

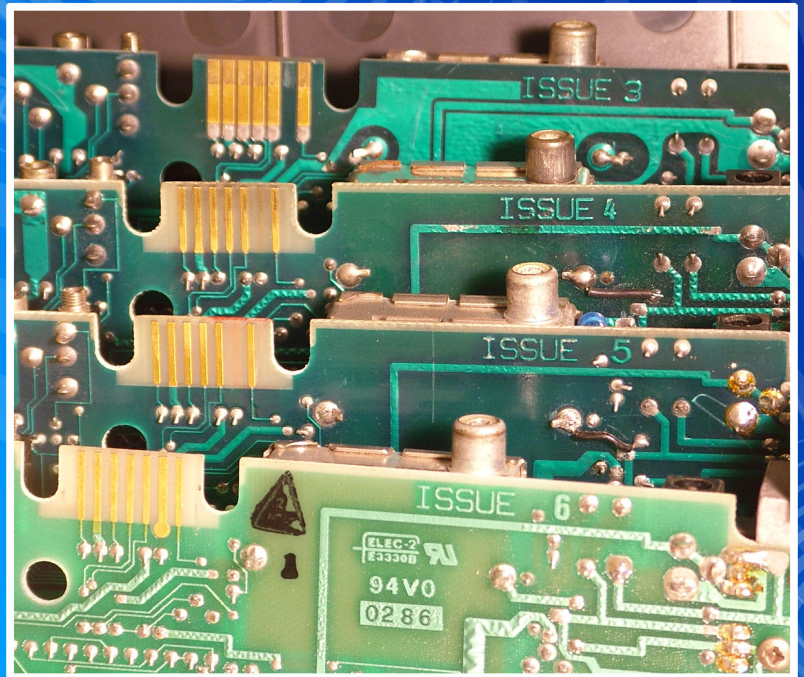
ENTERPRESS

Magazine for the Enterprise users

2018/1-2. January - April

How many Enterprise does exist?

Small encyclopedia
about Enterprise versions
(Zozosoft)



Interview with Jörn Proda

aka „Prodatron”,
SymbOS creator
and retro
enthusiast
(entebras)



Accelerate to turbo speed!

- Dream card, retro craziness, keep it up!



Written by: István Matusa
(Tutus)

First of all, I would like to warmly welcome all our Dear Members in the new year. The Enterpress Editors haven't been slacken off and your favorite Enterpress magazine is here again in 2018 as well.

It is good news that the Enterpress is issued in english also (although our colleagues sometimes fearly get sweat with the translations but at the end it is allways fine). A good example for that is the interview with Prodatron which have been issued in Spanish and English on the Distrito Entebras retro blog.

Exceptionally this has to be translated into Hungarian. My colleague, Máté Hajdú does not like unprecise translations, so I had to meet with him taking my laptop with myself. At this meeting he have asked many many questions where he was uncertain in the original article. There were many professional expressions which I also did not know, here finally Zozo gave some help. That is how it came into our first issue of this year the interview with Prodatron form which you can find many interesting things form Jörn, his work and plans.

On our Club day in last December our member Csaba Szilvási made a spontaneous presentation about applicable displays for Enterprise. I asked him to create an article from this and to send it to us (Zozo completed it with some additional things).

We report form hardware novelties of Maciej Gruszecki (pear). We know from him that last year he did not have too much time for hardware development for Enterprise. On the EP forum it can be seen the these hardware (EP DreamTurboCard and E-Power) are not promises and plans anymore but they are going to be realized soon. The headline of this preface refers a bit to the „Dreamcard” but beside of this it could be a good advice for the Enterprise developers for this year!

In the regular Pascal article form Povi, you can find useful programming advices with the usual program lists.

Zozo has long been planning to prepare a huge article from the Enterprise versions. „How many versions of Enterprise exists?” The information

is still flowing while the article is being made so perhaps we could have a good overview by now. We don't belive that such a computer could exist like Enterprise...

Its blurred past, its history can be find out from 33 years distance. The article deploys many illustrations and gives a comprehensive picture form the topic.

Laci Kiss game block also can not be missed out. He have gathered the TOP10 games which have to be seen by all the Enterprise owners.

We prepare a selection within such topics which have not been issued even in the old Enterpress Magazines. We start a serial which describes the dBase II. database manager. This software runs with IS-DOS system on Enterprise.

In 2018 we are also trying to produce a varied magazine for you. Now, at the beginning of this year, I can see that there will be so much to write about. And this is very good news!

ENTERPRISE FOREVER!



Interview with Jörn Proda

aka “Prodatron”, SymbOS creator and retro enthusiast

(interview published on DISTRITO ENTEBRAS blog on December 23, 2017)



Interviewer:
Frank Romero
(entebras)

Everybody knows that the old computers are experimenting a second life. On one hand, the 80s revival we can see in some Netflix and Disney products (in series like Stranger Things and Guardians of the Galaxy) and the neo retro aesthtetycs (present in a bunch of Steam games and Raspberry console remake like Retron 5 or Mini NES Classic) are everywhere; and in on the other hand, there is still a big community developing hardware and software for those “early age” machines.

Many of them are in these subculture since the 80s. And our visitor, Prodatron, is one of them.

Behind this nickname there is a digital creator from Germany, forged in Demos and HTML programming in the late 80s and early 90s (a CPC owner who was part of the staff of SymbiosiS and Beng!). Barely active



in the Net, he gets a notorious echo in 2006, when he made an entire OS for several 8 bit computers (CPC, PCW, MSX2 and Enterprise computers), available for free digital download. In 2017 he released the version 3.0, and nowadays SymbOS gets bigger and bigger with new applications, video-games and other resources.

[Distrito Entebras] – My first impression when I saw this product was like: “It’s an 8 bit Windows”. MSX and Amstrad machines with floppy Disk Drive had MSX-DOS and CP/M command line interfaces, respectively (which were very close to MSDOS first version), but not an environemtal User Interface with icons and mouse pointer; at least in MSX case, not available for the west-erners. You made a great program.



[PRODATRON] – Thank you! (smiling) Already since the 80s I had this dream to have multitasking and a graphical user interface with overlapping windows etc. for my Amstrad CPC. In the old days I did some attempts to reach this goal, but it wasn’t really useful. Years later I discovered the CPC again, now as a “retro computer”. At this time I had some more experiences how to develop a project and how things are working. I had to thought about some important issues, like the preemptive priority-based task



scheduler, splitting the GUI into a high level platform independent part and fast screen-specific low level screen routines as well as a concept how to use the limited bankswitching possibilities of the CPC in the best way for multiple programs running at the same time inside the extended memory. At the end it seemed, that all this was solvable, and so I went on with this project and finally was able to fulfill my old dream.

[D.E.] – In your personal site you say were part of SymbiosiS, a group of Demosceners. The golden years of this activity were a truly inspiration for a lot of users (and I'm including myself), it was essential to define the "cyberculture" term. Looking back, do you miss any aspect of the Computer Demos subculture?

[PRODATRON] – Being part of the Demoscene was a great time and a fantastic experience. You learned a lot how to squeeze everything out of your computer – no matter, if it was an 8 bit or a 16 bit one at this time. You did things, which were probably impossible in the imagination of the original developers of the machine. I don't want to miss this experiences at all, as it helped me a lot to optimize code and getting a feeling, what is the optimum and how a computer can do something in the best way.

On the other hand I don't miss my activities as a demo programmer today so much. It seems, that I am more a tool de-

veloper. But I am still a passive a member of this subculture by joining the two biggest demo parties in Germany every year (Revision in Saarbrücken and Evoke in Cologne). Today it's a completely different generation of hardware, but it's still really cool to watch actual 64K demos!

[D.E.] – Since the first release (April 2006), the last version of SymbOS is huge in elements and addons. Is it a mere willing that was born in your mind as a final concept, or was it a large and planned product that changed a lot from the earlier sketches?

[PRODATRON] – It is a mixture of both. The basic concepts for SymbOS from 2001 didn't change. Fortunately it was never necessary to modify them, even today with the new hardware and possibilities it still works fine. But now we already have new features, which weren't in my mind at the beginning. Best examples are the ports to other Z80 machines or things like daemons or the extended desktop.

The first goals of SymbOS have been defined like this: It should be much better than GEOS for the C64, it should have a preemptive multitasking scheduler like the Amiga workbench (never liked cooperative

multitasking), and it should look like Windows 95. After designing the concepts for all the SymbOS components, the first real working version appeared at the end of 2004. At this time it was still small, the GUI could even run on a 64K system. With the FAT12/16/32 filesystem implementation and much more features SymbOS was growing and growing. But until today we never violated the rule, that it is still bootable on a naked original 128K Z80 system from the 80s.

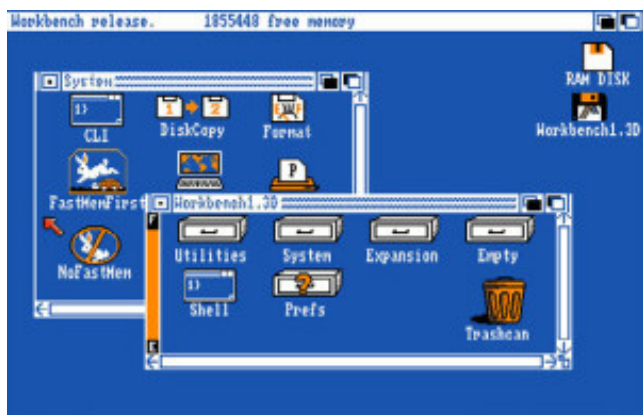
The flexibility regarding memory consumption probably is quite a special property of an 8 bit product. Most of the new features are now placed inside external modules and service applications. The minimal configuration still requires about 80K of RAM. But a full installation with a high resolution backdrop, multiple desktop widgets and all services running including network support etc. already takes about 200 KB.

[D.E.] – In present days there is a lot of homebrew videogaming software for obsolete computers, but only a few non-entertaining applications and OS. What was your main reason to make an Operative System like SymbOS? Do you feel more comfortable when you are making applications than when you are making videogames (like Lord of the Rings for CPC)?

[PRODATRON] – Beside the fact, that I am more a tool programmer, that's a good question anyway! In peoples view a retro computer is usually a pure gaming machine. In one aspect this is somehow true: You still can play nice games on these machines, and many people still have the same fun like they have with modern games. But 99% of them would never use an 8bit computer for their daily work.

And this is the point which is so fascinating to me. With SymbOS I am trying to convert such an old machine into something, which appears to be very similar to





actual modern systems. Developing new tools, which look and behave like these which I have running in Windows on the PC is really fun for me.

Another motivation for SymbOS is the support of new hardware. As an example we now have network interfaces, MP3 decoders and even a new graphic card (at least new for the CPC). Using them with the old single tasking OS is quite boring. You may watch a demo for the new graphic card, or you may download one file from the internet, or you may try your MP3 player. But not at the same time, and then your computer is completely blocked for this one task. In SymbOS you can use the new hardware in a much better way. You are listening to your favourite MP3 playlist while having your chat program open and check, if your buddies are online. All this in a new bigger resolution at high speed with lots of colours. And if nobody wants to chat with you, you play Pac-Man or Columns, while you are downloading and unzipping new applications and media files in the background, while SymAmp is still playing music.



[D.E.] – We can see in SymbOS many common elements with the 80s Microsoft products (specially between Windows 2 and 3.0): Task Manager, Control Panel, a DOS terminal, a Bar Menu, some keyboard shortcuts, etc. Even the installation menu have some resemblances with the

WinXP installation.

What would you say it was your main inspiration excluding MS Windows: GEOS for C64, the MSX japanese file managers, or even the OS GUI's for 16 bit computers like Amiga and Atari ST?

[PRODATRON] – The Amiga workbench was the number #1 inspiration for me, when I only had my CPC in the past. I also liked the Macintosh-like design of the C64 GEOS a lot. To be honest compared to the workbench I never liked GEM. At the beginning of the 90s I saw the Arthur GUI (later Risc OS) of the Archimedes, and IMHO (in my humble opinion) Microsoft made a good decision to rip some ideas from this GUI for Win95. Unfortunately I didn't know details about the MSX before I started the port.

[D.E.] – SymbOS runs perfectly on a lot of machines, including MSX computers with add-ons like Powergraph V9990 and CPC marginal equipments like PCW computers. I suppose you made it on Assembler, the "old school" programming language (you've written in your site that the total code is about 119000 lines). Was it very difficult to port SymbOS to other platforms, or you made only a few changes between Amstrad and MSX versions? As your personal point of view, is assembler coding some kind of romantic act?

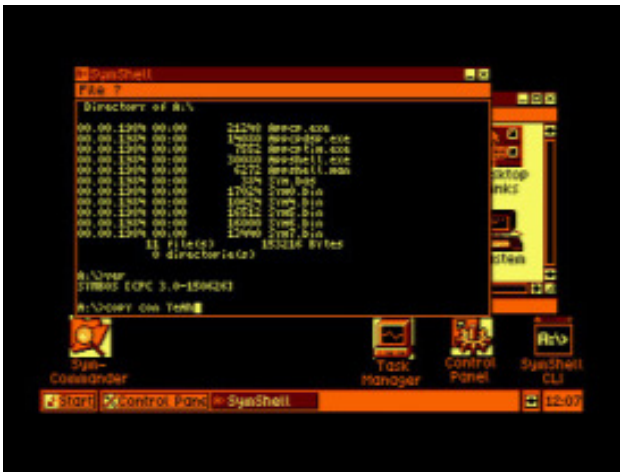
[PRODATRON] – Sure, SymbOS is written 100% in Z80 Assembler. The first port for the MSX required several initial work like re-sorting some source codes, making thoughts what all has to be done for a port in general, having a new concept for handling 16 and 4 colours at the same time, improving some interfaces between the SymbOS modules, etc. Today it's much easier as all the concepts, preparations and experiences are already there thanks to the first port. It shouldn't take much more than about two weeks to have a new port running rudimentary on another platform – the initial Enterprise 128 port took 1,5 weeks. Oh yes, coding in assembler is incredible romantic! (big laughs)



Well at least it's probably good for keeping your brain trained; you feel good, as you try to reach the optimum for your code size and speed; and you always remember about the beginnings.

[D.E.] – What would you say to the actual average programmers, using huge IDE's every single moment, a lot of DLL's and protected by big amount of online documentation with given examples? Don't worry to hurt their feelings a little.

[PRODATRON] – Hahaha, it's the only way how you can survive today in commercial business. If I have to develop an actual application I am using huge IDEs, DLLs and a lot of documentations and examples as well. Now C++ is becoming the new assembler language – many



people don't use it anymore, now it's even hard to find C++ coders at all. But it starts to become really strange, that many programmers don't even know anymore, what a Hex number is or how to use Bits. And there is sometimes a problem with code optimization. Today's computers are so fast, that you usually don't recognize, if your code is completely unoptimized. If it's running on your local machine only, that maybe ok, so there is no pressure to learn it anyway. But if it has to run in a time-critical environment like on a server farm, which is accessed by thousands of clients per second, it could become a problem or quite expensive.

[D.E.] – That's a typical question: What actual OS do you prefer (beside SymbOS): Windows, Linux, MAC OS, Android?

[PRODATRON] – I prefer Windows and Android. Linux is great for running servers, but I still like using Windows on my PC at home. I am not a big Apple fan but I love my Apple Lisa.

official site you talk about SymStudio, but the link is broken.

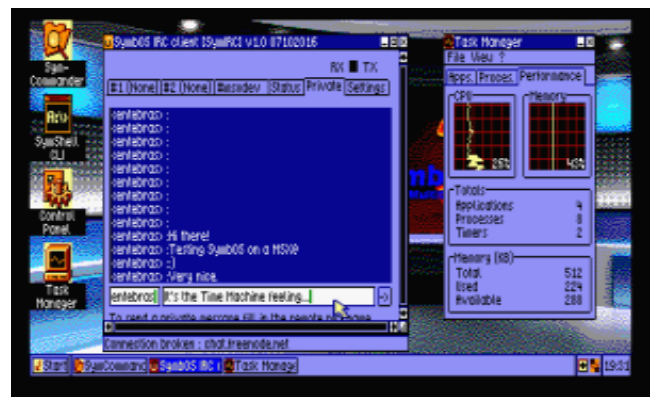
[PRODATRON] – Good news here, SymStudio is now called Quigs and will be available soon for the public! Trebmint (the alias of another CPC developer, called Rob Buckley) is currently working hard on the first release. Currently there is a full working previous version available, which was used by EdoZ (another support programmer in the SymbOS project) to create most of the new games and apps of the last three years. But there are differences in the Basic-like language, so it's better to wait for the new version.

[D.E.] – Have you ever considered to make SymbOS in other languages (German, Spanish, Japanese)? Would you adapt them if the community gave you the entire translations?

[D.E.] – Among with the original OS, in your site there are a lot of applications, including video and music players (an MP3 reader!), a calculator, many games (Snake, Columns, Pacman, Game of Life); and even some other resources (fonts, wallpapers). If any user wants to develop one of these resources for your OS, is there any editor available? In the

language I would have to assemble an own binary of the whole operating system and for each application as well. It is already hard to handle all the different ports of SymbOS and this would even add a lot more variants. The nice thing about the english language is: It is understandable by most people and – from an 8 bit computer point of view – it is a very compact language! (intense laughs).

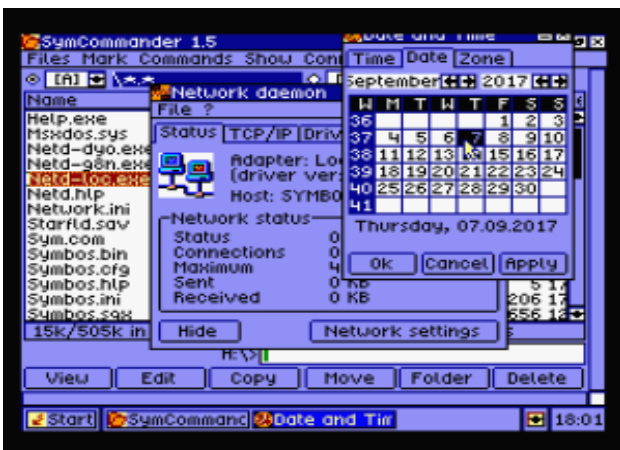
[D.E.] – Have you considered port SymbOS to other machines like Spectrum +2, Dragon or BBC computers?



[PRODATRON] – SymbOS requires a Z80 and has some requirements for the memory bank switching capabilities of the platform. Unfortunately many older machines are not able to provide this. Porting it to the ZX Spectrum would be a dream, but without hardware modifications it's impossible for the normal ones. Spectrum +3 would allow 128K only with very huge changes to the kernel and memory structures. But I am planning to port SymbOS to the ZX Uno and Spectrum Next. And of course there is still the possibility to port SymbOS to other Z80 machines like the Amstrad NC100/200 range and even the PcW16 with its fast 16MHz Z80.

[D.E.] – Time to finish the interview. Now we'll close the Text Editor, write exit in the command terminal and close all programs before leaving the System. We wish you the best in the next years, our old machines need big creators and programmers like you.

[PRODATRON] – Thanks a lot for these very interesting questions and your kind words!



Selection of a display for Enterprise nowadays

In the glory times (from 1985) most of the EP owners are used their favorite 8-bit computer with the RF modulator supplied television, living with the well known side effects for example: blurred picture (TEXT 80 was hard to read), blunt and „bleeding“ colors (that is true that only those lucky could see that who owned a color device that time), a modulator temperature dependent sync signal.

The main disadvantage of this solution was that the three color components are supplied via the same wire towards the display, thus the interference between them could not be eliminated.

The luckiest – by the way well informed – are used the RGB output with a custom made (RGB -> SCART, or RGB -> „suitable for the monitor socket“) cable to supply the display.

This was usually remained the same TV display but the privileged ones in front of a branded monitor could experience the best picture quality of the EP if the appropriate devices are used.

Less lucky have prepared a homemade input for a Junosty television. With this modification one could reach a sudden enhancement using the EP default monochrome video signal – which was free from the above mentioned interferences –.

These traditional, CRT solutions are not advantageous nowadays for several reasons. The RGB monitors preserved in excellent condition are very rare, expensive and typically 25+ years old: therefore the risk of malfunction and the maintenance costs are high. Besides that they consume a lot of space and the 50Hz refresh rate is also not a good news for those who have been destroying their eyes in the age of teens and want to see 10+ years later.

So who today (in 2017) would like to have nostalgia on real hardware, perhaps wants to discover the missed out things on EP-fronts, very soon puts the question: what kind of display he should/could use and which are the criteria for the selection? Referring to the above mentioned



reasons the RF-modulator solution should be forgotten in the XXI. century: the modern LCD televisions and monitors often offer much poorer image quality than their traditional CRT brothers. Although the modulator can be easily desoldered and exchanged to a composite output where the image quality somewhat enhances – and the image shift question also solved –, the main problem remains: with the color components combined transmission not a true-color image looks back at us anyway.

So the RGB-output usage remains combined with the mapping of the connecting modern possibilities beginning from the forced solutions until finding the optimum solution. The first given possibility is to use the existing, 16:9 aspect ratio, any type, huge screen LCD TV in the dining room. The disadvantages appear

very soon: the preferred aspect ratio (4:3) with center positioning usually can be achieved but the image size is too big to ensure the usage of the computer directly sitting in front of TV. The black side bars on the screen are disturbing for many people, moreover the SCART connectors are hardly to be found on the most modern devices.

The next option could be to use a video signal converter. These active devices could be bought with different designs and input-output socket combinations. From the Enterprise perspective it is ideal to use a SCART => VGA converter, thus the computer can be easily attached onto a cheap TFT monitor with traditional aspect ratio.

However this modification demands sophisticated electronics because the two standards have completely different technical parameters: the most significant problem is that the RGB sync signal is 15 kHz against the VGA where it starts from 31 kHz with the lowest resolution (640x480).

Accordingly the high quality converters are very expensive: starts from about 20 thousand HUF (approx. 65 EUR) – so the money we win on one hand we lose on the other.

Further disadvantage of these types of converters is that a delay (input lag) appears in the system. However this is not irritating during word processing or programming but it can be annoying while playing an intensive action game. That is true that the degree of the input lag varies by converter type and the disturbance factor is also subjective. Nevertheless it has to be taken into account.

Finally we have reached our final destination which seems to be the best „all-round“ solution: this is nothing but the traditional monitor-TV combo.

Traditional meant 4:3 aspect ratio for 15 inch and 5:4 aspect ratio for

17 and 19 inch displays. The common features of these displays are that primarily they are monitors, secondarily they are multimedia (TV) devices with SCART connectors. This is very important to say because there are also devices which are primarily low-end TVs with VGA connectors.

The native resolution of the last mentioned displays is typically 640x480, less often 800x600 regardless of their size.

Whatever the diagonal is, these televisions - typically used in the children room for watching cartoon - can be taken into account as plan B for EP retrospective because of the poor quality panel, low contrast ratio and high delay time similarly to the composite output.

In the followings we refer to the monitor-TV combo simply as combo.

Traditional aspect ratio combos were produced by several companies but in Hungary we could find devices mainly from Samsung and LG - logically we can only buy used ones from online auctions or advertisements.

Fortunately these perfectly fits into our goal and all of the devices have SCART connection possibility which were sold in Europe.

Recommended appliances: Samsung Syncmaster 710MP and 730MP (17 inch), 910MP and 930MP (19 inch), and from LG the M1717A and M1721A (17 inch) or M1917A and M1921A (19 inch) types. From the M1917A type it has been produced parts to sell overseas without SCART connector therefore it is recommended to check if it exists before the purchase.

Naturally we can find devices perfectly fit into this application from other vendors as well. For example there is the Philips 150MT2 which produces even better image with beautiful colors than any of the Samsungs. Additionally the interlace modes appear perfectly stable on the screen because of the automatic deflicker function.

For those who has lack of space, it is worth to consider one of the 16:9 Full HD combos. With one of these appliances it can be served a PC and the EP on the same desk with the same monitor switching between them with a single keypress.

Such as for example the LG M2262D, M2362D, M2762D serials (Zozo: I have M2362D), which have plenty of inputs so even a Spectrum and a C64 can be parallelly connected.

Our plan is to prepare a list from the appropriate devices which can be



used with the Enterprise without any compromise. Additionally those will be able to attach comments who have been used their computer with the given appliance. Hopefully this will make it easier to start a targeted search for those EP-fans who would like to buy a modern display.

Csaba Szilvási

Dream card in preparation (DreamTurboCard)

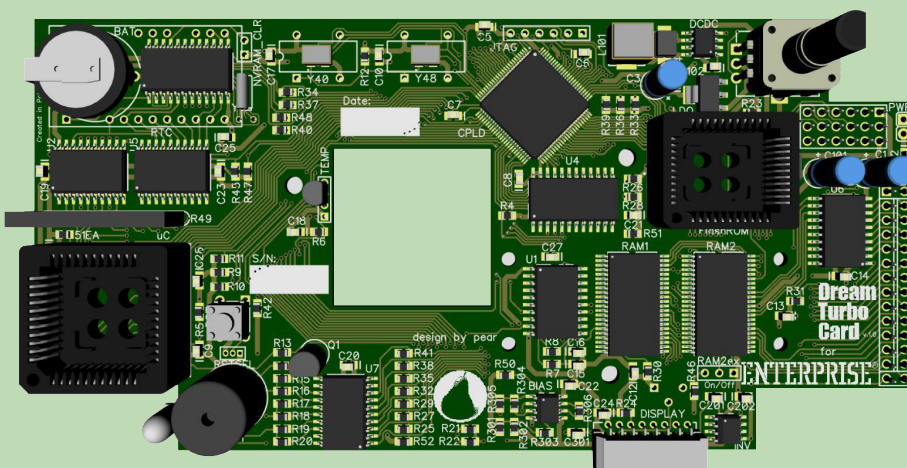
Maciej Gruszecki (pear) works in his workshop to create a miracle card for Enterprise, which will be able to:

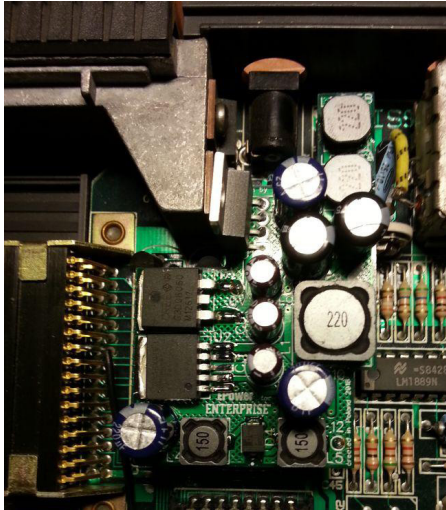
- 1 MB SRAM, optionally 2 MB, in banks of 64KB,
- 512 KB FlashROM, 8 banks of 64 KB with the option of individual switching off, EXOS in bank 7 (always on),
- RTC clock,
- NVRAM (battery backup),
- two-channel synchronized clock signal generator: system clock 4/8/12/16/20 MHz (2/4/6/8/10 MHz Z80 CPU), EXDOS clock 8/9.6/10/12/13.33/16 MHz
- LCD or OLED display (2x16 chars),
- RGB LED to signal by colors the selected CPU clock:

2MHz blue,
4MHz green,
6MHz yellow,
8MHz orange,
10MHz red,

- optional temperature sensor for NICK,

- configured by rotary encoder or by software.





Enterprise Power module

The EPower module replaces the original Enterprise power circuits. Specification The module has three power sources:

12 V @ 0.7 A,
5 V @ 1.5 A channel A,
5 V @ 1.5 A channel B.

The current limitation of the 5 V stabilizer is set at 3.7 A [$I = 37125 / R1$] (the maximum possible current is 7 A, if need, but it could damage the circuitry of the computer). Maximum values (limited by used components) are:

12 V @ 1.0 A,
5 V @ 2.3 A per channel (both 5A+5B @ 4.5 A).
This is much more than the original power source (12 V @ 0.15 A and 2x 5 V @ 1 A).

How to install

The author has made every effort to make the module as reliable and safe to use as possible. However, You make any modifications inside of your equipment at your own risk !

What you need

EPower module screwdriver soldering iron tin extractor solder tin pliers Enterprise mainboard preparation. The following components should be desoldered from the motherboard:

- C8 (100 μ F)
- C9 (100 μ F)
- C10 (100 μ F)
- C11 (100 μ F)
- C12 (100 μ F)
- D2 (1N4001)
- D3 (1N4001)
- D4 (1N4001)
- L1 (coil)
- U19 (LM7805)
- U20 (LM7805)
- U21 (LM78L12)
- TR2 (BC337)
- TR3 (BC212)
- R13 (100 Ω)
- R14 (10 Ω)
- R15 (1.5 k Ω)
- R16 (3.9 k Ω)

Installing the module

The module pins are matched to holes left after the components:

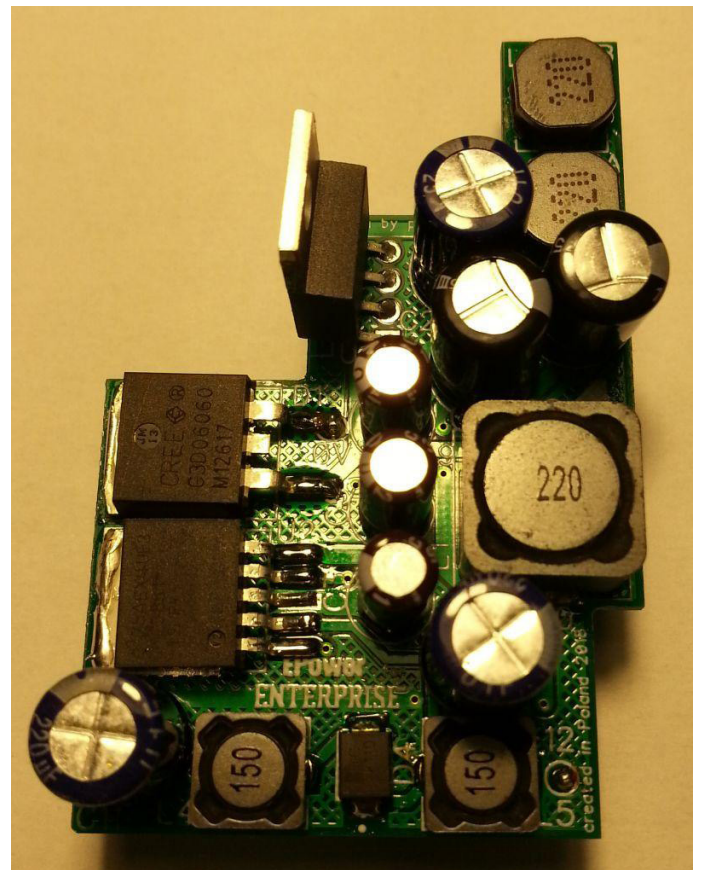
D2 (both holes),
TR3 (ground),
C8 (+9V),
U21 (output +12V).

The holes in which the module is installed should be very carefully cleaned of tin residues. Especially the holes after the transistor TR3 and the U21 chip due to their smaller diameter.

Do not force the pins. Despite careful assembly, it is possible to slightly tilt the pins from the vertical. They should be corrected if necessary.

The position of the pins is very precisely matched and the module should be allow gently slide into place. When soldering, make sure that the module adheres to the main board (up to the height of pin spacers). After assembly, cut out the excess of tips with a pair of pliers.

The main stabilizer is intentionally undercut to allow the existing heat sink to be screwed.



The mysteries of HiSoft Pascal



Written by: Zoltán Povázsai
(Povi)

Let's start this article with a riddle: What does the following program say?

```
program test;
var a : integer;
begin
  a := 32767;
  WriteLn(,a + 4 = , , a + 4);
  WriteLn(,4 + a = , , 4 + a);
end.
```

The watchful reader may immediately suspect that the result of the operation will certainly not fit within the range represented by an integer: the result is greater than $2^{15}-1$, or 32767. The more watchful reader who has already read HiSoft Pascal's description of the „Compiler Options” which says, „if the overflow control compile option is switched on, the program will stop with an overflow error message!”

Let's see what the documentation says about this: the ,O' option controls overflow handling for certain arithmetic instructions. Integer multiplication and division, and all real type operations are always checked. In the case of integer addition and subtraction, it is checked only if the option (O+) is switched on. The default is that this option is on.

Based on the above, we expect the program to stop around the first WriteLn line with an overflow error message. What do we see instead?

```

HISOFT PASCAL COMPILER
c
HiSoft Pascal Enterprise
Version 1.2
Copyright HiSoft 1985
All rights reserved

6468 1 PROGRAM test;
6468 2 VAR a : integer;
6471 3 BEGIN
647A 4   a := 32767;
6480 5   WriteLn('a + 4 = ', a + 4);
64A0 6   WriteLn('4 + a = ', 4 + a);
64C7 7 END.
End Address: 64C9
Run?y
a + 4 = -32765
4 + a = Overflow at PC=64C1

```

The first WriteLn line ran without errors, although the overflow monitoring option is on!

Still is the sum dependent of the order of the addition? Or is the compiler just beeing faulty? Let's see what the compiler generates for the second case (4 + a):

```
ld  hl, 4           ; HL = 4
push hl             ; HL to the stack
ld  hl, (0xfffe)    ; HL = a
pop  de             ; DE = 4 (pop from the top
                    ; of the stack)
or   a              ; clear Carry flag
adc  hl, de          ; HL = HL + DE + Carry
call pe, 0x6a6      ; in case of overflow jump to 0x6a6
```

At first glance, it might be strange why the compiler use the slower ADC command (15 clocks) instead of the ADD (11 clocks) and even have to delete the Carry flag before (plus 4 clocks) to get a good result. The explanation is that the ADD command does not set the overflow flag, but the ADC command does, and that is what we need when the overflow check is on! At an overflow event, the routine at address 0x6a6 will state the error message and the program stops.

Of course, when the overflow control is off, the compiler will use the faster ADD command:

```
ld  hl, 4           ; HL = 4
push hl             ; HL to the stack
ld  hl, (0xfffe)    ; HL = a
pop  de             ; DE = 4 (pop from the top
                    ; of the stack)
add  hl, de          ; HL = HL + DE
```

But let's go back to the first case (a + 4), which ran also when overflow control was on:

```
ld  hl, (0xfffe)    ; HL = a
inc  hl              ; HL = HL + 1
inc  hl              ; HL = HL + 1
inc  hl              ; HL = HL + 1
inc  hl              ; HL = HL + 1
```

The compiler recognizes that four inc hl commands (24

clocks) are faster than putting the 4 into the DE register (31 clocks) and then add (11 clocks). The only problem is that during the high optimization it forgets that the overflow detection option is on. The compiler always generates the above code, regardless of the value of the „O“ option.

Based on these, this is an error in the compiler, so it's good to know about it. If the overflow test is important for us (it is switched on) and one part of the addition is constant 1, 2, 3 or 4, place it to the left side! In case the overflow check is off, place the constant to the right so the compiler can generate faster code!

Let's take a look at the following case:

```
program test;
var a : integer;
begin
  a := 20000;
  WriteLn(, a * 2 = , , a * 2);
  WriteLn(, 2 * a = , , 2 * a);
end.
```

According to Pascal documentation, integer multiplications are always checked for overflow, regardless of the value of the „O“ option. Instead, we see that the first multiplication runs, even though the result is greater than 32767.

Do you think the documentation is not good? Is it possi-

```
ld  hl, 2          ; HL = 2
push hl           ; HL to the top of the stack
ld  hl, (0xfffe)   ; HL = a (variable „a“ is
                  ; at address 0xfffe)
pop  de           ; DE = 2 (pop from the top
                  ; of the stack)
call 0x077e        ; multiplication routine:
                  ; HL = HL * DE
```

The first four lines are similar to the addition case: inserting the two operands into the HL and DE registers. And finally calling the routine at 0x077e, which makes all the multiplication (and handles any overflow), then returns the result in the HL register.

For inverse factors ($a * 2$), the compiler generates the following code:

```
ld  hl, (0xfffe)   ; HL = a
add hl, hl         ; HL = HL + HL
```

Indeed, our guess was good, an optimisation happened here too: the compiler recognizes that it can produce much faster code if it does not call the multiplier routine, but makes the multiplication by two with a simple addition. The only beauty issue is that, although the documentation says that there is always an overflow test for the whole multiplication, this is not the case, regardless of what is set in the „O“ option.

What can we do about it? If we insist on overflow testing and one factor of our multiplication is constant, put it to the left, in which case the compiler will always generate code that uses the multiplier routine. However, if you want to take advantage of the speed increase resulting from optimization, let's put our constant factor to the right! Of course, there will not always be optimization, just only for cases of 2, 3, 4, 5, 6, 8, 9, 10, 12, 16 and 20.

```

c
  HISOFT PASCAL COMPILER

HiSoft Pascal Enterprise
Version 1.2
Copyright HiSoft 1985
All rights reserved

6468  1 PROGRAM test;
6468  2 VAR a : integer;
6471  3 BEGIN
647A  4   a := 20000;
6488  5   WriteLn('a * 2 = ', a * 2);
649D  6   WriteLn('2 * a = ', 2 * a);
64C1  7 END.
End Address: 64C3
Run?y
a * 2 = -25536
2 * a = Overflow at PC=64BB
  
```

ble to switch off the overflow option for the multiplication operations? This is contradicted by the fact that our second WriteLn line actually stopped with an overflow error message! Then how it could be?!

The program will always have the same result, regardless of the compile option. The first multiplication always runs correctly, the second always stops with overflow. What is the difference between the two multiplications? Would it not be true that the product value is independent of the order of the factors?! We may suspect that there will be something similar in this case as in the addition case.

Let's see what the compiler produces for $2 * a$:



How many types of Enterprise does exist?



Written by: Zoltán Németh
(Zozosoft)

There were the NCC-1701 followed by the NCC-1701-A, NCC-1701-B,... as a Star Trek fan would list it.

But let's just stay with our favorite machines. In our country (Hungary) most probably the answer is the English and the German EP128. More informed people would add that there is also an EP64. If we raise this question at the end of 80's then the answer is English, German and bilingual... The latter characterizes well the flow of official information at that time. Years passed before it became clear that all German machines were bilingual. But many German machine owners (including us) were delighted to discover that his machine was bilingual, so thus the smartest.

The company Enterprise originally planned to market the machines in 26 different countries: United Kingdom (UK), Andorra, Australia, Belgium, Channel Islands, Denmark, Finland, France, Germany, Netherlands, Iceland, Israel, Italy, Luxembourg, Norway, South Africa, Spain, Lebanon, Portugal, Singapore, Malta, Cyprus, Hong Kong. The first two models were Enterprise 64 and Enterprise 128, their official model numbering being 500-525 and respectively model 400-425 in the order of the countries listed above.

Unfortunately, almost none of the ambitious plans came to fruition, the English company sold three types: English Enterprise 64 (Model 500), English and German Enterprise 128 (Model 400 and 408). Model 911 would have been just a few of the next Enterprise models that existed as prototypes, but its development was interrupted due to the financial collapse of the English company.

Between 64 and 128 machines in addition to the memory size there were several differences:

EP64 is equipped with version 2.0 EX-DOS and BASIC, but the EP128 with version 2.1.

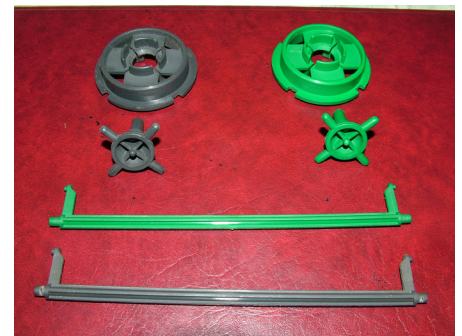
In case of EP64 the labeled cartridge, for EP128 it was already missing, probably it was the victim of a cost reduction.

The EP64 has a green joystick cap and joystick arm, as well as under the



invisible rubber bell on the joystick, and a space key press bar. In EP128 all of this is gray (some machines have a green press bar for the space bar). The green joystick was only known from the cover of the English manual, causing many to feel a painful „Why is my machine does not have a green joystick?“.

Removing the cover of the computer it can be seen that additional ground



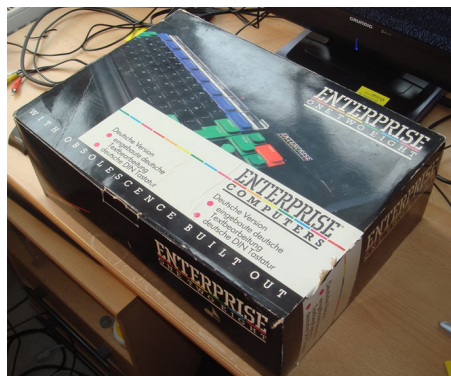
wires have been routed in EP128 machines to reduce interference. It was prescribed for the repair shops that if an EP64 would arrive, they should make this modification.

There is also a major technical difference between the English and German machines: the German „engine room„ had been painted with a silver shield on the inside to conform to the stricter German regulations regarding radio frequency noise emissions (such modifications have been occurred also in case of other machines). This modification, under some extreme circumstances (such as a long ribbon cable extension on the system bus), resulted in more stable German machines.

From a software point of view, the German machine received 16K more ROM. Inside this, in addition to the German language upgrade, it was also placed the VLOAD / VSAVE / VDUMP utilities. Switching between German and English mode is possible with the BRD and UK commands, hence the name „bilingual machine“. I understood the term UK relatively easily, but thinking of the BRD for more than 20 years, until Sipuchu stated that it was the abbreviation for the Bundesrepublik Deutschland.

Physically, this expansion available in two cartridge variants, one with the original English BASIC ROM on two socket panels, and the other with the English and German ROMs on a single socket panel with 32K EPROM.

It is less common that there are two types of German-looking machines: machines sold in Germany (or at least ready to be marketed there) have undergone a „fuller Germanization“, giving them a plus 128K label replacing the well-known „ONE TWO EIGHT“ and the machines also had stickers with German text on the cover. Since most of the machines (including the German ones) came to Hungary directly from the warehouses in England, this variation is very rare, only a few are known.



Thanks to different vendors, there are still Enterprise variations:

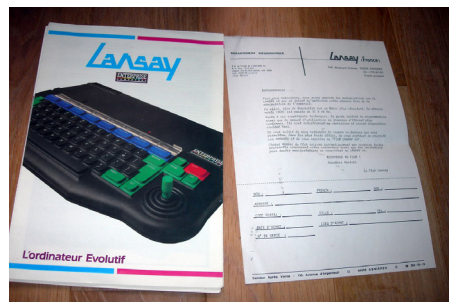
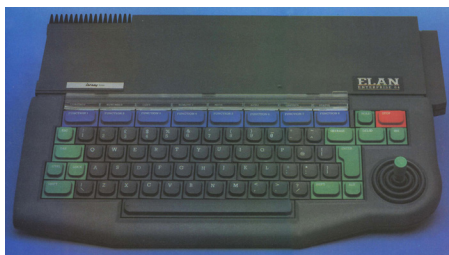
The German company Hegener & Glaser developed chess computers under the Mephisto brand. Chess was certainly the link for the Intelligent Software company, working on the same area, to get known with the Enterprise. Initially, they bought the EP under their „own name“, selling the 64K machines with name Mephisto PHC64. In practice, this was manifested in Mephisto stickers covering the Enterprise inscriptions. They also tried to sell the machine to

schools, for which an initial version of the German language expansion was completed. Then, in August 1985, they founded Enterprise Computers GmbH, the German EP, jointly with the English Enterprise, and from then on, EPs ran under their own names.



The French Lansay, primarily a toy company, in the 1980s, made a trip into several fields of electronics, disk players, hi-fi towers, etc...

In the field of computers, Enterprise became the focus of choice. At the beginning of 1984 it was already said in some articles that they would sell it, but after a while they try to sold it under their own name call it as Lansay 64. A January 1985 issue of Soft & Micro was shown a „real“ Lansay machine appearing in a Lansay label glued above the F1-F2 buttons. However, the machine itself was an early prototype of ELAN, probably



the photos are much earlier, and was announced when the machine finally came out. The machines that Lansay

actually sold were completely plain English EP64s, as can be seen in later articles and advertisements. Only the French EP brochure shows the Lansay logo.

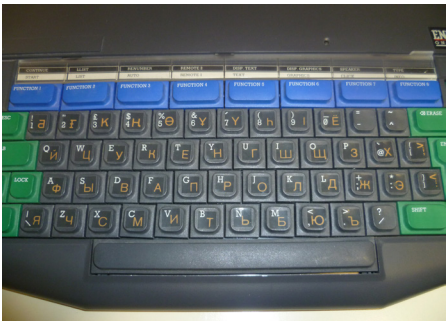
The most spectacular Enterprise variation thanks to Egyptian Computer Technical Co.: the Arabic Keyboard EP! Initially, Arabic characters were stickered on the keys. In the first series, they are black. Then they may be realized that black on gray keys is not a good idea, so it was changed to green for the next series. Most of the machines have already been painted professionally with Arabic characters, also in green. (I think it looks very good, so it would be good to have a similar technique, producing a HFONT keyboard where the ALT characters would be painted similarly.) From technical point of view these are normal English machines, the Arabic software could be loaded. In principle, only 64K machines have been introduced into Egypt, but at least one Arabic keyboard 128K has been found there.



One of the big surprises of 2017 was that it turned out that the Danish distributor (Semicap) not only made the Danish ROM (by modifying the BRD expansion), but also made the Danish keyboard!



The German and Hungarian EP companies worked together to target the Soviet market, the biggest result of which was the transfer of about 3,000 machines to schools in Kazakhstan. These are Cyrillic (to



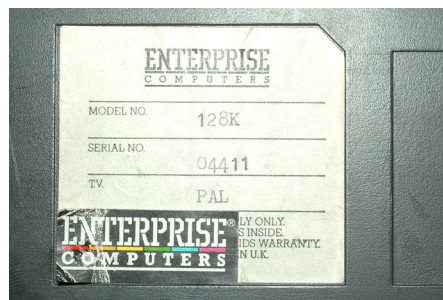
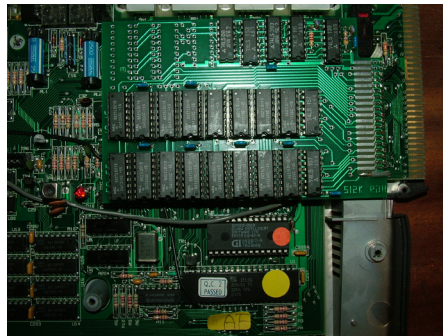
be exact Kazakh) keyboards, and the Cyrillic characters are stickered.

The machines were EP128 for students, and EP64 for the teachers,



and there were connected an additional unit containing a Winchester having also a 256K RAM expansion. Therefore the machines got an ENTERPRISE 320 label.

The Dutch and German price lists also featured an ENTERPRISE 320 and an ENTERPRISE 576, which we were surprised at first. It turned out that these are machines equipped with an expansion board from the Dutch company BUGTRONICS



(with one or two rows of RAM IC) installed at the German company Enterprise.

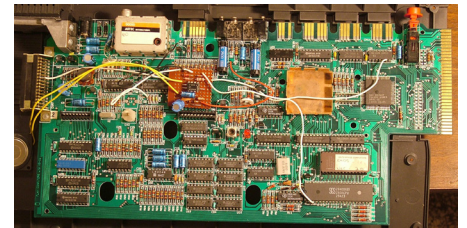
If we look inside the machine, we could notice further variations: as with many other machines, the EP comes with several versions of the motherboard. Currently ISSUE 3, 4, 5, 6 are known.

ISSUE 3 motherboard packed into the first 100, were not commercially available machines. They were sent to developers and journalists for getting known with the machine between November and December 1984.

Most noticeably on the motherboard itself, the internal speaker was not designed for the machine, and the associated amplifier was added at the last minute, assembled in a piece of prototype board, then wired. (This development could have been omitted because most of the

EP owners first hardware modification was to cut the internal speaker wires) Some newspaper articles even mentioned machines without this modification. The motherboard quality feels somehow better, unused board areas are filled with shielding surfaces, and the pins of the edge connectors are wider. By the way edge connectors: it is noticeable that it was originally designed positioning grooves for all the rear connectors, although they have never been cut. The monitor lacks the A6, B6 pins. This has been changed for later motherboards, and the other connectors still have a recognizable cut.

Commercially available machines are made with ISSUE 4, 5, 6 motherboards. ISSUE 4 and 5 are the typical motherboard of the EP64, while ISSUE 6 is typically the motherboard of the EP128. However, there are exceptions: at the



CONCESSION NOTE No: 2

ORIGINATOR: Colin Adams
DATE: 22.10.84
PART NO(S) AFFECTED: 500-04 (P.C.B. Assy)

DESCRIPTION OF PROBLEM
ROCKWELL'S READ TO MARK - SCALE.
R21 REPLACED BY 470R POT

REMEDY (NOTE ANY DEVIATIONS FROM SPEC.)
ADD 470R POT IN PLACE OF R21.
ENTERPRISE TO SUPPLY 100-001.
WELDON TO ADJUST 50% OF UNITS FOR 25% COUNT
AND 50% FOR 80 COLUMN MODE.

THIS APPLIES TO ISSUE 3 PCB ONLY
CLASS REPAIR CONCESSION 49 S

NUMBER OF COMPUTERS AFFECTED: 100-001/153
COST IMPLICATION PER COMPUTER: 1
TOTAL COST IMPLICATION: 1

AUTHORISATION

PRODUCTION CO-ORDINATOR'S SIGNATURE: Colin Adams
VENDOR'S Q.A. SIGNATURE: Colin Adams

CONCESSION NOTE No: 5

ORIGINATOR: COLIN HOWES
DATE: 24.10.84
PART NO(S) AFFECTED: 500-05 (PACKED UNIT)

DESCRIPTION OF PROBLEM
REQUIRED TO IDENTIFY ON H/L AND C/L (04-02) WHETHER H/L BIASED FOR 256 COLUMN OR 80 COLUMN MODE.

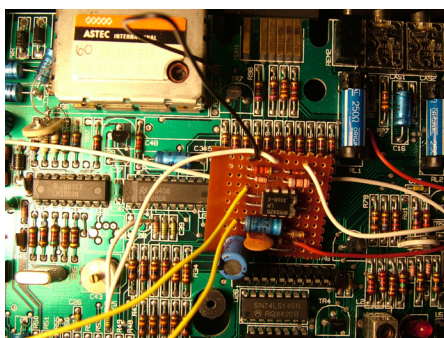
REMEDY (NOTE ANY DEVIATIONS FROM SPEC.)
LABEL AS SHOWN BELOW, SUPPLIED BY ENTERPRISE TO BE ATTACHED TO UNDERSIDE OF CASE. MARKING AND UNDERSIDE OF PRESENTATION LABEL (04-02) - LABEL TO BE AFFIXED HEREON.
NOTE: IF BIASED FOR 80 COLUMN MODE, STRIKE OUT 256, AND INSERT 80 COLUMN AND 80 COLUMN MODE, CHANGING LABEL DATA. CLASS 1/5/85 CONCESSION NO 2

NUMBER OF COMPUTERS AFFECTED: 100 - ISSUE 3 BOARDS
COST IMPLICATION PER COMPUTER:
TOTAL COST IMPLICATION:
AUTHORISATION:

PRODUCTION CO-ORDINATOR'S SIGNATURE: *Colin Howes* VENDOR'S Q.A. SIGNATURE: *John Dutton*

STANDARD VIDEO BIASED 80/256 NOT FOR RESALE

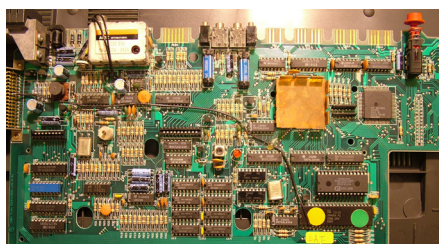
LABOR SUPPLIED BY ENTERPRISE.



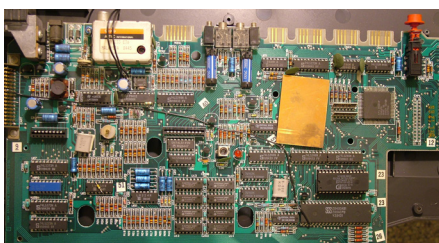
beginning of production, some motherboard failed at quality control, these ISSUE 4 motherboards were later repaired and put back into production, so they pop up randomly, even in EP128 machines. It does not to be known any EP128 with ISSUE 5 motherboard but some of the EP64s were made with ISSUE 6.

The ISSUE 4 is almost the final, has the internal speaker amplifier already on the system board. Only a resistor and a capacitor next to the modulator are soldered afterwards. The monitor connector has changed compared to ISSUE 3, the 12V switching voltage has been applied to the B6 pin, and the B1 pin is missing. The most interesting thing about this board is the branding: FLAN instead of the usual ENTERPRISE! This name was worn by the company only for about 1 month: February - March 1984. Thus, the brand indicates that the first few thousand motherboards

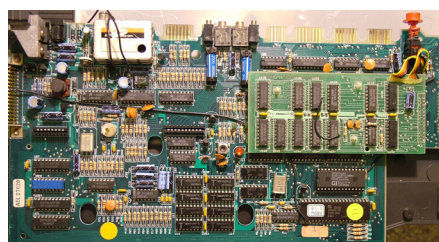
were manufactured during this period. So it's particularly interesting the FLAN, ISSUE 4 motherboard EP128, which from about two dozen are to be known.



On ISSUE 5 boards, the above mentioned capacitor and resistor beside the modulator are already on the board, and the branding is already ENTERPRISE. The monitor connector is unchanged, so the pins A6 and B1 are missing.

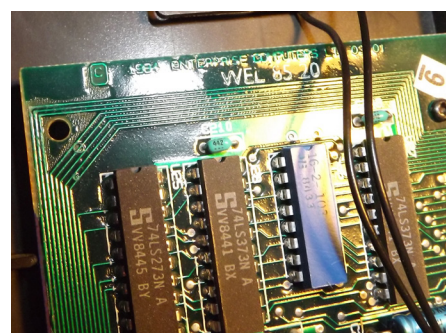
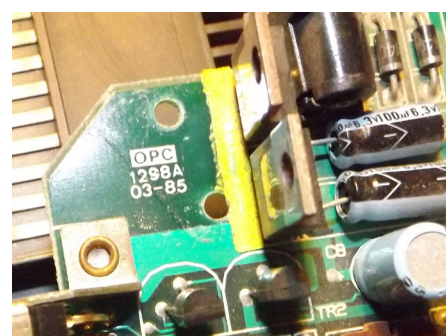
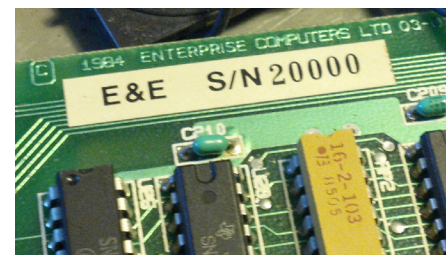


ISSUE 6 is the most well-known version for us, as most of the EP128 machines are equipped with it except the above mentioned ones. Here, the unused pins of the monitor connector are placed back as spare pins (most of the people wired the signal to the B1 pin when creating a color composite output).



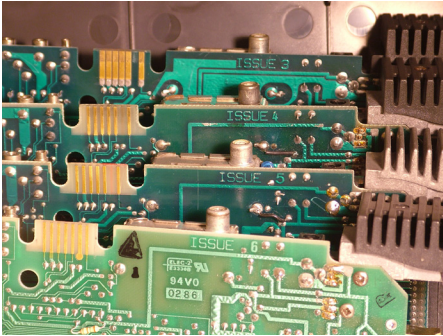
For true gourmets, looking more closely at the motherboards can discover signs from different manufacturers: OPC, WEL, FLHK, AEL, E&E... it is managed to be unscrambled only

three them: WEL=Welwyn Electronics, OPC=Oriental Printed Circuits Ltd., E&E=Elec&Eltek.



Out of these, the E&E boards appear to be the last in the series and are well recognizable by their light green color (even without being disassembled, peeping through the lower grilles). This is interesting for those who wants to find a machine assembled with a new, improved version (08-47) of Nick's chip.

The easiest way to guess the motherboard version without disassembling the machine is to take a look at the monitor connector: once all pins are in place, it is the ISSUE 6. If we see this in an EP64, it's a rare piece (We know about 3 of them so far). If A6 and B1 are missing then it is ISSUE 4 or 5. If we see it in an EP128 then 99.99% it is an ISSUE 4, so it is the rare FLAN motherboard. ISSUE 5 has not yet been found from EP128 machines.



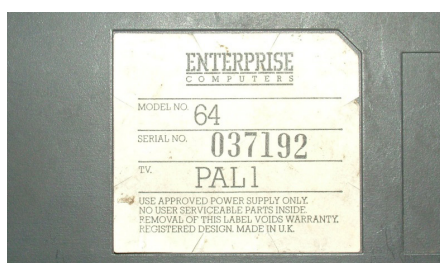
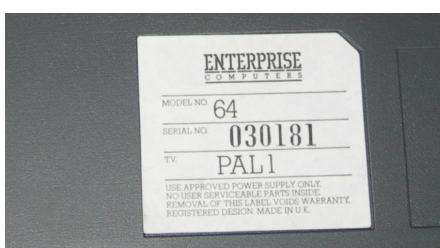
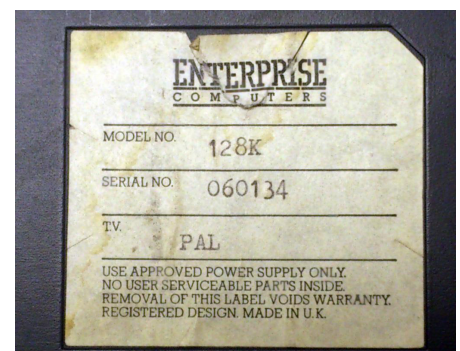
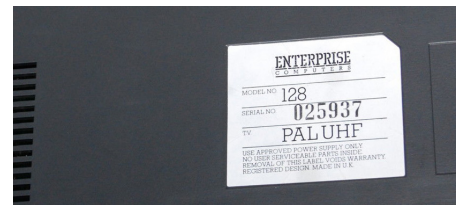
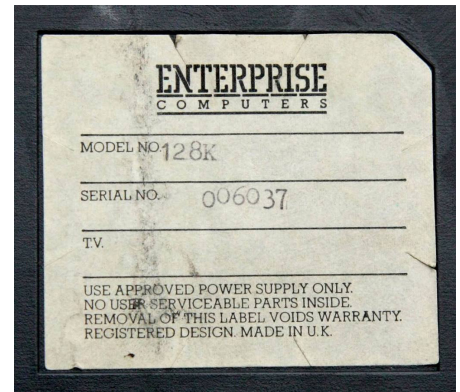
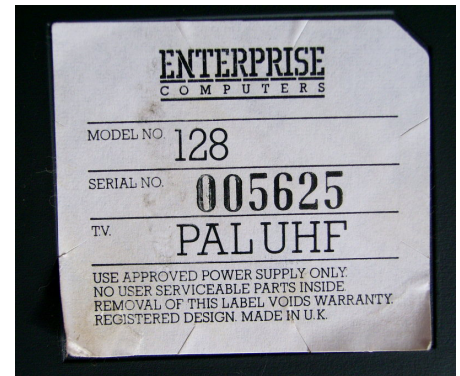
If one has seen more than one Enterprise machine, it will sooner or later be seen that not all machines have the same serial number stickers. The EP64 is made with beautiful large printed numbers all the way through, and each serial number is six digits long. The EP128 has five-digit serial numbers for the first time, probably after they were switching from 005000 to the six-digit beautiful large printed numbers already known at EP64. For about the first 3600 machines, the serial numbers were stamped with something like a stamp, but the subsequent ones seemed to be typewritten. It is known that because of the long delay they could not really break into the market (especially since the 1984 Christmas season was almost completely gone), so they have brought forward the introduction of the EP128, hoping to have a better welcome of the more advanced machine. The labels suggest that the first 5,000 machines were originally intended to be EP64s, and because of the change in plans, labels that were quickly manufactured have succeeded in a different design.

Looking through the serial numbers, another interesting thing is revealing: in the first two thousandth range, the first 64's and 128's machines are mixed. Could it be that the already available EP64s were converted to EP128 with keeping of the serial numbers? Or they

have decided later on that it is better to use other numbering? Only a same serial number EP64 and EP128 could make a clear decision. Or a competent person from Enterprise.

The 128's are numbered nicely until about 026000. In case of the 64's from about the first 2000 they have jumped to 030000, than they have jumped from about 037500 to 070000 and finally they have reached about 073500. Summing it up, it could be find out how many machines were made: 26000 EP128, (2000) + 7500 + 3500 = 11000/13000 EP64, 37000/39000 Enterprise machines, depending on whether in the first 2000 it was numbered the 64's and 128's machines together or separately. Plus 4 Model 911 prototypes.

Returning to the serial number labels for a moment: these „typewriter“ labels appear randomly in the range above 005000, most likely due to typing mistakes. At least no other explanation for the 060134 is available.



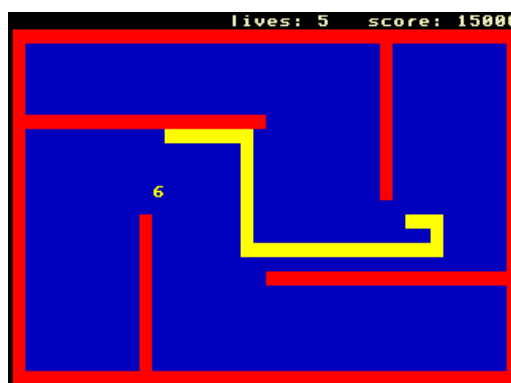
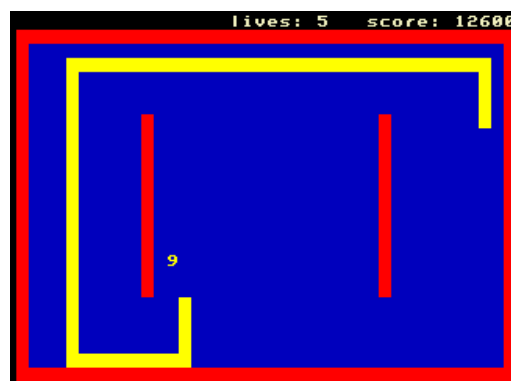
Nibbles 1k

2005 - PovySoft

Nibbles is the processing of the well-known „snake apple eating” game. Although it had been written a game named Nibbles for Enterprise a few years earlier by EDC, the curiosity of the software of PovySoft is that the size is under 1kbytes. The software was made for the 2005 MiniGame Compo (an upgraded version of Snake 1k). The game won the 21st place out of 24 from the 1kbytes games category. He did not get a better rank, based on the comments, because it is „only” a Nibbles clone, without any further imaginations, it didn't even have any music. Unlike Snake 1k, Nibbles 1k is no longer running on EXOS 2.0 (Ep64) because for example it saves bytes and therefore the system variables are no longer set EXOS-compatible but using direct system segment writings. Of course, it probably would have fit in 1kb anyway.

The aim of the game is to collect 9 numbers on the levels following each-other. The snake must not collide with the walls or with itself. After catching each number, the snake is extended. The difficulty of the levels are increasing with more and more walls appearing. It has to be completed 9 levels in the game.

Controlling can be done with either the built-in or EXT1 joysticks. The game can be started by pressing SPACE, paused by pressing the PAUSE (HOLD) and exit with the ESC buttons.



Mega Pac Man 1993 - Endre Baráth

Simple but imaginative platform game. Compared to that it is a game compiled using Zzzip from basic, the graphical implementation is not bad either (up and down scroll and cute graphics). The goal is to collect everything on each level, then find the key and then the exit. The interesting point in this is that picking up every heap increases our jumping power so we can get into more and more parts of the playground as we gather. Sometimes we have to get back to the beginning from the end because we can go where we haven't before with our increased jumping strength. When you get to a new level, the jump force will be zero again.

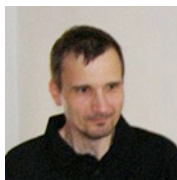
On each level we have an enemy, and when we hit, we lose energy. The main problem is mostly not this, but the fact that our jumping power is also diminished this time... and this can sometimes cause us to fail the course! So take care! Falling into the water has a similar effect on us, so it should be avoided. There are energy-boosting E letters on the playground, and they must be picked up to complete.

We can not control the protagonist while jumping, but we can control him when he falls, and we often need to! We can break certain platforms if we fall from above. This is often the only way to get there! (The first level contains a dangerous place where we can break off the platform from below the heap to be picked up, so the heap cannot be picked up anymore! Although this is more of a bug...) We have to deal with 5 levels.



What you should definitely see

- Top 10 Enterprise game



Written by: László Kiss
(Lacika)

The following „top list” is for those who may not have been following the development of Enterprise games on a daily basis since 1995. Of course, this does not mean that the top 10 games made since then - which is quite subjective anyway - but it is guaranteed to be spectacular and / or unique.



10. Boulder Dash - Enterprise Edition

The Boulder Dash Spectrum version is known by most of the Enterprise owners but it is of a very scandalous quality (primarily due to the „revolutionary” scroll), and so to say useless. Fortunately, the game also has a pretty good version for CPC, which runs on a graphical screen, but it couldn't be rewritten because it changed most of the animations by modifying the palette (there are only 2 fixed colors in the 16-color palette). However, the CPC version is actually a transcript, and this game runs in character mode on machines that can handle it (like Commodore 64 and Plus / 4). In practice the CPC version uses a software emulated character mode which highly facilitated „rewriting”. István have completely rewritten the game thus the Enterprise version uses 4 (and respectively 5 with ALTIND0) color character mode. In many places, with turning into character mode, it have been achieved significant simplification and / or acceleration of the

code. Instead of the complex hardware based - video address suffering - scrolling in the (much faster) character based mode it is enough to copy the screen content with LDI commands. And this is still faster than the CPC in graphics mode where only incoming characters and the top (status) line is redrawn. The conversion also resulted in significant memory savings, so the transcript runs on EP64 (at enjoyable speeds).

Although only the first edition was prepared for CPC, the expansion of the program (the track format of edition 2 has new features) made it possible to handle the tracks of both the second and third editions. There are several versions of the program:

Boulder Dash CPC - the transcript of the CPC version (the graphics are changed on some points).

Boulder Dash 1 C64 - CPC transcript with C64 raphics, and the colors of the tracks are modified, respectively the 1. level is a slower.

Boulder Dash 2 C64 - C64 style graphics and colors, and slow - C64 version emulating - speed. There is a loading screen (BD-2SCR.COM) which is animated and it can be separately started. Boulder Dash 3 C64 - C64 graphics and tracks which complies with the 3rd edition. Originally „Demo” was not prepared for this edition, István have made one for it. There is a loading screen for this also.

Boulder Dash Classic Collection 1-2 - Track collections converted from Spectrum with C64 charset. The tracks are collected from different machines (C64, Spectrum, és Atari) by the Triumph Game Labs. It have been put such BOULDASH.COM version inside this which uses the FILE extension for .lvl file selection; the program contains the FILE, thus it is not to be loaded separately. By pressing the STOP key the default BOULDASH.LVL file is loaded, and this happens also when there is no EXDOS (tape recorder configuration). It can be selected only .LVL extension files, and this version checks the CRC of the compressed data. There are 97 sets of tracks in the first edition and 40 sets in the second, hopefully meeting every need...

9. Sorcery+

Although the Sorcery is well known as one of the few programs which from was issued an official EP version, one may notice the plus symbol at the end of the title. At first glance, Geco's transcript is not different from the „original version” (except the



displays below the playfield). It is true that some of the objects are in a different location, the counter-distribution is not exactly the same, and one of the wizards is elsewhere.

The surprise comes to the „unsuspecting“ Enterprise owner when, after the release of the eight wizards, he takes his rightful place with them in the SANCTUARY. After we „grab“ the reward points based on our remaining time, the adventure continues! Passing the door opening in the upper left corner, the story continues with a new mission: destroying the evil Ghostbiter mentioned in the framing story. It is possible only that way if we collect the 4 GOLDEN HARTs and we take them to the MAIN HALL. We can get one of the hearts by taking the disguised figure (DISGUISED ???) from the room called JUST IN TIME to the room called UNDER MAIN HALL and throw it into the water. In the second episode, the graphics, monsters and usable objects change. We should pay attention for the flames of the torches because they consume our energy when touched (unlike in the original EP version), and some of the cauldrons do not charge but discharge us!

In CPC, the two parts are loaded separately, in EP all codes fit into memory at the same time. We can enjoy the Amiga's loading screen.

8. Exploding Fist

The Spectrum version of Exploding Fist is also well known to EP owners: it was one of the first Spectrum transcripts which reached many machine owners. It was considered one of the best fighting games not only on EP but



on Spectrum. The game is memorable not only from its large, nicely animated sprites, but also that it owns 18 offensive-defensive movings. These movings try to simulate Bruce Lee's Jeet June Do fighting technique.

The CPC version well done too: the program runs on a larger, 16 color screen, and playing with it is good as well (the rules of the game and the „crafts“ are the same). Unfortunately, the creators were very keen on running the program on 64k CPC machines, so the decoration is quite moderate: 32kb program, 2 video pages on 32kb, there is no music and it has only one background image. However, Geco made a significant enhancement of the Enterprise version:

In the EP version, image toggling is only done on half of the two video pages, the fixed remaining background is placed on the half of one video page, thus makes extra 8kb free memory for the character set and music. The program features C64 music, of course, in a more modest arrangement.

On 128K machines, the battle takes place in front of the 4 backgrounds of the C64 version and the single background of the CPC (so the total of 5 backgrounds alternates).

The program should run on a 64K machine, but it is slow. Unfortunately on 64K there is only one background.

The colors are „more pleasant to the eye“ than on CPC and C64 versions. On the C64, the purple mountain is not so engaging for example ...

The speed can be adjusted with the numeric keys ‚1‘ to ‚4‘. On 4MHz machines, Mode 1 and Mode 2, on 6MHz machines, Mode 2 and Mode 3 seems appropriate.



7. Rick Dangerous

Rick Dangerous, also known from the Spectrum conversion did not only conquer Spectrum. The game made by Core Design has also been released for Commodore 64, Amiga, Atari St, Amstrad CPC and PC. Although the game requires a lot of practice, it is fun and won't be boring for a long time. István's conversion is a transcript of the CPC version, which (in principle) uses the same screen size as the Spectrum version, but the colors are very nicely selected. Additionally, on EP, the image is (practically) one row higher. The CPC version seems to have a mistake, that the visible screen is only 23 characters high.



6. Switchblade

The game made by Gremlin Graphics may be familiar to many former 8-bit computer owners, as the program is a true multi-platform development: in addition to Amiga it was also issued on Spectrum, Commodore 64 and Amstrad CPC. It is a very pleasant game with nice graphics and music. The most beautiful one from the 8-bit versions is the CPC version, which, fortunately, is not a conversion of the monochrome Spectrum version: it runs in four color mode and has larger screen size. The Commodore version is quite terrific: runs at half resolution, with a poor color composition, you can't really see what's on the screen... Enterprise owners have long been familiar with the Spectrum version, but since Batman they know that it can be produced very nice games in four color mode, so check out Geco's (extra enhanced) CPC conversion! The gameplay and the map are of course the same as the Spectrum (and C64) version, but the visuals are much more impressive. The 4 color images of the intro were replaced with EP attribute images, except for the sword, which remains in 4-color mode, and only changes line by line with LPT. While playing, use the F1-F7 function keys to select a color palette. Rivals got extra colors.

5. Star Sabre

The Star Saber shoot'em up game have the chance to apply for the title of the best Enterprise shot'em up



games. The only serious rival in the category is the Spectrum R-Type. The game was released for CPC in 2008, and in 2009 it was made another upgraded 128K version. This was converted for EP by Geco. In the game, you have to break through 5 difficulty levels through over an infinite number of rivals.

The only fault of the game is perhaps that that it became very difficult. On the one hand, the tempo evokes the speed of the original arcade games, which will initially be unusual after the Spectrum R-Type. On the other hand, the creator of the program (Paul Kooistra) did not economize on the number of enemies...

4. MicroProse Soccer Reloaded

The MicroPose Soccer is a true C64 classic football program. Unfortunately, the Spectrum version is quite disappointing, as it is virtually impossible to create a nice colored football program on an attribute screen. The CPC version is also a disappointing - so to say scandalous - Spectrum conversion. Geco, on the other hand, made major modifications (or rather rewriting) on the program.



In the CPC version, the screen size was probably not increased to allow the game to run at an acceptable speed. Although on Spectrum it has exactly the same size, it could have been at least two characters wider and four times higher. The CPC version - in a very crappy way - first draws the 32x20 playing field on 8000h and puts all the sprites on it, altogether in two color mode. Then depending on which video memory is inactive it converts and stores the data in 4 color mode to C000h/C400h (here the screen size is only 26x16). The playfield drawing routine has been substantially redesigned, the 4-color „visuals“ are based on the PC CGA version. The visible playing field has been enlarged to 40x24, making the screen even larger than on the C64.

Similar to the original C64, Spectrum and PC versions, there is also an indoor soccer version with 6-6 players. In this, the colors are alike C64 version.



3. Incentive games

There was a bit of „cheating” in the title because István created an Enterprise version of all six Freescape games (Driller, Dark Side, Total Eclipse, Total Eclipse 2, Castle Master, Castle Master 2) created by Incentive, so the title above covers 6 games. Most of these are known from the



transcripts of the Spectrum monochrom versions while the CPC versions are colored! However, István was not satisfied with the „smooth” conversion! Drastic modification of the programs allowed them a significant acceleration - this is not to be neglected in an „FPS game”. This was achieved mainly by replacing simple arithmetic routines with faster ones:

542Dh: signed multiplication: $AHL = A * HL$

5483h: signed multiplication: $DEHL = DE * HL$



54F1h: signed division: $AHL = AHL / DE$, $DE = \text{remainder}$ (most time can be won here because it is a mostly used and mostly slow routine)

5578h: signed multiplication: $HL = HL * L$

63F2h: signed division: $DEHL = DEHL / BC$ the nearest integer (not 0, unlike the others), $BC = \text{remainder}$

56F7h: filling of 60 bytes with the same byte (the 30 PUSH instructions for a new fill can be found at 36C6h); it is only used in outside areas, not in rooms.

In addition, it was managed to be accelerated by the modification of the interrupt routine and some other minor changes. However, most have been achieved by optimizing the routine that arranges the polygons to be displayed according to visibility (in this way the distant ones are drawn first and then properly covered by the closer ones). This operation can consume up to 25% time for more complex / slower parts (runtime is proportional to the number of polygons).

Thanks to all of these, from the 8-bit versions the Enterprise versions are the most beautiful and fastest ones (the C64 version uses half the resolution and is still awfully slow). Presenting the results of the conversions on Total Eclipse, the first frame duration at the start of the game is in milliseconds:

CPC	Ep (4 Mhz)	Ep (6 Mhz)	Ep (7.12MHZ)
720	533	350	296



2. Prince of Persia

The classic of Jordan Mechner, released in 1989, has no need to be introduced to anyone. For the game originally written for Apple II, the PC version brought the real success. The official 8-bit version was only issued for CPC and SAM Coupé. The CPC version was so well done that Geco „just” had to do a „smooth” conversion, and it became one of the most beautiful EP games ever.

1. International Karate + Reloaded

The similar game to Exploding Fist did not succeed very well (the screen is small and the game lacks mood-boosting back-



ground animations). It turned out during the rewriting of the CPC version that it entirely contains the C64 graphics in the same format. The part with a pond can also be fully found in the program, only the top row and 4 columns to the right and left side are missing. Probably, the creators also designed a 40x25 version, but they ran out of memory. It could also be happened that the 40x11 arena might not have been fast enough since the entire field is being erased in each frame. Quite a lot of instruction are used to draw the sprites because the C64 type graphics has to be converted to fit to CPC. However if it is stored in CPC format, 2 pixels stays in 1 byte, while on C64 there are 4 pixels in 1 byte (plus 1 byte / character to the colors), so it would need double space in the

program to store graphics. Because the smaller screen of the CPC version is quite disappointing for those who have seen the C64 version, the need to redesign the program is rightly arising. Geco has made significant changes to the program! On a 128K machine the speed is faster than on CPC, even though that the game appears on a 40x26 screen. The clearing time of the arena has been reduced to half the CPC version, despite the increased area. The waves known from the C64 version also appear on the water. The program runs on EP64 as well with still enjoyable speed, although the Soft reset does not work and it is a bit slower than the CPC version. The water part (the top two-thirds of the screen) was transformed from an Amiga screenshot, thanks to István's EPIMGCONV. This part of the screen is in attribute mode, including the top two lines. Of course, this also means that the resolution has doubled (!) despite that fact that at the same time this game displays the most colors. This version fit into 64k because while the original program used 2 full video pages for the visualization (the picture appears from one page or from the other), in this version the top two-thirds of the screen is taken from the same place and only the lower part remains in the old mode (so its resolution has not changed) to avoid flicker.

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dBase II. 2.43 (IS-DOS)

1. Basic concepts

The dBASE II relational database management system helps to organize and handle our data. Inside this sentence there are several concepts which could be unknown for many people. First of all those have to be described. This chapter could be skipped by those who have already get known to similar programs.

1.1 Data handling and the database itself

In case data has to be processed on any computer, it has to be stored on a mass storage. On the storage the so called „FILE“ contains a coherent dataset. In the golden era of data processing it has to be prepared a special manager program for all the files.

Each program could only use its on data, so the data that are related to

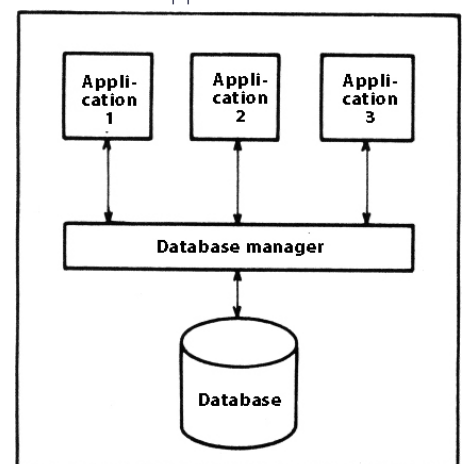
other applications had to be recorded in several files. This enhanced the storage wasting and in addition the possible mistakes.

Database management systems allows data to be stored as compact as possible considering one working environment. Later you can see that we have data where repetition is inevitable to ensure more confort for further work. Nevertheless these repetitions do not cause more recording work beacuse it is done by a computer which is faster and much reliable. The database manager is filling the gap between the database files and the application programs as a „floodgate“. Any data can only be accessed through the database manager.

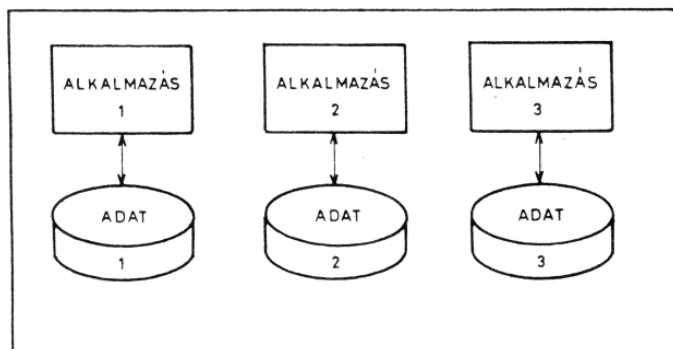
The database manager handles the data according to its own logic therefore the user do not need to know it to work with it. The modification and usage of data is very simple, the files are allways up to date.

The DATABASE is a wider concept than the file, it can be located phisically in several files on the mass storage. (The terms database and file are often confused in common usage.)

It is the merit of the database manager that each file can be managed in a uniform way, regardless of its structure, size and content. Changing or extending the data does not affect the programs of the applications made so far.



Standalone programs and files



The principle of the database management system

1.2. The relational database

Databases can be structured - the formation of relations between the data they contain - with a variety of logics. In the past it was used the so-called tree structure or HIERARCHICAL and the so-called NETWORK databases. In both of these, there is some kind of "parent-child" relationship. In a HIERARCHICAL system, all data can have any number of descendants, but only one ancestor. In a NETWORK system, the data not only could have multiple descendants, but also multiple parents. Both methods use complex chaining lists to record relationships to data, so storage requirements can be high for relatively small files.

The most widespread systems in microcomputer environments uses the so-called RELATIONAL databases, which structure is probably the most understandable. In this, the relationships between the data (records) of a file can be illustrated with a simple two-dimensional table.

The data for a single entity is in a row (this is a record) and the same properties of different individuals are below

CIKKSZÁM	CIKKNÉV	KÉSZLET	MINIMUM	HELY	ÁR

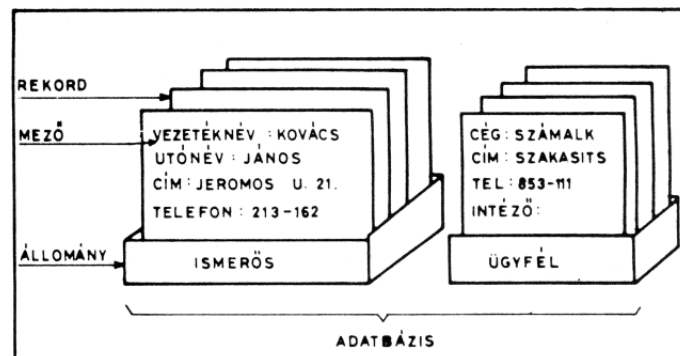
each other in a single column. The column is called a field. Each entry in the table is a self-managed value. Only the same type of data (for example number or text) can be included within a single column. Each row (record) is an independent unit, their physical order is generally irrelevant. Increasing the number of records does not make the data file more complicated, at most only „bigger”.

Usage of Relational Database Manager is appropriate when there is no unnecessary duplication of data in files. (for example in a stock record, we do not repeat characteristics of the commodity that remain unchanged throughout the work, but place them in a separate file.) Therefore, it is not advisable to store a relational database in a single file, but properly create multiple files.

In doing so, you have to work with records that are, in a sense, related to different files. The „identification field”, which is capable of unambiguously identifying individuals (records), helps to find them. Most records used in practice this type of data far before the introduction of compu-

ters. The name of an object or person is usually not reliably identifiable (think, for example, how many things have to be dictated in a register other than our name in order to be distinguished from our namesake relatives). Usually an identifier is a series of numbers, sometimes combined with letters. (In the example above, „article number” serves as the identification field.)

Another special type of field is the „switch field”, which creates a relationship between the related records



An example of a database structure

in two tables. It is often the same as the identification field, as it is advisable to choose some unambiguous property when making a connection. In the previous example the „article number” may be included in the „CARDBOARD” file, and in addition the „JOURNAL” file where we can record when and by whom the article was purchased. It is very important that you do not have to repeat the name, unit price, inventory of each item in the „JOURNAL” file using the switch field, as all of them can be searched from the „CARDBOARD” file with a short article number.

The switch field is thus contained in multiple files, so it is worth keeping a few features in mind when defining it: be as short as possible to take up small space; be unique, accurately identify the record; and finally, it should be easy for us to manage (implementation depends on the user).

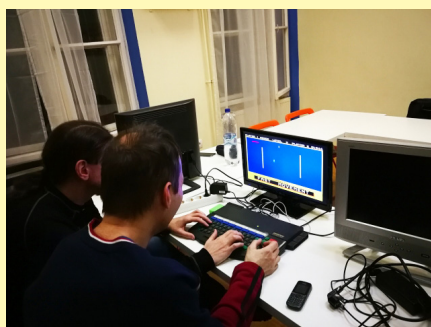
1.3 Main functions of database management systems

Activities expected of such a general purpose application program include:

- Creation of a database file (defining its structure)
- Data entry, modification and deletion
- Selection and display of data according to data aspect(s)
- Sorting of data by different aspect(s)
- Printing of data and other information

(To be continued...)

Enterprise Club 20 january, 2018

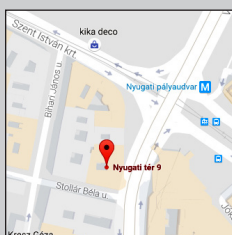


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