

# COMMODORE FREE

A free to download Magazine dedicated to Commodore computers.

Issue 79



## MACHINE CODE PROGRAMMING PART 3





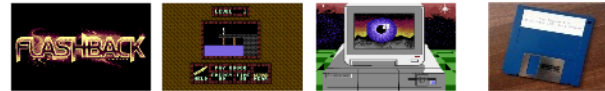
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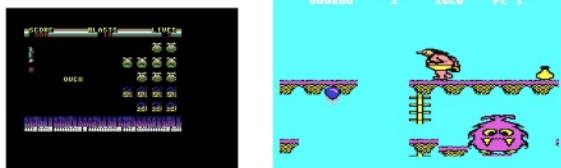


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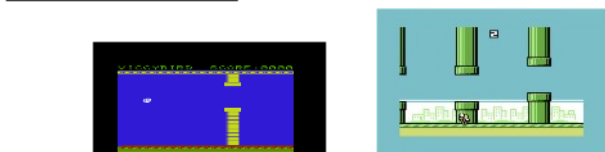
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# Editorial

I must say a big Thank you to Jose Zanni for maintaining a blog about Commodore Free here  
<http://commodorefree.blogspot.com.ar/2014/03/commodore-free-magazine-issue-78-2014.html>

and <http://retroinvaders.com/es/revistas/seed/11>

This issue sees reviews of the remarkably infuriatingly addictive Flappy bird, and also an E-covertape conversion of the game! In the magazine we review the Vic and the Commodore 64 versions, the VIC gets further treatment with 2 more games reviews a Gradius inspired game; and a version of Pacman, the quality of the games is unbelievable and the Gradius clone is so fast you would think you had plugged n the wrong machine!

I have also been playing with the Cassiopeda the Tape drive replacement and more for all 8bit commodore machines, read what it can do out of the box and what the author used his device for, then think about the possibilities this device "could" have!

We have a new features called "games that shouldn't have been" this month we look at Frak on the Commodore 64 and weep at the lucky BBC owners who owned a playable version of the game. If you find a game that is just so rubbish; or you wish you hadn't loaded it; or a conversion so rushed and buggy it should be assigned to the bin, then it could be a contender for this feature! If you do have a favourite contender, please drop me a contact; and as they say in business "ping me an email" I will write up a review unless you feel strongly enough to write your own, it's time to name and shame these games, it could be the VIC, PET, C64 or the Plus/4 or even the Amiga game.

And we finish off this issue with part 3 of our coding tutorial for the 6502 processor, so if you are still managing to follow from last issue; and your brain isn't just a soggy mush of goo! Read more about coding in part 3.

Of course the same plea goes out as ever  
 If you would like to submit something to Commodore free then email me

**[commodorefree@commodorefree.com](mailto:commodorefree@commodorefree.com)**

Thanks for reading and I hope you enjoy  
*Nigel* (editor)

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## Submissions

Articles are always wanted for the magazine. Contact us for details. We can't pay you for your efforts but you are safe in the knowledge that you have passed on details that will interest other Commodore enthusiasts.

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# Commodore is Awesome

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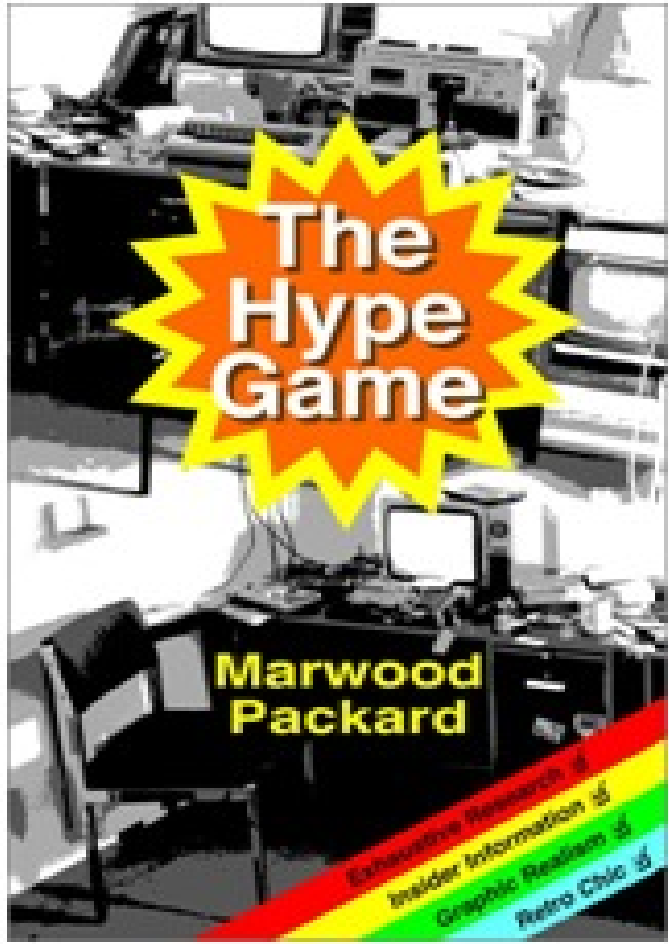


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# Readers Comments

## Commodore Free Epic Failure

Or you at the back sit up and pay attention

### MAGAZINE CORRECTION

**COMMODORE FREE:** Oh looks like a bit of a mistake here :-)

**From:** Gábor Lénárt

**To:** Commodore Free

Hi,

Just reading Commodore Free Issue 78. Let's see: "Black Lord has created a web site about the Commodore LCD". Well, the site, the information and the emulator is collected/written/etc by me (nickname: lgb, just note the domain: commodore-lcd.LGB.hu), not Black Lord. I guess I can understand what happens here: on one of the Commodore 128 topics, Black Lord opened a thread about the Commodore LCD emulator, but he never mentioned that it's his work, he only linked my site. It seems some people thought that it's the work of Black Lord.

The topic is:

<http://www.commodore128.org/index.php?topic=4799>

As you can see, the first post starts with "Posted in the CBM hackers mailing list by Gábor Lénárt", he only reported my work, as I am Gabor Lenart, nicknamed as lgb or LGB (which is from the Hungarian order of my name: Lenart GaBor).

Here is my first post from the thread above:

<http://www.commodore128.org/index.php?topic=4799.msg23689#msg23689>

Also, check out the bottom of this page:

<http://commodore-lcd.lgb.hu/thanks.html>

And compare the mail address written there with the one I send my mail now from :)

Hopefully it's enough to prove that the Commodore LCD emulator, documentation, site, etc is nothing about Black Lord,

but it's about me. I would be happy if you can fix this issue, not because I feel so much hunger for publicity, but still it's a bit annoying to treat my hard work for someone else which is completely unrelated to this project...

Thanks

### COMMODORE FREE:

Hi

Oh! Very sorry, this news item was emailed to me and I guess I didn't pay attention while reading through, I will print your comments in the next issue, (that's this one) I can understand you would be a bit frustrated about the error :- ( and I must apologise for the mistake

Regards

*Nigel*

PS: at least the website will get 2 x the publicity!

**From:** Gábor Lénárt

**To:** Commodore Free

Well, not too much to worry, I haven't done it because of the personal glory :)

Just it's a bit odd, especially when I received an email with a congratulation starting with "Hi Blacklord!" :) Back then I had no idea why I was named as Blacklord, I thought it was only a joke or something, but later I had to realize that for some reason, lots of people think it's the work of Blacklord (I don't know him at all), then I noticed that he quoted my mail from the Commodore Hacker list (e.g. on commodore128.org portal), and some people interpreted that as it's his work. Or such...

And btw thanks for the Commodore Free in general :)

## E-Tape Termination

I just want to let you know about the future of the E-Cover Tape. I have decided to make the 12th E-Cover Tape the final one. This is mainly due to lack of finding good quality C64 PD software I can find, and also due to lack of support I've had as well. Therefore issue 80's E-Tape will be the final one. It should be ready sometime in April 2014.

Thanks

*Richard*

**COMMODORE FREE:** Richard has done a marvellous job with the E-tape and so it is with sadness that I read his recent email to me, to be fair to Richard he had to trawl through various sources to try and obtain submissions for this feature. We never did receive anything from machines or users other than the Commodore 64. If you do still have something you would like featured in the magazine then still feel free to send it in!





# SUMMER BLOWOUT!

Buy a copy of Run/Stop-Restore: 10th Anniversary Edition at retail price \$17.99 USD and get your choice of either Lenard's latest book, Skits For 2nd Hand Puppets or stay with Commodore and get his software package for only \$1.00 (USD) extra!

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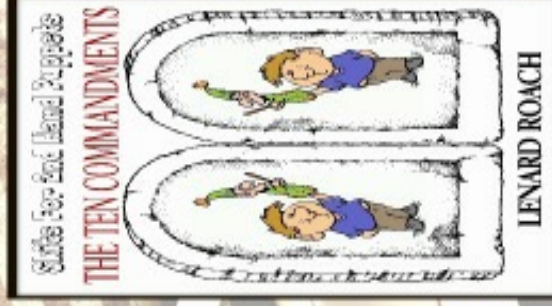
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Money Manager 2K (written by Rex Dey)

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# Fields: A dialog-like processor for cc65

by Joseph Rose, aka. Harry Potter

## Comments from Joseph

Fields is a simple window-like TUI for Commodore and Apple 2 computers. 8-bit systems don't really have much of an UI, so I designed this library to allow a user to enter data into a 6502-based computer the way one would enter data into a Windows dialog box. I don't remember exactly why I developed this library, but I enjoyed creating it and think it was a good experience

<https://github.com/oliverschmidt/cc65/wiki/User-contributions>

The demo may not amaze you! However it does come back with a number that represents the correct menu and item selected, so the skeleton is there for you to experiment with. Joseph Rose, a.k.a. Harry Potter, to me via email his comments were

“Hi Nigel

I appreciate your continuing interest in my work. Please could you give your readers the following information about my programs?”

- **Fields:** Fields is a cc65 library to provide support of an UI for data/settings entry and menu support. Supports C64, Plus4, C128 and Apple2e computers and is fully configurable
- **Hidden64:** extends the RAM usable on a c64 to cc65 from 50k to 61k by using bank-switching to access the RAM behind the kernel and I/O and using the cassette buffer
- **MemBank128:** Similar to Hidden64: the programs run in Bank 0, giving 56k RAM; Low RAM (the first 7k of Bank 0/15) can be used for data (code and in-it. data can be in the application buffer); and Bank 1 can be accessed. Total: 118k+ usable RAM. Not yet usable, sorry. :(
- **GenCart64:** cc65 cartridge support for the c64. Multiple configurations. Some okay graphics demos. Bank-switching. Some pre-existing code may be usable on a generic cartridge format.
- **GenCartVic:** Vic-20 cartridges for cc65.

You can also reveal my other projects \*without\* a guarantee they'll be done:

- two text adventures
- brainstorm demo for MemBank128
- GameCartVicA: cc65 Vic-20 tile-based game support, to be followed by GameLibC64A
- Vic-Hick: an electronic story-book--not a true text adventure--as a guided tour of different places. May be translated to other platforms.
- a C compiler to rival cc65, and some native to C= computers
- file compression, incl. C= targets.
- code snippets and libraries for BASSEM and D-Ass (I will use the C128-s C64 mode as an excuse to create C64 code using D-Ass)





# Commodore Free E-Cover Tape #12

By Richard Bayliss

It is that special moment once again, to bring you yet another E-Cover tape. There was almost no E-Tape this issue, due to problems finding titles to compile for it, and I almost made it the last one. Good news however is that this little hobby project for Commodore Free is set to continue. I have been contacting some people regarding putting their programs on to this month's E-Cover Tape and they were honoured :)

So this issue we have 5 great full games in store for you. One of which is a side scrolling wartime shoot 'em up, a game which brought out a new cultural tradition by the way of Flappy Bird, a couple of puzzle games and of course a C64 conversion of Cosmos. An old arcade classic (Who would have thought this game was made in 2014). So insert the tape. Press play and get ready for some pure gaming action.

*Please note that due to the compatibility problems with running Happy Flappy on the usual IRQ tape loader, this game had to be mastered by LoadONE by Joonas Lindberg.*

## Cobra Mission 2

(C) 2014 TND + Indysoft

**Programming** Ryszard Nazarewski (Using Sideways SEUCK), Richard Bayliss (Enhancements)

**Graphics** Ryszard Nazarewski

**Music** Richard Bayliss

**Controls:** Joystick in Port 2

- Run/Stop: Pause game
- Q: Quite game (While game is paused)

A few issues ago, we brought out the first Cobra Mission game, written a few years ago. Now Ryszard is proud to give out a sequel to the original Cobra Mission game. This game features a new front end, enhancements and plenty of music.

The story starts off that an evil dictator has captured a nuclear submarine. He also threatens the world to start a World War 3. He sends his evil and corrupt army to capture civilians and hold them as hostages on an island. The U.S.A and UN call for backup, and sends you in a U.S. Cobra helicopter.

Your mission is to fly across the sea, through the jungle; battling against the enemy forces of the Dictator. During your mission, you must locate and rescue the hostages who are stranded on this hostile island. Then search for the subma-

rine, and guard it so that the allied forces can fit explosives to the submarine and destroy it.

Your mission will not be easy, as the Dictator is already waiting for a big fight. The sea, and the islands are surrounded with armed forces. On ground, on sea, and airborne. You must fight against the enemies. If you are to make it to the Dictator's hideout. You will only have 3 Cobra helicopters to command. Can you help save the world, by preventing the ultimate threat of World War 3 from occurring? Good luck, you will need it.

**Note:** Cobra Mission 2 is divided into two parts. After completing the main game, you will be given a password for the ending. To see the ending, load in part 2 of the game and type in the correct password



## Happy Flappy

(C) 2014 Roy Fielding

**Programming:** Roy Fielding

**Graphics:** Roy Fielding

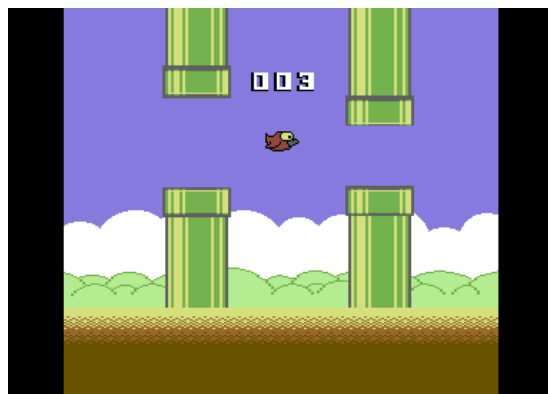
**Music:** Hermit

**Controls:** Spacebar

There had been a huge cult with Flappy Bird games, most of which were built for the touch screen systems. Now the Commodore 64 has had its turn in the FB phenomena. HAPPY FLAPPY

Flappy Bird fans will probably enjoy this game. This is a cute game, in which you must help a little hapless bird fly through the gaps in between the pipes. Unfortunately the bird is pretty dumb at flying, so you must help it flap carefully by

pressing the spacebar. If you crash into anything. Your bird will plummet to the ground with an unhappy ending. Try to get as many points where possible. :)



**Cosmos****(C) 2014 Hultén Brothers****Programming: Jonas + Patric Hultén****Graphics: Jonas + Patric Hultén****Music: N/A****Controls: Keyboard / Joystick in Port 2**

This is a real fantastic treat for you E-Tape fans out there. Commodore Free has been granted kind permission to release this brand new game on to the E-Tape. It is a conversion of the classic Cosmos game, which was originally a coin-op by Century Electronics, back in 1981. This game feels very authentic, and features in game speech. If however you are playing this game on a C64C, you won't hear the speech too clearly. This game is split into different sectors

in which you must try and complete before advancing on to the next level.

You are flying through the cosmos. Suddenly you are at war against aliens. To complete the first section, you must blast all aliens that appear. Once they are all destroyed, you will move on to the next section of the game. Which is an asteroid belt. During your travel across the asteroid belt, you must shoot at the asteroids, and also shoot blue fuel pods. These will increase your fuel. After you survive the asteroid belt, you'll have another two alien blasting sections.

The next section is the docking section. A tractor beam starts moving your ship to-

wards the docking ship. You must dock your ship carefully to refuel it and move on to the next zone. If you would like to see more information about the C64 port of Cosmos please visit this link below:

<http://http://kollektivnet.nu/cosmos/>

**Columns C64****(C) 1990 The Wanted Mideast Division / Public Domain****Programming: The Wanted Mideast Division****Graphics: The Wanted Mideast Division****Music: JCH/Vibrants****Controls: Joystick in Port 2**

I was originally going to give you Vioris, but we had enough Tetris games on the past issues. So how about an unofficial clone of Columns instead? Ok, here we

are. Game rules are pretty much simple.

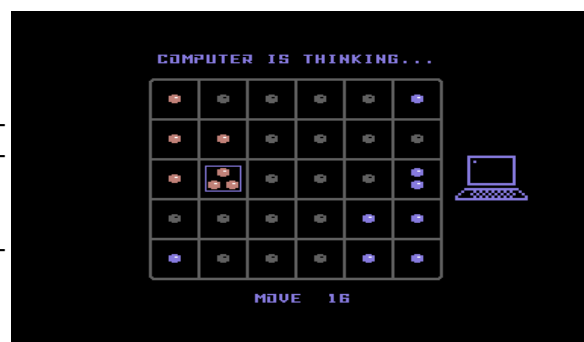
A row of 3 colours will come plummeting to the ground. You must stack them carefully and try to match 3 or more colours in a row horizontally, vertically or diagonally. You can use the fire button to rotate the colours. If 3 or more of the same colour is matched, the blocks you matched together will be eliminated. After each level increases, so

does the falling speed of the blocks.

**Nuclear Reaction 2100****(C)2014 Maik Merten****Programming: Maik Merten****Graphics: Maik Merten****Music: Richard Bayliss****Controls: Joystick in Port 2**

To end this month's tape we have Nuclear Reaction 2100. A simple board game where you can play against the C64 or your friends. Looks very simple, but it can be pretty addictive.

Take it in turns to place an atom inside a grid. You must try and cause a nuclear reaction by wiping out your opponents pieces. If you have 4 atoms, you can spread those to another grid. Full instructions are in the game itself.

**Next issue**

Next issue there will be some more games, including some content from the 2014 SEUCK Compo. Maybe some demos and tools might be included as well.

Do you have anything you would like to submit for the 13<sup>th</sup> E-Tape? If so please email it to [richardbayliss.c64@gmail.com](mailto:richardbayliss.c64@gmail.com) or to [commodorefree@commodorefree.com](mailto:commodorefree@commodorefree.com) and maybe next issue you could make it on to the next tape :) We might be changing to another loader system next issue, but you'll have to wait and see what will happen. See you next month



## NEWS GENERAL

### Source code for ssg

Let me start by saying I love the commodore free mag! Usually I don't have anything to add, but I think I finally found something for interesting you and the readers.

I recently found the long (presumed lost) source code for ssg by Eric Graham; the predecessor of Sculpt 4D and the ray tracer used to generate the famous Juggler demo! Eric himself was also pleased to hear I had found the code, when I contacted him. I posted this information on the English Amiga Board last month; and a guy called Alain Thellier was able to work out how the data in robot.dat file worked; and managed to compile the source; and get it to start rendering! I've both posted the ADF online and contributed it to the TOSEC collection so it won't be lost again :-)

I started looking for the code as I noticed Jimmy Maher (from the book 'the future was here') was asking about it on the forum, and I couldn't possibly imagine it would have been lost. A good few months of digital archaeology I was able to get my hands on it

### Here is the link to my blog:

[https://www.dottyflowers.com/index.php?file=home&module=blog&page=viewpost&post=raytracer-1\\_0-\(plus-source\)](https://www.dottyflowers.com/index.php?file=home&module=blog&page=viewpost&post=raytracer-1_0-(plus-source))

### And here is the EAB forum posting

<http://eab.abime.net/showthread.php?t=51911>

Your readers may also be interested in this item. Currently version 1.0 is online (Its 19 years of magazines about the KIM-1 and other 6502 single board computers). However they are all in Dutch for now. Step 2 of the process is OCR-

ing them all, step 3 translating (then again, once it's OCR-ed, most of the code is in English anyway.)

You can find it here (just click the button at the bottom to be redirected):

<https://www.dottyflowers.com/index.php?file=home&module=blog&page=viewpost&post=kim-kenner-archieff>

All the best,  
Patrick

### COMMODORE FREE

Well I already posted something in a recent issue about the Juggler demo, However thanks for the comments and the updated information about the magazines. Very interesting stuff!



## COMMODORE PLUS4/16 News

### Club Info 133 RELEASED

This is a German language d64 magazine for the Commodore C16 / Plus/4 computers, this issue features the following articles: Forum, Tips & Tricks, SVS OS 3.2, Computerspass, Hardware, Total Eclipse, SVS Calc 2.0 and other systems.

[http://plus4world.powweb.com/software/Club\\_Info\\_133](http://plus4world.powweb.com/software/Club_Info_133)



### Flashback Demo for the Plus/4 release

Flashback is a new demo for the Commodore Plus/4. Coded by József (Beast) with graphics and music from Csaba (Unreal). The main part of the demo was created in 1993 and 1994, now after 20 years it is completed.

<http://plus4world.powweb.com/software/Flashback>



### Saboteur RELEASED FOR THE C16

The game Saboteur was originally developed for computers with at least 48 Kbytes of RAM, however the FIRE crew have made the game available for the Commodore C16. Some features had to be removed but you can now play the game on the C16 and a trainer is also included.

[http://plus4world.powweb.com/software/Saboteur\\_C16\\_Plus2J](http://plus4world.powweb.com/software/Saboteur_C16_Plus2J)





# Amiga News

## Amiga Future Issue 106 and 107 released

Issue 106 of this English and German Amiga magazine contains Editorial, News, Reviews: Amiga Games 2014: Jet Hunt, Final Fight AGA, Tales Of Gurluth, Parallel Worlds, Chaos Guns, Castle Hack, Secret Of Maya, Trackdisplay, Homeworld, OpenXcom, WordMeUp, Hard n Heavy, Bomber, Montezuma, Key Master, DirMeUp, Comic Book Reader, BetterWB, AmigaOS 4.1 SDK, Amiga Monkey (2). Special: Demo Scene, Quo Vadis Amiga, Classic Reflections (13) Great Valley Productions (2). Workshops: Programming AmigaOS 4 (36). Shows: Amiga Meeting, AmiWest. Interviews: Trevor Dickinson.

The full colour preview and excerpts of the Amiga Future issue 107 (March/April 2014) are now available online. Some articles in issue 107 are: Test DigiBooster 3 Final Release Test Putty Squad WHDLoad Workshop and more.

You can also find some FULL versions of software, often what was commercially available, as well as the PD software on the cover CD... (Please click 'Read more')

A detailed description of content and excerpts can be found at:

<http://www.amigafuture.de/kb.php?mode=article&k=4486>

The Amiga Future magazine is available as an English and German printed magazine - every issue now available in FULL COLOUR - directly available from the magazine editorial office and also from various other Amiga dealers.



Preview:

<http://www.amigafuture.de/kb.php?mode=article&k=4486>

Orders: <http://www.amigashop.org>

<http://www.amigafuture.de>

<http://www.apc-tcp.de>

## How to Get Amiga Games on iPad and iPhone Legally

If you are an iOS users and don't want to risk the effort, and time involved in jail breaking your device but want to play retro Amiga games on it where can you go? This website has ports of Amiga Games by the original developers or third party programmers, and also the games for sale in the App store

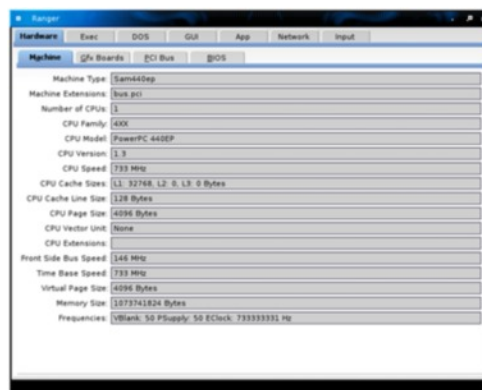
<https://voxelarcade.com/opinion/get-amiga-games-ipad-iphone-legally/>

# Voxel Arcade

## Ranger - Amiga

Ranger is a diagnostic tool for Amiga OS created by Steven Solie. It can automatically update the list of processes and DOS devices as they are added and removed. Changes in this version include: Improvements for the DOS/Volumes Open File and Lock List. And made some changes to compile with SDK 53.24.

<http://www.os4depot.net/index.php?function=showfile&file=utility/misc/ranger.lha>



# Amiga News

## AresOne (2014) available now

[http://www.ares-shop.de/product\\_info.php?language=en&products\\_id=30](http://www.ares-shop.de/product_info.php?language=en&products_id=30)

### Compatible with

native AROS, Aminux, ARIX and AEROS r3 / 4.

Normally AROS Broadway will be installed but we can install any Distro on request (free service).

If you like, we can install any other AROS flavour (AEROS, IcAROS and AspireOS).

### Specs:

- 4GB DDR3 RAM (Max 16GB possible)
- Xilence Power 350W PSU (only a fraction is really used, don't worry; ) )
- Cooler Master Case
- AMD Dualcore e350
- 32GB SATA II SSD
- GeForce 8400GS with 512MB VRAM
- 8GB USB-Stick for OS-recovery



## Classic Amiga point-and-click game The King of Chicago is out now for iOS and Android

The game is a direct port of the Amiga classic, with the developers making a few tweaks to ensure its suitability for touch screen devices.

<http://www.pocketgamer.co.uk/r/iPad/The+King+of+Chicago/news.asp?c=57482>



## New articles on Obligement

The following articles have been added to the website of the French Amiga/MorphOS magazine Obligement (<http://obligement.free.fr>) during the last few months:

- November/December 2013 news.
- Anciens articles d'Amiga News 41 à 44 : Reportage%&\$#@!: AmiExpo Cologne 1991, Test de Maxiplan Plus 2.7, Matériel : MultiStart 2, Test d'Art Department Professional 2.0.0, Matériel%&\$#@!: Kit ROM 2.0, Matériel%&\$#@!: DCTV, Dossier : La presse en Italie en 1991, Reportage%&\$#@!: World Of Commodore Show 1991, Comparatif%&\$#@!: HAM-E+ contre AVideo 24, etc.

Interview with Jérôme Senay.

- Interview with Martin Blom (from 2002).
- Review of Islands Mini-Golf 1.5.
- Review of CygnusEd 5.0.
- Review of Amiga Forever 2013.
- Review of FPSE 0.10.4.
- Review of Qt 4.7 0.9.0 sur AmigaOS 4.
- Review of Project-X Special Edition '93.
- File: graphic modes on Amiga.
- File: container formats.
- Tutorial: installation of MorphOS 3.x (update).
- Tutorial: format the AmigaOS 4 Sys: partition without a reboot.
- Tutorial: data transfer between a PC and an Amiga via USB with ANAHS.
- Special quiz about emulators...





## Amiga News

### AROS Vision 2.3 with full version of Wildfire 7 and Games Master System

ØlafS3 has uploaded the newest version of AROS Vision. It includes the full version of Wildfire 7 and the newest ver-

sion of AMOS Pro (bug fixes). Additionally it includes the "Game Master System", a developer kit for programming games. The program is now freeware!

[http://aminet.net/package/dev/misc/gms\\_user](http://aminet.net/package/dev/misc/gms_user)

### New ACA500 Packs available

two news packs for the ACA500 accelerator boards are available for your [Amiga 500](#) / 500+ :

- The [Crystal ACA500 Pack](#) including the ACA500 board and its dedicated Transparent Crystal case for 129,90 euros instead of 138,90 euros,
- The [Translucent ACA500 Pack](#) including the ACA500 board and its dedicated Translucent Crystal case for 103,90 euros instead of 108,90 euros.

With Workbench 3.1 floppy disk sets, they can now be supplied with the **ACA500 Crystal Ready to Run Pack** and **ACA500 Translucent Ready to Run Pack** !

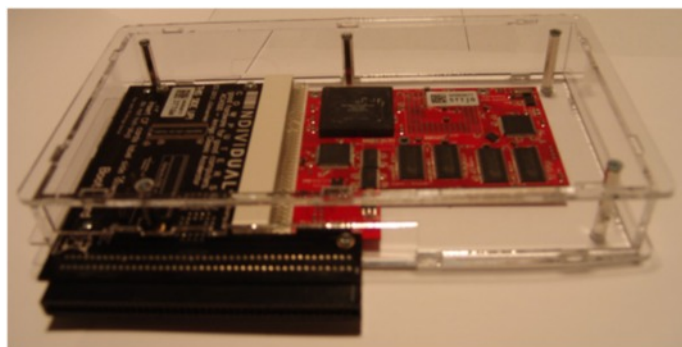
These packs include the ACA500 board for your [Amiga 500](#) / 500+ in its dedicated protection case and a 4GB memory card on which the Workbench 3.1 software is pre-installed

and ready to Run (the original floppy disks are also included)

N.B. : all prices include the French VAT and exclude the shipping costs.

Mail: [contact@amedia-computer.com](mailto:contact@amedia-computer.com)

Site: <http://amiga.amedia-computer.com>



### AEROS for Pi beta7 available for registered users

Now with 2D HW accelerated X11, so no more tearing if you move windows and accelerated scrolling.

Here you can find new screenshots from latest beta:

<http://www.aeros-os.org/photos/files...1034-full.html>

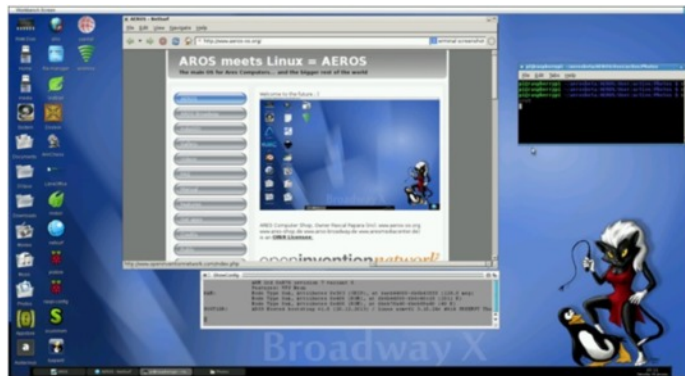
Changelog for beta7:

- 2D accelerated window movement and scrolling (no black tearing anymore, faster)
- added XBMC
- Access rPi GPU directly - after Exiting you need to press ctrl+alt+f2 and then ctrl+alt+f7 to get back to Wanderer-Screen
- Fixed disordered icons
- removed empty folders
- removed .\_-files
- removed crashing stuff
- fixed ejecting external media from Linux-file manager

which was broken

- added scrot command to take screenshots from shell
- cleaned some icons (fragments from nightly)

Registered users can get it from download page on [www.aeros-os.org](http://www.aeros-os.org)



### Amigatronics 1x02 Podcast

Amigatronics announce their second podcast (Spanish) with news, hardware, software, games, demos, events ... and dedicate a space to other machines and retro video games, the

usual dose of their unique humour

<http://amigatronics.wordpress.com/2013/12/27/audio-amigatronics-1x02/>



## Amiga News

### Hollywood available again for purchase

(Hollywood is a multimedia-oriented programming language that can be used to create graphical applications very easily)

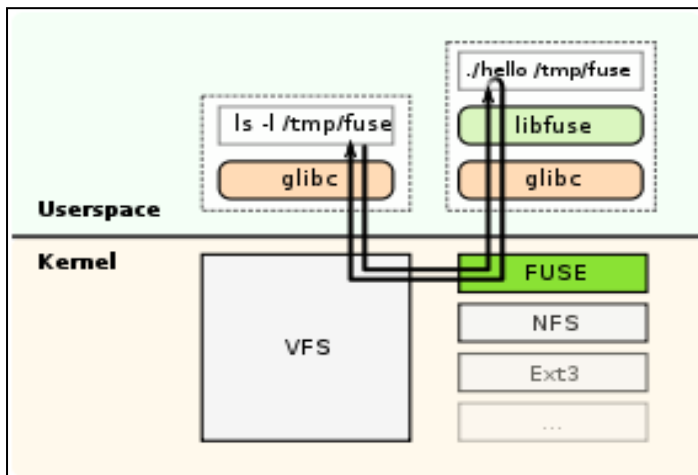
Airsoft Software is happy to announce that Hollywood 5 and Hollywood Designer 4 are available again for purchase <http://www.hollywood-mal.com>. New customers who buy the Amiga full version of Hollywood 5.3 will also get the Windows full version free of charge (or vice versa) for a limited period of time.



### HYPERON FUSE and NTFS for AmigaOS

<http://blog.hyperion-entertainment.biz/?p=1044>

COMMODORE FREE Information taken directly from the Hyperon Blog



FUSE is short for [File system in Userspace](#). FUSE was created to enable non-privileged users to run file systems outside of the kernel which is a big deal for Unix-like operating systems. In AmigaOS, everything runs in userspace so FUSE is not nearly as important for Amiga users. What makes FUSE valuable is [all the file system implementations which use FUSE](#) such as [NTFS](#), [ext2](#), [ZFS](#), etc.

The Amiga Operating System implementation of FUSE has been realized via a project called Filesysbox by Leif Salomonsson. A special thanks goes out to Leif for allowing his hard work to be utilized.

Amiga programmer extraordinaire [Fredrik Wikström](#) was then commissioned to port Filesysbox over to AmigaOS. Fredrik took the original code and updated it to AmigaOS 4.1 standards. This work included utilizing advanced DOS features such as object notification and the new file system API which seeks to completely avoid the esoteric DOS packet interface. [Colin Wenzel](#) is the main man behind the advanced DOS features.

In order to test whether Filesysbox was working properly we needed a file system to go with it. [NTFS-3G by Tuxera](#) was chosen for this purpose. Fredrik also ported a full suite of tools to go along with NTFS itself.

Both Filesysbox and NTFS-3G are contributions being offered to registered AmigaOS users via [AmiUpdate](#). The software licenses require that the source code be made available so registered users can download the matching source code [from Hyperion's web site](#) in the downloads section

It is hoped that 3rd party developers will become interested in porting more file systems in the near future whether they are via the FUSE API or the new DOS file system API. The upcoming SDK will include everything you need. In the mean time, please feel free to utilize the provided source code and [the AmigaOS support forum](#) for assistance.

Finally, a big thanks needs to go out to the AmigaOS beta testing team for risking their hard drive partitions while testing NTFS-3G and Filesysbox. It is demanding and potentially destructive work that should not be taken for granted.



# TUXERA



# AMIGA FOREVER AND COMMODORE 64 FOREVER

Amiga Forever

<http://www.amigaforever.com>

<http://www.facebook.com/AmigaForever>

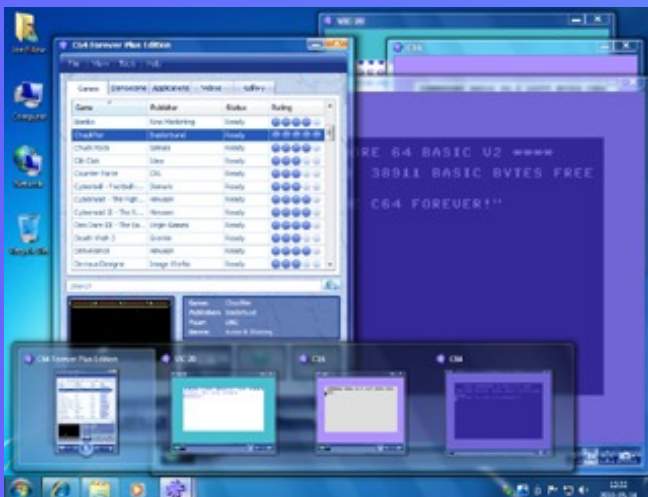
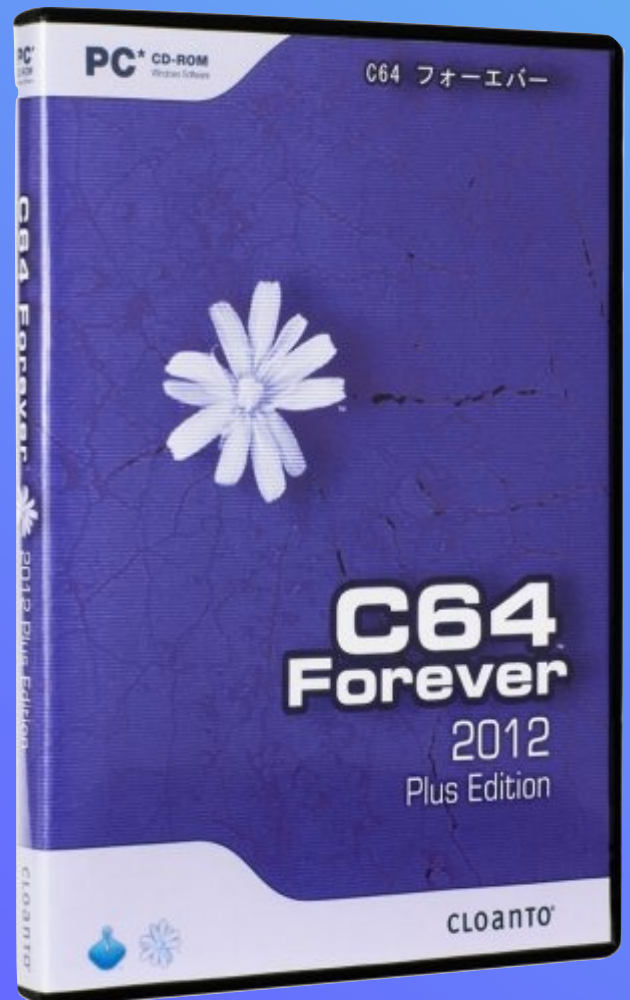
C64 Forever

<http://www.c64forever.com>

<http://www.facebook.com/C64Forever>

RetroPlatform Project

<http://www.retroplatform.com>



## C64 News

### C64 Take-away podcast 52

A new episode of the C64 Take-away podcast is available featuring the following music: Spherical, Roland's Rat Race, Formula 1 Simulator, Gauntlet III, Nothing Wrong, Alibi, Gravrace, Dark Rises, Uridium, Stormlord, Atmosphere, Tristesse, Way of the Exploding Fist, Last ninja 3 and Golden Axe. There is also news about: HVSC V59, Rob Hubbard - Commando, German Remix Group - Jeroen Tel, Awesome-A, Immortal C64 and Linus Åkesson.

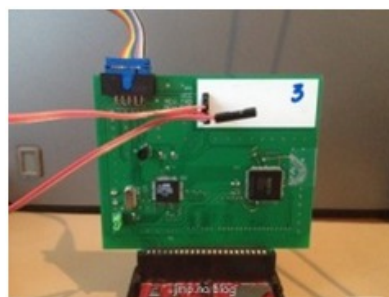
<http://c64takeaway.com/>



### C64FC FLASH CARTRIDGE

<http://jmp.no/blog/>

Stian Søreng has been developing a Flash cartridge for the Commodore C64. The AVR microprocessor can now write the cartridge image to the RAM and the Commodore C64 can read the RAM. The next step is to write the firmware.



### Digital Talk Issue 98 RELEASED

<http://csdb.dk/getinternalfile.php/128290/dt098.zip>

This is a German language disk magazine containing the following articles: Editorial, Computer Scene: VCFE#14, DRP, FAO, Nintendo, Retro#27, Return#14, C= Welt, Helfried Peyrl, 20 years DT, Champ, Dejuhra, Falk, Scorpe, Unlock, Talks, Games corners, Out of 64 and the Musikbox.



### WEB SID EXPERIMENT RELEASED

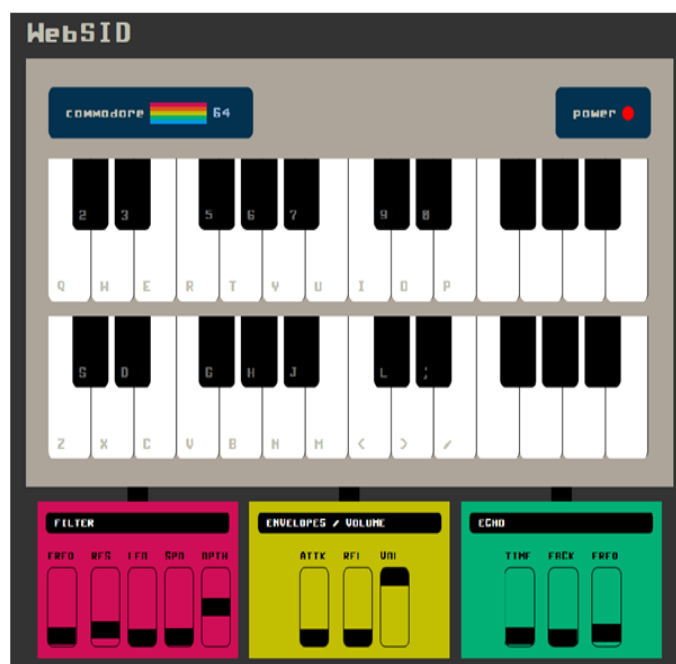
<http://www.igorski.nl/experiment/websid>

#### COMMODORE FREE the website says

You will need Google chrome for this website,

This is a Chrome experiment using the **WebAudio API** for actual sound generation and synthesis inside your web browser. In other words: no samples were used, it's all math. If only the high school teachers mentioned math was good for bass lines! Other technologies used are JavaScript and CSS3.

The awesome C64 font was made by Devin Cook





## C64 News

### geoSpecific GEOS CD

**From:** Bruce Thomas

**To:** commodore free

**Subject:** geoSpecific GEOS CD now available as a FREE download

geoSpecific GEOS CD now available as a FREE download

from Bruce Thomas

I'm thrilled to announce that V1.6 of geoSpecific, the GEOS PD/Shareware CD, is now available as a FREE download.

It's a little hard to realize that almost a dozen years have passed since I first created the geoSpecific CD and that V1.6 will soon celebrate being 10 years old. I've had a few requests in the last 5 or 6 years to update the CD with some of the more recent GEOS software but I've just never made the time to finish the V1.7 release.

I believe the last V1.6 copy that I burned and sold was late in 2012. There have been other inquiries since but I rarely check the email address listed on the CUE web site - <http://members.shaw.ca/cue64/> - which will be getting some badly needed updates shortly, including this announcement.

A lot of time and effort went into the creation of the CD including tracking down authors of some of the software in order to get permission to include it on the CD. This time and effort has again been expended in order to make the CD available as a FREE download but this time the effort wasn't made by me.

Over the past year Glenn Holmer has reached out to me a number of times to inquire about the status and availability of the CD. Somehow I missed the messages or failed to respond. Luckily, Glenn is a persistent fellow.

When his latest heartfelt query landed in my inbox on Valentine's Day (yes, bad pun intended) offering to host the CD and its contents for download I immediately said yes.

Then I took a little trip down memory lane and revisited the CD and some of its content.

My main contributions to the Commodore world and to GEOS in particular were numerous articles in multiple publications. All of these articles are on the CD plus my English translation of the German geoDOS instructions.

While my contributions pale when compared to the efforts of others (think Dick Estel's amazing Font Resource Directory) or the time required to create an entire Operating System (Wheels) or unique software (geoLabel, geoCanvas, geoFAX, LightShip, Circe, or Cluster Wars as examples) I'm proud that I was able to contribute something informative and a little entertaining while helping people get more out of their GEOSystems.

And my GEOS writing laid a foundation for current endeavours as I am now writing touring and special interest articles for print and the web for the Canadian magazine Inside Motorcycles (such as this - <http://www.insidemotorcycles.com/features/item/1270-calgary-motorcycle-ride-for-dad-helping-to-set-a-record-exclusive-online-feature-story.html>)

I still use my Commodore computers, just not as much as I used to. The main use now seems to be the Annual Family Newsletter that is produced with Wheels and geoPublish V1.1.

I'm happy to hear that GEOS is making a resurgence in popularity and will be happier yet knowing that people have easy access to geoSpecific, The GEOS PD/Shareware CD.

Thank you, Glenn, for being persistent.

You can find the content of the CD here - <http://www.lyonlabs.org/commodore/onrequest/geos.html>

enGEOy!

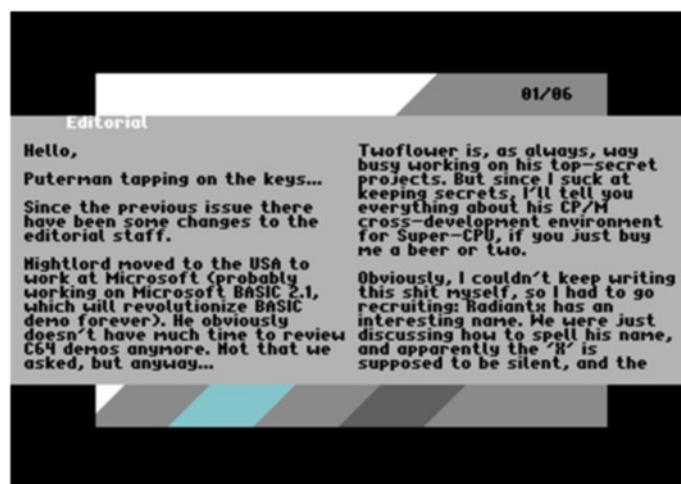
### Nordic Scene Review #8

[http://csdb.dk/getinternalfile.php/126872/nordic\\_scene\\_review\\_8.d64](http://csdb.dk/getinternalfile.php/126872/nordic_scene_review_8.d64)

Nordic Scene Review is an English diskette magazine with reviews of C64 demos.

In this edition:

We Love Homeconnected, The Awakening, Sabat in Thorn, Our First FLI demo, Eagle, Fogyish, Soy un Dilicuenta, Solaris, Too Hot To Trot, B-land Scrapbook, Fuersti, Matura Morta, Zeropage Gravity, Summer of 64, Live from Africa and many more.



# C64 News

## Website GEOS info and program code

### COMMODORE FREE MORE goes news, wow!

**From:** Terry Raymond  
**To:** COMMODORE FREE  
**Subject:** website GEOS info and program code

Hi all,  
 I have upgraded my website a little more hope you like it. If there are any interested in GEOS or Wheels code should work with most 8-bit or Wheels code.

My website URL is again:  
<http://traymond20.wix.com/wheelosapp>

I have some basic code there that shows how to code the following:

GEOS file Header-- Has all file information and Icon  
 The Icon is created in Geopaint and then cut and pasted into the code at a certain size  
 for a GEOS app icon. I do have an Icon template that helps with sizing the Icon.

GEOS Link File--- You put all of your assembled Relocatable Object code files to this file  
 all of this is then "linked" all together to form Applications, etc.

GEOS programming code--- This contains and shows how to make:  
 Menus, and Dialogue boxes.

The easiest way to create all related Graphics like Menus, DB's, Icons etc is to use  
 GeoBeaver from Bo Zimmerman's website:  
<http://www.zimmers.net>

There is not much information these days on GEOS programming and how to create apps etc, so I thought I would put most of this together on a website for those who may be interested.

The 3 items I have described above are all for download as .DOC files, sorry these were the only files WIX would allow or PDF. DOC was what I was able to have on hand at the time.

Again GeoProgrammer may work but has lots of bugs, the easiest for beginners is  
 Concept or Concept plus. I would put this on my website but not sure if this can be re-distributed on the internet, but I would gladly email these to those who need it, so feel free to email me for this or anything. But I'm no wiz at ML.

[traymond20@gmail.com](mailto:traymond20@gmail.com)

Best regards,  
 Terry Raymond



Welcome to my Commodore website mainly for GEOS/Wheels programming. The books below this are for both learning Machine Language and GEOS/Wheels routines and code. I may not have all the books that would help with learning ML but these are the ones I could find and use. You can find lots of good programming books on: <http://www.bombjack.org>. The one below titled: Jim Butterfield Machine Language is a good book on learning ML. On the very bottom of this page are 3 download buttons for GEOS example code.  
 GEOS header file code (for app file)  
 GEOS link file code (Links all Relocatable object code together to form application).  
 GEOS programming examples for programming:  
 Starting any routines  
 Menu's  
 Dialogue boxes  
 So feel free to download these and have fun.

## Scene World issue 22 released

**Released by:**  
[People of Liberty](#) ([Scene World Magazine](#))

**Website:**  
<http://www.sceneworld.c64.org>

In Issue 22 are  
 Editorial by Merman, Editorial by Jon, SWO Info, Feedback, BBS Scene, New Wave of PETscii, 1541 Ultimate, PAL + NTSC Scene news, Intro Creation Competition, ECCC NTSC Event Report, Chris Grigg Interview, David Crane Interview, Theyrk Interview, Honesty Interview, Iceout Interview, Video Interviews with Ralph H Bear And Jeri Ellsworth, Games Scene, Charts & Addresses

**Download:**  
<http://sceneworld.org/assets/downloads/issues/swo-22.zip>  
 (downloads: 154)

Scene World is an English diskette magazine for the PAL and NTSC Commodore 64 scene. In this edition of Scene World: Editorial, Feedback, EEEEC meeting, ASCII graphics, BBS news, Interviews with Jeri Ellsworth, Ralph H. Bear, Chris Grigg and David Crane





## C64 News

### Another Day, Another Zombie

Released for the SEUCK 2014 competition you can find the game here along with other entries and more information about the competition and how to enter your creations [http://tnd64.unikat.sk/Seuck\\_Compo\\_2014.html](http://tnd64.unikat.sk/Seuck_Compo_2014.html)

SEUCK Format: **Sideways Scrolling SEUCK**

Game design: Carl Mason

Graphics: Carl Mason

Music: AEG/Smash Designs

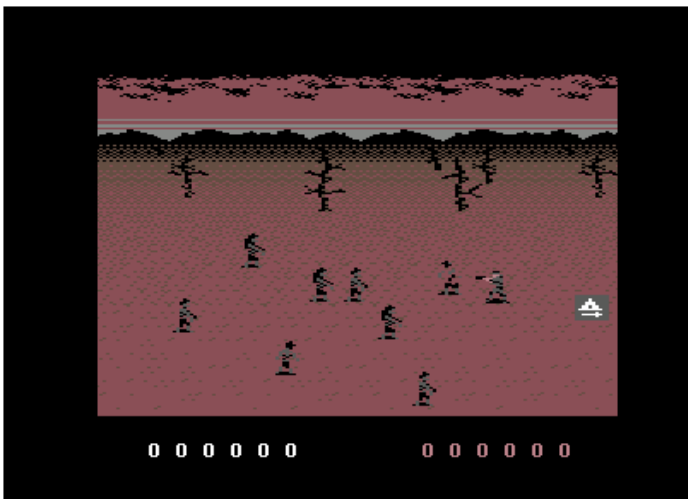
Mods (if any): 2 players linked to 1 control, Music on front end

**Another Day, Another Zombie** is a wave of the advancing undead. You and a pistol are the only thing between a horde of flesh eating zombies and your camp of a dozen survivors. If any of the walking corpses make it into the camp all hell will break loose and it's game over... you can't afford to let one of those get past you.

You can only fire a couple of rounds before you have to reload, so use your bullets sparingly, as a wasted shot can mean certain death. The faster you cut through the horde,

the more points you will acquire as more dangerous zombies appear such as Spitters which have a highly toxic ranged attack or Boomers that will explode, splattering corrosive bile around its proximity. Also a 'Zombie Combo' bonus is awarded for taking out a wave of zombies in succession.

How long can you hold back the creeping doom?



### Multicart 64 now available for sale

-----Original Message-----

From: Robert

To: Commodore Free

Subject: Multicart 64 now available for sale

On Sun, June 2, 2013 2:59 pm, I wrote:

- > 8-Bit Designs is now taking orders for the new Multicart 64, a C64
- > cartridge which contains 63 games, utilities, and applications. Some of
- > the games are Attack of the Mutant Camels, Centipede, and Frogger; some of
- > the utilities are C64 Diagnostic and Magic Mon; some of the applications
- > are Facemaker, Calc Result, and Graf64 -- all easily accessible through a
- > F-key menu. For the full list of programs included and pictures of the
- > cart and screenshots, go to

> <http://retro-link.blogspot.com/2013/06/multicart-64-is-now-available-for-sale.html>

(snip)

- > You can contact Charles at [charlesgutman \(at\) gmail.com](mailto:charlesgutman@gmail.com).
- > Payment by
- > postal money order or by PayPal. International orders by PayPal
- > only. No credit cards through PayPal.

Two or three Multicart 64's are still in stock, the fully socketed version (but no casing). It is being offered at a discount price. For more information, the contact information is listed above.

Truly,  
Robert Bernardo  
Fresno Commodore User Group  
<http://videocam.net.au/fcug>



## C64 News

### eyetoy-kinetic-combat-ps2-and-commodore-128

<http://c128.com/eyetoy-kinetic-combat-ps2-and-commodore-128>

Information take from the YouTube comments by André Fachat

### DEVELOPING A C64 EMULATOR

<http://www.youtube.com/watch?v=84XfgljFtDU&feature=youtu.be>

Introduction into the topic of emulation of classic computers for a not-so technical audience.

This is the English version of a German talk I gave at the Humboldt University in Berlin in 2013, available here: <http://www.youtube.com/watch?v=DZ6shi...>

The presentation first gives some emulation basics with simple examples. Then VICE is introduced and some of its special features highlighted. Using the CIA emulation it is discussed how to achieve emulation performance while still being accurate. Finally some modern emulation examples are given.

It's my first try at a long YouTube presentation, so a bit rough on the edges...

<http://www.medienwissenschaft.hu-berl...>

<http://vice-emu.sourceforge.net/>

<http://www.visual6502.org/>

<http://www.6502.org/users/andre/index...>

### VICE – Developing a C64 emulator

Shift-Restore-ESC 2013 - Dr. André Fachat

- Basics of emulation
- VICE specific features
- Example: CIA emulation
- Demos
- Modern emulators

### NIGHTS & DEMONS RELEASED

#### Released by:

Kabuto Factory

#### Website link:

<http://kabutofactory.netne.net/index.php/juegos/10-los-buenos/16-nuevas-conversiones-para-c-64-y-zx81>

#### COMMODORE FREE the manual explains the game as

Your mission is to complete all the boards with the same kind of tiles (knights or demons), before time is up. The tiles are changed in cross, inverting knights to demons and vice versa the selected tile, the upper one, the bottom one, and the each one of the both sides. Also, you can use the pikes to change only the selected tile, doing the board more easy to complete. Pikes are limited so...



### Hero Time 2 SEUCK GAME

Released for the SEUCK 2014 competition

[http://tnd64.unikat.sk/Seuck\\_Compo\\_2014.html](http://tnd64.unikat.sk/Seuck_Compo_2014.html)

In the game you are a lonely knight, and must defeat the forces of evil – these include skeletons, bats, deadly spiders you need to collect gold from wooden chests. Through the game you will travel across four different levels, the forest, village, cemetery and old church dungeons.

3 downloads are available for the game in different formats to suit peoples tastes

<http://csdb.dk/getinternalfile.php/126829/herotime2.d64>

[http://csdb.dk/getinternalfile.php/126830/Hero\\_Time\\_2\\_TAPE.tap](http://csdb.dk/getinternalfile.php/126830/Hero_Time_2_TAPE.tap)

[http://csdb.dk/getinternalfile.php/126831/Hero\\_Time\\_Documents\\_TAPE.tap](http://csdb.dk/getinternalfile.php/126831/Hero_Time_Documents_TAPE.tap)

**Game Credits:** Loader.... Martin Piper  
Code....Chris Yates **Music**....Richard **Graphics**...Indyjr  
Design...Indyjr **Linking**...Richard **Concept**... Indyjr





## General News

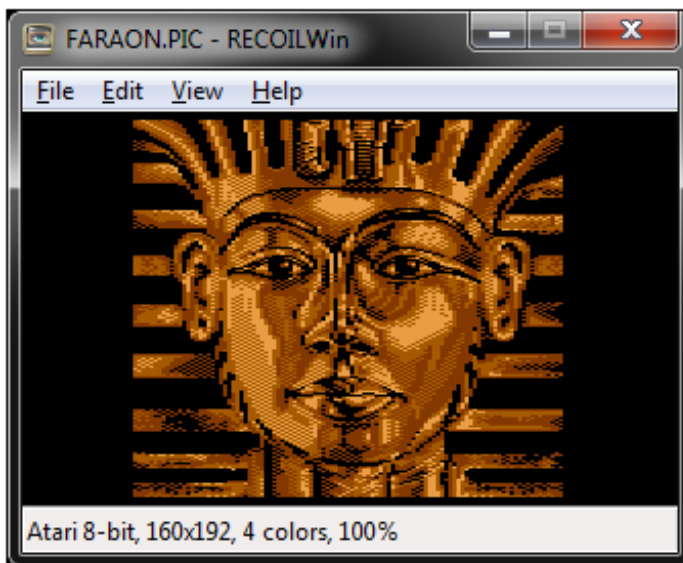
### RECOIL - Retro Computer Image Library

RECOIL is a viewer of pictures in native formats of [Amiga](#), [Atari 8-bit](#), [Atari Portfolio](#), [Atari ST](#), [Atari Falcon](#), [Commodore 64](#) and [ZX Spectrum](#) computers.

Currently the project includes:

- recoil2png - portable command-line converter to PNG files
- RECOILWin - viewer for Windows
- thumbnail providers for Windows Explorer and GNOME (Linux)
- plugin for XnView
- (de)coder for ImageMagick
- plugin for Imagine
- plugin for Paint.NET
- application for Android
- HTML 5 based viewer

<http://recoil.sourceforge.net/>



### ACME Cross-Assembler

Acme Cross-Assembler is a multi-platform cross assembler for 6502/6510/65816 CPU

ACME is a free cross assembler released under the GNU GPL.

It can produce code for the following processors: 6502, 6510 (including illegal opcodes), 65c02 and 65816. ACME supports the standard assembler stuff like global/local/anonymous labels, offset assembly, conditional assembly and looping assembly. It can include other source files as well as binaries while assembling. Calculations can be done in integer or float mode

<http://sourceforge.net/projects/acme-crossass/>

# COMMODORE FREE REVIEW OF THE CASSIOPIA

## Cassiopei

**The Cassiopei stands for:** Cassette IO Peripheral Expansion Interface.

The Inventor and creator of the Cassiopei is Jan Derogee, who you may remember, originally created the 1541-III, which he says; "Is the first fully functional .D64 MMC/SD-card reader emulating a real drive using the IEC-bus in a case". The 1541-III (so named, because we already have a 1541 disk drive and also Commodore released a 1541-II or Mark 2; so it seemed a natural progression for Jan to name his device the mark 3)

The Cassiopei is a device that connects to the cassette port of an 8-bit Commodore computer. It can load 50 times faster than standard tape speed, which is faster than a standard IEC serial disk-drive! You can connect the device to your PET, VIC20, C64, C16/+4, C128 computer. With it you can load .PRG and .TAP files. However it also has an expansion connector; allowing you to interface to your own hardware projects. The device also has 2 analog inputs and a PWM audio output for playing back .WAV files (8 KHz, mono, 4/8Bit) and a simple speech synthesizer. If you are interested I suggest you visit: <http://jderogee.tripod.com>

You may also like to check this link on YouTube that gives a general introduction to the device  
<http://www.youtube.com/watch?v=mPE6BKhd4>

Or here for cross development introduction  
<http://www.youtube.com/watch?v=uQwfUxs9P7U>

Home automation  
<http://www.youtube.com/watch?v=IFQiHtmjSEY>

See tap files loaded on a c16  
<http://www.youtube.com/watch?v=jxzAnn90D4g>

### As Jan says in the YouTube info

The Cassiopei has a simple speech synthesizer that requires two additional support files to be installed. These files are: a system file (.SYS) and a vocabulary file (.VOC). These files can be found in the download section of the Cassiopei's website.

**The Cassiopei also has a BASIC wedge; however this is currently not available for the C64,** although this could change, as the device is worked on.

### Back when the Commodore 64 was released

This sort of micro-controller technology wouldn't have been possible, but with various advancements and of course the success of the 1541-III, Jan wanted a device that would, work on "ALL 8-bit commodore computers". Now the Cassiopei is such a device, and by using the cassette-port as its physical interface, it can achieve its original goal. Jan has also created some dedicated software for controlling the device so, the Cassiopei is a versatile tool for every rank of commodore user.

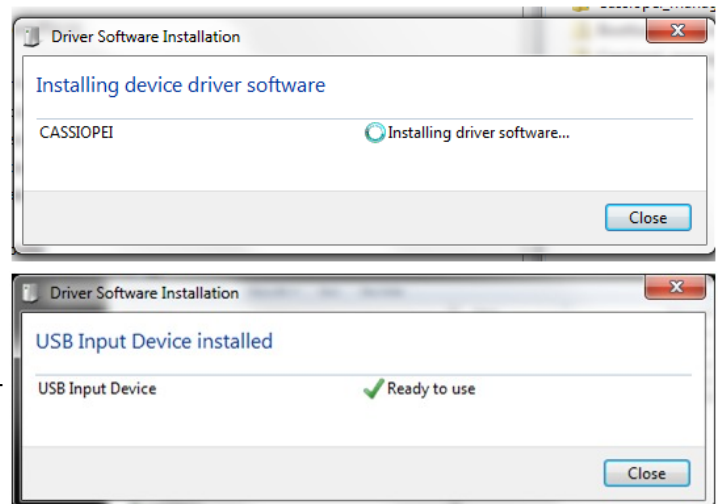
With this device you can load single file games, or program, (the so called PRG files), and Tape files (TAP) with its external connector the (IO Peripheral expansion interface) you can connect your own devices and control your own hardware projects with ease.

Cassiopei, can connect to virtually all 8 bit commodores; because it connects to the cassette port. Some Computers (like

the C16 and plus4 require the standard Commodore conversion connector) the device itself does not need any storage device to operate as memory is on-board. The Cassiopei is also useful for cross development due to quick transfer of data to your CBM computers memory.

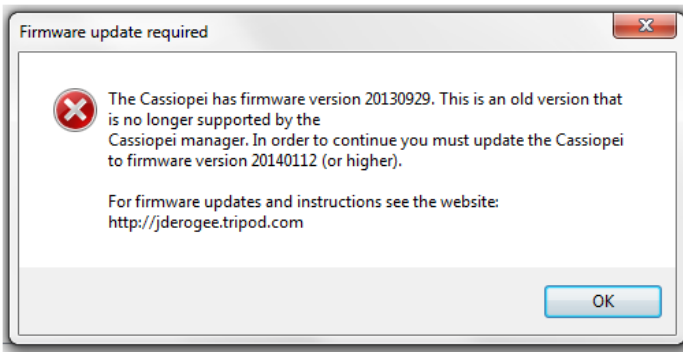
I purchased my device some time ago; it has to be said however I feel I can now fully write a review after a large amount of testing and finally obtaining what is commonly known as a (ROUND-TUIT)

The device arrived at my house in a very large cardboard box, However Jan pointed out to me that the shipping costs for a smaller box would be about the same, and he may also include an option to purchase hardware projects with the device, so standardising on a box seemed a good idea! Opening the box you see the device itself a standard USB to MINI USB cable and a laminated sheet thanking you for the purchase, and advising you to download the software with links about the software and how to download it and the PDF manual. After this was completed, (it obviously saves trees and money and means the software is always up to date) You load the software onto your PC (although my version did have a test file on it) the device itself has drivers built in, so in windows you see the device being recognised then the drivers install themselves and its all ready to use! As the meerkat says "simplez"

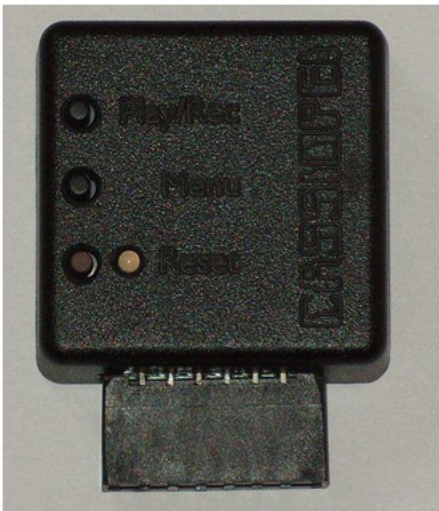


**Running the windows software on the PC I received the following error, well more notification than error.**





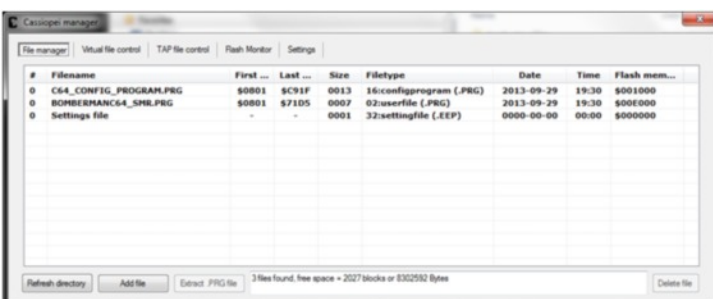
Obviously the first thing I need to do is update the software



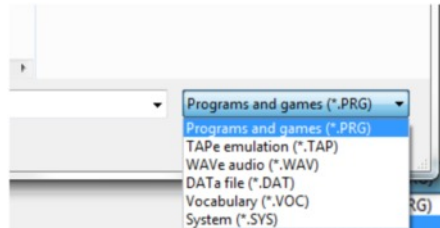
The device itself is about the size of your thumb in length and square, the only comments I would make are; that the case looks well made, with the name of the device and what the various buttons on it do. These markings are etched into the case. I have resisted the temptation to crack the device open! At this point.

However it could do with a couple of feet on the back to raise it to the level of the Commodore 64/Vic/C16 but a trip to my local diy shop found me with some foam pads that did the trick for a pocket money price.

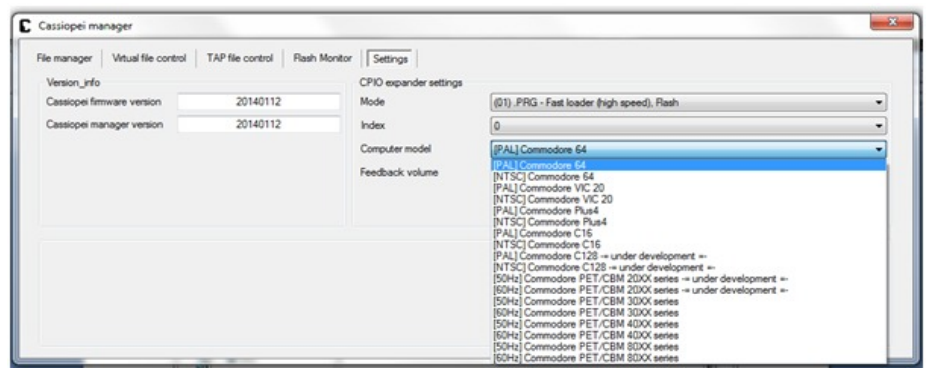
The Cassiopei device manager is where you would load files onto the device. Doing so is just a matter of hitting the ADD FILE button. The file manager lists all files that are loaded onto the device.



Hitting load gives the user a browse dialogue box and the option to search for PRG TAP WAV DAT VOC and SYS files!



The managers settings options gives quite an array of options, However I didn't need to alter any of these in my trials.



**SETUP**

After loading the files you and to the device you plug it into your machine and power on, then type LOAD and when prompted to press play you hit the menu, this brings up a menu on screen.

The menu is a program in its own right and so loads from the device, That's the basics, but as you know the device is much more, I seem to be running out of space, but you can use it to load what are called virtual files, these are loaded directly into the machines memory and will help developers speed up well erm development times as it's a really fast way to get the

prg into memory and test, on a real machine.

**SUMMING UP**

It's incredibly useful for loading TAP and PRG files, I am sure developers will love the virtual file option, and of course hardware tinkerers will find various uses for connecting devices to various commodore machines; and you need to check out Jans home automation customisation! Because the device is small it can easily be tucked into a shirt pocket. And of course because it loads TAP files that won't degrade like real tapes "I love it". The device will appeal to a large audience, however a friend did point out that it doesn't load D64 files, but that's not what it was designed for, and as it connects to the Tape port, it wouldn't be possible, unless.....

Well you never know!

I do however love TAPES and Tap files; it really takes me back to when I was a child loading games for the first time!

It's a pity the device can't create TAP files from real Tapes, that would be my final comment!

**SCORES**

**Build quality**

9/10 looking very professional

**Documentation**

9/10 once the PDF is downloaded its very comprehensive

**Software**

8/10 everything worked without a problem

**Usefulness**

9/10 almost a must have

**Overall**

9/10 (if it could create TAP files it would be a 9.5) If it used SD or Micro SD cards as well it would be a 10 out of 10

# Commodore Free interview with Kevin Tilley (Unkle K) Editor, Staff Writer, Designer of RESET magazine



## RESET Magazine

Reset Magazine, designed to give the modern C64 user a light hearted insight into the current world of the Commodore 64. Reset Magazine is a free, non-profit publication produced by Reset Magazine Staff.

<http://reset.cbm8bit.com/>

### Q Kevin, please give Commodore Free readers a quick "all about me intro"

Well, I'm a 34 year old retro computer enthusiast and gamer. I have been a C64 fanatic since my father brought one home for the first time in about 1984 and haven't looked back! I have never really been a part of the 'scene', however I have had many swapping contacts over the years; and have also been involved with a few other C64 related projects. In real life I'm the proud father of 3 beautiful children; and have one more due in May. I'm also a school teacher and love my job. My family is my life! And I'm always very busy. My computer/gaming hobbies are a great way to unwind and relax.

### Q Reset is just Commodore 64 based, was this the intention to solely concentrate on Commodore 64 content?

Reset will always remain dedicated to the C64, however may feature different computers within the content from time to time.

### Q I must ask about the name of the magazine "reset" this came from a plea on lemon 64 for a name did it?

Well, Reset started life as an idea that I had a few years ago to produce a Commodore newsletter for the Australian scene. I then found out about the

AusCBM Yahoo user group which pretty much had that covered. The idea stuck; but I was never able to get anything off the ground due to real life events and lack of time. Last year I thought I'd have another go at it, and the idea slowly evolved into what the magazine is now. On Lemon I announced the magazine and asked if anyone had a good name, Reset was one of the names that stood out and it seems to have been a good choice. Also "reset" sounded good

### Q The format of the magazine, it's a free PDF download, I believe it's supposed to be printed as an A5 booklet. Why did you choose this format and layout for the magazine?

The magazine is produced to look its best when printed. I chose a type writer style font; and a simple looking layout to give the magazine a retro/indie feel; and look for a retro themed mag. A5 is a great size for a booklet, is cheaper to produce, is easy to mail out and it looks great!

### Q How many writers do you have "working" for the magazine?

Reset Magazine Staff consists of 5 people.

**Kevin Tilley (Unkle K)** - Editor, Staff Writer, Design

**Vinny Mainolfi (C64endings.co.uk)** - Co-Editor, Staff Writer, Design

**Nick Dibble (Plume)** - Staff Writer

**Paul Morrison (PaulEMoz)** - Staff Writer

**Shane Wood (zap)** - Webmaster

A great bunch of people who are a pleasure to work with!

It's worth mentioning that Reset is by no means a professional publication. It is a hobby project done for fun, written by a bunch of people who are currently enjoying working on a project together.

### Q How difficult was it to persuade people to write for a new magazine?

No one needed persuading. I had some offers, others were invitations and they accepted. I think some people connected with the idea, and wanted to be a part of it, hopefully that can continue into the future.

### Q Can anyone contribute to the magazine, or do you just accept contributions from the "staff" writers?

Contributions are always welcome. We have a list of contributors, some of who will be regularly writing a column, and some who might only contribute when they get a chance. Anybody is welcome, if you have something to say about this fantastic hobby of ours the get in touch. Most of the content in Reset is exclusive and written for the magazine. Reset is not a news magazine, but rather a





collection of articles and columns celebrating the C64, retro computing and the hobby that connects us all. The magazine doesn't need to be filled, as long as there is something interesting to read; it doesn't matter if an issue is 20 pages long or 100.

**Q You seem to be obtaining quite favourable reviews, what's one of the best and one of the worst comments about the magazine you can remember?**

As long as we keep enjoying making Reset it will continue. I'm really glad that there are people out there getting something out of it, we enjoy making it. Saying that, we also want Reset to be its best, so any constructive criticism we receive will be looked at and considered by the team.

**Q When are the issues released?**

At the moment, we are aiming for the issues to be quarterly, however while that is the aim it is certainly not a commitment. Anything can happen and real life and family will always be a priority over a hobby.

**Q I read that a small number of each issue will be printed for distribution, you also say there may be a possibility of the magazine being available for sale, do you think this is a real possibility and have you thought about distribution and cover issue price?**

30 copies of Reset #2 (Special Edition) were produced and sold. This is a manageable amount for me and this offer will probably continue into the future, as long as I have the time. Any announcements will be made on the Reset Magazine thread at Lemon, and @resetc64 on Twitter. The price for Reset #2 was Au\$5, and that only just covering my costs. Reset will always remain non-profit.

**Q I know the issues are aimed at the "casual" commodore user, what would you define as a casual user?**

Anyone can enjoy Reset. I have had a lot of nice comments coming from C64 sceners who have enjoyed the light hearted nature of the magazine. The casual C64 user is the user who had a C64 in the old days and has recently come back and rediscovered it, or just enjoys the C64 as a casual hobby. I have had a few people tell me how surprised they were about the amount of

activity on the C64, with so many new games coming out. Maybe this can contribute to renewed interest and a few more sales for companies like Psytronik, RGCD and Protovision, as well as maybe even a few others who will catch the bug and come back to programming and producing something on the C64. Reset #2 has had over 2000 downloads so maybe this exposure can help contribute to the revival in interest we are seeing, which can only be a good thing.

**Q From what I have seen with Commodore Free the amount of readers seems to be going up each year, do you think there is a real nostalgic feeling about 8 bit systems, and do you think this is on the increase?**

Absolutely agree. It's especially great seeing new names come up on the CS-DB, forums and in credits for new games/demos/C64 related productions. Just turning on that blue screen brings back a lot of happy feelings for many people, and with all of the new and old software and hardware, there is plenty to do and collect.

**Q do you think more younger people are entering into the scene, who are maybe seeing Commodore for the first time?**

I hope so. People who are enjoying the challenge of producing something for a system with so many limitations. These people don't have that nostalgic connection to the C64, but may be attracted to programming on the C64 for other reasons. Others may just be interested in checking it out.

**Q I have to ask "do you read Commodore Free" and what comments do you**

**have about the magazine Good or bad?**

You do a great job, and as long as you keep enjoying it, keep doing what you do.

**Q Finally is there a question you would have liked to have been asked or any closing comment you would like to add**

Just a big thank-you to everyone who has supported Reset, and of course; everyone who supports the C64 in general! I would encourage people to find a way in which they can contribute to the scene, no matter how big or small, and go for it! This community of ours is filled with fantastic, creative and talented people. It's been a pleasure forming so many friendships; and meeting some great people over the years because of the C64 and retro-computing. Thanks for the interview Nigel, it's been a pleasure.



# Games that shouldn't have been FRAK by Aardvark Software Converted to the Commodore 64



In a sort of on/off type feature; I thought I would include a section entitled "Games that shouldn't have been" I am sure you can now picture such a game in your mind!

Some games were released that really should have been! Either they were rushed and buggy conversions; or just unplayable quick releases that you load and wonder why you were taken over by the marketing blurb and promises! Put them in a cupboard and forget them.

Frak is such a game, it was Original programmed by Orlando (aka Nick Pelling) for the BBC Micro

And published by his own 'Aardvark' software label in 1984... I can remember playing the game as if it were yesterday! I went to my friend's house (who owned a BBC micro of course) and we walked to town, we bought the usual records that a teenager would and with some extra money he purchased FRAK almost on a whim basically from the graphics on the back of the game box.

Taking the game to my friends house and loading up, we played the game to death, well at least until it was time for me to go home! Then what should happen, the game was ported to the Commodore 64; happy days? Well unfortunately "not"! It lost the charm

during the conversion process, and a whole lot more!

The main problem with the Frak conversion for me was, just how the game-play became ruined. If you look at the BBC version everything looks in scale, however on the C64 version; the Sprites were so big you couldn't see half the screen! And so constantly had to do what is commonly termed "the leap of death" not knowing if you jump would land on safe ground or not.

The original BBC version was a competent enough game, graphics looked great, super animations, the storyline was a little space You were a Caveman called Trogg and owned a yoyo for a weapon the game was a slow scrolling platformer moving from right to left as you moved over the platforms that had vine like ladders so you could walk up or down. You killed the monsters by hitting them with your yoyo and collected special potions and gems along the way, there were also static statues, balloons and knives that would float up the screen and kill. The whole object of the game was to find three keys located on each level. If you hit one of the monsters on your pixel perfect jumps, the Trogg would open a speech bubble with the "say" the word FRAK! The game-play although relatively simple was involving enough for the time. If you managed to complete all three levels, you were returned to the first level

with the screen display upside down, then rotated 90 degrees and repeated again. Then the video was displayed in black and white and rotated, and also the display was flashed on and off in three second intervals.

## And the Commodore 64 version?

The game was ported to the Commodore 64 in 1985 by 'The B Team' (Jason Perkins, Anthony Clarke and Mark Rodgers). The C64 version has six levels. Each level is much larger than the visible screen, and the game did have catchy background music (different for each level you need to enable the music on the main title screen, as it's off by default). The game starts out well enough with a splash screen and a menu, with various options, the screen has some lovely floating balloons (although, it must be a very calm day as they float straight up no drifting at all!)

It must have been the BBC Micro man's dream to see the rather laughable Commodore 64 version, what the heck were they thinking about on the conversion!

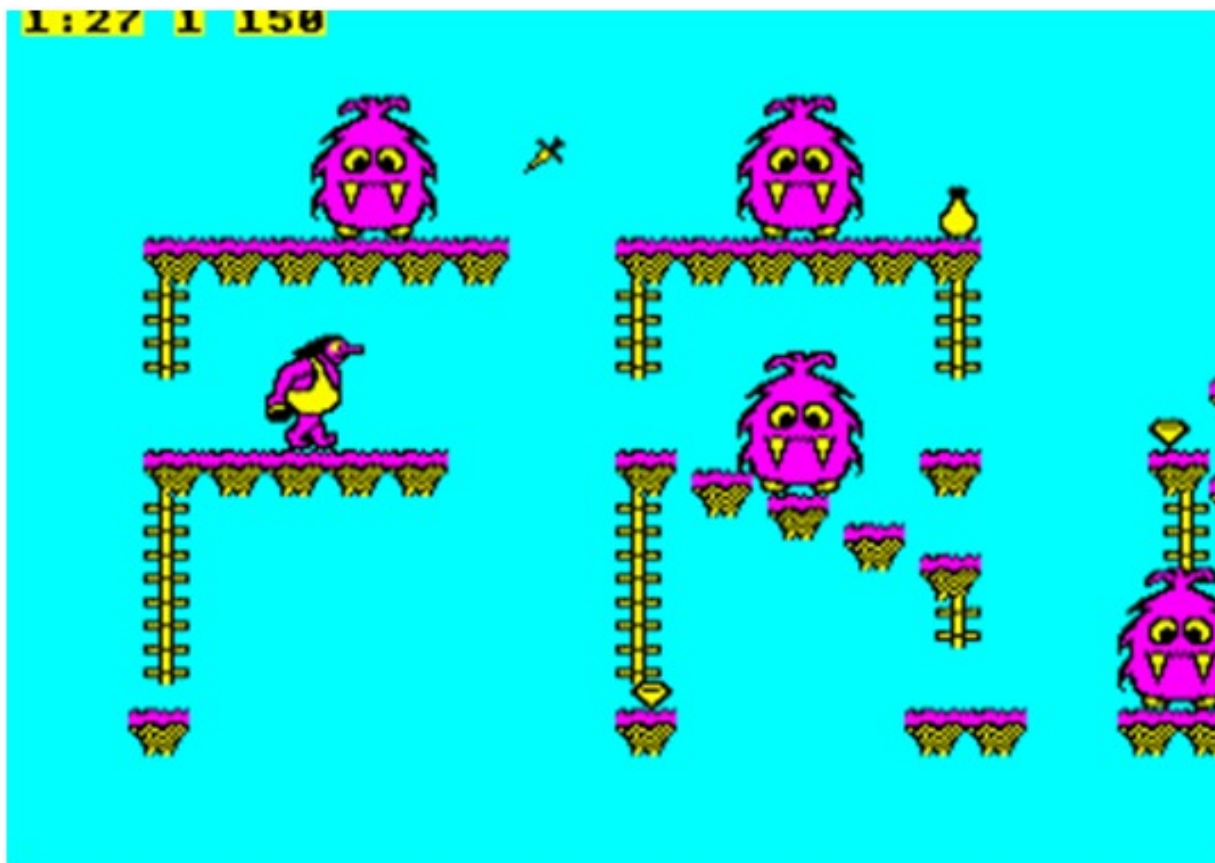
## Copy protection

If you tried to copy the game on the BBC it would play a rendition of *Trumpet Hornpipe*, (the Captain Pugwash theme tune,) instead of the game loading. Of course Captain Pugwash was a program featuring a pirate called Captain Pugwash. I never attempted to copy the Commodore 64 version (no one really wanted a copy) so can't comment.

# COMMODORE 64 VERSION



# BBC VERSION





# A.R.C.O.S. GAME REVIEW

## FOR THE C16/PLUS4 AND COMMODORE 64



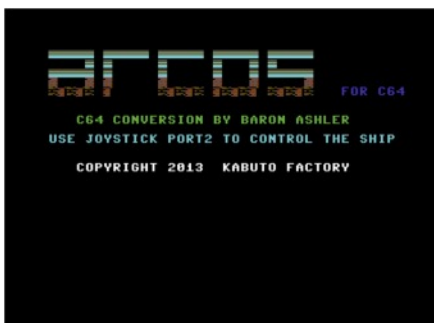
### THE PLOT:

Aliens are invading the Earth. A group of courageous spacemen have been sent to reject the attack, but the last chance for mankind is in your hands. You, a brave pilot, have been recruited to control A.R.C.O.S., the ultra-secret ultimate weapon. Your mission, easy to understand but hard to achieve: Kill the aliens and save the spacemen. With the power of A.R.C.O.S. lead us to the victory!!!

Along with the ZIP file for the C64 are the instructions and the source code for the game, this game has been written in BASIC

Loading the tap file gives some further information about the loading music and the screen gradually builds up line by line (I like this!) The loading music is quite calm and tuneful enough

### Then the menu appears



The only option is to use a joystick in port 2

And pressing space seemed to be the only way I could start the game, despite my best efforts on continually pushing the joystick button a number of times,

The game starts, and it's almost like Arkanoid or breakout but sideways, although nothing new in its design, we are greeted by some large and colourful graphics, there is sadly no sound at all in the game, not even a boing for the ball bouncing off our ship or other aliens. The games BASIC origins show through and although it's not fast, its written in basic so it will never dash over the finishing line with a gold medal. The game seems to have been coded competently and as far as the limitations of BASIC go, it plays very well.

The Commodore 64 and Plus for versions seem very similar, However the plus 4 version has no fancy loading screens, and music, it just goes straight into the game, however the plus 4 version plays really slowly compared to the Commodore 64 version and the Ship is in mono

On the plus 4 website it lists a ZX spectrum and an Amstrad version of the game, I don't have access to these machines and as this is a Commodore magazine can't really see a reason to look into these versions

The Commodore 64 D64 version has in game music, but no loading screen, bizarrely it's the loading music from

the Tape version, and sadly I don't think this fits the in game at all! I would have preferred this at the menu; then just in game effects. I am also sure its suffering from a bug, after playing for a while I suddenly received an OUCH but the ball was hitting one of the aliens at the time, this happened a couple of times, however I couldn't continually recreated the problem, the game suffers from its physics, if you align up your ship straight you can just sit there while the ball bounces over and over in a straight line and kills a line of aliens, then continue this with the next row, some random-ness should be put into the game so the ball doesn't just continually bounce straight.

### Scores

**GRAPHICS** 3.5/10 Bright and colourful but static

**SOUNDS** 4/10 Nice title music on the tap and in game on the d64 otherwise silence

**GAMEPLAY** 3/10 it's just a little frustrating to play because of the speed

**OVERALL** 3/10 It probably as good as a BASIC game gets

### AMSTRAD version

<http://www.cpc-power.com/index.php?page=detail&um=9937>

### ZX SPECTRUM VERSION

<http://www.worldofspectrum.org/infoseekid.cgi?id=0027952>

### PLUS4 Version

[http://plus4world.powweb.com/software/A\\_R\\_C\\_O\\_S\\_C16](http://plus4world.powweb.com/software/A_R_C_O_S_C16)

### COMMODORE 64 VERSION

<http://csdb.dk/release/?id=126752>

[http://csdb.dk/getinternalfile.php/125451/ARCOS\\_C64.zip](http://csdb.dk/getinternalfile.php/125451/ARCOS_C64.zip)

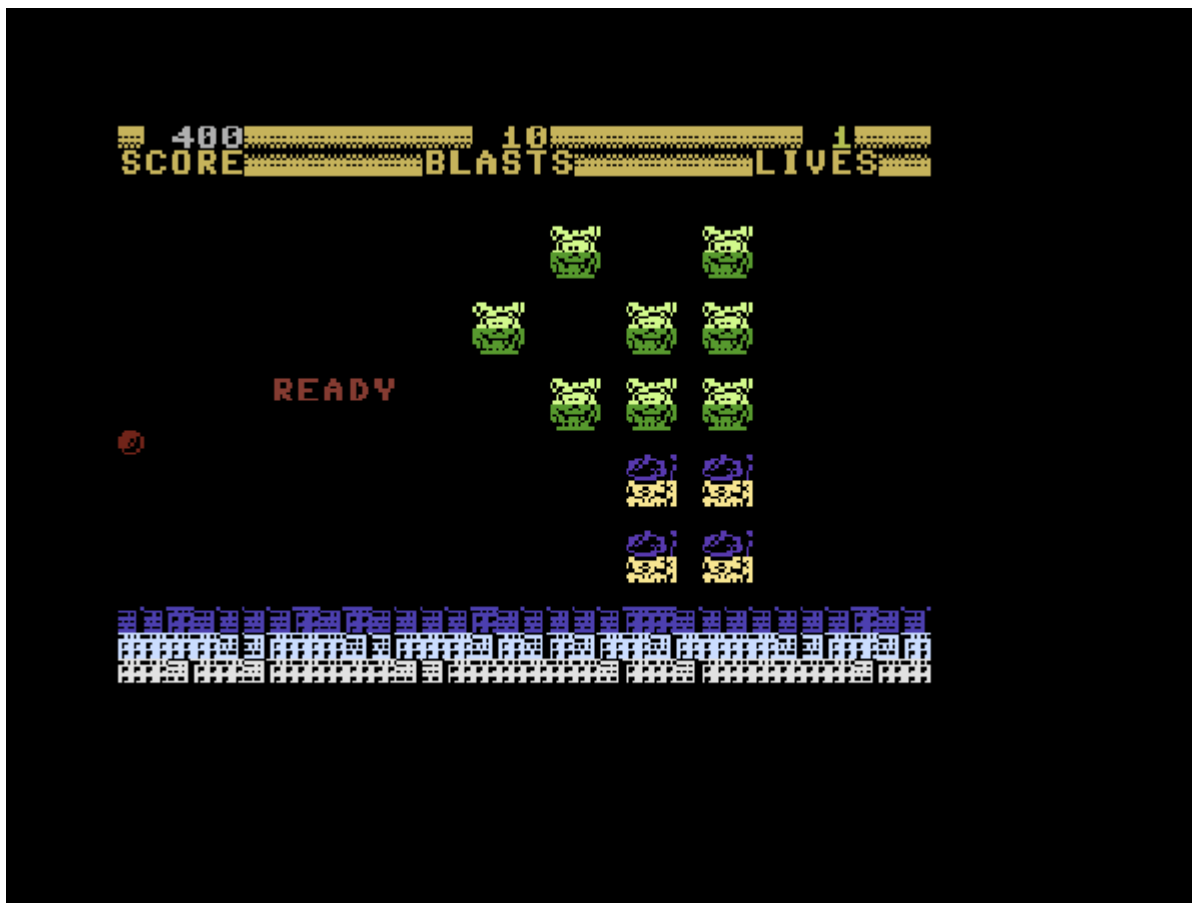
<http://csdb.dk/getinternalfile.php/125455/arcos.prg>

[http://csdb.dk/getinternalfile.php/125680/Arcos\\_V2.d64](http://csdb.dk/getinternalfile.php/125680/Arcos_V2.d64)

### COMMODORE 64 VERSION



### COMMODORE PLUS 4 VERSION



# Flappy Bird game review for the Commodore 64

If you still can't get enough of the game, on your cell phone or tablet, or are feeling a little Sad that the Flappy Bird game was removed from the app market. Well help is at hand; and you can rejoice once more; because you can play Flappy Bird on the Commodore 64! (And there is a VIC version by a different developer)

The game flappy bird originally created by .GEARS, who are a small independent developer from Vietnam. <http://www.dotgears.com/> some controversy seems to be around the game; and it was finally removed from the app store; apparently the programmer was overwhelmed with the attention, the game made its money from the in game adverts. A great many clones appeared but all seemed to want money from you! Now finally the game has been ported by Sos to the Commodore 64. Not only that but you can download the game for free here <http://sos.gd/flappy64/> and it doesn't have a single advert! The game is supplied as a single PRG file.

## BEWARE!

The game is so simple, so difficult; and just impossible to put down, you could waste endless time playing and still find your score is less than 10! Developer Sos Sosowski has already created multiple games; he says he is "an old generation low-level programmer." He created the conversion project for the fun of it, Sosowski does give credit to Dong Nguyen for creating the original game,

## PLAYTIME

So ok that's all out the way what exactly is this controversial game, the game involves a bird (flapping its wings) hence the flappy bird title, the bird is affected by heavy gravity and must flap to stay up in the air, you do this with the joystick pushing up or pressing fire will cause the bird to move up, (by flapping harder) then the scrolling landscape starts moving towards you with these green tubes come down from the top and raise up from the ground, they appear in random positions and have a gap between them, you need to ensure flappy bird moves through the gap; you do this by keep-

ing him up in the air, You can't control his forward movement, the landscape scrolls at a constant speed. The game is just the most simplistic thing you could imagine! However it's got some sort of "one more go" hook that keeps you going back again and again. You score points by passing through the tubes gaps so you can see that a score from my good-self of 5 isn't that good, or is it! I have seen other people claiming 7 but getting to 10 seems impossible!

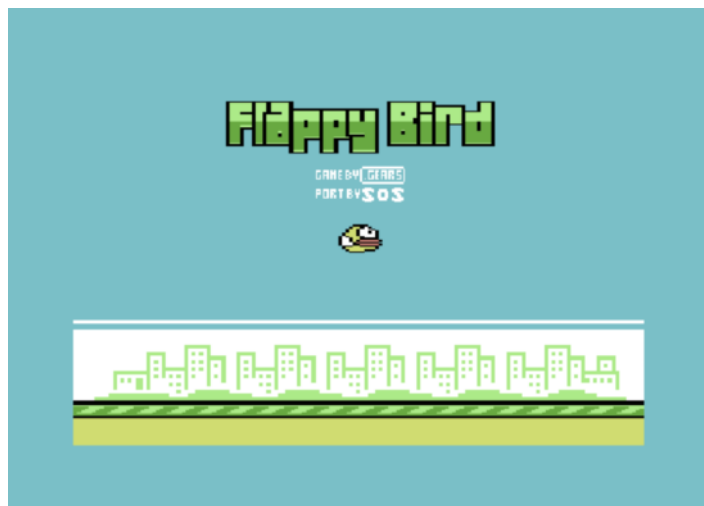
Of course the minute you stop tapping the bird falls from the sky, tap too many times and you go to high, there isn't much else to say about the game

## SCORES

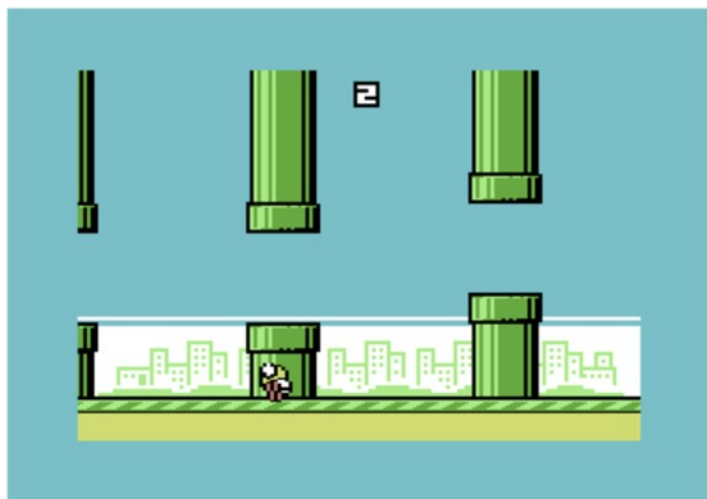
<b>GRAPHICS</b>	6/10	animation is cute and nice
<b>SOUND</b>	5/10	3d Mario columns only no music
<b>GAMEPLAY</b>	6/10	Spot effects depends on your frustration levels
<b>OVERALL</b>	6/10	nicey presented but frustrating

## OVERALL

It's a simple idea; well ported to the Commodore 64, the machine handles the game play with ease and the elements from the original seem to be all here, it depends on your frustration levels as to if you find the game addictive or just to frustrating, I would love to see a Commodore 64 version with someone scoring over 10. if you port something and add more fea-



tures then it could ruin the game, people would then say" it's not like the original", but some "SID" music would be a welcome





# Viccybird Game review for the Unexpanded Vic 20

**Name:** ViccyBird

**Author:** Misfit

**Requirements:** Unexpanded VIC-20 + Joystick.

**Description:** Flappy Bird clone for VIC

**Tested on:** VICE 2.4 and real VIC (PAL)

**Download the game from her**

<http://www.riimukivi.net/data/viccybird.prg>

**Discussion on the game here**

<http://sleepingelephant.com/ipw-web/bulletin/bb/viewtopic.php?f=10&t=6881>

As you would imagine from the title, ViccyBird is a conversion of the Flappy bird game but for the unexpanded Vic 20, you may like to read the Commodore 64 review for a more in-depth history of the game. Basically released on the google play market then removed, now playable on the Vic20 computer!

The game itself is so simple, you press the fire-button to keep the bird in the air, you need to pass between 2 gates or columns to score a point, the screen slowly scrolls towards your from right to left, you have no control over this, your only control method in fact is to press the fire button to make the bird go up a bit (or flap harder), the bird is weighted with heavy gravity, so not pressing fire results in lack of altitude and almost instant death! Press too many times and the bird will jump or flap to high and hit something, like the sky; although this doesn't kill you. Of course if

you hit the columns without passing through the gap, it's just instant death.

This version for the Vic is insanely difficult! If you were frustrated by the original you will be pulling your hair out on this version. It's just too hard to even be even frustrating! Graphics and animation is acceptable rather than remarkable, with some in game blips and pops for sounds its functional but nothing more, However it does show that even the Vic can play these new mobile games, albeit in a rather cut down version. It may not have the wow factor but it's a competent conversion of what could be the world's most frustrating game ever!

## SCORES

**Graphics** 6/10 acceptable but not outstanding

**Sounds** 4/10 Just some blips and pops

**Gameplay** 4/10 Way too hard to play

**Overall** 5/10

## Summary

It's just too hard to play! Although it shows even the unexpanded Vic can play mobile games, although not easily on the move



# COMMODORE FREE REVIEW PULSE FOR THE UNEXPANDED VIC 20

Name: pulse

Author: pixel

Requirements: Unexpanded VIC-20, Joystick

Description: A horizontally smooth-scrolling shoot-'em-up, inspired by "Gradius";

## Synopsis

Our enemies now attack us from the 20<sup>th</sup> dimension! We hastily created a drone remote control software. You are one of the last pilots with the right hardware to use it out there. We don't know what to expect. We count on you. Good luck! Hit fire!

## Just in case you missed the plot

You control a ship with the Joystick, and can move freely up, down left and right. However the screen scrolls from right to left at a constant speed and enemies appear in waves, shoot a full set of aliens (or a wave) and you get the option to pick up a bonus, you do this by flying over it. The landscape then starts to form, giving you further problems, trying to avoid flying into the landscape, and either kill or avoiding the land based enemies shooting upwards at you. If you die then your bonuses are lost along with your life; and you are reduced to your standard firepower as if you had just started, albeit at a harder part of the game.

Let's not mess about here, this sort of game needs fast action, fast reactions not to mention a fast machine and tightly programmed code, so we have most of the options; but just an unexpanded VIC 20 to run the software on!

Actually that seems all we need! This is an unbelievably fast game! true there are one or two slight glitches, (some flickering on the bases mainly) and an odd bug where you can disappear into the landscape, the screen still scrolls but you seem to be invisible, moving up and down seemed to bring me back, and occasional ghosting of the main ship. I don't think it's anything to spoil either the speed of the game or the game play, even when All options are thrown on screen at a time the machine just keep on pumping out the action with only the smallest amount of slowdown.

This version has all the elements; tightly thought out and expertly executed code. Sounds are blazing and if you hold down the fire button; the amount of ammo coming from your ship is just unbelievable, especially when you collect a few bonuses! It's sometimes hard to believe, some would claim this is "JUST" a VIC 20! Let's just say, it's not that the VIC isn't a cable games machines, but an unexpanded machine! Well let's be honest the resources are tight to say the least.

The graphics are good for this type of game and the sounds are more than acceptable, I think it would be asking too much for a sound track to play along with the game play, as I would think the machine is already maxed out displaying all the graphics! the question is does it really need a sound-track, Slap on a cd turn out the lights and then the TV sound up to loud and your all set!

A brief information screen appears once at the start, then after you press fire your launched straight into the game, once all live are lost you just start again , no menu screen is shown on subsequent starts of the game. The gameplay is just as good as the game itself! You just have the right amount of hardness curve (if that's the right term) truly the standards bar has been lifted some way with this release!

## Program file:

<https://github.com/SvenMichaelKlose/pulse/blob/master/pulse.prg?raw=true>

## Source code:

<https://github.com/SvenMichaelKlose/pulse>

## SCORES

**GRAPHICS** 7/10 colourful and incredibly speedy  
**Sounds** 6/10 just in game shots and explosions but **fitting** for the game  
**Gameplay** 9/10 Wow  
**Overall** 8.5/10 unbelievably quick game for the VIC

## Summary

Wow this is an unbelievably quick game for the unexpanded VIC, one or two small glitches, but the speed and playability of the game are just unbelievable, a must have download for any VIC user



# COMMODORE FREE REVIEW PANICMAN FOR THE VIC

**Name:** Panicman

**Authors:** Dane Bills, Jeff Messner

**Released:** March 2, 2014

**Requirements:** VIC20 with +3k or +8k, joystick (developed on NTSC)

**Description:** A maze game clone of a well known 80s game written in assembly

## Information

Both versions should load and you can type 'run' from the basic prompt after loading.

e.g.: load "panicman3k.prg",8

There is no difference between the 3k and 8k version other than a splash screen to show the authors on the 8k. I just thought it might be nice to have the 8k executable for someone to run on the real iron if they didn't have a 3k cartridge. The 3K has received the most testing on real hardware.

## +3k version:

<https://drive.google.com/file/d/0B0VOPYWAvrJHZjBQW1uVWVYcDg/edit?usp=sharing>

+8k version

<https://drive.google.com/file/d/0B0VOPYWAvrJHSHhBd0hJbHg5RE0/edit?usp=sharing>

discussion thread:

<http://sleepingelephant.com/ipw-web/bulletin/bb/viewtopic.php?f=10&t=6870>

So then pack man, just for the one person who doesn't know, you are a yellow man and must collect dots, you must avoid the ghosts if you touch them they will kill you, the larger dots turn the ghost blue so you can eat them.

Right, well not much to add really a very competent version for the VIC, with just a 3k expansion, it's all here; the secret break in the maze to shoot off one side and return on the other, and the fruits that appear in the lower of the screen to boost your score. The ghosts are a little on the dim side in logic, but that means more playtime

if your not very dextrous or nimble on the joystick. The graphics are very faithful to the original and the sounds take you back to the 80` all over again, (not sure if that's a good or bad thing really, flashbacks of mullets are affecting my judgement)

Well executed, you sort of start thinking "what's happening on the VIC with the community" the amount of software appearing it's amazing, both in the quality, playability and the dedicated programmers showing the machine is far from dead.

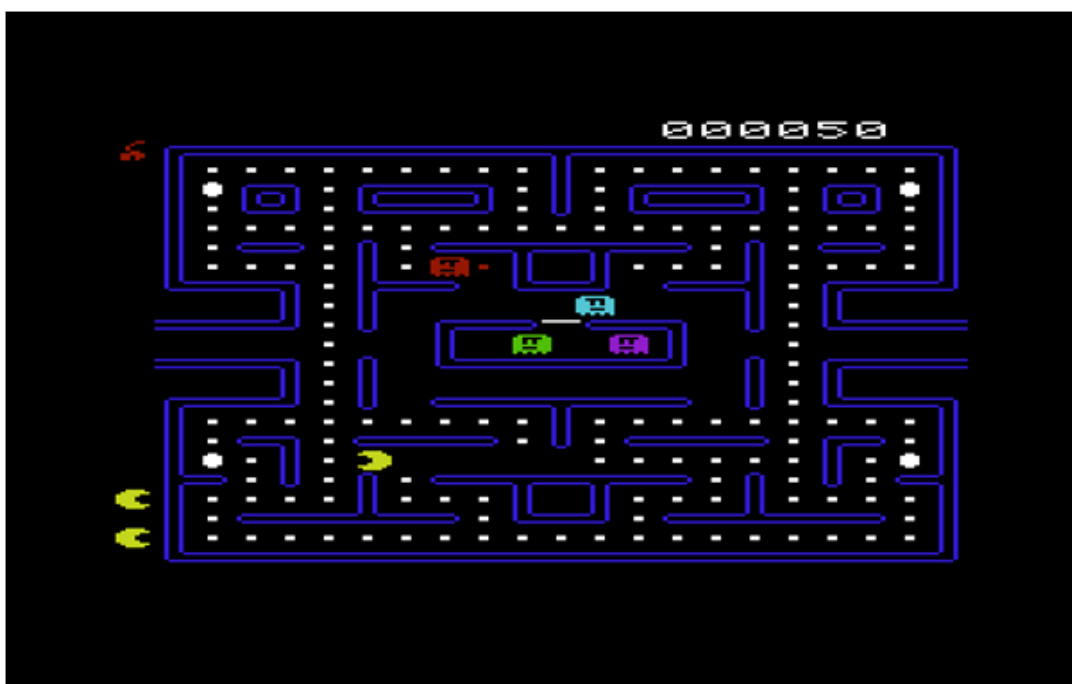
This version is fast and almost glitch free, I am just amazed at the quality and can't wait to see what releases will be churned out for the VIC next, I think if you sat someone down and said you're playing the Commodore 64 version, I don't think anyone would notice!

## Scoring

Graphics	9/10 Faithful to the original
Sounds	9/10 again faithful to the original
Gameplay	8/10 Maybe just a touch to easy
Overall	9/10 Very faithful conversion

## Summary

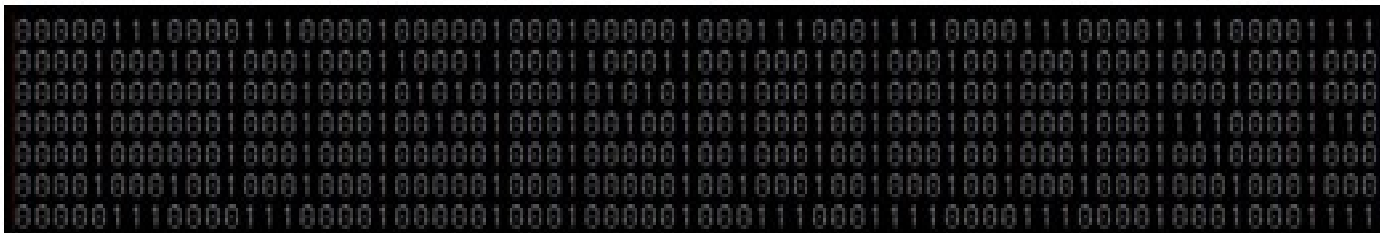
Wow what can I say a faithful version of Pacman on the VIC, with the fruits and secret tunnels to either side of the screen. Brilliant, an almost a perfect conversion.





# The Assembly Line \$02: Binary Numbers

## By Bert Novilla (satpro)



Last time out we looked at the hardware registers in the 65x family of processors. Today we will discuss the format your computer expects all code and data to be encoded with – binary. Knowing the fundamental structure of a byte is absolutely invaluable, and you will want to know how to fluently read, write, and convert to (and from) binary format in order to be successful writing programs in assembly language. If binary numbers are new or seem confusing, then today's topic is for you.

### The Power of 2

When we talk of numbering systems it is crucial to remember that the CPU uses numbers in binary format exclusively; that is, the CPU understands only binary digits 0 and 1. No fractions, no number 2. And that's it. The CPU understands the binary format and moves data around between memory and devices using this format. There. See? That's all there is to the world of Binary.

In this binary world everything is always exactly one of two ways – on or off, enabled or disabled, high or low, true or false, set or reset – it is this one simple fact which will factor into every programming choice you make – ever. Other programming languages deal with this fact, too, and have developed concepts such as *if-then*, *for-next*, *case*, and so on, but these concepts represent many instructions encoded in binary format and placed in a coherent order for the CPU to execute with expected results. The concepts are meant to make a programmer's life easier. In assembly language you are working with the computer at a much more fundamental level – the bit, nybble, byte, and flag level – and the CPU expects all data to be in binary format. For you the assembly language programmer, *if-then* statements become a series of loads, stores, loops, comparisons, branches, and flags.

### The Bit

A basic unit of measurement in the computer world is the byte. While this is true, a byte is actually made up of something smaller still – a set of 8 individual components called **bits**. Bits are simple on/off switches. The state of any bit is *always* either **set** (= 1) or **reset** (= 0). You write a binary number just as you write a decimal number; that is, least significant digit on the right, all larger digits to the left. The difference is, in binary you only have two digits –> **0 and 1**.

### The Byte

An 8-bit CPU such as the 6502 is called an 8-bit processor because it is able to process eight data lines at a time, or in

programming terms, process one byte of data (eight individual bits, each connected in parallel to the computer's data bus, together representing a byte). The byte is the standard frame of reference in programming. Although individual bits are sub-parts of a byte, they are not directly addressable, and are instead manipulated in the A Register using specialized instructions such as OR, AND, EOR, and others. An entire byte is moved to or from memory at a time, so all eight bits go at once.

### The Word

The 6502 needs to make two separate memory accesses in order to modify a 16-bit value (aka **word**). It only knows 8-bit quantities, so a double byte must be attended to as two individual bytes working together as a single 16-bit entity. Addition and subtraction instructions rely heavily on the state of the Carry flag in a multi-byte operation.

The 65816 can access 16 bits, or two bytes, per memory access. The first byte, commonly called the low byte, contains the lower 8 bits, while the byte directly after, aka the high byte, contains the upper 8 bits. So, it's two adjacent bytes, 8-bits each, with least significant byte first in memory (even though we write numbers high-byte first in source code). Each more significant bit has a value a **multiple of two** higher (double) than the bit lower before it, has half the value of the bit following, and so on for all 8 bits, but a bit itself knows *only* 0 or 1. The processor assigns a value to each bit. 8-bit data has a value range limit of 0-255, or  $2^8$  bytes, while 16-bit data ranges 0-65535, or  $2^{16}$  bytes. Individual bit values, numbered from bit 0 through bit 7, are 1, 2, 4, 8, 16, 32, 64, and 128, respectively. For multi-byte numbers, bits 8-15 have values of 256, 512, 1024, 2048, 4096, 8192, 16384, and 32768.  $2^0$  to  $2^{15}$ . These bit-values are assigned by the processor, so knowing them well will help you in countless ways as you develop more complex code in the future.

### Representing Binary Numbers in Source Code

Just as in base 10, when all the digits to the left of a non-zero digit are 0, you may omit the "0" digits to the left when representing a binary number in source code. It can be much easier to read small numbers without all the leading **0s** sometimes, although I generally leave **0s** in when referring to a variable or location for which some or all bits are important – I like to see the bits for reference while programming. For example, the value %00000001 could be written as %1 if the programmer was certain none of the other seven bits were going to be referenced in some way elsewhere in the program, because simply storing a value of %1 (which is re-

## The Composition of a Two-Byte Word (lower 16-bits)

Position	Value	Binary	Hexadecimal
Bit 7	128	%0000 0000 1000 0000	\$0080
Bit 6	64	%0000 0000 0100 0000	\$0040
Bit 5	32	%0000 0000 0010 0000	\$0020
Bit 4	16	%0000 0000 0001 0000	\$0010
Bit 3	8	%0000 0000 0000 1000	\$0008
Bit 2	4	%0000 0000 0000 0100	\$0004
Bit 1	2	%0000 0000 0000 0010	\$0002
Bit 0	1	%0000 0000 0000 0001	\$0001

## The Composition of a Two-Byte Word (upper 16-bits)

Position	Value	Binary	Hexadecimal
Bit 15	32768	%1000 0000 0000 0000	\$8000
Bit 14	16384	%0100 0000 0000 0000	\$4000
Bit 13	8192	%0010 0000 0000 0000	\$2000
Bit 12	4096	%0001 0000 0000 0000	\$1000
Bit 11	2048	%0000 1000 0000 0000	\$0800
Bit 10	1024	%0000 0100 0000 0000	\$0400
Bit 9	512	%0000 0010 0000 0000	\$0200
Bit 8	256	%0000 0001 0000 0000	\$0100

**Table 1.** A word is just two adjacent bytes, with the lower byte addressed in the lower memory position.

ally %00000001) into the byte might cause a disastrous result (by clearing the other seven bits) if some part of the program needs other bits in the byte.

### About Table 1

Traditional Commodore assembler syntax has “%” before the number, as in %10000000. In the alternative, some assemblers append a “b” to the binary number (no %). I split the nybbles of 16-bit binary numbers just for demonstration, but many assemblers dis-allow spaces to represent a binary number. Notice how the base 2 (binary) number is written just like a base 10 number, as is hexadecimal, which is most significant digit first. (That’s for us to understand it easier. In memory the lowest significant byte is always placed first.)

### The Nybble

We went right on by the nybble! Well, sort of. A nybble is conceptual. It exists as a convenient 4-bit grouping of bits that can represent any value with a range of (0-15). Four adjacent bits form a nybble, so there two nybbles in each byte, a lower nybble and a higher nybble. Lower nybbles span bits 0-3 while upper nybbles span bits 4-7, so there are two nybbles per byte. Nybbles are convenient especially because they can accommodate numbers with a range of (0-15). A familiar use is the system used by the C64’s color memory. A word consists of four nybbles, two in each byte, but the methods for accessing specific bits in each nybble are the same.

### Hexadecimal Numbers

We managed to evade the use of hexadecimal numbers until now, and in a way, that’s a good thing. Hexadecimal numbers, like nybbles, are conceptual in nature. They are both also closely related. Hexadecimal numbering is the convention used to represent the 16 members of a nybble. It’s actually quite simple. The first 10 members are given their decimal equivalents (starting at 0), so they become 0-9. The remaining 6 members (10-15) are assigned the letters A-F. The number 13 (decimal) is equivalent to binary number %1101 ->  $(1*2^3) + (1*2^2) + (0*2^1) + (1*2^0)$ , so in hexadecimal it becomes \$D. We use the “\$” or “0x” prefix to represent hexadecimal numbers, which themselves represent 4-bit values

### In Conclusion

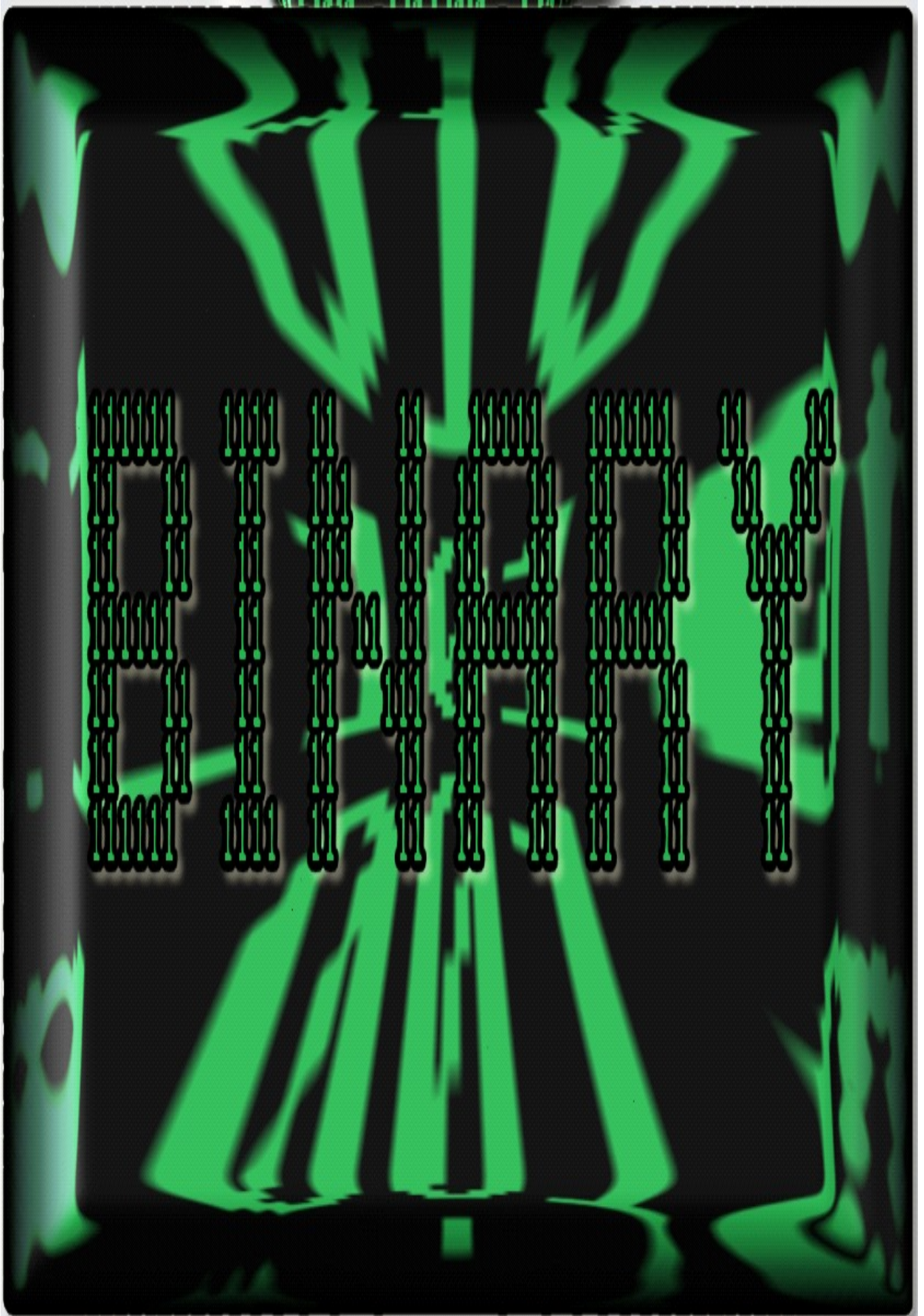
Today was about binary numbers, with sections on bits, bytes, words, nybbles, and hexadecimal numbers. Binary numbers are what programming is all about, and further reading on binary and hexadecimal number systems may be necessary in order to get a better understanding. Unquestionably, to succeed in assembly language programming one must first thoroughly understand binary numbers. I look forward to next time when we will discuss the 6502 “Load” and “Store” instructions, as well as (hopefully) introducing the Native mode of the 65816. So, until our next meeting, take ’er easy.

Please send errors, omissions, or suggestions to [bert@winc64.com](mailto:bert@winc64.com) or on [Lemon64](#), username [satpro](#).

### A Multi-Byte Number Displayed in Different Formats

2014	Decimal
%11111011110 or %0000011111011110	Binary
\$7DE or \$07DE	Hexadecimal
$(0*2^{15})+(0*2^{14})+(0*2^{13})+(0*2^{12})+(1*2^{11})+(1*2^{10})+(1*2^9)+(1*2^8)+(1*2^7)+(0*2^6)+(0*2^5)+(1*2^4)+(1*2^3)+(1*2^2)+(1*2^1)+(0*2^0)$	







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