

ENTERPRISE

May 2015

Anniversary edition - e-Magazine

30 years old the
ENTERPRISE
COMPUTERS



**Unknown chapters
in the history
of Enterprise**

Interview with Werner Lindner

ENTERPRISE 128
SD Cartridge port adapter

SymbOS
(by Jörn Mika)

Unknown chapters in the history of Enterprise

Interview with Mr. Werner Lindner (Technical Director of Enterprise GmbH)

Do you know how many machines were sold in Germany and in other countries? We already know machines sold in the UK, Germany, Hungary (more than 20000), the Netherlands, Denmark, Spain, France, Egypt (4000) and Soviet Union (3000).

As for the sold machines in every country I really have to admit, that I do not know exact figures in any case. My work for ENTERPRISE Germany started, when UK was already closed. In the beginning I was responsible for end user support and I did some training - as far as hard-/software is concerned - for the new sales people. New, because the original staff of Germany was also fired by Lachu Mathani in autumn 1986. These people had promised to be able to sell thousands of computers in Germany, but managed only about 2.500 in appr. one year. Because of their promises ENTERPRISE UK had produced a lot of German EC128k machines and Lachu had them in stock now (his company Broadlight Ltd. had taken over all of the remaining ENTERPRISE stock).

There is a lot of paperwork missing, especially as far as sales figures is concerned and therefore all quantities before autumn 1986 are just estimations:

Germany: Appr. 2500 128k machines and a very small number of ENTERPRISE 64k (both by ENTERPRISE Computers GmbH) and a very small number of Mephisto PHC (via Hegener & Glaser). In fact: I have only seen one Mephisto BASIC Cartridge and one Mephisto PHC, that came in for repair.

Denmark, Netherlands, Norway, France, Spain and probably other western european countries: ENTERPRISE UK had direct dealer contracts with one importer for each country, but these people had only small companies. In fact they were more ordinary dealers but real importers/distributors and therefore there is probably only a small number of machines in each of those countries - a few hundred maybe in each country. The import and contact stopped in almost all cases after ENTERPRISE UK went into receivership.

In Germany we had only contact to the people in Denmark and the Netherlands. I talked to the guy from the Netherlands several times by phone and met him once, when he came to Munich to buy 12 machines from us. He showed us some hardware prototypes from his country: An internal 512kByte Memory Expansion with dynamic RAM and a small EXDOS controller, that was stacked on top of the computer (shown on ENTERFACE 1987/04-05).

As far as Denmark is concerned, I had contact to Anders Roar Nielsen. He and his brother were the heads of the local user group and

made a lot of things for the ENTERPRISE. Apart from nice programs and system extension (like the cards extension) they'd made a modem card and software for the ENTERPRISE. With this package the computer could be used as a BBS (there was neither internet nor email at this time :-)).

Egypt: The Egypt importer was Computer Technical Co. in Cairo. The founder and M.D. was Mr. Nabil Lashine. He had already bought about 500 ENTERPRISE 64k machines from England. He imported them to Egypt and sold them as electronic typewriters to other companies. He was not interested in games or other ancillaries, because he couldn't sell them (nobody in Egypt could afford a home computer for private purposes at that time). He made his own software for the computer and did the green keyboard print by himself. He bought additional 64k machines from us, but there was only appr. one shipment per year and not more than 150 machines (25 boxes á 6 computers). He also got appr. 500 empty cartridges from us. He always payed with monthly cheques. Sometimes it took long to get the money, but he was very reliable. His last order was in 1993, last contact to him in 1994. At this time his company was in big trouble and his bank had the hands on his remaining stock of EC machines. I've never heard of him afterwards, but I still have a complete set of printed keys, that he gave me while he was visiting us in Munich. All in all I think that 4000 units is too much - I personally know only about 1500 units, incl. the machines from England (but maybe Lachu has sold something to him directly).

About Hungary and the countries of the former Soviet Union:

These are both very special stories. I do not know all the details and I would like to ask a good friend of mine, who made these contracts, before I'm going to tell you anything wrong. I will also ask him about the total number of stock computers in England, because I cannot remember this figure at the moment.

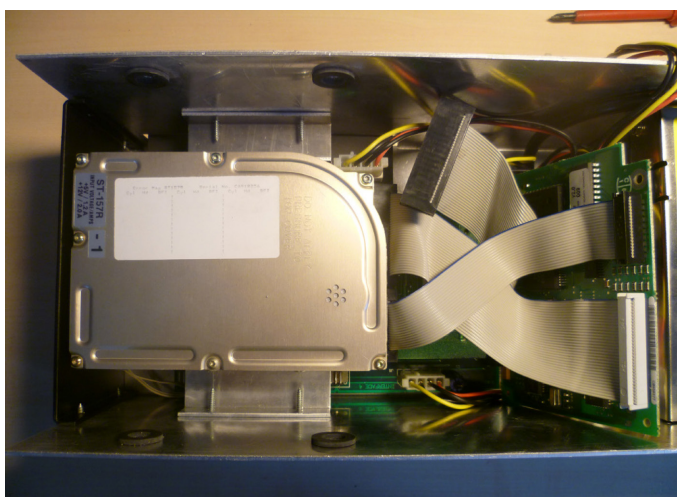
England: I have no idea about the total number of sold machines there but I assume, that they have not sold more than 25.000 units. The people of GRI Ltd told me, that they have produced something around 45.000 machines (64 and 128k engl./german). I do not know the production figures of the former producer (between 10/84-06/85), but the overall output was very low in 84 and they produced a lot of scrap too, which forced ENTERPRISE to look for a different manufacturer finally. The people of GRI told me a lot more (Communication problems, problems with supply of parts and materials, big problems with the test gear and all in all a much to expensive production due to the design of the machine and a lot of manual work, like memory expansion, ...), but this is also a separate story, that has to be told later.

About the Enterprise hard disk we read what Mr. Kopácsy told in an interview in 1991. But never knew any more :-(Until few years ago when we found this on Adrian Graham's page. This is the first evidence! Later Adrian sent me the ROM image of the hard disk expansion.



This design is from 1989 and used two small PCB's. One for my Minibus-Expansion-system (which is described in ENTER-NEWS 1/88) and a smaller one for the hdd-controller-card. There was a flat ribbon cable between the two PCB's. Unfortunately I have only two prototypes (wire-wrapped) of this expansion system anymore, but my exdos-controller from 1986 fits to it. The Minibus-System was expanded later and got the name Motherboard-Extension-Bus: There was a driver board, which fitted to an EXDOS-Controller case and a 50pin ribbon-cable to a 19" box with power-supply and backplane. The harddisk and the controller were in this 19" box. Unfortunately only the computer-side of the project survived. Both systems were no commercial „success“, because the overall number of users, who were interested in this system was too low. So there were only three or four handmade samples.

What is on the website is the prototype design of the harddisk- and memory-expansion-pcb for the teacher machines of 70 school networks for the Dhezgazkhan region in Kazakhstan. We needed one PCB, that contained the memory expansion with 256 kByte of static ram, the socket for the existing EXDOS-controllers and the socket for the SEAGATE Controller (ST11-R). The design, testing and production of the 70 units was done in Hungary. Vilmos Kopacsy has organised it.



About the drive units: For build these dismantle existing EXDOS cards, or used remain EXDOS PCBs? From the single drive unit only 3.5" version exist or also produced with 5.25" drives?

The German Floppy-Disk-Station was produced in Germany. From England came the following parts: Complete system bus bridges, packed in poly-bags and bare Exdos-controllers without ROM (no case, just the boards, packed in cartons and individual poly-bags). The German producer took these parts and mouted them in the case, together with the power-supply and the fdd-drive itself. He had got a master of EXDOS 1.3 and did eprom-programming by himself.

There were no Floppy-Disc-Stations with a 5,25" drive, only that prototype had such a drive. All other stations had the black 3.5" BASF-drive. The reason for powering the controller from the computer was simple: The existing system-bus-bridges, that they had to use (for cost reason) already had the power regulator and delivered 5V to the controller. Therefore only the drive was powered by the built-in psu.

As there were no manuals coming with these exdos-controllers, German ENTERPRISE was under pressure: They rushed out a translation of the original manual and simply did photocopies of it. Some of these photocopies were very bad. The IS-DOS manual had the same size and the same quality in the beginning. The A4-sized German manuals came later, when the crew at ENTERPRISE Germany had already changed. As far as I remember it was Michael Leopoldseder (who did the Harddisc-Software later) and me who translated the original manuals again. The translation was done on an ENTERPRISE, with Wordstar 3.0 :-). I still have the original files in my backups.

The EXDOS-Controllers, which were sold in Germany, did all come from England as a kit. These Controllers had no foam and/or carton packages. Furthermore there was also the EXDOS EPROM missing. The producer of the Floppy-Stations completed them with the EPROM, put them in the housing an repacked the stuff. That was the reason, why there were no originally packed EXDOS-Controllers in Germany. You can easily indentify these controllers out of German assembly, because the are all missing the coloured EXDOS-sticker on top.

I always thought the German machines and the German expansion ROM are produced by the German company. Now when I asked about the BRD ROM, the answer totally surprised me!

The 08-59 EPROM and its contents did not come from ENTERPRISE GmbH. The German ENTERPRISE 128k was the only official foreign version, which was planned, produced and shipped from England. Apart from that there were only english 64/128 machines. The contents of the 08-59 EPROM must have been produced by IS directly.

I think, that the story started at a time, when Hegener & Glaser tried to sell the ENTERPRISE 64k as Mephisto PHC. They had to realize, that a pure English machine was difficult to sell, especially as they tried to sell it as a network computer (for schools, ...). Therefore the beginning of the BRD-extension must be somewhere between December 1984 and early 1985. German ENTERPRISE was founded mid 1985 and the German 128k machine was already ready at this point.

About the manufacturers I asked it: on some motherboards no sticker, another ones have a sticker with different names: AEL, FLHK, E&E. Do you know anything about these?

E&E: <http://www.eleceltek.com/en/aboutus.php>

Most of the motherboards were made by OPC:
<http://www.hkexporter.net/electronic/circuit/opc-manufacturing.html>

So, in principle: Almost all Motherboards (EXDOS and the cartridges too) came from far east and AMI shipped the production lots to Hong Kong, That ist also the reason, that there were no significant stocks of unsoldered NICK/DAVE-Chips in England.

AEL and FLHK is out of my mind at the moment, but I have a copy of the ENTERPRISE code-book (the bible of all parts, that ENTERPRISE ever used). Probably I can find something there. Please be patient.

Little piece of the history, but very interesting:

We at ENTERPRISE Germany used a PC based Compiler for our developments. Code was written with a text editor, we also had batch files for the compilation and we used Eprom simulators for testing the extensions roms on the ENTERPRISE. The simulators were connected to the sockets within a cartridge or to a socket on an expansion board via a ribbon cable. It was very easy: Write the code, compile it, send it to the simulator via LPT-copy, reset the Enterprise and look what happens.



Here is one such structure:

Some people were asking about the eprom simulator in the forum. Unfortunately I do not have the original one anymore, that we used from appr. 1990 onwards. However, I still have one working sample of the newer model, that we bought in 1993, to support the work of the programmers (pictures attached).

The older model was much bigger and had only 128kByte (simulated eprom up to 27128). It was horrible expensive at that time, but development work got to a new level with it. The model on the pictures has 512kByte of static ram and can simulate eproms up to 27512. It is powered from the eprom socket, which it is connected to.

Operation is really simple:

- Put the connector to the EPROM socket
- Select the eprom you would like to simulate with the rotary switch on the front
- Connect the simulator to a PC via a standard LPT-cable (25 Pin/Centronics)
- Send the HEX-File from the PC to the LPT:-Port (in binary mode of course)



- Reset the ENTERPRISE and look, whether your code is working or not

Photos of a prototype cartridge-pcb with direct bonded BA-SIC 2.1 chip. EC UK was looking for possibilities to reduce production cost and GI made these engineering samples for them for evaluation purposes.



This is shown in the Enterface 87 / 04-05 front page

Attached the promised pictures of the very stylish-looking EX-DOS-Controller from the Netherlands (Interface 87/04-05, picture on title). It has a plastic housing and the design looks very much like being original ENTERPRISE :-). The mechanical structure of the expansion port socket/connector can be seen on the title of Interface 89/05-06 but I never saw an additional expansion card for that system. The card on top of the „stack” is a prototyping card, so I believe that the EXDOS-Controller was the only professional produced board.

An interesting detail is the aluminium tube within the expansion connector. It supports the structure and acts as a cooler for the 5V power regulator too.

They were using the 3mm variant of „Leistensteckverbinder DIN 41612”. One part was directly soldered to the expansion port, which gave a very strong connection.

In my MINIBUS/Motherboard Expansion Bus I also used this kind of connector, but with 5mm spacing between the two rows. These connectors are ideal for the ENTERPRISE extension bus, because they have 64 pins (2 rows of 32 pins) and they are very well constructed.

Germany sold EXDOS/Floppy

You probably know the EXDOS/Floppy-Station („Diskettengrund-einheit”) which was sold in Germany. We had a prototype for an additional drive on top of the first one and I've attached some pictures of it. This is really a one-off.

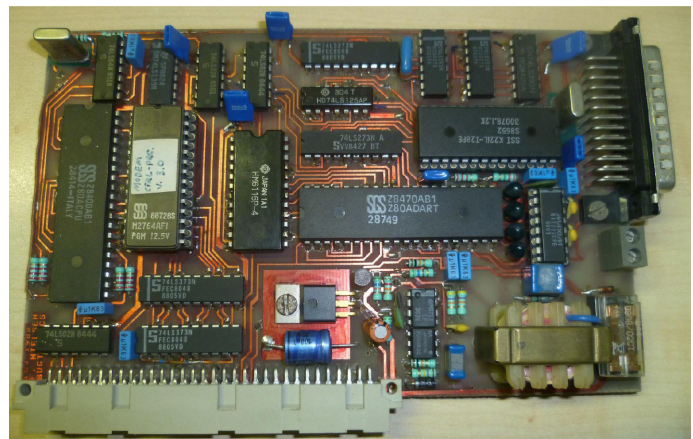


It was never produced/sold in Germany or elsewhere. The single drive with its metal case and the big switching power supply was already too expensive. It had been ordered by the first ENTERPRISE sales team in 1986 and the total number of produced drives was only around 600. In the beginning it was sold for DEM 698,00 incl. VAT. At this price nobody was interested in a second drive.

The prototype suffered a little bit from being stored in my cellar for at least 25 years, but both drives are still working. With the connector on the backside of the second drive you can connect additional drives. We had two Cumana double 3.5" FDD's and showed the ENTERPRISE with four connected disk-drives in our office in Munich.



We already know something about this card from its creator, but he doesn't have one. But Werner does :-D It is a modem card, in Denmark it was used for Enterprise BBS!



The card has a Z80CPU, running at 2.4 MHz, 2 kByte of static ram and a Z80DART. It is the most complex expansion for the ENTERPRISE, that I know. At least it has not more power than the computer it was connected to :-).

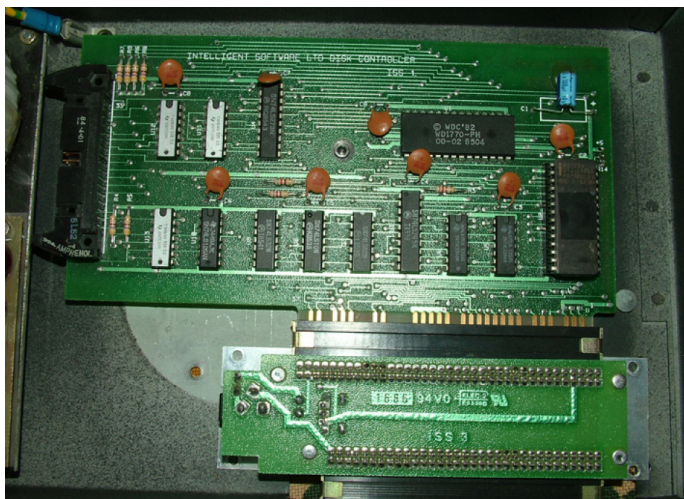
The connector is exactly the same as that one used for the ex-dos-controller from the Netherlands.

About the „EXDOS - Early version - small hole” I asked it: Look at this photos about the Floppy Station. I think it is developed for the early „small hole” cards. For the final cards needed the big screw washer.

Werner confirmed:

yes I believe that too. Probably the Germans got the early version of the controller to start developing the floppy disk station and there was neither a box for the controller, nor there was one for the system bus bridge at that time. This is probably the reason why there is the „naked” edge connector on the fdd-unit, that is shown on the German brochure.

The metal tooling was already finished for the German fdd-unit, when Enterprise UK released the final version of the controller incl. the ABS housing. Then they made this big metal washer to fix the new controller in the case. Unfortunately there was this



slight change in the contour of the edge connector as well. So the first German drives had a problem with the expansion port connection. The „fingers” on the edge connector were not fully aligned to the contact of the system bus bridge. Therefore there were a lot of floppy disk stations coming back as „non-functional”.

We had to rework all drives of the first production lot! We turned the washer upside-down and moved the exdos controller a little bit forward towards the front end. You can see that on your picture, as the stud is not centered in the hole. And we had to remove appr. 1mm from one side of the system bus bridge. That moved this pcb in the same direction. Then everything was working well.

And there was another mechanical problem: We had to use the existing system bus bridge. The bridge was designed for sitting in a stand-alone box. The height of it's pcb matches the height of the computer pcb exactly. When mounting the bridge and it's ABS housing in the metal case of the fdd, the edge connector of the bridge was appr 2 mm higher than the computer pcb. Therefore the computer was appr. 2mm above ground on its right-hand side, when it was connected to the fdd. We had to cut these 2mm from the bottom-end of the ABS housing of the bridge to be able to „lower” the pcb. After this conversion the heat-sink of the bridge was sitting directly on ground of the fdd-case. This increased mechanical stability too.

The fdd-units worked properly after that conversion and we had no further problems with the drives. All-in-all we had to do appr. 250 units, that we had in stock. It was a nice job and caused a lot of trouble and it was a costly exercise too. But it is a typical example for a variety of problems that Enterprise UK caused themselves by sloppy planning, pressure of time and fading financial resources.

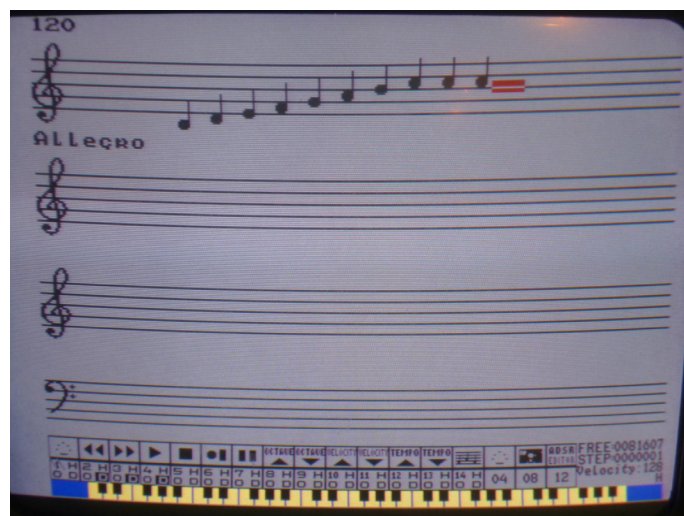
Another thing what we never seen:

now the details about the MIDI-cartridge:

When Vimos Kopacsy was in Munich in autumn 1989 he presented me a MIDI-cartridge for the ENTERPRISE. The cartridge was longer than a standard EC cartridge and contained an eprom, an EF6850P async I/O chip, some lcs and two MIDI-connectors for MIDI out/through. The software was far away from being ready, but the cartridge was already able to play some midi-files. He

brought a Roland MT-32 digital sequencer to show communication and the result was impressive.

He told us, that they would develop a software with a full graphical user-interface and promised that within 1990. A few months later I visited Budapest and he presented me the cartridge with a software package called „ScoreTrack 1.0”. It looked complete, and ready for use, but he told me, that the software would still have some stability problems, which they were working on. He gave me a sample cartridge, incl. the software.



The software reads and writes *.SND, *.MID, and *.ENV files, but unfortunately not compatible to the common standards. To show the file-format I have added the file „OKTAVE.MID”. The copyright in the files and in the software says „ENTERPRISE Computers Ltd. EED”. EED stands for „East European Division”. This was a joke, because it should have been „VTGe Electronics Ltd.”, which was a joint venture between us and aStudio.

A little bit later he told me, that all development on this cartridge/software has been stopped, because there would be no market for it in Hungary or anywhere else. Instead of this they were working now on equipment for the ATARI ST series.

Interviewer: Zozosoft

The Enterprise X, Model 911 or Project Vulcan

It took me a while to sort out all the information I have about this matter and to write everything down in the right order, but now I am ready to present you the last big mystery in the history of Enterprise Computers. Up till today there was only one small picture in Popular Computing Weekly, telling something about the new Enterprise from July 1986, as you know.

The story behind this machine goes back to autumn 1985 when it became clear, that the original plans for producing/selling the 64k/128k had to be revised. The home-computer computer market was changing rapidly, the first 16bit machines were already announced. Due to the late arrival of the 64k/128k there was a variety of competitors, that had already occupied the market. Sales were not as expected and EC UK had to do something. Releasing the 128k machine earlier as planned didn't push the business. In fact sales were going down after loosing contracts with bigger department stores and retailers and they decided to develop some kind of a „super ENTERPRISE“.

There had not many alternatives as far as the hardware design is concerned: NICK and DAVE had to be used further on, there was no money for a redesign of the chips. Therefore first designs were more or less bigger 128k machines with built-in EPROM bank and Exdos controller. The plan was to target companies and offices with a package, that contained a business Enterprise with bundled software, monochrome monitor and a single floppy disk drive. This project got the model number 911.

Right from the start it was clear, that they had to do something for getting production cost down. The assembly of the existing machine was too time consuming and therefore too expensive. The existing moulds would have to be renewed after approx. 100.000 „shots“ too. Therefore they needed a new design with a reduced number of parts. A design study was started and as a result there were at least 6 different proposals. The management decided to go for draft no. 6 with some minor changes on the cooling slots on top of the machine. The final drawing (marked „1.3“) went to the model maker later for a first prototype housing.

The first circuit diagrams for the new machines were made out of the existing drawings of the 64k/128k machine and are dated 16.12.1985. These plans got a number of changes over the next month and the last known change is from 03.06.1986. It is not known, when EC UK started with the first prototype motherboards, but this must have been after the design study and after they had determined the final measurements of the new machine.

When they had fixed final dimensions of the machine, work on the pcb started immediately. The first and only available version of the motherboard is dated somewhere in february/march 1986. At that point some parts of the old machine (the UHF modulator and its circuits and the old power regulators) were still planned to be on the new machine. And there is no 8MHz clock circuit for the internal exdos.

The old power regulators showed to be overloaded (at least they get very hot in a machine with additional ram/serial board) and a plan for

an external switching power supply with 5V/12V was born, although the documentation of 25th, february 1986 show a drawing for an intermediate heat sink, that should be mounted between the old power regulators and the metal chassis. The existing metal chassis (all prototype made by a company named „Brighon Sheet Metal“) already have a hole for the power plug of the new external power-supply (the old socket does not really fit to this).

The first and only top cover for the computer (made by a model maker) was ready somewhere in april/may 1986. The same applies to the one and only keyboard that has survived. This keyboard is a PC style keyboard without internal electronics and a keyboard membrane, that has the same layout as on the 64/128k machines. On the working prototype not all keys are assigned to their correct keycodes (because EXOS 2.1 had got no changes for the new model yet) and therefore some of them are not in the position you would expect them to be, but the keyboard is working fine.



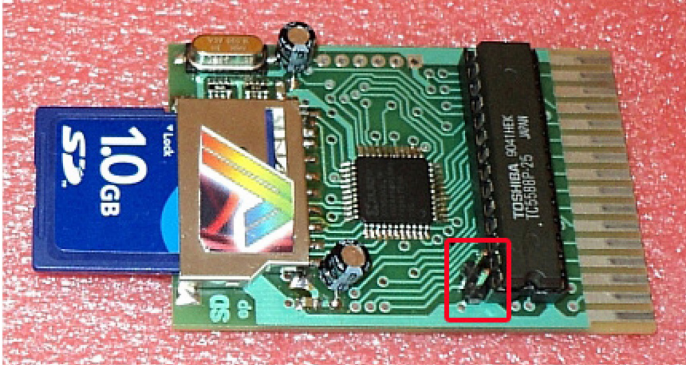
EC UK worked on the prototype until they had to close down in July 1986. At this point there were no drawings for the housing, there was only a preliminary version of the metal chassis (no final construction drawings), there was no final keyboard and there was no newer versions of the pcb for the machine. And there was absolutely no work done as far as EXOS/BASIC/EXDOS and/or the planned word processor is concerned. The EXOS on the prototypes was only changed as far as the clock

settings for DAVE (running on 6 MHz) is concerned and EXDOS 2.0 only contained changes to be able to format floppies on a 6 MHz machine.

I assume that there must have been a lot of paperwork relating to the prototype and the current state of development, but this was all scrapped/lost, when the remains of EC UK went to Broadlight Ltd. When we took over everything in autumn 1986 and discovered the prototypes, we immediately contacted Lachu Mathani, to find out more. As he had no idea about the prototype, he contacted Steve Groves, who answered him with the attached letter in November 1986. Steve made an excellent summary about the current state of development and the planned features of model 911. But his letter also showed, that IS was not too deeply involved in the development work on the prototype. Asking Lachu about the reason he told us, that IS was asking for a lot of money for this work and EC UK was not able/not willing to afford that.

All in all there were only 4 PCBs, 3 chassis, 2(3) ram/serial boards and one complete prototype, that had survived. Two of the pcb's were in very bad condition and not working at all, but I kept them together with all the other stuff. The complete machine was securely packed and never touched by us. The working prototype without keyboard was used for intensive testing on our side. I made a stand-alone keyboard out of a non working EC128k machine for it to be able to use the computer and the complete prototype and my own „creation“ are still running today.

ENTERPRISE 128 SD Cartridge port adapter



The pre-production of the ENTERPRISE 128 Cartridge Port SD adapters has been completed. This Rev 1.0 version will not be publicly available (only a few pieces were made for development and testing purposes). The "Premium" version can now be ordered, write an email to my address "vortyx at gmail dot com". The Premium version will be quite different in appearance from the Rev 1.0 version shown here (its PCB will be formed to the original IS-BASIC card shape, in order to fit inside the standard Enterprise cartridge plastic case), and all its components will be SMD surface mount. I personally find the pre-production SD adapter card easy to use (as I have been using it from the beginning), others may need a short guide to help them along.

The Enterprise 128 Cartridge Port SD Adapter Rev 1.0 - currently takes this form

- The soul of this hardware is a Xilinx CPLD chip.
- It replaces the standard IS-BASIC ROM Cartridge and comes with ZoZoSoft's quick test, BASIC 2.1, EXDOS 1.4, WP 2.6 and its own SDEXT 0.3 firmware, loaded onto a surface mount flash memory IC.
- The flash memory IC content can be changed at any time when working on the ENTERPRISE by using a jumper connector together with the appropriate software.
- The adaptor card includes two SD card slots for microSD and SD cards. These can be used separately or in parallel, as required.
- Cache memory is included on the card.
- As with the EP128 IDE card, the SD Adapter card's firmware is currently compatible with FAT12. This allows you to manage partitions that are 32Mb in size.
- EXDOS with FAT16 compatibility is actually under development. In the future you should be able to quickly and easily upgrade your SD adaptor card to make use of this.

Start-up:

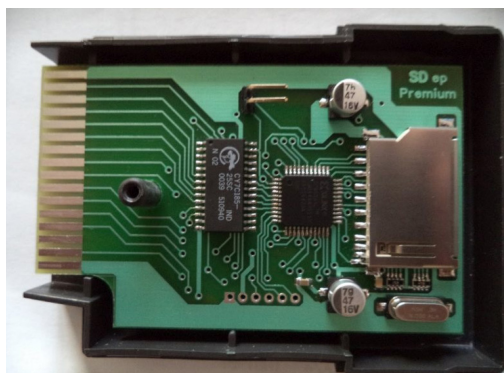
Turn the ENTERPRISE computer off from the power supply. Remove any existing ROM cartridge from the ROM BAY, and then gently insert the adapter card into

its place as indicated in the photo below (with the SD card slot upwards and the soldered side of the card facing down). Make sure that you slide the card straight into the computer's motherboard edge connector. If the card misaligns, the circuitry will not engage correctly and you will have to remove and insert the card all over again. Important: On no account remove or insert the adapter card while the ENTERPRISE is still powered up, as this may damage the computer, the adapter or even both!

Unfortunately EXDOS 1.4 is not yet compatible with FAT16 file system so first of all it is necessary to use a suitable external device (e.g. a PC using "partition Guru" software) to transfer a Virtual Disk File to any SD card you intend to use. The partition manager software slowly creates six 32Mb partitions, this takes about 15 minutes. (If anyone has a faster, more reliable, or better way of doing this, please let me know!) Use the DISK sub-menu 'OPEN VIRTUAL DISK FILE' function to open the Virtual Hard Disk (VHD) file. Write the six FAT12 partitions to your SD card using the TOOLS sub-menu 'CLONE DISK TOOLS' feature. Now, any files can be copied to the modified partitions of the SD card, the ENTERPRISE 128 can load these files after inserting it into the adapter's SD card.

Currently, EXDOS does not automatically recognise the adaptor card, so it is necessary to insert the card into the ROM BAY of the ENTERPRISE before powering up the computer. If you need to use the card on-the-fly, always turn the computer's power supply off first, before you insert the card. Note: it is no use pressing the computer's red RESTART button several times, as this does not fully initiate the ENTERPRISE booting process. There is no "on/off" button on the ENTERPRISE, so you must either remove the power cable from the back of the computer or turn it off at the mains supply plug end. The ENTERPRISE will now boot up with a ZoZoSoft quick-test, then the machine will list all the available SD card / cards partitions, sectors and size of the drive letter assigned to them. During this test, or whenever the driver listings are scrolling, you may want to examine the display. If so, (using the old-style PC key method) press the <Pause> key (German keyboard) or the <HOLD> key (English keyboard). The computer will remain in this mode until you press that key again. If pressed during the ZoZoSoft quick-test, you can notice that in the top right hand corner of the screen the word <Pause> appears, and a listing of the drivers in the top-left corner.

<HOLD> informs you that the computer is still running (i.e. it is waiting for you, it has not frozen). In principle, this sleight of hand will be no longer necessary with FAT16 compatible EXDOS, because you might be able to handle the whole content on only a 2GB partition (or on some less ones, if required). Pressing any keyboard key causes the usual flashing colours ENTERPRISE default screen to appear. After pressing any other key the BASIC command interpreter logs on again (who later



changed the content of the flash IC, something else can be loaded according to the upgraded content: IS-DOS, EPDOS, FORTH etc.).

A short ENTERPRISE 128 and EXDOS guide

A rudimentary file manager program is now available in the new version of EXDOS. It is easy to use, type the ":FILE" command. The search bar moves up and down using the internal joystick, you can change the folder and select files with ENTER. All executable files can be run with ENTER. The partitions can be selected by typing a drive letter (default drive is F: Drive, and G:, H:, I:, J:, K:, etc.).

I shall not repeat the complete EXDOS manual here; it is enough to say the adapter works with standard EXDOS commands. So I just mention a few simple instructions that you will definitely need. Type the ":EXDOS" command to enter the EXDOS command shell. Anyone who is looking for the colon key on the German keyboard should press "Ä" instead. Of course, within BASIC an extension command can be issued (bypassing the EXDOS shell), you need only to use the colon sign in front of each command. First type HELP (the EXDOS shell prompt puts you the necessary colon sign), this lists all the currently available built-in programs on your ENTERPRISE system. Normally this will be the machine's response:

:HELP

SDEXT version 0.1

EXDOS version 1.4

BASIC Version 2.1 (currently the English BASIC is available)

WP version 2.6 (SUPERWP)

WP version 2.1 (programmed on the motherboard's ROM).

Built-in programs from this list (which may include Pascal, Forth, IS-DOS, Assembly Language etc.) can be called up by a command line instruction (Note: SDEXT is the software driver for the SD adapter itself, so it makes no sense to call this). For example, to call the Super Word Processor (loaded version 2.6) from inside BASIC - just type the ":WP" command. From within EXDOS to enter the text editor, type "WP" without using a colon. Of course, the usual ENTERPRISE function keys may also be used for this purpose. From the text editor, pressing <SHIFT> BASIC + F8 allows you to exit. From the WP - press F8 to enter any EXDOS commands, or press <ENTER> to exit the EXDOS command prompt mode. From within EXDOS type a ":BASIC" command to exit into the BASIC shell.

Go to the EXDOS command shell and experiment with using the drives. First select one of the drives, enter the drive's designated letter followed by a colon. For example, I linked a VDF file that contains the following drives „F: GAMES_1 (games libraries 00-H)“, „G: GAMES_2 (games libraries I-R)“, „H: GAMES_3 (games libraries S-Z, CPC games)“, „I: DEMOS (more 100 demo, not counted)“, „J: Media (music and video players)“, „K: UTIL (Util, IS-DOS)“ these you can choose.

I:

It lists the contents of this drive, as I said, a lot of this library will be on the drive.

DIR

Volume in drive I: DEMO is

Directory of I: \

3D_SHOW

ALPHA

AMIGABLL

ARTAN etc. ...

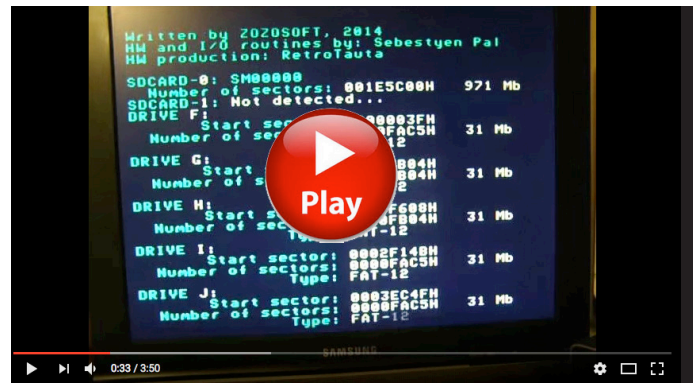
The listing can be stopped from scrolling by pressing the pause key (<PAUSE> / <HOLD>), or else you can press the <STOP> key instead. If so, the "*** STOP key pressed" EXDOS wording appears. You may then change into another directory of your choice, for example, in SMALLDEM.

CD SMALLDEM

You can list the DIR command. If we look at the results we can see that we get information in files level too. If we find an executable file, it will load up with the LOAD command.

LOAD SMALL.COM

You load this example, the famous and beloved Small Demo, sit back and relax; the adapter performs surprisingly fast, even when compared to a floppy drive. When you are bored with this demo you can do a reset. After exiting you can see the strange thing that the computer has remembered where in the hierarchy volume you were before. If you want to go to the root of the current drive, enter the CD command followed by the correct drive letter.



CD I:\

The backslash symbol on the German keyboard can be found on the "smaller and larger" (< / >) symbol buttons as shown below.

So now you have sufficient knowledge to use EXDOS in a basic level, at least good enough to load up stored programs onto your computer. Of course, we look forward to a file manager program and the Enterprise conversion of a few similar Videoton TV Computer software (the Videoton TV Computer is a Hungarian ENTERPRISE clone, based on the early license of ENTERPRISE Computer)! :-)

How to overwrite the content of the flash memory IC:

The flash memory IC is set to read-only by default. If you want to change the content of the IC itself you should turn the computer off, remove the card and then insert a jumper connector as shown in the picture below, with a red circle. Doing so will now allow you to write to the flash memory IC.

The program designed for this purpose and the right chosen ROM files should now be copied on the SD card into one partition then start it in the ENTERPRISE. Writing, checking the contents of the flash will be done. If no error is caused, the memory space (that was used by the machine so far) will be overwritten. So, in principle, the amendment cannot mess up the flash (I have managed to change the content without any mistakes), but if a power outage should occur when overwriting and something goes wrong, the adapter can be re-programmed, of course.



(by Jörn Mika)

SymbOS is a graphical user interface (GUI) based multitasking operating system for Z80 based supported home computers. SymbOS provides true multitasking and a complete windows like GUI. It supports up to 1024KB Ram for data and code execution and includes a FAT12/16/32 implementation. SymbOS 3.0 is now network enabled! (TCP/IP) The purpose of this document is to describe how you can use and install the SymbOS operating system.

Supported hardware

If you are planning to install SymbOS on your home computer it is a good idea to check if your hardware is supported by the operating system.

Supported Z80/R800 models:

MSX models	Amstrad CPC	Amstrad PCW	Enterprise
MSX 2 MSX 2+ TURBO-R OCM	CPC6128 CPC6128+ CPC 464 CPC 664 CPC TREX	PCW 8256 PCW 8512 PCW 9256 PCW 9512 PCW 10	Enterprise 64 Enterprise 128
128 Kb minimal 1024 Kb maximal	128 Kb minimal 1024 Kb maximal	256 Kb minimal 1024 Kb maximal	128 Kb minimal 1024 Kb maximal

Storage devices:

MSX	Amstrad CPC	Amstrad PCW	Enterprise
Sunrise IDE MegaFlashRom SCC+SD Padiial LPE-MMC/SD-V8BKP* Yeongman MMC/SD* GR8NET SD Microsol FDC National (MB8877A) FDC Toshiba (Panasonic) FDC Philips (WD2793) FDC SVI (WD1793) FDC <small>* not in the candidate release</small>	CPC-IDE SYMBiFACE II X-MASS NEC FDC 765 HxC direct SD access	NEC FDC 765	SD ep Premium WD1770 FDC

Supported sound devices

MSX models	Amstrad CPC	Amstrad PCW	Enterprise
AY-3-8910 Sunrise MP3 decoder	AY-3-8910 Play City (6 AY)	none	none

Supported input devices

MSX models	Amstrad CPC	Amstrad PCW	Enterprise
MSX standard mouse PS/2 mouse adapter by Nyirikki	"joystick compatible" (AMX Mouse, Reisware Mouse) SYMBiFACE II compatible PS/2 adapter	Kempston Mouse Interface AMX Mouse Interface	Boxsoft Mouse Interface

Supported network interfaces

MSX models	Amstrad CPC	Amstrad PCW	Enterprise
Sunrise Denyonet (W5100) GR8NET (W5100)		- W5100 (prototype) - ESP8266 (prototype)	

Installation on ENTERPRISE based machines

Copy the files to your storage device and start SymbOS by typing: LOAD „SYM“

After loading SymbOS you can configure the system path and other system settings.

How to use SymbOS

SymbOS is an OS with a graphical user interface (GUI). Like MicrosoftWindows, SymbOS uses a mouse device to operate the OS. Proper care and use of your mouse mainly requires common sense. Use your mouse on a clean, smooth surface. Make sure you have adequate desktop space to manipulate your mouse, so you don't have to constantly pick up and reposition it. Don't hold the mouse by its cord, or let the body of the mouse hang off the table. A mouse don't react well to being dropped. The mouse features a ball on the underside that is rolled upon a flat surface to manipulate the onscreen activity, and two fire buttons. What you can actually do with your mouse depends on the software program you use it with. You can select icons, draw pictures, move a cursor or play games --- just about anything you need a controller for. The left fire button is the button which is usually active. The right fire button may also be functional, depending on the application that is started. Plug the mouse into either of the JOYSTICK CONTROL PORTS exactly as you would plug in a joystick.

A mouse is the perverted way to have control over your SymbOS home- computer, however there is support for the keyboard as well if you don't have a pointing device. You can move your mouse pointer by using your mouse device or press the function key and use the arrow keys on the keyboard to move your mouse pointer. Depending on your computer the function (ALT) key can be found as:

Left click

CPC = COPY KEY

MSX = GRAPH KEY

PCW = ALT

Enterprise = ALT

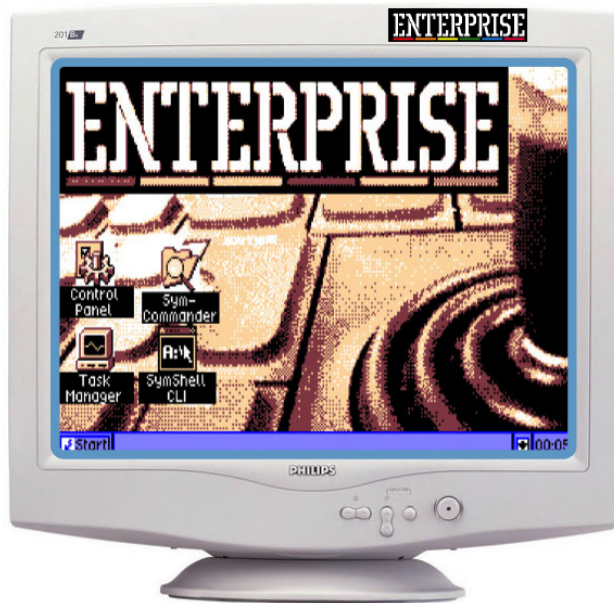
Right click

CPC = SMALL Enter KEY

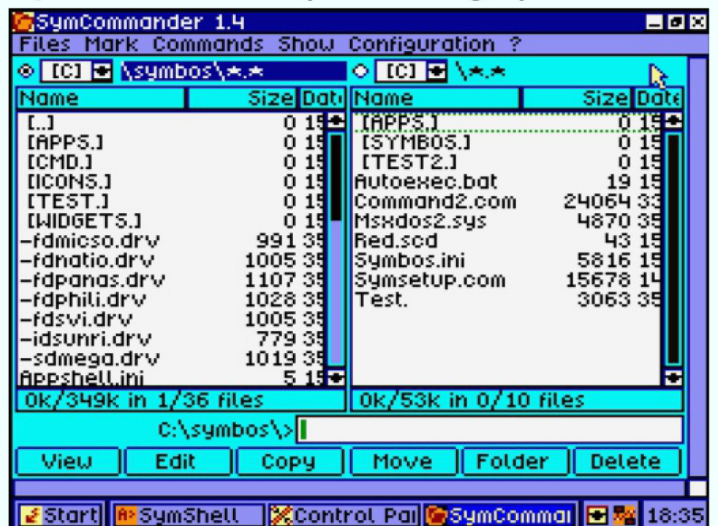
MSX = Code KEY

PCW = ALT

Enterprise = ALT



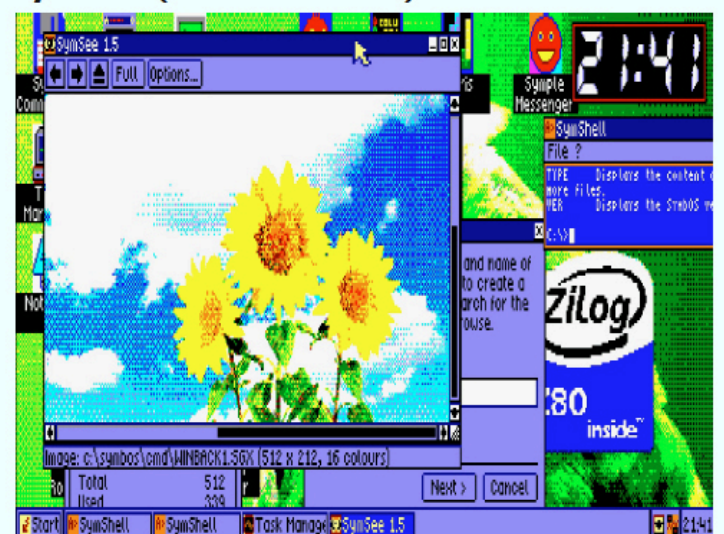
SymCommander (File Manager)



SymPlay (Video Player)



SymSee (Picture viewer)



A full description can be downloaded
in PDF format from here:



Download Now



IDE hard disk controller card for the Enterprise

Let's see what this beast of mine actually does. The card creates four I/O ports, by default at addresses between 0ECh and 0EFh, however this can be modified with a jumper. The software searches for the card in the full port range of 0E0h-0EFh, so in theory there can be even four cards connected to your Enterprise (At that time I thought mainly about hard disks accessible for an average EP user, thrown out from PCs with capacity like 20-40 Mbytes - so you would have needed many of them).

Unfortunately - for us - the IDE bus is 16 bits wide, so we have 0th port as the lower 8 bits of the data port, and the 1st port is for the high 8 bits. The remaining two ports are used as the command ports for the two connectors. The lower three bits of the command port are the IDE address bits, the next bit is the CS0/CS1 address bit, and the next two bits are the write/read signals. The two bits left are not connected for output, but as input you can access the INT and PDIAG signals of the IDE bus there.

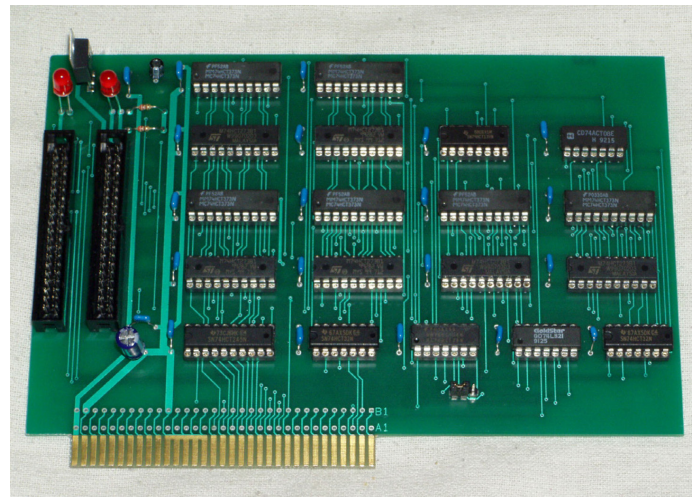
The lower 6 bits are connected for both of input and output, so you can read back the lower 6 bits of the value written previously to the command ports. This is the way the software searches for the card as well: the lower 4 bits are tested with values between 0 and 15 that it can be read back (only 4 of the 6 bits, so it won't disturb the IDE bus itself).

Writing to the IDE bus is done with filling the two 8 bits wide data ports which forms the 16 bit value, then the address is put onto the command port where the value is driven to the IDE bus initiated by the „write“ bit. The read process is done in the reversed order: the read is done with the address bit and the „read“ bit via the command port. In this case, the read is processed on the IDE bus, the 16 bit result is latched on the card, and it can be accessed with reading the two 8 bit data ports then.

Programming the hard disks themselves is specified in the ATA standard. Currently the following commands are interesting for us: IDENTIFY DEVICE, INITIALIZE DEVICE PARAMETERS, READ SECTOR, READ MULTIPLE, WRITE SECTORS, WRITE MULTIPLE, SET MULTIPLE. Addressing is done in LBA mode primarily, since the software itself also uses LBA addressing internally. If the hard disk does not support LBA (so it's older something like 18-20 years) then the address is converted into CHS.

Let's continue with the IDE registers. For this, there is an older ATA standard here which also contains the CHS addressing and it also has a quite neat summary table about the register addresses (page 14).

Unfortunately, there was a minor mistake with the PCB design: address lines A1 and A0 are swapped. Though, it does not cause a bigger problem, only I had to define my constants differently



in my software. It will cause some additional work for Istvan if he put this into the ep128 emulator.

Originally there are three address bits and two Chip Select (CS) signals (I have the suspect that it's from some ancient times of the MFM controllers) on IDE. Since only one of the two CS signals is used simultaneously, I've replaced one with an additional address bit.

Considering the facts discussed above, here are the register addresses on EP:

- 0000: Data
- 0010: Error / Features
- 0001: Sector Count
- 0011: Sector Number / LBA(7: 0)
- 0100: Cylinder Low / LBA(15: 8)
- 0110: Cylinder High / LBA(23:16)
- 0101: Device/Head / LBA(27:24)
- 0111: Status / Command
- 1101: Alternate Status / Device Control
- 1111: Drive Address (it's only specified in the ATA-1 standard, later versions mention it as obsoleted)

Zozosoft

Part list:

- | | |
|------------------------------|---------------------------------|
| 74HCT273 - 6 pieces | LED (as you wish) - 2 pieces |
| 74HCT373 - 6 pieces | 220 ohm resistor - 2 pieces |
| 74HCT04 - 1 piece | If you want to use two cards |
| 74HCT08 - 1 piece | then you also need a three pin |
| 74HCT21 - 1 piece | connector with a jumper. If you |
| 74HCT32 - 2 pieces | don't have HCT, you can also |
| 74HCT245 - 1 piece | use ACT, or even LS, ALS, etc |
| 74HCT139 - 1 piece | (but then you may need to cool |
| 7805 stab. IC - 1 piece | the 7805) The 273s and 373s |
| 100 uF elco - 1 piece | should be the same type to |
| 10 uF elco - 1 piece | avoid timing problems caused |
| 100 nF capacitor - 19 pieces | by the fact that some bits set |
| 40 pin connector - 2 pieces | up faster than the others. |

10 Mhz on Enterprise

```

TESTED: 0064Kb OK: 0000Kb
          RANDOM FILL
RANDISK: 0000Kb RAM-ROM: 0000Kb
EDCWEXT: 0000Kb      10.00Mhz CMOS Z80
  
```

```

EXOS 2.4 Gyorsteszt
írta: ZOZOSOFT&APOCI (1992-2013)
  
```

```

HOLD: teszt felfüggesztése
(C)old reset          (E)xos reset
(A)dvanced test      (N)ormal test
(T)est-rom engedélyezés
(R)amdisk törlés
F1: teszt F8-ig (128Kb) (ALT: 64Kb)
5,6,7,8: teszt 5,6,7,8-ig
F2: EXOS ROM-teszt
F3: nincs azonos ROM-ok ellenőrzése
F4: ROM szimulációk törlése
F5: EDCW bővítések törlése
STOP: hibás szegmenseknél várakozás
ESC: ugrás a bejelentkezéshez
  
```

Zozosoft development of 10 MHz can read our next issue.



In this image Prodatron CPC and this is connected network card you can see which Internet can also connect.

It made a similar Enterprise development was also.

You can read about this in the next issue.

The Enterprise 30th Meeting of birthday will soon have separate numbers we mean!



Köszönet mindazoknak az ENTERPRISE programozóknak és fejlesztőknek, akik Magyarországon idejüket nem kímélve, saját pénzüket befektetve programokkal és hardverekkel segítették a magyar és külföldi ENTERPRISE felhasználókat!

* * *

Thanks to all those ENTERPRISE programmers and developers who spared no time in Hungary, invested their own money in programs and hardwares helped the Hungarian and the foreign ENTERPRISE users!

Németh Zoltán és Németh József (Zozosoft & Apuci)
Mészáros Gyula (M.Gy. Hard Soft)
Gyányi Sándor
Haluska László
Faragó Gyula
Kulcsár Tibor
ORK Soft
Richter István és Tamás (Moonlight & Timelord)
Csikos Csaba és Hidas Szilárd (BAM Soft)
DevilSoft
Microteam Kft.
Bankó Miklós (MICROTEAM)
Rauscher Attila (MICROTEAM)
SMD Team
Vincze Béla György (EDC)
Pertik László
id. Matusa István† és Matusa István
Lukács Árpád (Mr. Prise)
Koch Tibor (Venus)
Tóth István (EGO)
Kiss László (ep128.hu)
Baráth Endre

Ujlaki László
Hajnal Csaba
Bozai Gábor
Bartha István
Ari Sándor
JOVI
Lolasoft
Kocsis István (KCopy)
Mátrix Kft.
Ameko Kft.
Kovács Gábor† (Ameko Kft.)
Juhász István
Piotr
Szalontai Andrea
Hámori György
Kopácsy Vilmos
Persa Noel (geco)
Sárközy Gergely (SzörG)
Kiss Attila (attus)
Flying Time Studio (Z80 System)
Povársay Zoltán (Povi)
Varga István (EP128 emu)

The magazine will now periodically appear in electronic form!

<http://enterpress.news.hu>