Alive Dead Media: Pixel Graphics

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Cases:

Sinclair ZX Spectrum (Today)
Amstrad CPC (Tomorrow)

- ZX Spectrum examples
- Multipaint: pixeling practice

Sinclair ZX Spectrum in 1982

A sequel to Sinclair ZX80, ZX81 (1Kb computers with no pixel graphics)

- 16K ROM and 48K RAM
- 256 x 192 pixel graphics
- 32 x 24 colour resolution
- 8 colours with two brightnesses (except for black)
- BASIC in 16K ROM as operating system

ZX Spectrum was a hit in UK, a widely known phenomenon and achieved moderate success in Europe.

Home computers at 1982

Late 1970s-early 1980s: Computers had broken through in industry, logistics and trade. Markets for a “home computer” products also emerged. Governments encouraged computer literacy and new industry/entrepreneurship.

- Early models like Apple II, Atari 800 expensive
- “Serious” computers (CP/M) even more expensive
- Cheap models Commodore Vic-20, Sinclair ZX81 were underpowered (1-4Kilobytes of memory)
- Colour graphics and sounds, but “multimedia” did not yet exist. (No CD-ROM, no sampled audio, no truecolor, no video)

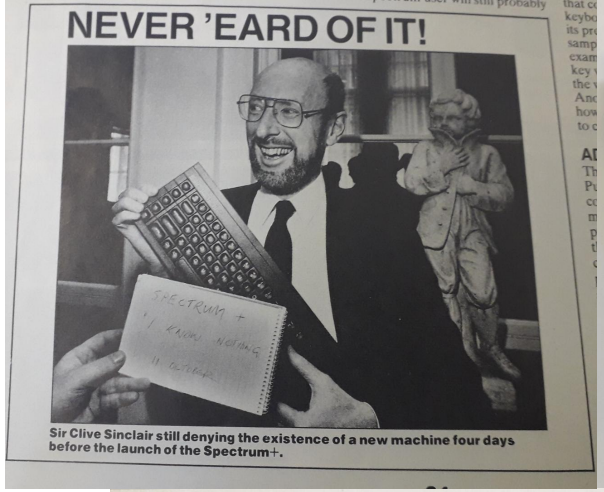
Sega SC-3000	Sinclair ZX Spectrum	Telmac TMC-600
1295 mk	1395 mk	1495 mk
Digital Systems	Oy Hedengren Ab	Telercas Oy, vali
90-632269	90-670211	90-248055
Z80A	Z80A	CDP1802
8K/16K	16K/16K	24K/9K
48/32K	48K	37K
64 näppäintä, 48 toim.näpp. funktionäppäinten avulla, kursorinäppäimet, kumi	40 näppäintä, 180 funktiota	76 näppäintä, nu päimistö, kirjoitu
Väri-tv 38 x 24	Väri-tv 38 x 24	Väri-tv 40 x 24
256 x 192 pistettä, sprite	256 x 176 pistettä, 192 pistettä konekieli	80 x 72 pistettä, puoligrafiikka
16 väriä, sekoittamalla 210	8 väriä	8 taustaa, 8 me
3 kpl + kohina/4 oktaavia	1 kpl/10 oktaavia	2 kpl + kohina/8
4-värikirjoitinpiirturi, 2 peli-kahvaa, tulossa muita	Piirturikirjoitin, mikro-asema, nauhapohjainen massamuistiasema, usei-den muiden valmistajien oheislaitteita	Levyasema, mu tajien kirjoittime koneet, laajennu monitorit, nauhu

Tom Lean: *Electronic Dreams: How 1980s Britain learned to love the computer* (Bloomsbury Sigma, 2016)

1395 mk = ~510€ in 2021

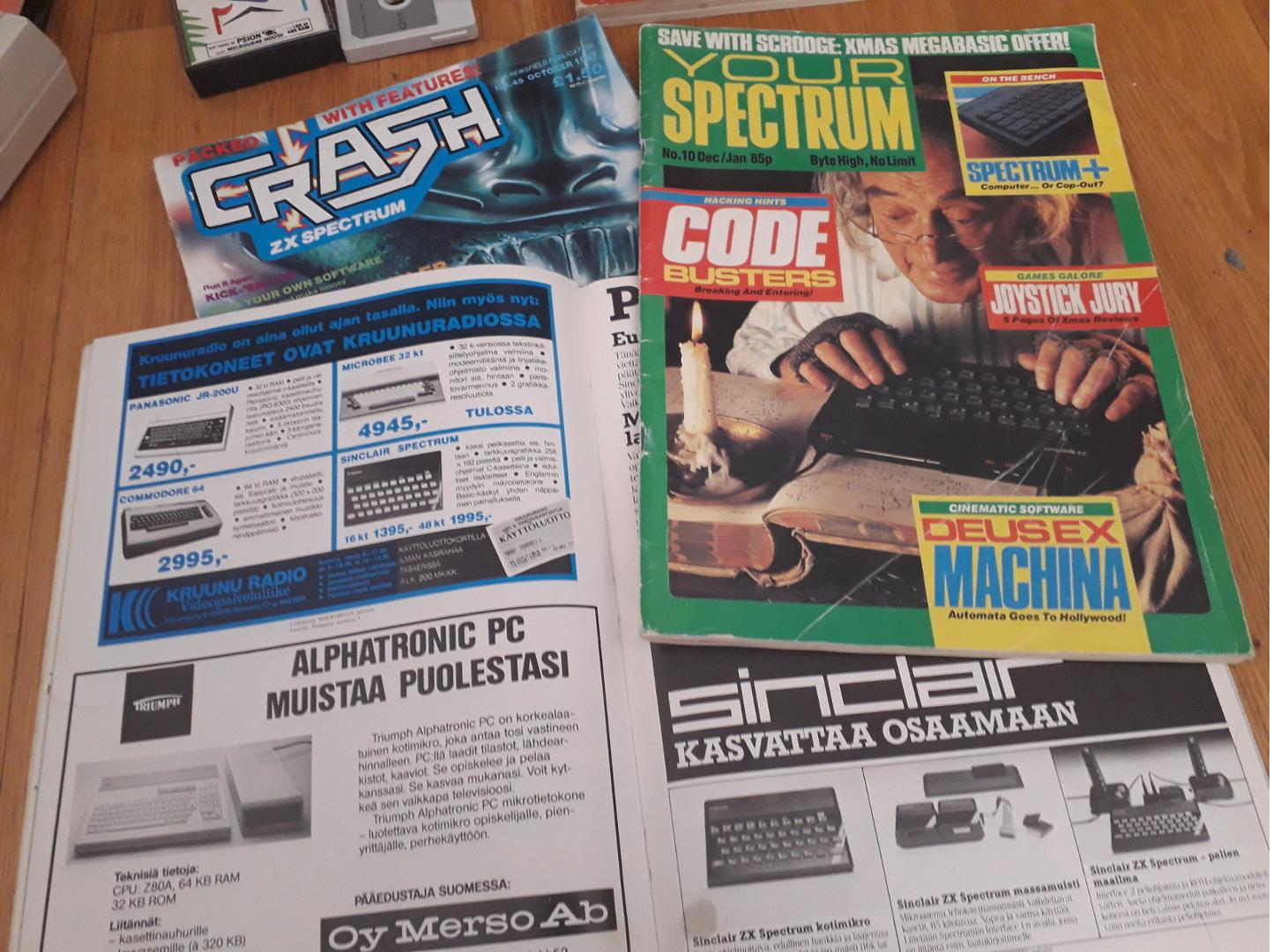
Sinclair?

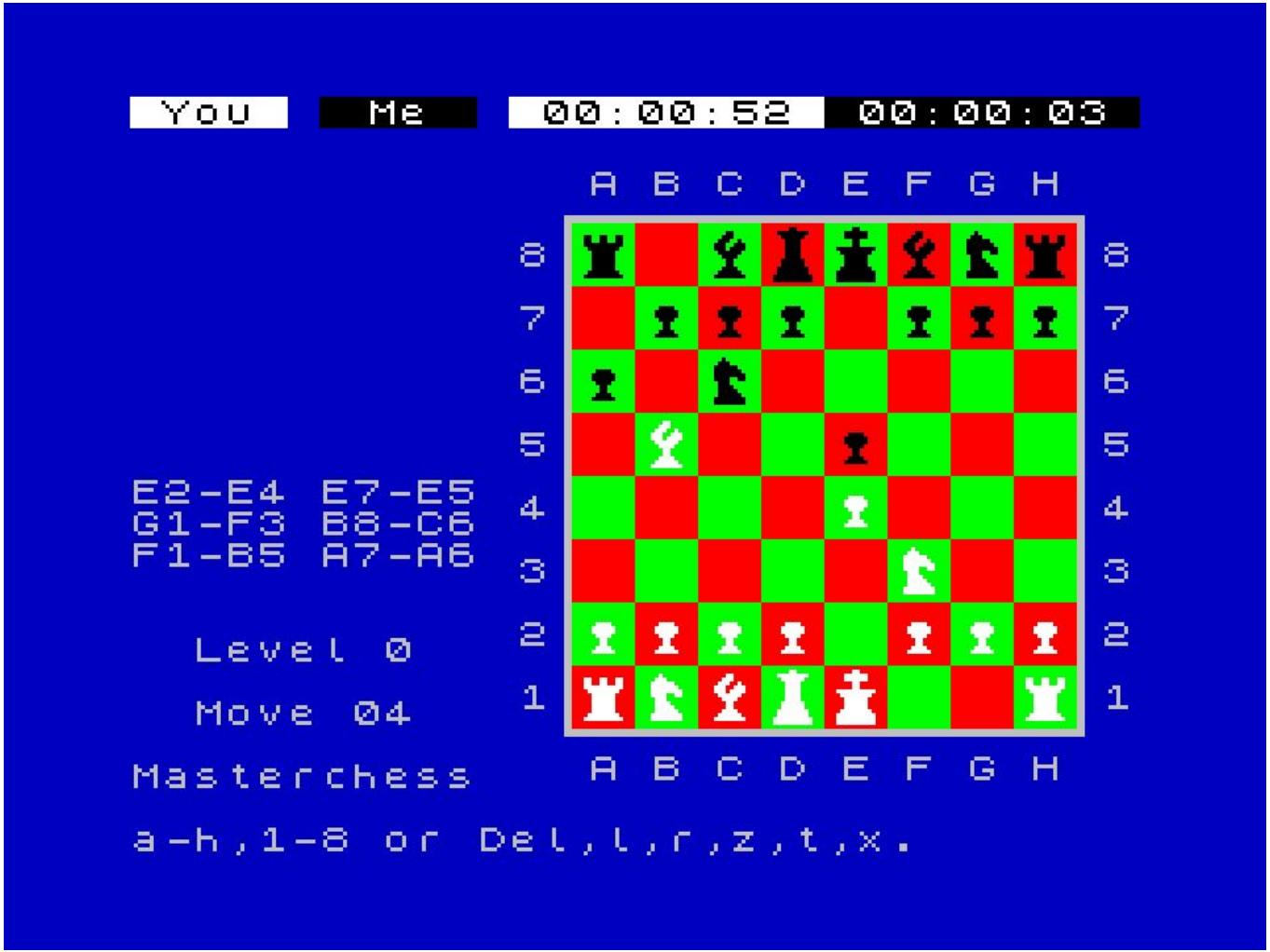
- Founded as Westminster Mail Order Ltd. in 1973
- From hobbyist electronics to home computer oriented company in ~1980
- Founder **Sir Clive Sinclair** (1940-2021)**,** face of micros in UK: “Uncle Clive”
- Inventor: Miniaturisation of TVs, calculators, electric cars…
- Computers: ZX80, ZX81, ZX Spectrum, Spectrum 128, Sinclair QL
- Industrial designer Rick Dickinson
- Sinclair brand and product line sold to Amstrad in 1986



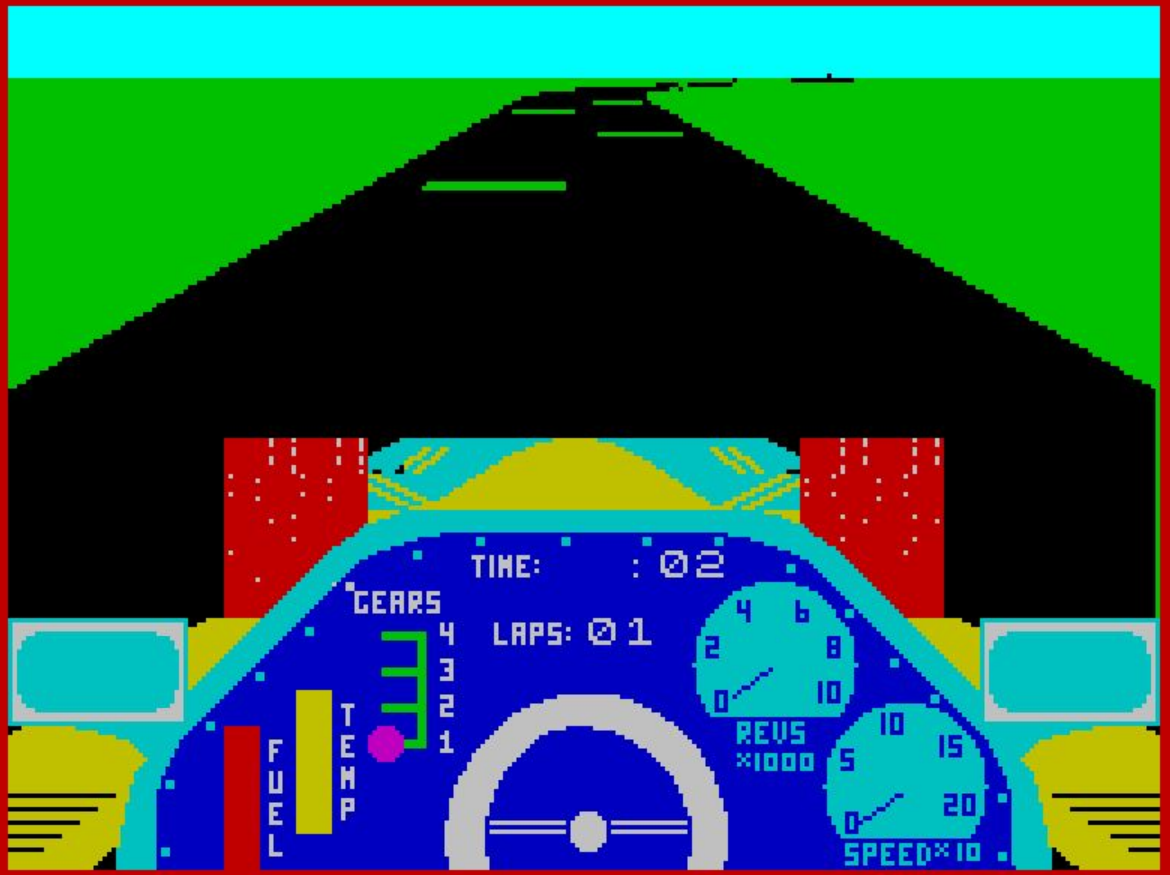
Spectrum setup

Magazines


SAVE WITH SCROOGE: XMAS MEGABASIC OFFER!
YOUR SPECTRUM
No.10 Dec/Jan 85p
Byte High, No Limit
ON THE BENCH
SPECTRUM+
Computer... Or Cop-Out?
HACKING HINTS
CODE BUSTERS
Breaking And Entering!
GAMES GALORE
JOYSTICK JURY
5 Pages Of Xmas Reviews
CINEMATIC SOFTWARE
DEUS EX MACHINA
Automata Goes To Hollywood!
CRASH
ZX SPECTRUM
PACKED WITH FEATURES
YOUR OWN SOFTWARE
Kruunuradio on aina ollut ajan tasalla. Niin myös nyt:
TIETOKONEET OVAT KRUUNURADIOSSA
PANASONIC JR-200U
2490,-
MICROBEE 32 kt
4945,-
TULOSSA
SINCLAIR SPECTRUM
16 kt 1395,- 48 kt 1995,-
COMMODORE 64
2995,-
KRUUNU RADIO
Videopalvelutalo
ALPHATRONIC PC
MUISTAA PUOLESTASI
TRIUMPH
Triumph Alphatronic PC on korkealaatuinen kotimikro, joka antaa tosi vastineen hinnalleen. PC:ltä laadit tilastot, lähdearkistot, kaaviot. Se opiskelee ja pelaa kanssasi. Se kasvaa mukanasi. Voit kytkeä sen vaikkapa televisioosi.
Triumph Alphatronic PC mikrotietokone – luotettava kotimikro opiskelijalle, pienyrittäjälle, perhekäyttöön.
Teknisiä tietoja:
CPU: Z80A, 64 KB RAM
32 KB ROM
Liitännät:
– kasettinauhurille
PÄÄEDUSTAJA SUOMESSA:
Oy Merso Ab
sinclair
KASVATTAA OSAAMAAN
Sinclair ZX Spectrum kotimikro
Sinclair ZX Spectrum massamuisti
Sinclair ZX Spectrum – pelien maailma



Masterchess
(Psion/Sinclair Research, 1983)



Chequered Flag
(Psion/Sinclair Research, 1983)

Horace goes Skiing
(Psion/Sinclair Research, 1982)

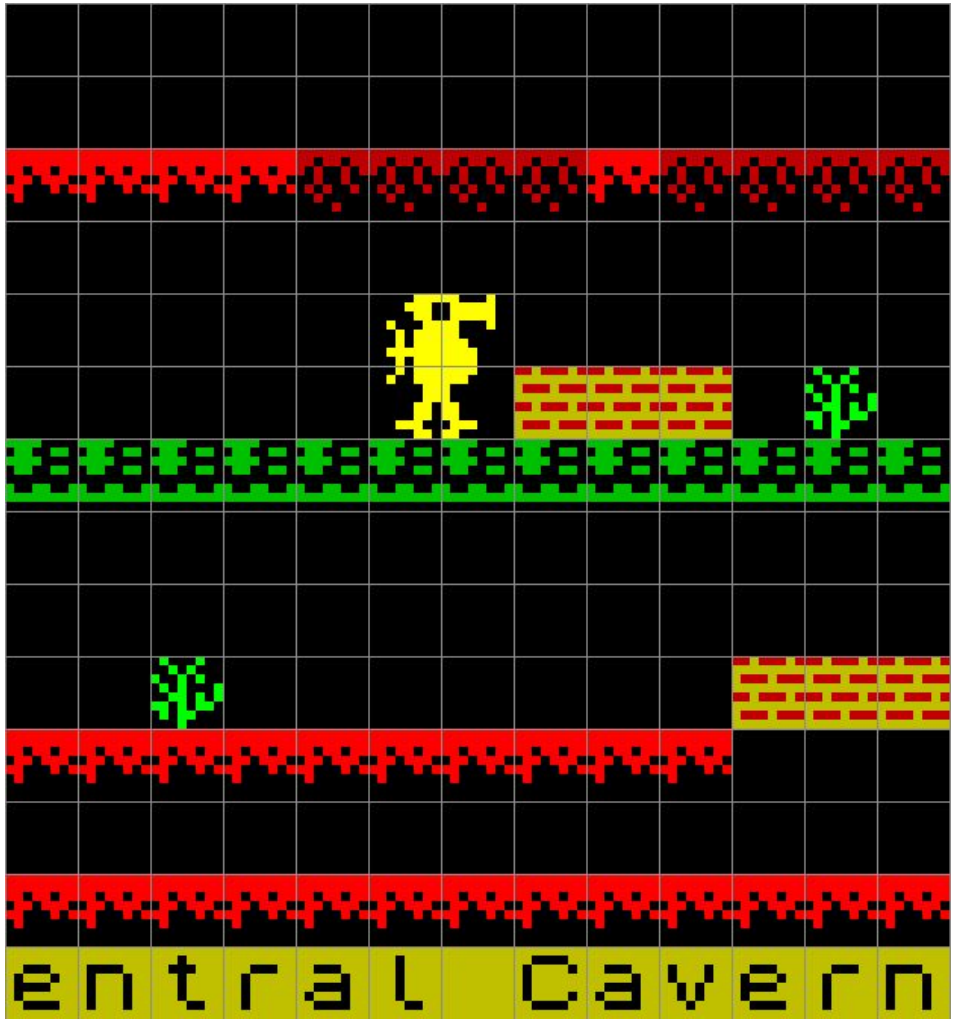
Manic Miner
(Bug-Byte, 1983)

Manic Miner
(Bug-Byte, 1983)

8x8 areas are also game tiles

16x16 pixel player and monster graphics were typical

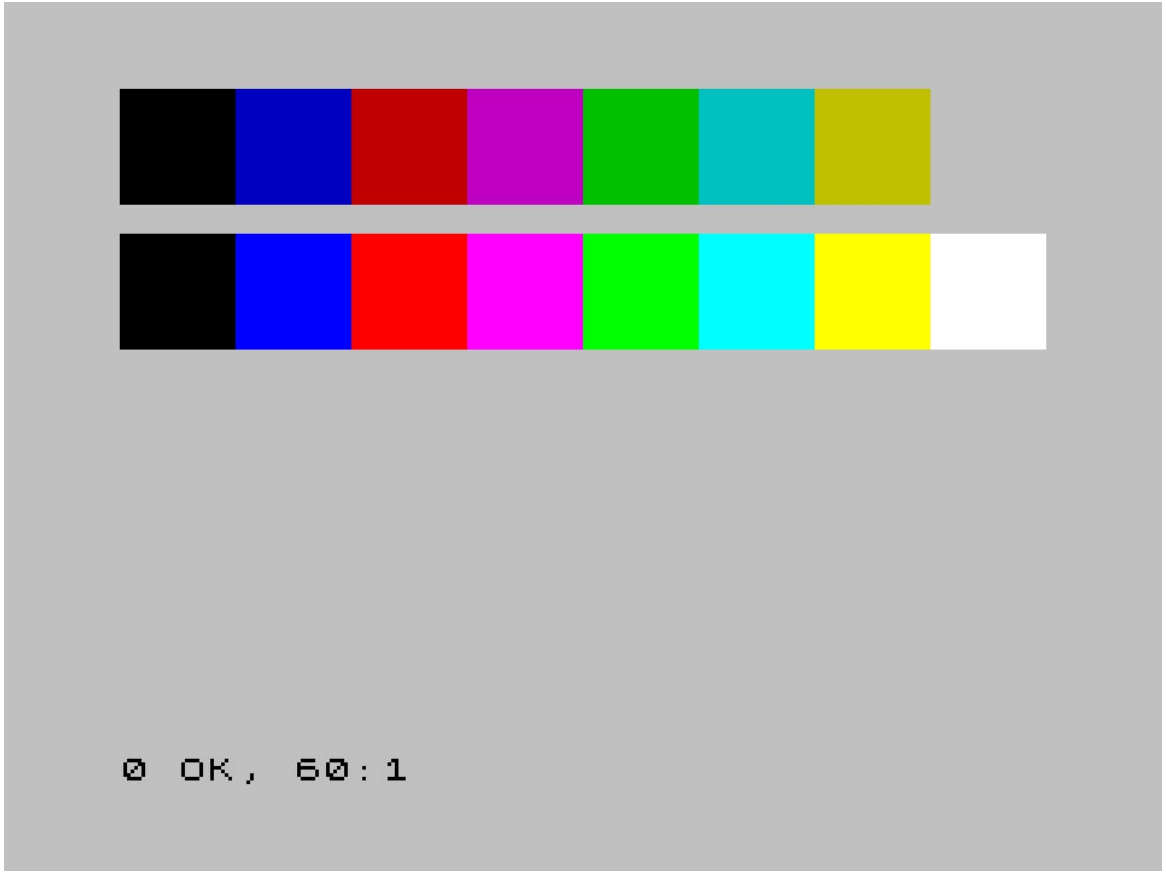
(Font is the ZX Spectrum standard character set)



Colours

8 colours with two brightness-levels

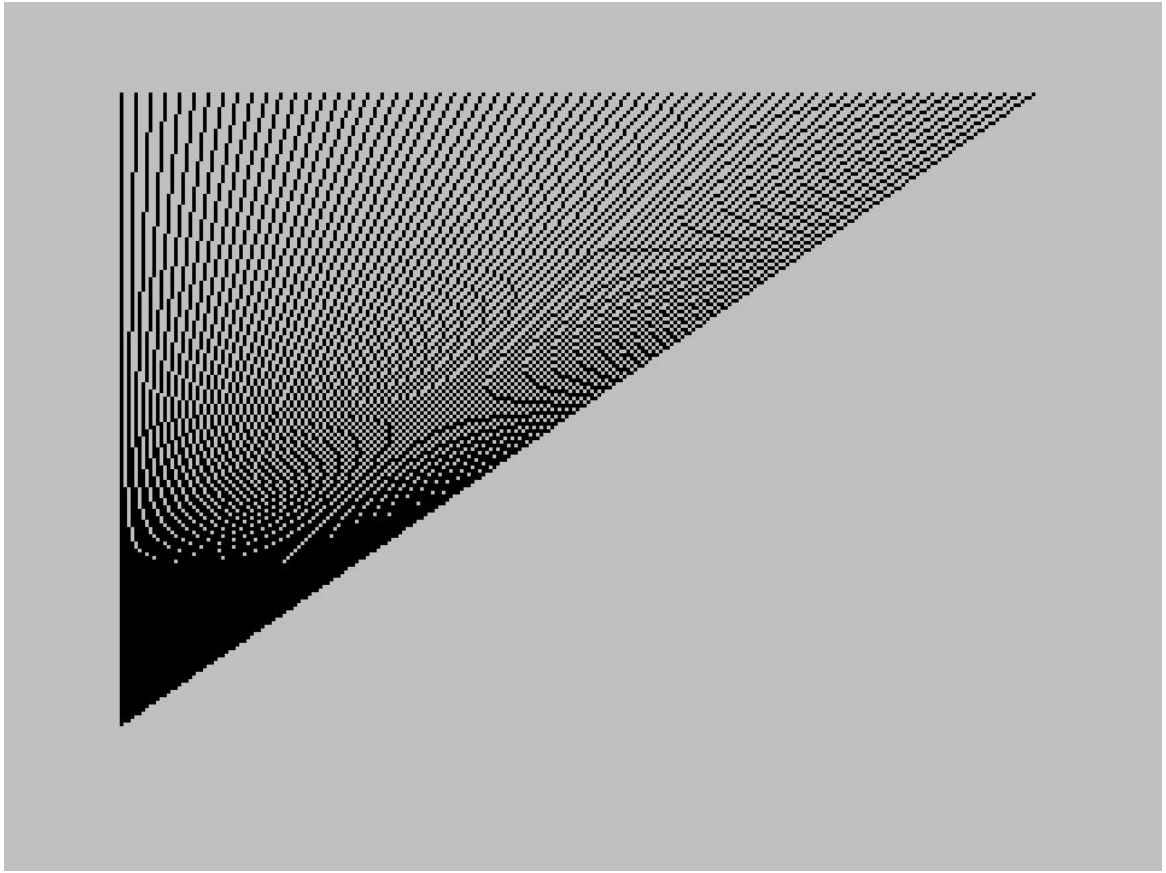
- Black has only single level so “15 colours”
- Two brightnesses cannot be mixed
- FLASH attribute!
- Palette cannot be changed



Pixels

256 x 192

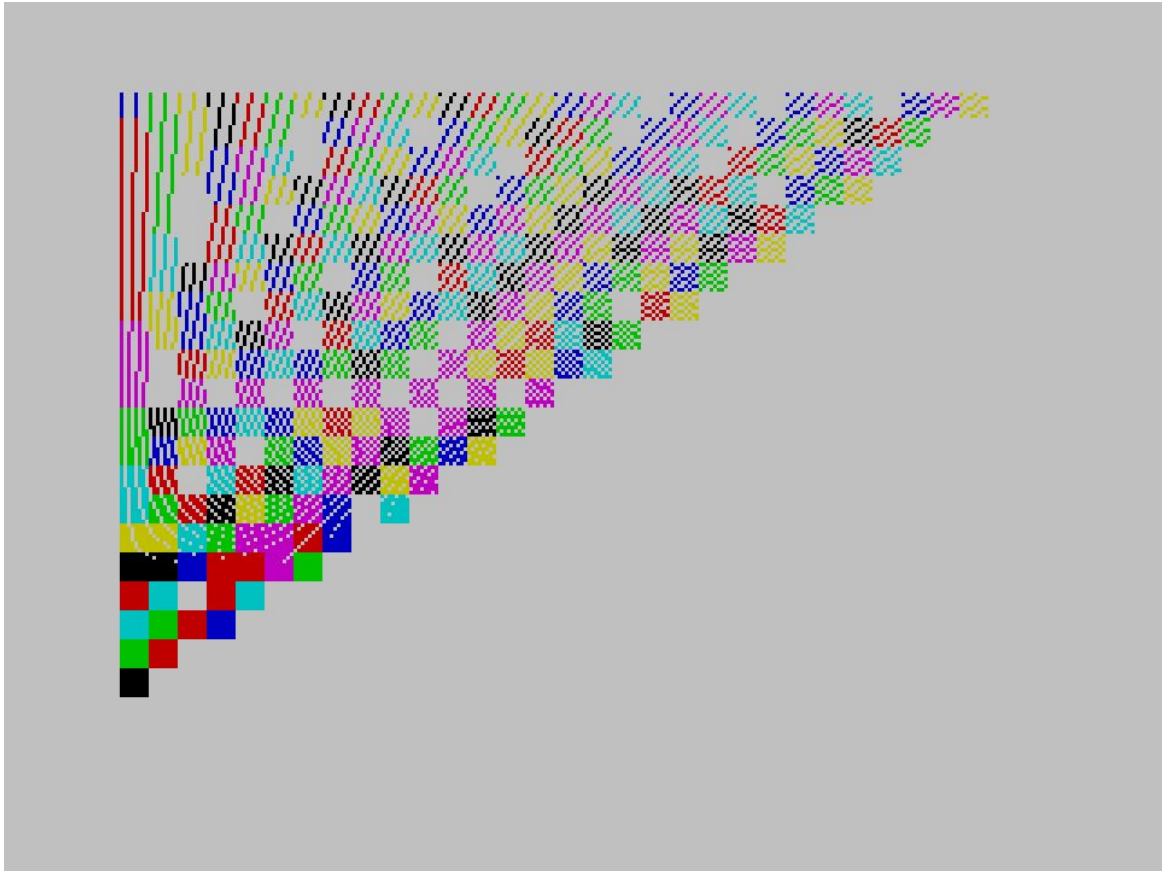
- 1 bit = 1 pixel
- 1 byte = 8 pixels



“Attribute clash”

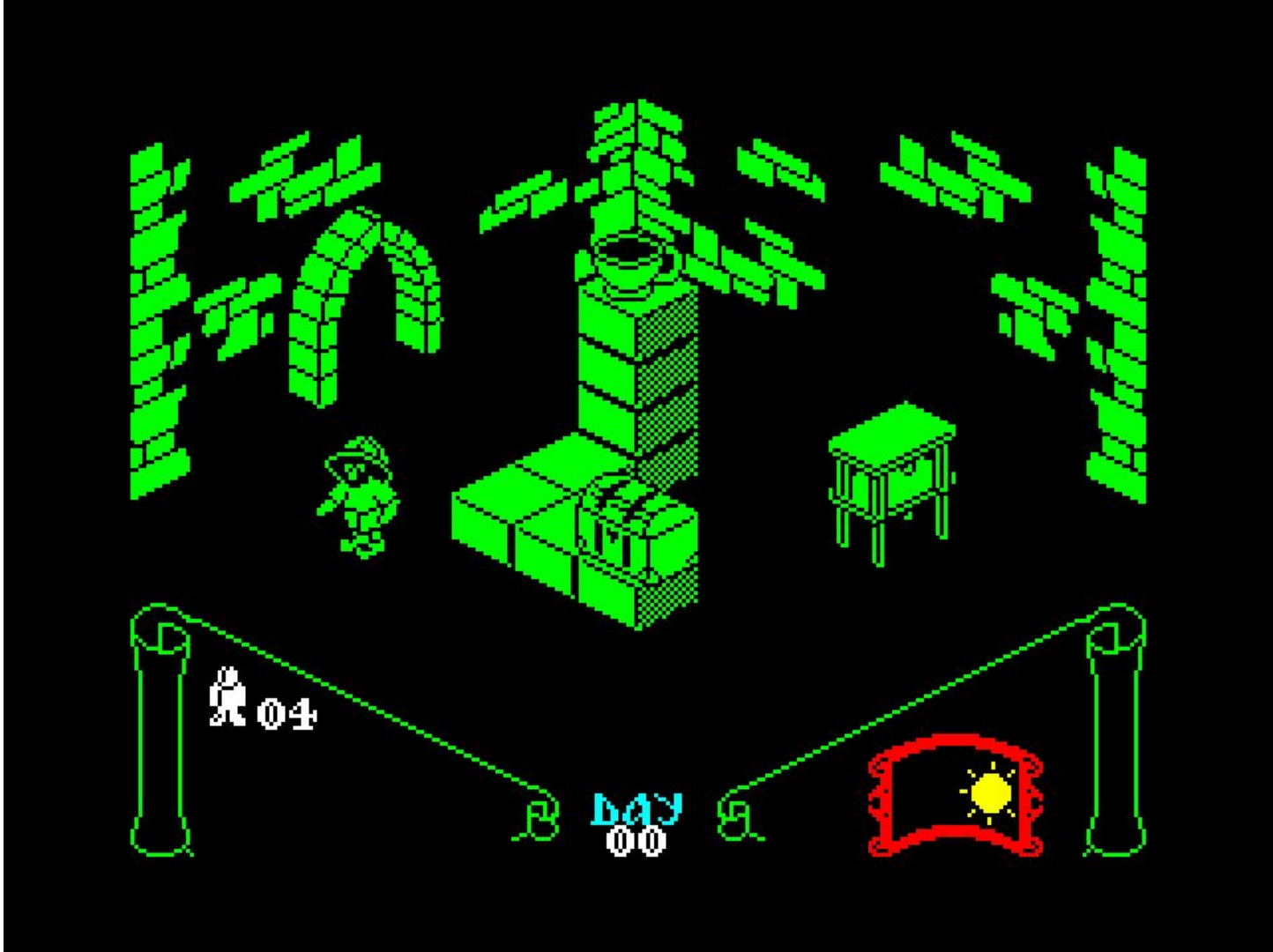
Colours can be set in 32 x 24 resolution (768 cells)

Trying to simply draw different colored lines next to each other will result in clash.

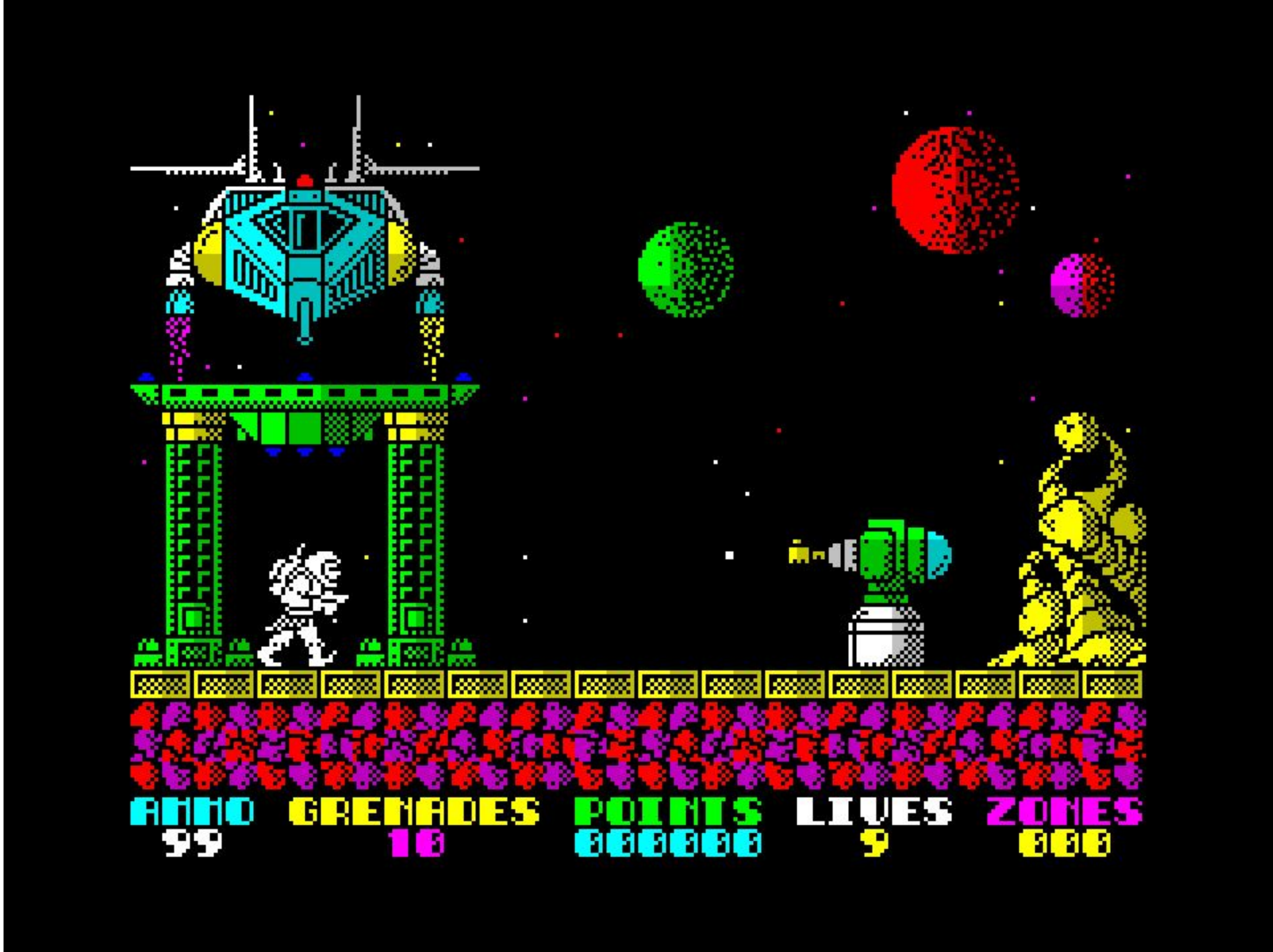


Knightlore
(Ultimate, 1984)

Many games limited colours altogether



Lords of Midnight
(Beyond, 1984)



Exolon
(Hewson, 1987)

PSSST
(Loading Screen,
Ultimate 1983)

Head over Heels
(Loading Screen,
Ocean, 1987)

Cursed Eight
(Piesiu, Chaos Constructions demoparty 2010)

Creating graphics for 8-bit and 16-bit computers

Software pre-history:

- Ivan Sutherland's *Sketchpad* (1963) was a vector/CAD software but already had direct manipulation.
- Bitmap drawing software *Superpaint* (Xerox Parc, 1970s) and the commercial *Quantel paintbox* (Quantel, 1981)

8-bit and 16-bit home computers

- *Koala Painter*, *Art Studio* and *Artist* for the Commodore 64 and ZX Spectrum - no real standards.
- Fully mouse-driven ***Deluxe Paint*** on the Commodore Amiga became industry standard in late 1980s.
- Compare for example *MSPaint*, *MacPaint*.

Software for making 8-bit and 16-bit graphics in the 2000s:

- *Grafx2*
- *Multipaint*

CREATE ELECTRONIC ART ON YOUR OWN TV SCREEN WITH THE SPECTRUM DOODLER!

Carrots Graphic Design Cambridge

Software designed in conjunction with Sinclair Research

Draw straight on to your screen!

The Spectrum Doodler is a lightpen that enables you to draw straight on to your own tv or

textures, repeat stock patterns or make your own design using a special layout grid. Draw free hand – point to point or continuous line ribboning. There is also the facility to add text to your design.

Store your work on cassette or microdrive!

Robustly made, fun to use!

The lightpen is robust and comes complete with software on cassette which can be duplicated on to microdrive cassette. There is an instruction manual that's simple and easy to understand and an interface box for connection to your Spectrum computer. You can even write your own software for the Doodler if you wish.

To get your own Spectrum

The Spectrum Doodler light pen

Advertisement, 1980s

Commodore Amiga 500 (1987*)

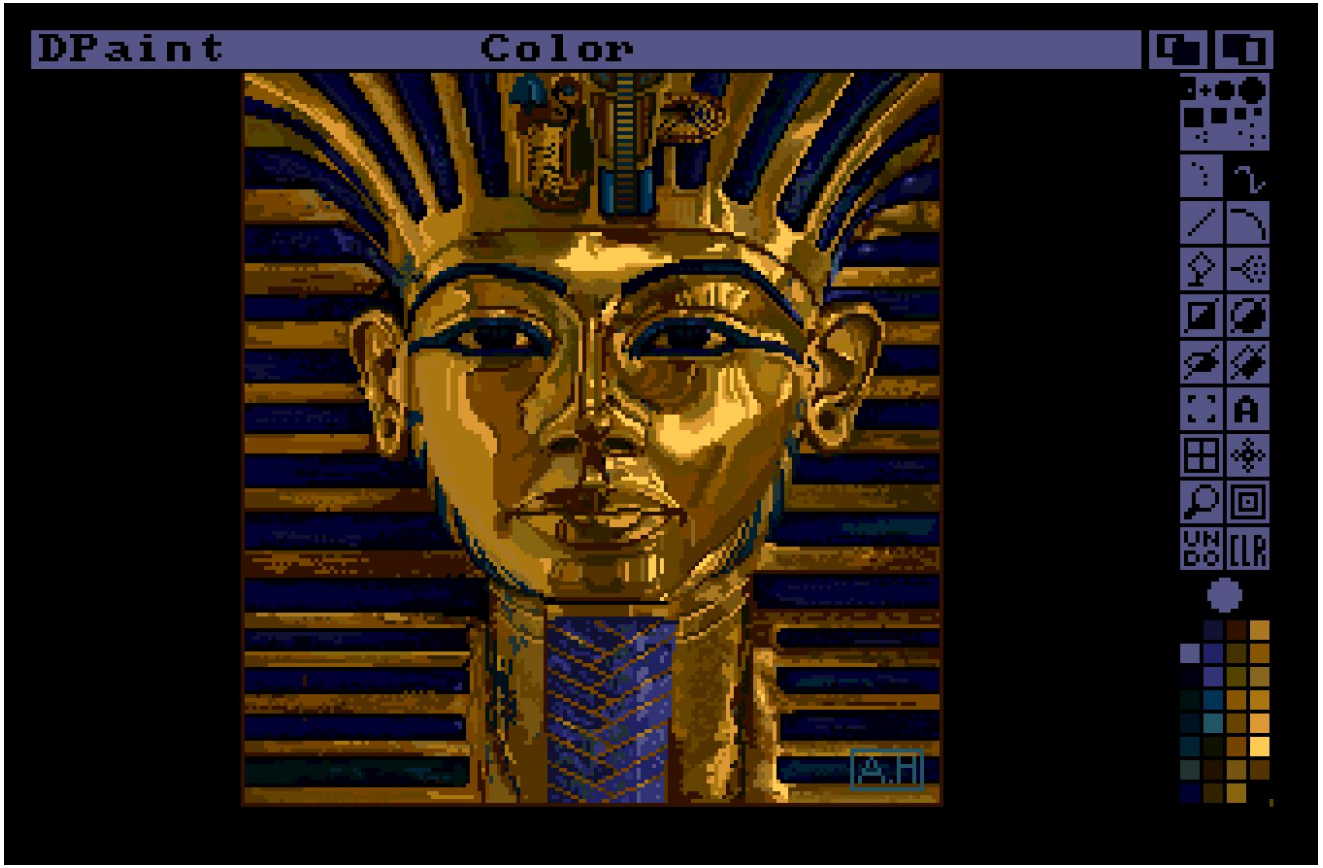
“The First Multimedia computer”

(Jimmy Maher, *The Future Was Here,* 2012)

16-bit
512-1024 Kb typical

Many screenmodes, e.g. 320 x 240 x 32

*Amiga 1000 was released in 1985

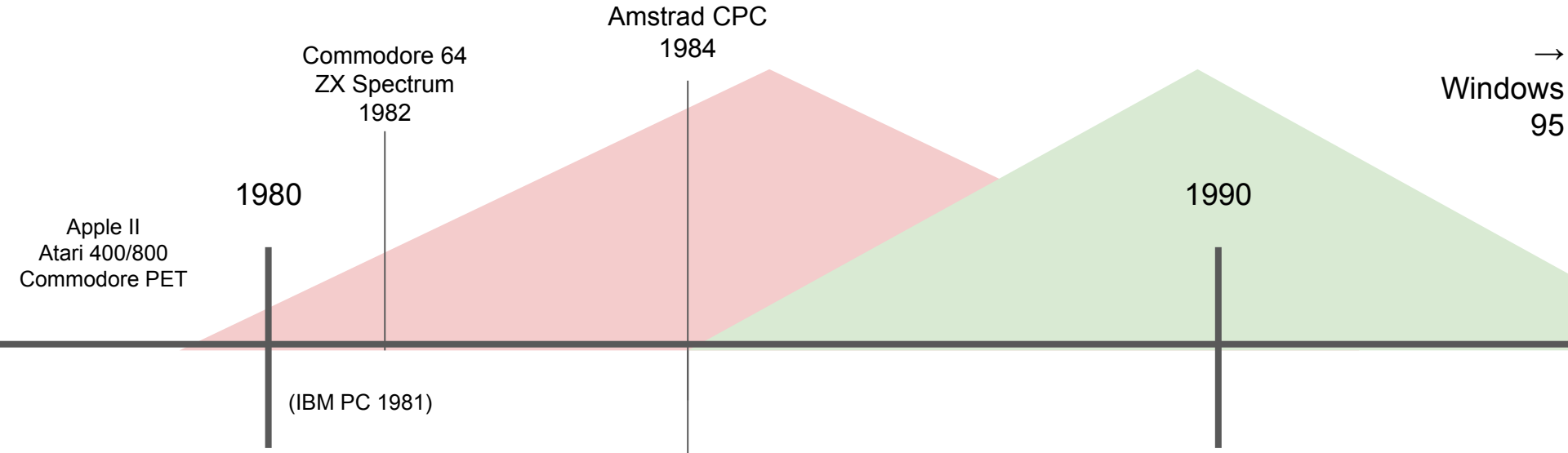


Deluxe Paint (1985)

Running on an Amiga computer.

“King Tut” promotional image by Avril Harrison

Bitmap Brothers: Chaos Engine



The 8-bit era

- 6502/Z80 Processor
- 32-64Kb memory
- Internal BASIC
- Tape or external floppy
- Fixed 8 or 16 colours
- 3-channel sound chip or beepers

The 16-bit era

- 68000 Processor
- 512/1024Kb memory
- Mouse-driven GUI
- internal Floppy Drives
- 16 colours of 4096
- Multi-channel sampled sound

Multipaint & Deluxe Paint

Differences to Photoshop-style applications:

- No layers
- No “selection”, copied area instantly becomes a brush
- Palette is always indexed
- Program state can be quite complex.
  (Modern software usually focuses on one thing at a time)

We’re using a 2020s computer…
…to run an application that resembles a 1990 paint program…
to draw early 1980s graphics…

- Reduced toolset is relevant for low resolution and low colour work
- Simulates 8-bit graphic limitations directly
- Exports files that can be run in the original hardware

Multipaint task 11th of May:

Create a game mock-up screen for a ZX Spectrum game:

- No too abstract ideas, sorry! It’s the 1980s commercial world!
- An identifiable player character
- Background elements
- At least some game information like Lives, Score etc. either by text or some other means
- Black background is easier…

2-button mouse with wheel is recommended,
but the program should be useable with one-button, without wheel.

The final works are exported to the TAP format. The result is uploaded to the ADM-2022 Google Drive Spectrum-folder

FILE EDIT TOOLS OTHER ZX SPECTRUM
Dropdown menus:
File load/save
Brushes:
Basic drawing tools:
Select platform:
C64 HIRES
C64 MULTICOLOR
C64 HIRES FREE
ZX SPECTRUM
ZX ULAPLUS
MSX1 MODE 2
PLUS4 HIRES
PLUS4 MULTICOLOR
AMSTRAD CPC MODE 0
AMSTRAD CPC MODE 1
CPC MODE 0 OVERSCAN
SINCLAIR QL MODE 8
ATARI ST LOW
Spare, Magnify, Grid, Snap
Undo, Trash, Pipette
Colour selection
Dither/fill
256x192 15

…Alive Dead Media pixel graphics continues, 12th of May 2022
Tero Heikkinen / Uniarts Helsinki

Amstrad CPC:

A later 8-bit computer that fixed the problems of older computers.

- Good keyboard for typing
- More flexible BASIC language
- Internal tape/Disk drive

- 16 colours out of a palette of 27 colours = 3 red * 3 green * 3 blue
- Free positioning of colours
- 160 x 200 so the pixels are wide!

- Still the Z80 Processor at about 3,5Mhz, like the Spectrum

Mario
(Titan, 2020s)

Ken 3
(Titan, 2020s)

Multipaint task 12th of May:

Create a game loading screen / splash screen for Amstrad CPC:

- Use the game topic from yesterday
- Logo could be nice, or “press space to start” etc.
- We’ll discuss the techniques of manual “dithering” and “Anti-aliasing”

BORDER can be changed from the drop down menu TOOLS → SET BORDER

or by changing its colour using the sliders

Alive Dead Media 2022 Thursday/Friday

Use **.PNG** extension to save image as a normal PNG from the **SAVE AS** menu option

But also, export the Amstrad-specific files wih **OUTPUT *.bin** menu option

Note the export format also has “bin” extension like normal Multipaint files.
Sorry for the confusion!

For Friday 1300 the results will be viewed in PNG:

- **PETSCII**
- **ZX Spectrum**
- **Amstrad**