

# **RiVA-0.43**

Stephen Fellner

<b>COLLABORATORS</b>
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# Chapter 1

## RiVA-0.43

### 1.1 RiVA v0.43 --- AmigaGuide Documentation

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RiVA v0.43 - Realtime Video for Amiga

MPEG-1 Video Player for AmigaOS Classic Platform

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.

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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 68k MPEG player that exists for the Classic Amiga Platform. It was developed from scratch in 100% assembly language and is highly optimized to achieve the highest possible performance on Classic Amiga Systems.

Take a look at the [Performance](#) to see how RiVA compares to other MPEG Players.

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

Great care had been taken to ensure that RiVA is as stable and bug-free as possible. If you do find any bugs, please report it to the [author](#).

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...

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## 1.4 Features

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### Features

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- RiVA can play any standard MPEG-1 Video Sequence.
  - Support for system streams
  - Audio support via mpeg.a.library
  - Highly efficient AsyncIO reading
  - Full Picasso96 support (not emulated CyberGraphics)
  - CybergraphX support (including VLayer)
  - AGA support (with very fast c2p routines)
  - Fast, high-quality colour AGA modes (DHAM6 and DHAM8). Same as the STORM dither in the MooVid AVI/MOV Player, but even faster!
  - HALFHEIGHT option to increase playback speed on AGA machines
  - PIP support under P96 (needs PIP-capable gfxcard, like the PIV or CV64/3D)
  - Can use the special PlanarAssist hardware of the PicassoIV to increase playback speed. (Will require the next Picasso96 release!!)
  - VLayer support under CyberGraphX
  - Very efficient YUV to RGB conversion routines for fast TrueColor playback
  - Very fast, special HiColor playback mode to achieve fastest possible speeds in colour on gfxcards without PIP!
  - Custom HiColor routines for EVERY possible hicolor format. This gives high performance on ANY GfxCard
  - 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.
  - Written in pure 100% Assembly language!
  - Specially written to utilise the advanced pipeline caching of the 68060!
  - Intelligent display mode selection! RiVA should automatically find the best display mode on your system automatically, so you don't need to worry about specifying screen mode IDs or other options. For instance it will instantly use PIP or Vlayer if available or will fall back to other alternative display options if not.
  - On-the-fly zooming of PIP/VLayer window
  - Standard features like ASL filerequester, icon tooltypes, drag'n'drop...
  - Audio scaling when different framerate is specified
  - Surround Sound option (MONOSURROUND)
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## 1.5 Limitations

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### Limitations

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The following features are currently missing:

- GUI
- VideoCD track reading (you need to grab the tracks for now...)
- PPC version (I need lots of registrations to get a PPC card, please support me! :)

### Demo Limitations:

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

Please take a look at the [speedtests](#) to see how colour playback speed compares to the greyscale in the demo. In general greyscale is about 30% faster on gfxcards and about 50-60% faster on AGA. Using the 'HALF' option on AGA increases colour playback by about 30% so you can get quite close to greyscale speed on AGA (at the cost of lower vertical resolution of course...)

## 1.6 Performance

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### Performance

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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 & PPC604e/200 (CyberStormPPC) PicassoIV GfxCard

**MACHINE 3** A1200 68040/40 (Blizzard 1260 revII)

**MACHINE 4** A1200 68030/50 (Blizzard 1230/IV)

## 1.7 Benchmark 1

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### Speedtest Results

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

All values are in units of FPS (Frames Per Seconds)

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Notes:

The AGA DHAM8 and DHAM6 modes are HAM8 and HAM6 modes with double horizontal resolution to simulate 18bit and 12bit modes with minimal HAM artifacts.

Only RiVA and aMiPEG support these modes.

The tables show both RiVA-0.40 and RiVA-0.20 so you can see how much speed has improved.

This machine did not have FBlit installed because it would not work with P96, so AGA Frogger tests could possibly be faster...

Grand.mpeg (160x120)

	True-	Hi-	AGA	AGA	AGA	Grey	Grey
	Color	Color	DHAM8	DHAM6	8bit	GfxCard	AGA
RiVA-0.40	15.0	18.1	13.7	14.6	---	28.2	25.4
RiVA-0.20	13.3	15.7	---	---	---	24.4	22.3
aMiPEG 1.1	8.7	8.6	8.4	9.2	---	17.0	11.3
mpeg_play	1.03	8.2	---	---	---	7.6	11.0
Frogger 1.64b2	5.9	5.8	---	---	---	6.3	10.0

mgs\_launch.mpg (320x240)

	True-	Hi-	AGA	AGA	AGA	Grey	Grey
	Color	Color	DHAM8	DHAM6	8bit	GfxCard	AGA
RiVA-0.40	5.4	7.2	4.7	5.3	---	11.8	9.6
RiVA-0.20	4.8	6.3	---	---	---	10.1	8.6
aMiPEG 1.1	2.6	2.6	2.4	2.7	---	5.5	3.5
mpeg_play	1.03	2.6	---	---	---	2.4	3.8
Frogger 1.64b2	2.2	2.0	---	---	---	2.1	4.2

## 1.8 Benchmark 2

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 Speedtest Results  
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MACHINE: A4000 68060/50 & PPC604e/200 (CyberStormPPC), PicassoIV GfxCard

All values are in units of FPS (Frames Per Seconds)

Notes:

The AGA DHAM8 and DHAM6 modes are HAM8 and HAM6 modes with double horizontal resolution to simulate 18bit and 12bit modes with minimal HAM artifacts.

Only RiVA and aMiPEG support these modes.

This machine did not have FBlit installed because it would not work with P96, so AGA Frogger tests could possibly be faster.

For Frogger I used 'DISPLAY VLayer' instead of 'DISPLAY P96' because it was much faster (I don't know why, they both use the PicassoIV's PIP)

I've also included FroggerPPC tests, although it's stupid to compare 060/50 RiVA to 604/200 Frogger, but I was surprised how close RiVA playing on 68k is to Frogger playing on this PPC, even beating it in some cases!

Maybe I should optimize some more... :)

Grand.mpeg (160x120)

```

+-----+-----+-----+-----+-----+-----+-----+-----+
| VLayer | True- | Hi-  | AGA  | AGA  | AGA  | Grey | Grey |
| (PIP)  | Color | Color | DHAM8 | DHAM6 | 8bit | GfxCard | AGA |
+-----+-----+-----+-----+-----+-----+-----+-----+
| RiVA-0.40 | 76.2 | 53.3 | 69.5 | 46.3 | 51.6 | --- | 102.4 | 85.3 |
+-----+-----+-----+-----+-----+-----+-----+-----+
| aMiPEG 1.1 | --- | 27.5 | 28.9 | 25.5 | 28.5 | --- | 57.4 | 35.0 |
+-----+-----+-----+-----+-----+-----+-----+-----+
| mpeg_play 1.03 | --- | 26.1 | --- | --- | --- | 22.5 | --- | 32.8 |
+-----+-----+-----+-----+-----+-----+-----+-----+
| Frogger060 1.64b2 | 40.7 | 21.7 | 28.3 | --- | --- | 20.1 | 39.6 | 24.6 |
+-----+-----+-----+-----+-----+-----+-----+-----+
| FroggerWOS 1.64b2 | 87.6 | 32.3 | 89.7 | --- | --- | 36.6 | 69.5 | 37.9 |
+-----+-----+-----+-----+-----+-----+-----+-----+
    
```

Xwing.mpg (320x240)

```

+-----+-----+-----+-----+-----+-----+-----+-----+
| VLayer | True- | Hi-  | AGA  | AGA  | AGA  | Grey | Grey |
| (PIP)  | Color | Color | DHAM8 | DHAM6 | 8bit | GfxCard | AGA |
+-----+-----+-----+-----+-----+-----+-----+-----+
    
```

RiVA-0.40	23.5	15.5	21.0	12.0	14.1	---	30.1	22.8
aMiPEG 1.1	---	6.9	7.3	6.1	7.2	---	13.9	8.6
mpeg_play 1.03	---	6.4	---	---	---	---	5.6	7.9
Frogger060 1.64b2	12.9	6.1	8.4	---	---	---	5.0	11.7
FroggerWOS 1.64b2	31.5	8.9	30.3	---	---	---	8.8	21.8

### 1.9 Benchmark 3

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 Speedtest Results  
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MACHINE: A1200 68040/40 (Blizzard 1260 revII)

All values are in units of FPS (Frames Per Seconds)

Notes:

The AGA DHAM8 and DHAM6 modes are HAM8 and HAM6 modes with double horizontal resolution to simulate 18bit and 12bit modes with minimal HAM artifacts.

Only RiVA and aMiPEG support these modes.

This machine had FBlit installed which should give the best performance with Frogger.

Grand.mpeg (160x120)

AGA	AGA	AGA	Grey
DHAM8	DHAM6	8bit	AGA
RiVA-0.40	22.2	24.0	---
aMiPEG 1.1	13.1	15.0	---
Frogger 1.64b2	---	---	11.1
Xwing.mpg (320x240)			
AGA	AGA	AGA	Grey
DHAM8	DHAM6	8bit	AGA

```

+-----+-----+-----+-----+
| RiVA-0.40 | 6.0 | 6.9 | --- | 10.8 |
+-----+-----+-----+-----+
| aMiPEG 1.1 | 3.3 | 3.8 | | 5.7 |
+-----+-----+-----+-----+
| Frogger 1.64b2 | --- | --- | 3.4 | 4.3 |
+-----+-----+-----+-----+
    
```

## 1.10 Benchmark 4

### Speedtest Results

MACHINE: A1200 68030/50 (Blizzard 1230/IV)

All values are in units of FPS (Frames Per Seconds)

Notes:

The AGA DHAM8 and DHAM6 modes are HAM8 and HAM6 modes with double horizontal resolution to simulate 18bit and 12bit modes with minimal HAM artifacts.

Only RiVA and aMiPEG support these modes.

This machine had FBlit installed which should give the best performance with Frogger.

Grand.mpeg (160x120)

```

+-----+-----+-----+-----+
|| AGA | AGA | AGA | Grey |
|| DHAM8 | DHAM6 | 8bit | AGA |
+-----+-----+-----+-----+
| RiVA-0.40 | 10.5 | 11.5 | --- | 18.5 |
+-----+-----+-----+-----+
| aMiPEG 1.1 | 6.5 | 6.9 | --- | 5.2 |
+-----+-----+-----+-----+
| Frogger 1.64b2 | --- | --- | 5.3 | 4.8 |
+-----+-----+-----+-----+
    
```

Xwing.mpg (320x240)

```

+-----+-----+-----+-----+
|| AGA | AGA | AGA | Grey |
|| DHAM8 | DHAM6 | 8bit | AGA |
+-----+-----+-----+-----+
| RiVA-0.40 | 3.0 | 3.5 | --- | 5.5 |
+-----+-----+-----+-----+
| aMiPEG 1.1 | 1.6 | 1.7 | --- | 1.4 |
+-----+-----+-----+-----+
| Frogger 1.64b2 | --- | --- | 1.6 | 2.0 |
+-----+-----+-----+-----+
    
```

## 1.11 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)
- 1MB of memory.
- mpega.library should be installed for audio!

#### Recommended Configuration:

- A graphics card with Picasso96 (and preferably one with PIP hardware)
- Kickstart 3.1
- A 68060 processor (you really need this for smooth fullscreen playback)

## 1.12 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.

## 1.13 Usage

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### Usage

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RiVA can be started by one of the following ways:

1. By Double-clicking its icon and selecting a file from the requester
2. By dragging a file on top of RiVA's icon
3. Using the command line (Shell)

To abort playback, press escape or close the window (if in PIP-mode)

For PIP/VLayer playback, the + and - keys on the numeric keypad can be used to zoom the window. Additionally, you can press keys 1-6 on your keyboard for preset zoom values.

Additionally, RiVA can be configured by the following ways:

1. Adjusting its icon's tooltypes
-

## 2. Specifying command-line options

Below is a list of each option with detailed description of what it's for.

### OPTIONS:

#### DISPLAY

USAGE: DISPLAY=<keyword>

#### DESCRIPTION:

Selects desired display type. This allows you to specify what display format RiVA should use for playback. This is useful if the default display RiVA selected automatically is not what you want. For instance you may want to use a faster HICOLOR mode, instead of the higher quality TRUECOLOR (default).

Available display types are:

PIP.....Picture-In-Picture (VLayer) Window

TRUECOLOR.....24bit or 32bit TrueColor (depending on GfxCard)

HICOLOR.....15bit or 16bit HiColor (depending on GfxCard)

GRAYPIP.....Grayscale PIP (VLayer) Window

GRAY24/GREY24...256-shade grayscale on GfxCards (slower but nicer)

GRAY/GREY.....Standard 8bit grayscale (fastest mode available)

ACCUPAK.....Special FAST Color Mode for PicassoIV only!

(This planar format requires PIVPLANARASSIST option and special PiassoIV.card not part of the current Picasso96 distribution)

DHAM8.....Double-width HAM8 Colour AGA mode (default on AGA)

DHAM6.....Double-width HAM6 Colour AGA mode (very fast!)

In Command Line (Shell) mode it is also possible to use 'DISPLAY ?' which brings up a display selection menu.

EXAMPLE: DISPLAY=HICOLOR

#### ZOOM

USAGE: ZOOM=<percentage>

#### DESCRIPTION:

This option lets you specify a default zoom value for PIP (VLayer) playback. The value is a percentage.

EXAMPLE: ZOOM=200

#### FPS

USAGE: FPS=<value>

#### DESCRIPTION:

Allows framerate to be specified. This lets you control playback speed.

It's useful since some MPEGs have been encoded with the wrong framerate, this lets you specify the correct framerate for those files.

It's also useful in combination with the NOSKIP and VERBOSE options to test the

maximum speed your machine can play a particular MPEG with the given DISPLAY mode.  
(ie FPS 1000 NOSKIP VERBOSE as command line arguments give you the maximum speed)

EXAMPLE: FPS=15

NOSKIP

DESCRIPTION:

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

This option is not recommended with files containing audio, because framerate may not be maintained correctly, causing audio 'gaps'.

HALFHEIGHT

DESCRIPTION:

Displays MPEG with halved vertical resolution. This mode will only work in AGA modes and achieves great speedup in colour! Also requires Kickstart 3.1+ !

Will only work in PAL!

PICASSO96

DESCRIPTION: Forces RiVA to use Picasso96 graphics system.

CYBERGFX

DESCRIPTION: Forces RiVA to use CyberGfx system.

AGA

DESCRIPTION: Use PAL screen on AGA.

PIVPLANARASSIST

DESCRIPTION:

Uses the special PlanarAssist hardware of the PicassoIV.

This option is not available with the current Picasso96 v2.0 release. It requires functionality that is due to be added in the next release of Picasso96.

When this is enabled, PIP and GRAYPIP will be considerably faster. Also you can use the DISPLAY=ACCUPAK option to get really fast (but not so good quality) playback in colour.

NOAUDIO

DESCRIPTION:

Disables audio playback. The current audio playback is not very good, if it gives you problems (perhaps your machine is too slow for it or UAE crashes :) then use this option.

NOVIDEO

DESCRIPTION:

Disables video decoding. Can be useful if only audio playback is desired.

NORENDER

DESCRIPTION:

Disables video display. Video is decoded, but not displayed. Useful for testing

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how much your video bandwidth is limiting playback speed. (ie. you can compare speed test with and without this option to see if it's worth upgrading to a GfxCard with faster memory bus :))

NOP

DESCRIPTION:

Forces P frames to be skipped. (Useful for performance calculations)

NOB

DESCRIPTION:

Forces B frames to be skipped. (Useful for performance calculations)

PUBSCREEN

USAGE: PUBSCREEN=<public screen name>

DESCRIPTION:

This option lets you specify a public screen on which the RiVA window is to be opened. (By default the window is opened on the Workbench screen)

EXAMPLE: PUBSCREEN=MyPublicScreen

MONOSURROUND

DESCRIPTION:

Enables an experimental surround audio effect. This option should make audio to be more enjoyable compared to a flat mono sound. May increase synchronisation problems though.

AUDIOQUALITY

USAGE: AUDIOQUALITY=<value>

DESCRIPTION:

Lets you specify the quality of audio decoding. The quality options are the same as in mpeg:

AUDIOQUALITY=0....Worst Quality

AUDIOQUALITY=1....Medium Quality

AUDIOQUALITY=2....High Quality

Default is 1 (Medium Quality).

If illegal values are encountered, the default setting will be used.

AUDIOFREQDIV

USAGE: AUDIOFREQDIV=<value>

DESCRIPTION:

Frequency division to be used for audio decoding. Values are the same as in mpeg:

AUDIOFREQDIV=1....Use Full Frequency (ie. 32 kHz, 44.1 kHz, 48 kHz...)

AUDIOFREQDIV=2....Use Half Frequency (ie. 16 kHz, 22 kHz, 24 kHz...)

AUDIOFREQDIV=4....Use Quarter Frequency (ie. 8 kHz, 11 kHz, 12 kHz...)

Higher frequency means more CPU time used, resulting in slower video updates.

Default is 4 (Quarter Frequency).

---

For illegal values given, the default setting will be used.

#### SAVEAUDIO

[command-line only]

USAGE: SAVEAUDIO=<audio filename>

#### DESCRIPTION:

This option lets you save the audio from MPEG files with audio.

The audio will be constantly saved into the file during playback until the end of the MPEG file is reached or the user aborts playback.

IMPORTANT: Make sure you have enough free space for the audio to be saved!

EXAMPLE: SAVEAUDIO=RAM:MyAudioFile.mp2

#### DEFAULTDIR

USAGE: DEFAULTDIR=<path for default directory>

#### DESCRIPTION:

The default directory used in the filerequester can be specified with this option.

EXAMPLE: DEFAULTDIR="Work:MyMovies/MPEGs"

#### VGA or MULTISCAN

[command-line only]

#### DESCRIPTION:

Use Multiscan Productivity screen on AGA. Currently only available as command line argument and not yet implemented in colour modes (in colour it'd be much slower due to increased AGA bandwidth usage and HALFHEIGHT option is not possible). Best to use a scandoubler, but I can implement this if requested.

#### RTG or AKIKO

[command-line only]

#### DESCRIPTION:

Use OS RTG rendering routines. This should also automatically use the AKIKO C2P hardware of a CD32 if available.

#### VERBOSE

[command-line only]

#### DESCRIPTION:

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

## 1.14 Registration

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

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playback as well.

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

Stephen Fellner  
38 LaRosa Street  
Green Bay  
Auckland 7  
NEW ZEALAND

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

10 UKP (UK Pounds)  
15 USD (US Dollars)  
30 DEM (Deutsche Mark)  
30 NZD (New Zealand Dollars)

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

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.

Please take your time to fill in all the information on the registration form.

With your registration you support my program and encourage me to continue development of RiVA and other great programs for the Amiga.

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

## 1.15 Current Bugs

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Current Bugs  
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Audio playback sometimes skips, especially at the start and audio sync is not perfect. On slower systems you'll find that with audio enabled video framerate

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drops dramatically or even stops. This is partly because there's hardly any CPU time left for the video decoding (since the audio decoding has higher priority).

Hopefully I'll be able to implement a more advanced audio decoding system, which minimizes these problems by clever double-buffering techniques.

If you find any bugs, crashes or unpredictable behaviour of this program, please do not hesitate to contact the [author](#).

If you contact me with a bugreport, please give me a detailed description of your 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.

## 1.16 History

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### History

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\*\*\*\*\*

\* RiVA Revision History \*

\* \*

\* 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. \*

\* - ADDED HiColor dither (faster colour playback) \*

\* - ADDED DITHER option with help/request (using 'DITHER ?') \*

\* - Complete redesign of DitherMode selection logic \*

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- \* - 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 \*
  - \* \*
  - \* 0.30 (2 Apr 2000) \*
  - \* - OPTIMIZED IDCT routines (up to 15% global speedup) \*
  - \* - OPTIMIZED B-frame skipping (up to 60% global speedup!) \*
  - \* - ADDED AsyncIO (smooth real-time load/playback) \*
  - \* - Major internal code re-design (for system stream code) \*
  - \* - ADDED System Stream support (FINALLY !!! :-) \*
  - \* - FIXED many major and minor bugs... \*
  - \* \*
  - \* 0.33 (4 Dec 2000) \*
  - \* - ADDED CyberGraphX VLayer support \*
  - \* - ADDED support for more 15/16bit modes \*
  - \* - ADDED Experimental PicassoIV PlanarAssist and Accupak options \*
  - \* (Great speedup, especially on Z2 machines!) \*
  - \* - ADDED ZOOM option for PIP/VLayer. \*
  - \* - ADDED PIP/VLayer on-the-fly zoom selection (1-6 and +/-) \*
  - \* - ADDED Colour AGA support (AGA8 and AGA6) \*
  - \* - ADDED HALFHEIGHT option for faster AGA playback \*
  - \* - ADDED ASL File Requester \*
  - \* - ADDED Workbench start support (no more shell-only usage) \*
  - \* - ADDED on-the-fly half/full height selection (use SPACE bar) \*
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- \* (Note this only works in AGA modes!) \*
  - \* - ADDED Workbench Argument reading. You can drag'n'drop files onto \*
  - \* the RiVA icon and RiVA will start playing them. \*
  - \* - ADDED Workbench tooltype parsing (RiVA can now be configured via \*
  - \* its icon's tooltypes) \*
  - \* \*
  - \* 0.34 (8 Dec 2000) \*
  - \* - CHANGED AsyncIO code (New AsyncIO rulez!) \*
  - \* - Re-implemented LOOP option (with new AsyncIO) \*
  - \* - ADDED Seek option (F1-F10 allows seeking into bigger files) \*
  - \* - FIXED AGA dither selection (now defaults to AGA8) \*
  - \* \*
  - \* 0.35 (30 Dec 2000) \*
  - \* - FIXED bug in closedown code (buffers not freed, etc. LAME!) \*
  - \* - ADDED experimental audio support!!!! \*
  - \* \*
  - \* 0.36 (8 Feb 2001) \*
  - \* - FIXED FPS counter bug introduced in 0.34 \*
  - \* - FIXED Seek bug in new AsyncIO \*
  - \* - OPTIMIZED IDCT algorithm (a bit more speed... again... :) \*
  - \* - ADDED NOAUDIO option (to disable experimental audio :) \*
  - \* \*
  - \* 0.37 (9 Feb 2001) \*
  - \* - IMPROVED Audio Support (PAL/NTSC autodetect, now supports any \*
  - \* frequency (ie. 32kHz, 44.1kHz, 48kHz) \*
  - \* - FIXED lots of Audio bugs... :) \*
  - \* \*
  - \* 0.38 (10 Feb 2001) \*
  - \* - Temporarily removed F1-F10 seek and LOOP options (until Audio \*
  - \* support is finalized... sorry guys :) \*
  - \* - Some cleanups (removed some old obsolete stuff...) \*
  - \* - REMOVED NOIDCT switch (not really needed) \*
  - \* \*
  - \* 0.39 (10 Feb 2001) \*
  - \* - Implemented Audio Scaling (audio is scaled to fit specified \*
  - \* framerate) \*
  - \* - ADDED extra key input check (if video can't keep up) \*
  - \* \*
  - \* 0.40 (11 Feb 2001) \*
-

- \* - ADDED NOVIDEO and SAVEAUDIO options \*
- \* - IMPROVED Audio support (uses both left & right channels) \*
- \* - FIXED a bug introduced in 0.39 which caused crashes on streams \*
- \* with no audio \*
- \* - ADDED MONOSURROUND option \*
- \* - Updated icon tooltype parsing \*
- \* - Changed 'DITHER' keyword to 'DISPLAY' in tooltype (both can be \*
- \* used as command-line argument) \*
- \* - FIXED VLayer ZOOM on Cgfx \*
- \* - CHANGED names of AGA6 and AGA8 display modes to DHAM6 and DHAM8 \*
- \* - FIXED videodecoder bug (did not exit in certain cases!) \*
- \* \*
- \* 0.41 (22 Feb 2001) \*
- \* - FIXED Enforcer Hits \*
- \* - ADDED PUBSCREEN option \*
- \* \*
- \* 0.42 (27 Mar 2001) \*
- \* - ADDED B frame support \*
- \* - ADDED NOP and NOB options \*
- \* - Disabled custom intra/nonintra matrix loading (some MPEGs give \*
- \* custom matrix but are still encoded with default matrix) \*
- \* - IMPROVED timer and framerate calculators (now handles very large \*
- \* values and is more accurate) \*
- \* - ADDED 'Displayed Framerate' calculation \*
- \* - ADDED full-pixel vectors (Thanks to Pavel for sample MPEG file) \*
- \* \*
- \* 0.43 (6 May 2001) \*
- \* - ADDED AUDIOQUALITY and AUDIOFREQDIV options/tooltypes \*
- \* - ADDED DEFAULTDIR command line option and tooltype \*
- \* - Made 'DITHER ?' work without filename \*
- \* - FIXED NOVIDEO option (no video decoding done at all) \*
- \* - ADDED NORENDER option (decodes video but does not render) \*
- \*\*\*\*\*

## 1.17 Future

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 Future  
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These are the planned improvements of RiVA:

- VideoCD track reading
- GUI
- Other cosmetic stuff, minor fixes/improvements, etc.
- PPC version (if I get enough registrations... :)

## 1.18 Author

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Author  
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Please send suggestions, bugreports, or any other queries to:

Stephen Fellner

38 LaRosa Street

Green Bay

Auckland 7

NEW ZEALAND

EMail: [riva@aioworld.com](mailto:riva@aioworld.com)

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