppy disks are very fragile, so it is a good idea to at least wrap it in a few pages of paper

when putting it into the envelope.

Your email address is optional, if you do not wish to include it it's fine, but I recommend that you do so, in case something unpredictable happens so I can contact you and resolve any problems.

Please take your time to fill in all the information on the registration fee, optional information is of course not required, but I can provide better user support if I know what machines RiVA is being used on, and it will give me ideas of what users expect and what other software I will develop later.

Thank you for supporting the Amiga and the concept of shareware!

1.11 Current Bugs

Current Bugs

There are no current "bugs" in RiVA, mainly just limitations, missing features, etc. Of course there are many different amiga systems available, most bugs are actually bugs of the graphics card software, or other system software which you may be running. If you encounter any bugs with RiVA, please try to remove additional software which you may be running (for example, MCP, Executive, and there are many other programs which may cause problems, but RiVA should work fine with any such patch or system enhancement utility).

If you find any bugs, crashes or unpredictable behaviour of this program, please do not hesitate to contact the [author](#) . But only send a bugreport if you can tell me your exact system configuration (both software and hardware) and describe exactly how the crash happened, so I can try to reproduce the bug with a similar configuration under the same situation.

1.12 History

History

1.13 Future

Future

These are the planned improvements of RiVA:

- P/B frame support
- Async I/O
- Intelligent frame skipping
- System Layers support
- Audio playback
- GUI
- Improve playback speed (using faster IDCT algorithm)
- PPC version

1.14 Author

Author

If you have any suggestions, bugreports, or any other queries, write to:

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Auckland 7

NEW ZEALAND

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