

# **RiVA**

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<b>COLLABORATORS</b>
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# Chapter 1

## RiVA

### 1.1 RiVA v0.1 --- AmigaGuide Documentation

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RiVA v0.20 - Realtime Video for Amiga

MPEG-1 Video Player for AGA, CybergraphX and Picasso96

Written by Stephen Fellner

Additional programming by László Török

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**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** Evolution of RivA...

**Future** What's coming...

**Author** Who to blame...

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### 1.2 Disclaimer

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Disclaimer

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This software package is provided "as is" without warranty of any kind, neither express or implied.

In no event shall the author be held liable for any damages, direct, indirect, incidental, special or consequential, resulting from the use, misuse, or inability to use this program.

The author reserves the right to stop development of this software package, without notice, or any reason whatsoever.

This archive may be freely distributed as long as all files are included, no modifications are done to any of the files and no files are added to the archive that may be inappropriate.

Aminet is explicitly allowed to distribute this archive on its CDs.

Magazines may distribute this archive on their coverdisk floppies or CDs, however I would be grateful for a copy of the magazine to be sent to me. Also I would assume that at least an EMail message would be sent to me so that I'm aware of such an event.

## 1.3 Introduction

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Introduction  
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Foreword

RiVA is currently the fastest MPEG player that exists on the Amiga platform, thanks to its highly optimised assembly language programming, which was developed to take full advantage of the resources available on your Amiga. Because RiVA is the only MPEG player for the Amiga, which was developed in 100% assembly language, there is no other player, that could even come close to the performance of RiVA. Take a look at the [Performance](#) to see just how fast it is.

Development of RiVA started in 1997, and still continues today.

Although RiVA is highly optimized, its speed is still increasing with newer and more advanced routines being developed, new programming techniques used, as new ideas are exploited.

The authors of RiVA take optimisation very seriously, so when you run RiVA on your Amiga, you can be sure that it uses the most state of the art programming techniques know to date.

But speed is not the only advantage of RiVA over other players. RiVA is rock stable. Because the authors of RiVA realise how frustrating it can be when a program crashes, special care has been taken to ensure the RiVA is as stable

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and reliable as software can possible be, so you can view your MPEGs with much confidence, showing off to your PC friends, without being embarrassed by crashes or buggy playback, which is sadly a reality with most other MPEG players on the Amiga.

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 with RiVA, and I hope that it will give you endless hours of fun and enjoyment...

#### Aims/Goals

RiVA is planned to become the general video player for the Amiga. MPEG Video 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!). Development of the PPC version will start when the authors will be able to afford a PPC-based CPU board for development purposes. This will depend on the number of registrations received, as well as support from the Amiga Hardware Manufacturers, who are supplying these boards.

The authors of RiVA are hoping for financial assistance from Amiga Hardware Developers/Manufacturers, to be able to support the latest hardware products (processor, video and audio boards and peripherals).

People registering the current 68k version will be entitled for the PPC version, when it will become available. In fact, the price of RiVA may be increased, when it becomes a more complete, professional product with different CPU versions available, all highly optimised, due to the huge amount of work involved in development, but currently registered users will always be able to get the latest updates and CPU versions free of charge.

## 1.4 Features

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Features  
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- RiVA can play any standard MPEG-1 Video Sequences.
- Full Picasso96 support (not emulated CyberGraphics)
- CybergraphX support
- AGA support (currently only grayscale, a fast 18bit mode coming soon!)
- PIP support under P96 (needs PIP-capable gfxcard, like the PIV or CV64/3D)
- The very best chunky-to-planar algorithms for maximum AGA performance!
- Akiko support on a CD32!
- Very fast, special HiColor playback mode to achieve fastest possible speeds in colour on gfxcards!
- Fast playback (it really is fast, check out the [speedtests](#) !!!)
- High playback quality: RiVA uses high precision arithmetic to provide excellent playback quality in both grayscale and colour!
- Fast, intelligent frame skipping, to be able to keep up with required frame rate.
- 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!
- On-the-fly dither selection! Just press the SPACE bar to change modes!
- Intelligent display mode selection! RiVA will find the best display mode on your system automatically, so you don't need to worry about specifying screen mode IDs or other options!

## 1.5 Limitations

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### Limitations

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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 Async I/O (See NOTE)
- No GUI (usable only from shell)

NOTE: 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.

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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

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Performance  
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Results are sorted performance-wise, ie. fastest on top, slowest at the bottom.

Also, results from the last public release of RiVA are also included to demonstrate that RiVA is still getting faster and faster..

From these results you will be able to see that no other MPEG player can even come close to the speed of RiVA!

Choose one of the machines below to see the performance of different MPEG players on that system:

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

**MACHINE 2** A4000 68060/50 (CyberStormMKII), PicassoIV Z3 GfxCard

## 1.7 Benchmark 1

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

Grand.mpeg  
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- Colour Playback:

RiVA 0.20 HiColor 15.7 FPS

RiVA 0.20 TrueColor 13.3 FPS

RiVA 0.1 TrueColor 12.7 FPS

aMiPEG 1.1 HiColor 8.5 FPS

aMiPEG 1.1 TrueColor 8.5 FPS

mpeg\_play 1.03 (village24) 8.2 FPS

Ripley TrueColor ~5.2 FPS

Osiris TrueColor 4.5 FPS  
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- GreyScale Playback:

RiVA 0.20 GfxCard 24.4 FPS

RiVA 0.1 GfxCard 23.0 FPS

RiVA 0.20 AGA 22.3 FPS

RiVA 0.1 AGA 21.3 FPS

aMiPEG 1.1 GfxCard 17.0 FPS

aMiPEG 1.1 AGA 11.3 FPS

mpeg\_play 1.03 (gray8 AGA) 11.0 FPS

Ripley GfxCard ~6.3 FPS

mgs\_launch.mpg

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- Colour Playback:

RiVA 0.20 HiColor 6.3 FPS

RiVA 0.20 TrueColor 4.8 FPS

RiVA 0.1 TrueColor 4.6 FPS

mpeg\_play 1.03 TrueColor 2.6 FPS

aMiPEG 1,1 HiColor 2.5 FPS

aMiPEG 1.1 TrueColor 2.5 FPS

Ripley TrueColor 1.5 FPS

Osiris TrueColor 1.5 FPS

- GreyScale Playback:

RiVA 0.20 GfxCard 10.1 FPS

RiVA 0.1 GfxCard 9.8 FPS

RiVA 0.20 AGA 8.6 FPS

RiVA 0.1 AGA 8.2 FPS

aMiPEG 1.1 GfxCard 5.5 FPS

mpeg\_play 1.03 (gray8 AGA) 3.8 FPS

aMiPEG 1.1 AGA 3.5 FPS

## 1.8 Benchmark 2

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Speedtest Results

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MACHINE: A4000 68060/50 (CyberStormMKII), PicassoIV Z3 GfxCard

Grand.mpeg

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- Colour Playback:

RiVA 0.20 PIP 62.3 FPS

RiVA 0.1 PIP 61.9 FPS  
RiVA 0.20 hicolor 60.3 FPS  
RiVA 0.20 truecolor 48.1 FPS  
RiVA 0.1 truecolor 47.4 FPS  
Osiris overlay ~37.3 FPS  
mpeg\_play 1.04 (picyuv) 29.8 FPS  
mpeg\_play 1.03 (village24) 25.5 FPS  
AmiPEG 1.1 PIP 24.5 FPS  
AmiPEG 1.1 truecolor 24.3 FPS  
AmiPEG 1.1 hicolor 24.2 FPS  
Ripley PIP ~22.3 FPS  
akMPEG demo (overlay) ~16.1 FPS  
- GreyScale Playback:  
RiVA 0.20 gray (gfxcard) 88.8 FPS  
RiVA 0.1 gray (gfxcard) 88.8 FPS  
RiVA 0.1 gray (AGA) 75.1 FPS  
RiVA 0.20 gray (AGA) 74.1 FPS  
mpeg\_play 1.03 gray (AGA) 33.1 FPS  
AmiPEG 1.1 vlayergray 24.7 FPS  
AmiPEG 1.1 gray (gfxcard) 24.6 FPS  
AmiPEG 1.1 gray (AGA) 24.3 FPS  
Ripley grey PIP ~22.3 FPS  
MGS\_Launch.mpeg  
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- Colour Playback:  
RiVA 0.20 PIP 22.8 FPS  
RiVA 0.1 PIP 22.7 FPS  
RiVA 0.20 hicolor 22.0 FPS  
RiVA 0.20 truecolor 15.8 FPS  
RiVA 0.1 truecolor 15.7 FPS  
Osiris overlay ~13.1 FPS  
Ripley PIP ~12.3 FPS  
AmiPEG 1.1 PIP 10.2 FPS  
mpeg\_play 1.04 (picyuv) 9.2 FPS  
AmiPEG 1.1 hicolor 8.3 FPS  
mpeg\_play 1.03 (village24) 7.8 FPS  
AmiPEG 1.1 truecolor 7.8 FPS  
akMPEG demo (overlay) ~5.2 FPS  
- GreyScale Playback:

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RiVA 0.20 gray (gfxcard) 32.9 FPS  
RiVA 0.1 gray (gfxcard) 32.9 FPS  
RiVA 0.20 gray (AGA) 24.9 FPS  
RiVA 0.1 gray (AGA) 24.9 FPS  
AmiPEG 1.1 gray (gfxcard) 17.8 FPS  
AmiPEG 1.1 vlayergray 12.7 FPS  
Ripley grey PIP ~11.3 FPS  
AmiPEG 1.1 gray (AGA) 10.9 FPS  
mpeg\_play 1.03 gray (AGA) 10.6 FPS

## 1.9 Requirements

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Requirements  
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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 :-)

## 1.10 Installation

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

## 1.11 Usage

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Usage  
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USAGE:

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> 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 DITHER GRAY24 LOOP

This will play the file RAM:Test.MPG in grayscale on a 24-bit graphics card screen (if available), keep looping until the ESC key is pressed.

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.

DITHER

- Selects desired dither type. This keyword is to be followed by the desired dither type, for example 'DITHER GREY' will force RiVA to play in greyscale.

Available dither types are:

PIP.....Picture In Picture Window

TRUECOLOR.....24bit or 32bit TrueColor

HICOLOR.....16bit HiColor

GRAYPIP.....Grayscale PIP Window

GRAY24/GREY24...256-shade grayscale on gfxcards

GRAY/GREY.....Standard 8bit grayscale

It is also possible to use 'DITHER ?' which brings up a dither selection menu.

P96,PICASSO96

- Use Picasso96 graphics system.

CGX,CGFX,CYBERGFX,CYBERGRAPHICS

- Use CybergraphX system.

VGA,MULTISCAN

- Use Multiscan Productivity screen on AGA.

PAL,AGA

- Use PAL screen on AGA.

RTG,AKIKO

- Use OS RTG rendering routines. This will use AKIKO hardware of a CD32 if available.

NOIDCT

- This option is for speedtesting purposes only. It disables the Inverse

Discrete Cosine Transform algorithms to allow speed measurements with-

out IDCT, so the CPU usage of the IDCT routine can easily be calculated.

#### LOOP

- Enables loop playback.

#### FPS

- Allows framerate to be specified. For example, to play the MPEG at 100 frames per second, you would type 'FPS 100'.

#### NOSKIP

- Disables frame-skipping. With this option, RiVA will not attempt to keep up with the specified framerate by skipping frames.

#### VERBOSE

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

## 1.12 Registration

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### Registration

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

(NOTE: Colour Playback on AGA isn't finished yet, so AGA users should probably wait for a newer version. Since there was virtually no request from AGA users for this, colour AGA support has been moved to a lower priority. If we get more requests, colour AGA support will be added soon!)

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

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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 the mailman could get rich, and I may never get your registration. ;-)

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 that'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!

## 1.13 Current Bugs

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### Current Bugs

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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, in fact RiVA is constantly tested on highly patched and hacked systems and still proves to be 100% reliable.

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.

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## 1.14 History

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### History

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\* RiVA Revision History \*

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\* 0.1 (18 Jun 1999) \*

\* \*

\* - First public release \*

\* \*

\* \*

\* \*

\* 0.11 (5 Jul 1999) \*

\* \*

\* - ADDED FPS limiting code, intelligent frame-skipping, FPS and \*

\* NOSKIP options. \*

\* \*

\* - Completely redesigned Video Stream parser \*

\* \*

\* - Major code structure redesign! (better internal error \*

\* detection) \*

\* \*

\* - ADDED Automatic screen-centering \*

\* \*

\* - IMPROVED Playback quality (more contrast - as it's supposed \*

\* to be) \*

\* \*

\* - IMPROVED Looping - now loops properly with as much skipping \*

\* as you like! it skips over end of anim and skips into the \*

\* exact(!) place needed to keep the loop playback constant. \*

\* \*

\* - IMPROVED Frametime code (optimisations) \*

\* \*

\* - ADDED ESC-Quit detect on screens too + fixed PIP close bug. \*

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* *
* - ADDED HiColor dither (faster colour playback) *
* *
* - ADDED DITHER option with help/request (using 'DITHER ?') *
* *
* - Complete redesign of DitherMode selection logic *
* *
* - ADDED On-the-fly dither selection!!! (using SPACE bar) *
* *
* - IMPROVED CybergraphX support *
* *
* *
* *
* 0.12 (8 Jul 1999) *
* *
* - PIP bugfix by László Török *
* *
* *
* 0.20 (27 Aug 1999) *
* *
* - ADDED P frame support *
* *
* - Major changes in internal code structure *
* *
* - FIXED all known decoder bugs *
* *
* - FIXED some old bugs which caused incorrect decoding of P frames *
* in some very rare MPEG files *
* *
* - FIXED XING framerate (Was 8 fps, now 15 fps) *
* *
* - Implemented new frame-skipping routines to handle P and B frames *
* *
* *
* *
* 0.21 (4 Sep 1999) *
* *
* - Fixed bug which caused crashes on some 030-based systems without *
* a gfxcard *
* *
*****

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## 1.15 Future

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Future

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These are the planned improvements of RiVA:

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

## 1.16 Author

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Author

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

snail-mail:

Stephen Fellner

38 La Rosa Street

Green Bay

Auckland 7

NEW ZEALAND

e-mail: [sfell@xtra.co.nz](mailto:sfell@xtra.co.nz) (please include the word 'riva' in the subject)

phone: +64 9 827 2864

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