

Introduction to the Atari Jaguar Development System

Atari is proud to introduce the most advanced entertainment console system in the whole industry, the Atari Jaguar. Featuring 64-bit technology and multiple custom RISC processors, the Jaguar has the power to lead interactive entertainment into the 21st century.

The Jaguar development package contains development hardware, software, and documentation describing the development environment. All of the current documentation is delivered in an Atari binder for ease of use. As new documents are released, we will keep you updated within the terms of the developer support agreement you signed. Also included are disks containing the current release of the developer software. Installation instructions are included later in this section.

Included with your development system is a game cartridge of CYBERMORPH, the first truly interactive 3-D-world game existing at a consumer price level. Cybermorph should give you some idea about the capabilities of the machine. However, while Cybermorph is an impressive game, we would like to emphasize that as one of the earliest Jaguar releases, it only scratches the surface of the machine's capabilities.

Because there are some differences between your development console and a standard off-the-shelf retail Jaguar, please refer to the section titled **How To Run A Game Cartridge In A Development System**.

We also are using a developer support BBS where you always will find the most current releases of all software demos and development tools. This should also be a communication platform to help to ensure high quality support and good response speed. Please refer to the section titled **Online Support**.

We would like to encourage developers to push the Jaguar system to the limit and design software that takes advantage of the great variety of capabilities offered by the hardware. Push the envelope of reality on the first entertainment system that delivers real *Power Without the Price™*.

Contacts At Atari

The information below will introduce you to your Jaguar Developer Support contacts at Atari Corporation, tell you their titles, phone numbers, electronic mail addresses, and so forth.

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Online Support

The Jaguar Developer Support staff can be reached through electronic mail using the mail addresses shown above. In addition to this, Atari has online file libraries containing the most recent updates of all the developer tools, code libraries, and sample programs.

Atari Software Development BBS - Atari operates a bulletin board system for developers. Updates to the development system tools, libraries, and sample code are posted to the BBS on a regular basis. The telephone number for the Jaguar Developer BBS is (408) 745-2157. The modem settings should be 8 data bits, 1 stop bit, no parity. Transfer rates up to 28,800 bps are supported. The first time you call, you will not have access to files, so you should leave a message to the sysop requesting access that includes your name and company, and the name of the project you are working on.

Compuserve - The ATARIGAMING forum of the Compuserve online service has special private Jaguar Developer message areas and file libraries. Send email to Mike Fulton and/or Normen Kowalewski to request access.

Who To Contact For What?

Bill Rehbock — Business related issues, publishing concerns.

J. Patton — Trade shows, licensing issues, Title Rating/Labeling Issues.

Normen Kowalewski — General programming topics, Jaguar-specific programming topics (1st choice), Developer Seminars/Conferences, Development System availability, Address & Phone number changes.

Mike Fulton — Installation & Setup, Development Tools, General programming topics, Jaguar-specific programming (3rd choice), Documentation, Jaguar Developer Newsletter, Address & Phone number changes, Online access requests.

Scott Sanders — General programming topics, Jaguar specific programming topics (2nd choice), Sample programs, Address & Phone number changes

Loic Duval — European Developer Support.

Alistair Bodin — U.K. Developer Support.

Setup & Installation

There are three basic steps to getting started with your Jaguar Development System:

- 1) Installation
- 2) Configuration
- 3) Running your first program

We'll take you through each of these steps from installing the Jaguar development tools and sample programs onto your system to running your first sample program.

If you have problems...

If you experience any problems with installation, please contact your developer support representative. If you have problems with one of the floppy disks, you may wish to check on the Jaguar Developer BBS system to see if you can download the files required to recreate the bad disk.

Installation

Please read these instructions carefully before trying to install the Jaguar developer tools & sample code. Also be aware that due to the fact that Atari is constantly improving the tools, the installation process may change. In order that you have the most up to date instructions, we ask that you please view the file READTHIS.1ST (normally found on Disk 1) prior to attempting installation.

About 15 megabytes of free disk space on your hard disk drive is required for installation. **Note:** You must perform the installation from the MSDOS command prompt. If you are running Microsoft Windows, please exit to DOS or run the MSDOS command prompt from within Windows in order to perform the installation.

- 1) Change to the drive and directory where you want to install the files. The installation will automatically create a directory named JAGUAR at this location and install everything into it. (e.g. if you are at D:\ then you'll end up with D:\JAGUAR and it will contain everything. Therefore, you do not need to create a JAGUAR directory yourself.)
- 2) Insert disk #1 into your floppy drive.

To install from drive A: enter the command "A:install A:"

To install from drive B: enter the command "B:install B:"

Type the commands exactly as shown. Do not use a backslash following the drive letter and colon. **Note:** The drive letter and colon specifies the SOURCE drive, not the destination. The destination is implied by the current drive and directory when you run the installation.

The installation process will take several minutes to complete, and you will be prompted to change disks when needed. Simply follow the onscreen instructions. When the installation is complete, you will be returned to the DOS prompt.

Configuration

There are several environment variables used by the Jaguar development tools that need to be set properly before you can do anything. The instructions below apply to an MSDOS system (with or without Microsoft Windows). If you have a different operating system, you will have to adjust the steps as appropriate. If you need assistance, please contact Jaguar Developer Support (see the info on pages 2 & 3).

Add the following lines to your AUTOEXEC.BAT file:

```
set RDBRC=E:\JAGUAR\BIN\RDB.RC
set DBPATH=E:\JAGUAR\BIN
set ALNPATH=E:\JAGUAR\BIN
set MACPATH=E:\JAGUAR\INCLUDE1
set GCC_EXEC_PREFIX=E:/JAGUAR/BIN
set TEMP=C:
set PATH=%PATH%;E:\JAGUAR\BIN
```

You should change "E:\" in the paths above to the drive and directory where the JAGUAR directory is located (this is the path from step #1 of the installation). Having these environment variables set correctly is critical if you want the tools and examples to work properly.

You may already have a TEMP environment variable specified in your AUTOEXEC.BAT file. If so, change it so that it specifies just a drive letter and colon, as shown above. The GNU GCC C compiler may not work properly if your TEMP environment variable ends in a backslash.

After you have made the changes to your AUTOEXEC.BAT file and saved it back to your hard disk, reboot the machine so they will take effect. For more detailed information about how these environment variables are used, please refer to the documentation for the individual tools.

The RDBPC and DBPATH variables are used by the debugger. The ALNPATH variable is used by the linker. The MACPATH variable is used by the Madmac assembler. The GCC_EXEC_PREFIX variable is used by the GCC C compiler. Note that GCC_EXEC_PREFIX uses a forward slash ("/) as a path separator instead of a backslash ("\). Most of the tools also use the PATH and TEMP variables.

¹ As of Sept. 26, 1994, the standard system include files have been revised and are now located in the JAGUAR\INCLUDE directory instead of JAGUAR\INC. Some older source code may still require the older versions of the include files, but this should not be a problem with any of the current examples in the developer's kit.

Running Your First Program

After you have installed the Jaguar Development Kit tools and source code, and configured your environment variables, you are ready to compile and run your first program on the Jaguar. Most of the Jaguar developer tools are designed to be invoked from the MSDOS command prompt. If you are running under Microsoft Windows, you should either exit to DOS or else run the MSDOS command prompt. If you are running under a different operating system, you should do whatever is required to run MSDOS programs².

- 1) Change to the JAGUAR\SOURCE\JAGMAND directory³. This directory contains the source code to a Jaguar Mandelbrot fractal program that uses the Jaguar's GPU to calculate a picture of the Mandelbrot set using fast integer arithmetic.
- 2) Type "MAKE" at the DOS command prompt. This will invoke the "MAKE" utility to build the JAGMAND program from the source code. On a DX2/66 machine, this typically takes between 10 and 30 seconds depending on hard disk and/or network access speed.
- 3) When MAKE is finished, you should have an executable program named JAGMAND.COF. To run it on the Jaguar, we will run the debugger and tell it to load the program into the Alpine board.

Before proceeding, let's make sure your PC and Jaguar are properly connected. Your PC should have an 8-bit bidirectional parallel port. (In the event that your PC does not already have such a port, you should install the card supplied with your Jaguar Development system. Please see the documentation included with the card.) The Jaguar Alpine board should be plugged into your PC's parallel port using the supplied parallel cable, and the Alpine board itself should be firmly plugged into the cartridge slot of the Jaguar. Make sure that the toggle switch on the top of the Alpine board is switched to "Write Enable". If you have not done so already, turn on the Jaguar. You should see a message similar to:

JAGUAR ® Development System
© 1993 Atari Corp.
31 Oct '93

on the monitor or television that the Jaguar is connected to. Note that the date shown on your screen and other minor details may be different (particularly if you have a CD-ROM development system). If you do not see this message, you should verify that everything is plugged in correctly. If you still cannot get this message to appear, then contact Atari Developer Support for assistance.

² Compatibility has been tested with *Windows v3.1*, *Windows For Workgroups v3.11*, and to a lesser degree with *Windows NT* and the "final beta" version of *Windows 95*. Any compatibility problems with these systems are likely to be related to your specific system setup. However, if you report your problems to Atari, they will be investigated. Compatibility with other operating systems such as *OS/2* has not been tested.

³ This was in the JAGUAR\EXAMPLES\JAGMAND directory in older versions of the standard distribution. If you are using this directory, you should check online for the latest updates to the distribution archives, or else contact Atari Developer Support.

- 4) Enter the command "RDBJAG JAGMAND.COF" at the command prompt. This will load the Jaguar debugger and tell it to load the JAGMAND.COF program. You should see something that looks approximately like this:

```
G:\JAGUAR\EXAMPLES\JAGMAND>rdbjag jagmand.cof
Jaguar Debugger v1.00 PC - May 27 1994
(C)1993 Atari Corporation. PC version by Brainstorm.
Bidirectional parallel port used: LPT1
JAGUAR stub (31-Oct-'93) ready & running in ROMULATOR, (NTSC)
COFF program jagmand.cof loaded:
      start   size   end
text  802000   440   802440
data  802440   200   802640
Loaded 304 symbols from COFF program jagmand.cof.
PC: 00802000 SSP: 00000DD2 USP: FFFF7DF7 SR: 2100  SU IPL=1 XC PL NZ VC CC
D 80150014 0080F000 0000000B 0000FFFF FFF70050 FBFF7FFF FFFFFFFF FFFF7FFF
A 0080198A 008006EA 00000E46 00001FFA 00F14000 008015F8 00F00000 00000DD2
00802000>  move.l    #$70007,$F0210C G_END
At \JAGUAR\EXAMPLES\JAGMAND\JAGMAND.S:32:
32>      move.l    #$00070007,G_END
Db:
```

If you don't see something essentially like this message, then something may be wrong with your installation, your parallel card may not be recognized as 8-bit bidirectional by RDBJAG, the parallel cable running from your PC's parallel port to the Alpine board isn't plugged in correctly, or there may be something wrong with your Alpine board and/or Jaguar. (Note again that the version numbers and dates may be different on your system.)

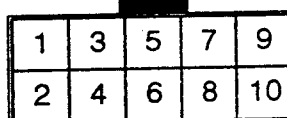
- 5) Assuming that things worked as expected in step #4, then type "G" and hit <return> to run the program. The Jaguar should draw an overall view of the Mandelbrot set fractal screen in roughly 8 seconds.

Please note that while the Mandelbrot demo is reasonably speedy, it is not fully optimized and could be made to run even faster. Greater speed could be accomplished by having more work done internally by the GPU, and less by the 68000, and you could also speed things up by having the DSP do some of the calculations. Through these methods, you could probably gain at least a 100% speed increase.

Most of the other sample programs supplied with the Jaguar Development System are set up to be compiled and executed in more or less the same way as the JAGMAND demo. Simply move to the directory containing the demo you want, type "MAKE", and then run the debugger to load the executable into the Jaguar. Note that depending on your system setup, it may be necessary to make slight changes to the MAKEFILE for each demo in order to get things to compile correctly on your system. The **Sample Source Code** section has more specific information on the various sample programs and how they work.

How To Run a Cartridge in a Development System

1. With the Jaguar console turned off, plug in the cartridge in place of the Alpine board.
2. Connect a 1k Ohm resistor between pins 4-5 in the STOP cable that normally plugs into the back of the Alpine board. Otherwise the console will not run or might mess up the sound. (Note: Pin 1 on the header of the cable is marked with a small triangle and normally the line leading to pin 1 of the cable is colored.) Below is a diagram of the header on the Alpine-end of the cable.



1	3	5	7	9
2	4	6	8	10

3. Hold down the 'B' button of joystick #1 and turn on the console's power. Release the 'B' button when you see the Jaguar logo.
4. From this point operation is identical to a standard retail console. Hit the 'B' button again to leave the Jaguar logo screen and begin the game.

Note: If you are trying to run a game loaded onto a Flash ROM cartridge then you should press the 'C' button instead of 'B' in steps 3 and 4. Note that your development console must have a ROM dated November 1994 or later in order to use Flash ROM cartridges.

How To Boot a CD-ROM in a Development System

If you have a Jaguar CD-ROM development system with a boot ROM installed, you may play standard Jaguar CD-ROM titles. Follow steps 1-4 as shown above, except press button 'C' instead of button 'B'. If there is a Jaguar CD-ROM in the drive, it will be executed. If there is an audio CD in the drive, then the built-in *Virtual Light Machine* program will be started.

If you cannot get the Virtual Light Machine program to come up on screen, your Jaguar CD-ROM unit may not be equipped with the proper boot ROM. Note also that your development console must have a ROM dated November 1994 or later in order to boot from the Jaguar CD-ROM. Contact Atari Developer Support regarding ROM upgrades.