

READY



EMULATORS and EMULATION

Emulating a trip through
Craig's childhood;
One machine at a time.

Craig Maloney
craig@decafbad.net
<http://decafbad.net>



I love computers

**I love a lot of
computers**

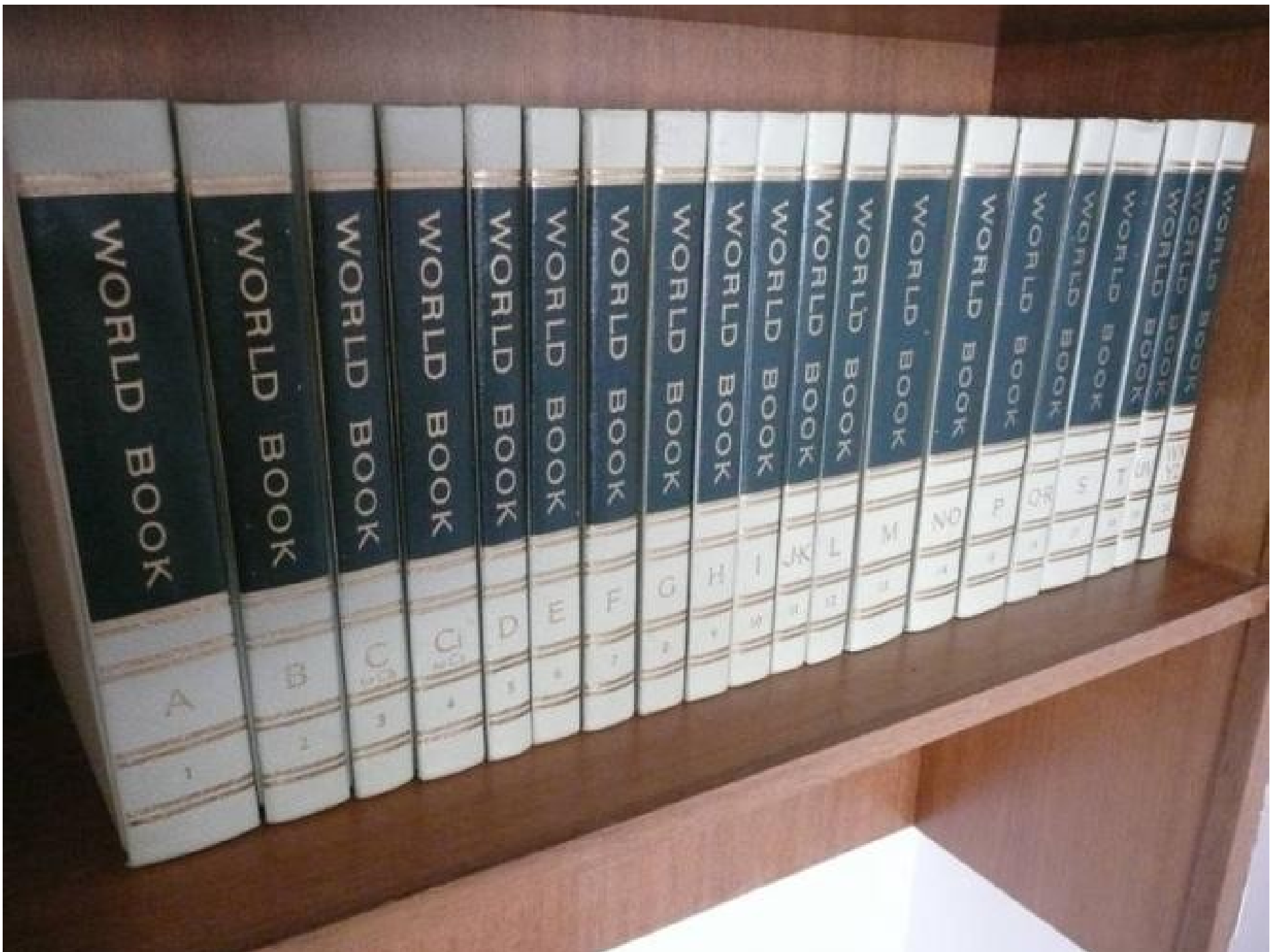
**I love a lot of
classic
computers**

IBM



<https://plus.google.com/+AndyHertzfeld/posts/g8dqNaskdni>

Our hero
discovers the
computer





The RTCC in 1966 (Photo courtesy of NASA)

Sigh.

What every educator should know about desk-top computers.

It's easy to get into classroom computing. What's tough is to do it right. With so much talk about computers in the classroom, educators like yourself want all the facts before they recommend any system for classroom use. That's why Apple Computer's new "Curriculum Materials Kit" can help, with answers to your questions and some very important data you may not have considered before.

Who uses desk-top computers.

Hundreds of innovative educators have already discovered the Apple Computer for instructional applications from kindergarten through college. Apple gives you computer-assisted instruction capabilities, including drill and practice, tutorial, problem-solving, games, simulations, and more.

Apple engages student interest with sound and color video. In fact, your students will be able to write programs and create high-resolution graphics. And you can use your Apple for testing, counseling, even classroom data processing. That's just the beginning.

What to look for.

Once you've unlocked the power of the

desk-top computer, you'll be using Apple in ways you never dreamed of. That's when the capabilities of the computer you recommend will really count. You don't want to be limited by the availability of pre-programmed cartridges. You'll want a computer, like Apple, that you can also program yourself. You don't want to settle for a black and white display that limits you to just putting words and numbers onto the screen. You'll want a computer, like Apple, that can turn any color tv into a dazzling array of color graphics*. The more you and your students learn about computers, the more your imagination will demand. So you'll want a computer that can grow with you as your skills and experience grow. Apple's the one.

How to learn more.

The quickest way to learn more about desk-top computers is to request your free copy of Apple's Curriculum Materials Kit (specify level). Get yours by calling 800/538-9696; in California, 408/996-1010. Or by writing us. Then visit your local Apple dealer. We'll give you his name and address when you call.

*Apple II plugs into any standard TV using an inexpensive modulator (not included).



 **apple computer**™

10260 Bandy Dr., Cupertino, CA 95014

Reader Service Number 2

<http://www.applegazette.com/mac/flashback-apple-print-ad/>

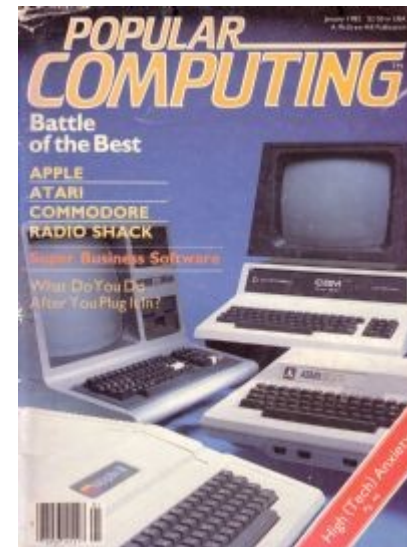
**Personal
Computers?**



**I can has
computer?**

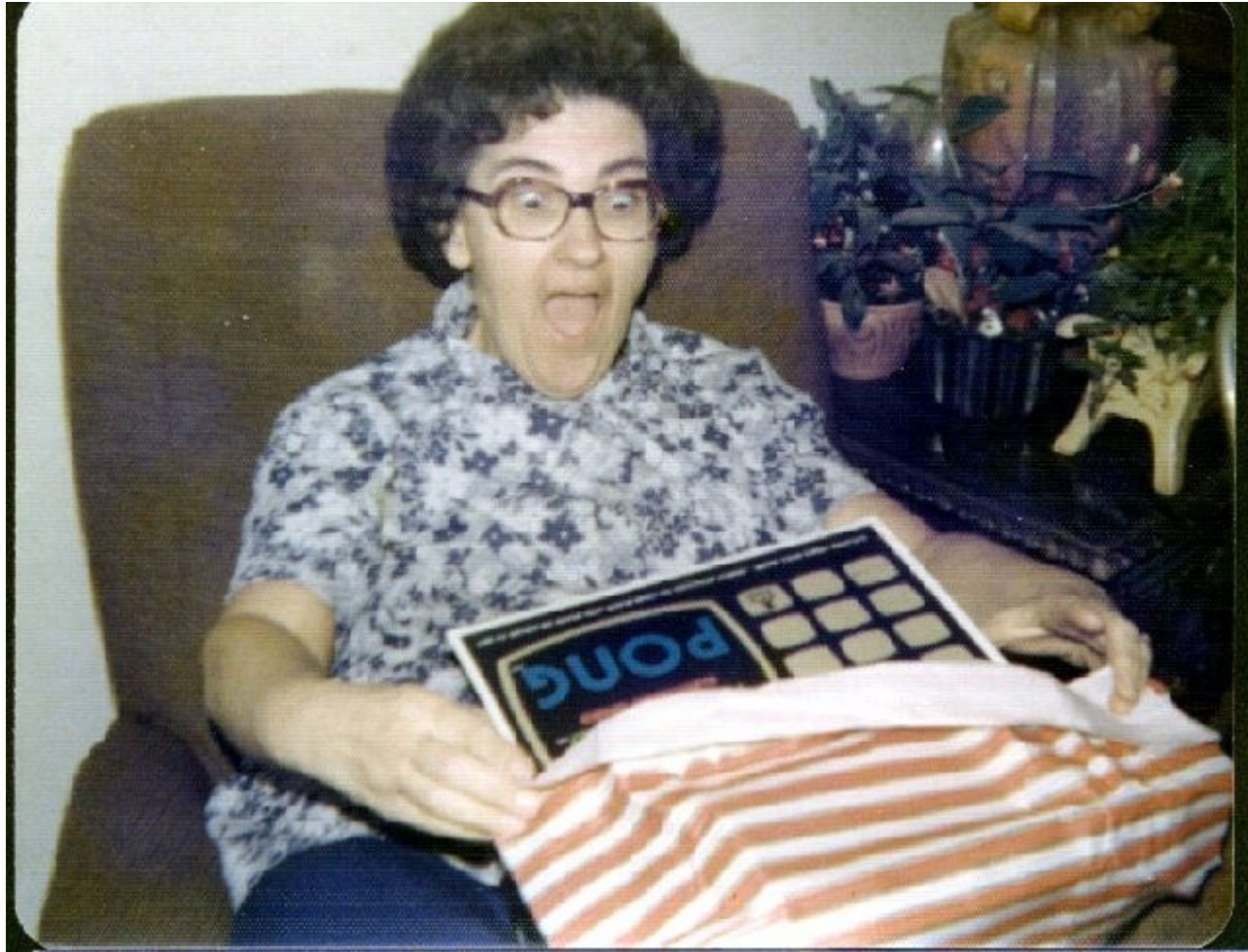
ComputerLand®

Radio Shack®





And then . . .



(Re-enactment)



♪ Angelic Chorus ♪

BASIC PROGRAMMING

ATARI® GAME PROGRAM™ INSTRUCTIONS



ATARI
A Warner Communications Company



CX2620

COMPLETE BASIC
PROGRAMMING
INSTRUCTIONS

WRITE AND DISPLAY
PROGRAMS

SAMPLE PROGRAMS
INCLUDED



V = 000 H = 000 E = 9125 T = 1
O = +000 P = -000 R = +014



The personal computer with expandable memory, advanced peripherals, and comprehensive software so it will never become obsolete.

How sophisticated can a personal computer be if it's outdated in a year? Or in even a month?

Well, Atari solves that problem by introducing the *Timeless Computer*—the Atari-800™.

It's the top-of-the-line personal computer system with more adaptability. That's because of its expanded memory, a variety of peripheral components, and a comprehensive software library. The Atari-800™ is designed to change as your customers'

needs change.

The Atari-800™ can be easily used by people with no previous computer experience without compromising capability for the sophisticated user who wants to write specialized software. Storage and manipulation of large data bases ranging from stock market analysis to inventory control will allow the Atari-800™ to find its way into uses never before imagined.

In addition, the Atari-800™ is an instructional tool that speaks to you,

asks questions, and uses the TV screen as its blackboard. Available subjects range from Algebra to Zoology.

And the games!

The most sophisticated action and thinking games ever, with excitement, sounds, and color never imagined before. Like Basketball, Chess, and Stock Market, just to name a few.

The Atari-800™. The only computer your customers will ever need to buy.

The Atari-800™. The *Timeless* Personal Computer System.







Atari 8-bit computers

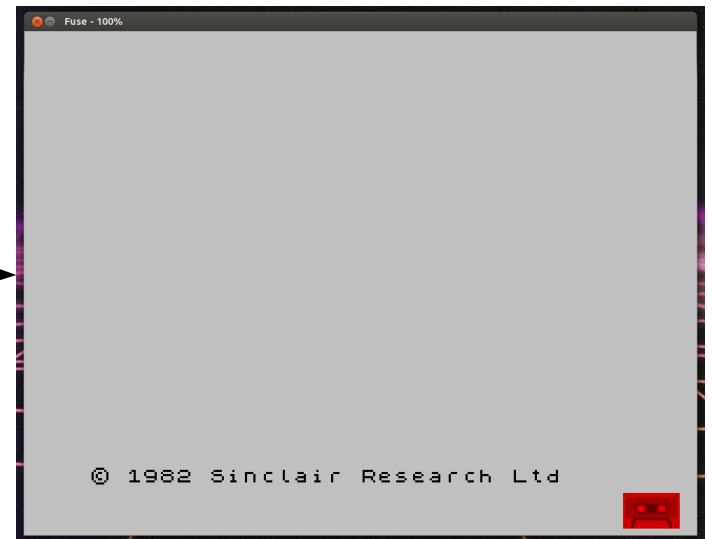
1979 - 1992

1981 - 1993

12 years of nostalgia

Hey Grandpa,
isn't this
supposed to be
about emulation?

Emulating old hardware



Why Emulate Old Hardware?

Why Emulate Old Hardware?

Nostalgia

Why Emulate Old Hardware?

Nostalgia

Preservation

Why Emulate Old Hardware?

Nostalgia

Preservation

Learning Experience

Why Emulate Old Hardware?

Nostalgia

Preservation

Learning Experience

BECAUSE WE CAN!

The Problem



This should not
be a problem. . .

**This is a
problem.**

The Problem

- Many of these companies outsourced their development:
 - Sinclair contracted Nine Tiles Networks for Sinclair BASIC
 - Microsoft wrote Commodore BASIC
 - Digital licensed a version of GEM for the Atari ST
 - Atari contracted out Atari BASIC / Assembler / DOS to Shepardson Microsystems Inc. (later Optimized Systems Software, which later merged with ICD, which later was purchased by Fine Tooned Engineering, which later...)

The Problem

- Many of these companies either went bankrupt, were sold, or both.
- Some of these companies were sold off piecemeal.
- Figuring out the rights requires lawyers and a lot of time.

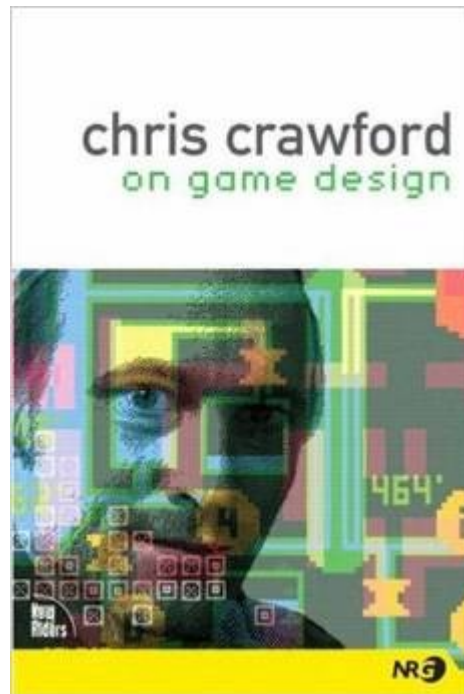
Atari

- 1971: Founded as Syzygy; Incorporated and renamed as Atari in 1972.
- 1976: Sold to Warner Communications
- 1983: Atari Split into Atari Games (Coin-Op) and Atari Inc.
- 1996: Atari Inc. merged with JT Storage.
- 1998: Sold to Hasbro.
- 2001: Bought by Infogrames, renamed to Atari SA.
- 2013: A bunch of Atari companies enter Chapter 11, emerge one year later, adding Atari Casino to the mix.

Question:

Who owns the rights to the Atari Computer ROMs?

Atari



p. 441-442



http://www.atarigames.com/index.php?option=com_content&view=article&id=45

Technically . . .

Of these 8-bit computers only the Sinclair-series has ROMs Available both under the GPL (ZX80/ZX81) and under a non-commercial, freely-available, by-attribution covenant



Sinclair



Nine Tiles Networks Ltd wrote Sinclair Basic. They released the ZX80 / ZX81 ROMS as Open80 / Open81 and put them under a GPL v2 License.

Amstrad graciously released the Sinclair ZX Spectrum ROMS under a non-commercial, freely available (with attribution) license.

Jupiter Ace



>From boldcomp@aol.com Wed Sep 23 07:54:21 1998
>Received: from Boldcomp@aol.com
> by imo11.mx.aol.com (IMOV16.10) id ROUWa05091
> for <edward_patel@hotmail.com>; Wed, 23 Sep 1998 10:44:17 -0400 (EDT)
>From: Boldcomp@aol.com
>Message-ID: <2062feb6.36090941@aol.com>
>Date: Wed, 23 Sep 1998 10:44:17 EDT
>To: edward_patel@Hotmail.com
>Mime-Version: 1.0
>Subject: Boldfield
>Content-type: text/plain; charset=ISO-8859-1
>Content-transfer-encoding: quoted-printable
>X-Mailer: AOL 3.0.i for Windows sub 177
>
>Thanks for your email.
>
>I seem to remember that we gave the ROM listing away, but I am sure nobody=
> is
>going to get upset about the emulator - so good luck to you.
>
>All we have remaining are some of the ACE games cassettes that we produced
>for this project. You could mention that these are available to users - wh=
>ere we would only ask say 5 pounds to cover administration and postage.
>
>Best wishes
>
>
>Paul Downham
>
>

Commodore / Amiga

Sordid details on who owns what available here:

<http://amiga-news.de/en/news/AN-2015-02-00027-EN.html>

Short answer: Cloanto Italia

Commodore Amiga



C64 / Amiga Forever

- <http://c64forever.com>
- <http://amigaforever.com>

Atari

- **Atari ST:**

- <http://sourceforge.net/projects/emutos>

- **Atari 8-Bit**

- <http://sourceforge.net/projects/atari800/files/ROM/>

MAME

MAME | ROMs for Fr x

mamedev.org/roms/

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








ROMs for Free Download

Fork me on GitHub






Thanks to the generosity of some of the original creators of the classic games that MAME® can emulate, several games have been released for free, non-commercial use. It is our hope that in the future, we will be able to add more games to this list.

Note: The ROMs on these pages have been approved for free distribution on this site only. Just because they are available here for download does not entitle you to put them on your own site, include them with your own distributions of MAME, or bundle them with your software, cabinet, or other item. To do that, you must obtain permission from the original owners.

Exidy Games

 Circus ©1977 Exidy	 Robot Bowl ©1977 Exidy	 Car Polo ©1977 Exidy	 Side Trak ©1979 Exidy	 Rip Cord ©1979 Exidy
 Fire One ©1979 Exidy	 Crash ©1979 Exidy	 Star Fire ©1979 Exidy	 Targ ©1980 Exidy	 Spectar ©1980 Exidy
 Hard Hat ©1982 Exidy	 Victory ©1982 Exidy	 Teeter Torture ©1982 Exidy	 Fax ©1983 Exidy	 Top Gunner ©1986 Exidy

Other Games

 Robby Roto ©1981 Bally/Midway	 Super Tank ©1981 Video Games GmbH	 Looping ©1982 Video Games GmbH	 Gridlee ©1982 Videia, Inc.	 Alien Arena ©1985 Duncan Brown
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Copyright © MAME 2015

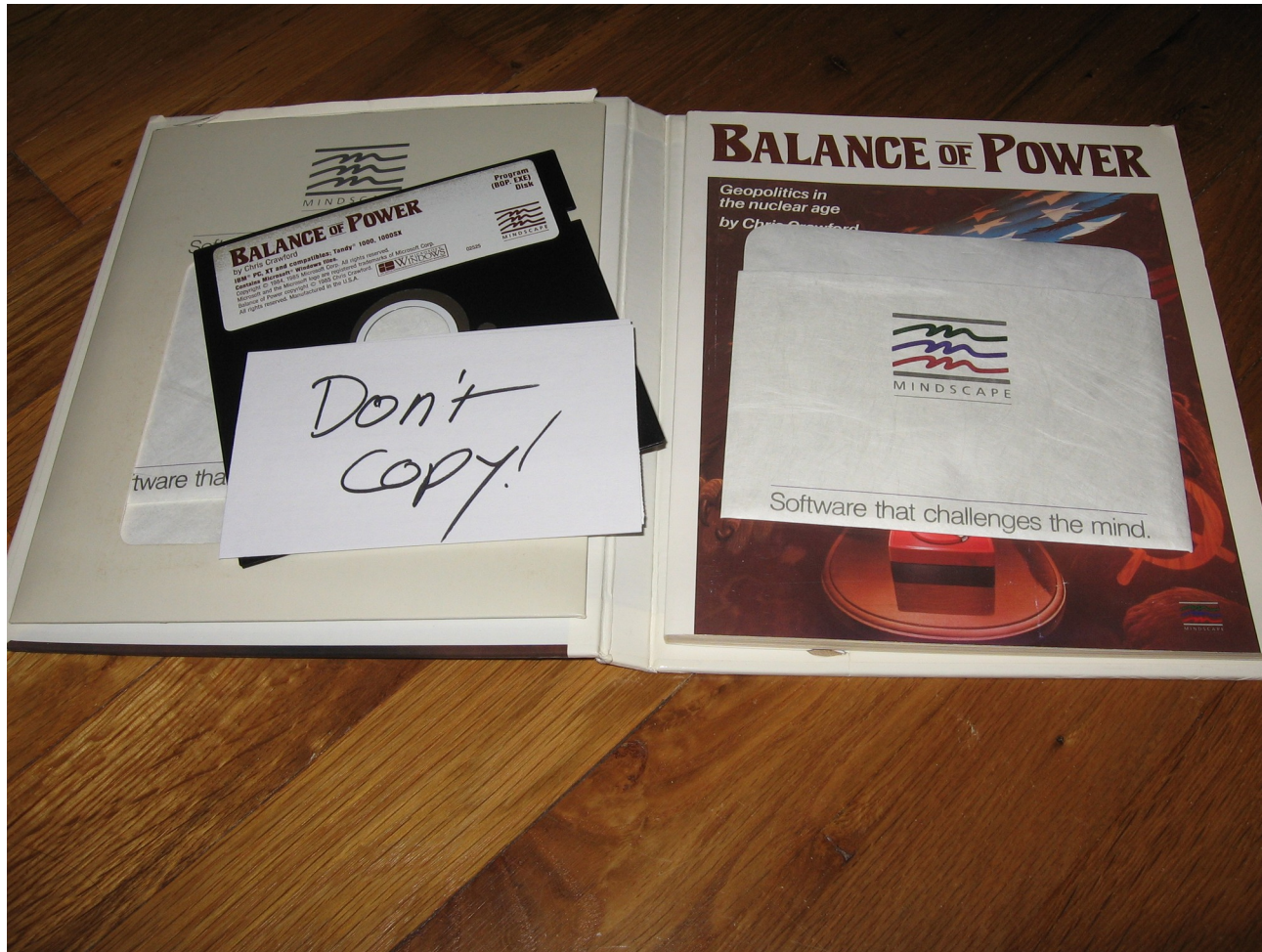
ST0002.zip | froggies_over....zip | grotesque.zip | CUDDLY_P.zip

Show all downloads...

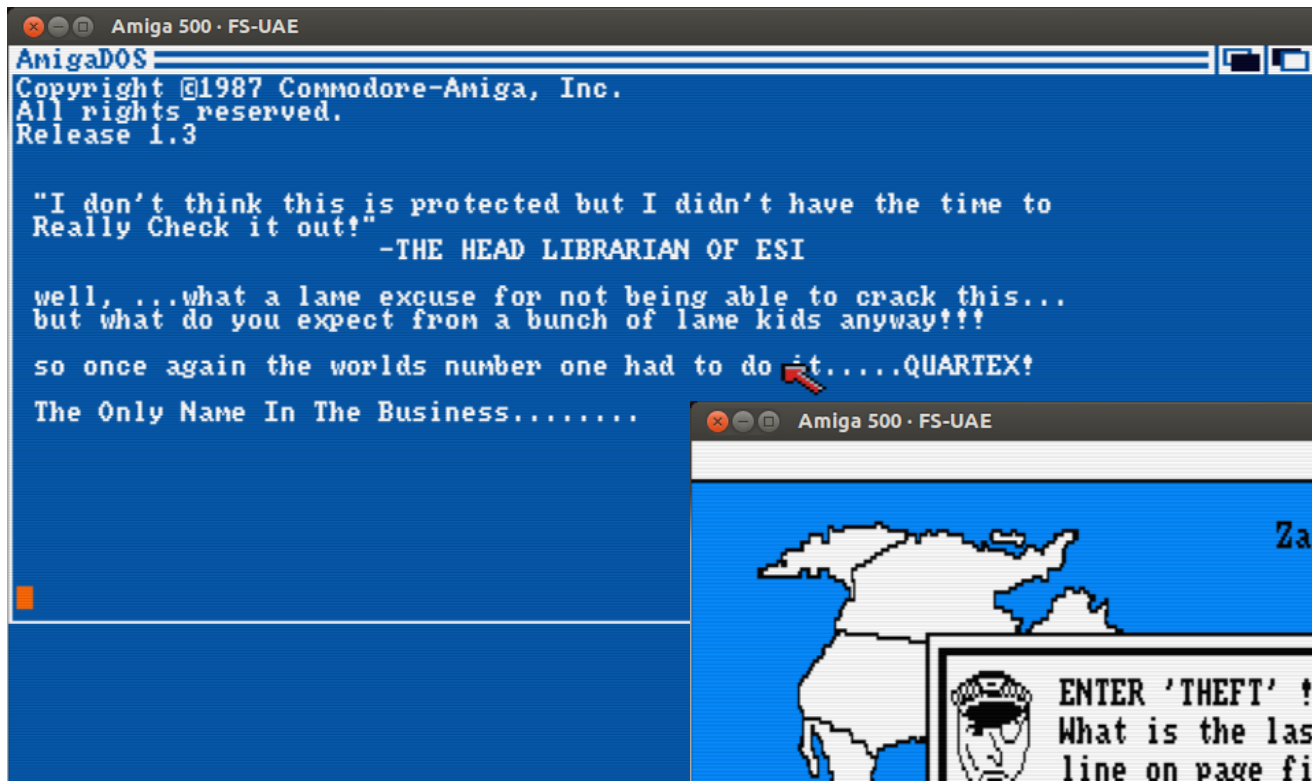
Research

**Another
problem. . .**

Another Problem...



Canonical Copies. . .



Hey Hippie, I
thought we were
going to show
off some
computers?

EMUATORS we '11 cover

- Vice (PET / Vic 20 / C64)
- Atari800
- Atari++
- Hatari w/ EmuTOS (Atari ST)
- FS-UAE (Amiga)
- SZ81 (Sinclair ZX80 / ZX81)
- xAce (Jupiter Ace)
- FUSE (Sinclair Spectrum)
- MAME (Exidy Titles)
- The Internet Archive

Demo

Links

- <http://www.worldofspectrum.org/>
- <http://c64forever.com>
- <http://amigaforever.com>
- <http://jupiter-ace.co.uk/>
- <http://sz81.sourceforge.net/>
- <http://www.spectaculator.com/android-support/>
- <http://fuse-emulator.sourceforge.net/>
- <http://sourceforge.net/projects/atari800/>
- <http://www.xl-project.com/>
- <http://fs-uae.net/>
- <http://www.factor5.de/downloads.shtml>
- <http://hatari.tuxfamily.org/>
- <http://sourceforge.net/projects/emutos/>
- <http://mamedev.org/>
- <http://www.twitchasylum.com/jsvecx/>
- <https://archive.org/details/internetarcade>
- <https://archive.org/details/consolelivingroom>

Thank you!

Wikipedia is awesome!

- <https://commons.wikimedia.org/wiki/File:Aim65.JPG>
- https://commons.wikimedia.org/wiki/File:Amiga500_system.jpg
- https://commons.wikimedia.org/wiki/File:Apple_II_Plus.jpg
- <https://commons.wikimedia.org/wiki/File:Atari-400-Comp.jpg>
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- https://commons.wikimedia.org/wiki/File:ZX81_kit.jpg
- <https://commons.wikimedia.org/wiki/File:Zx81-timex-manipulated.jpg>
- <https://commons.wikimedia.org/wiki/File:ZXSpectrum48k.jpg>
- https://en.wikipedia.org/wiki/Star_Raiders#/media/File:Star-raiders-game-under-attack.gif

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