UNIX micros CATALOG

European UNIX systems Users Group

EUUG

Edition 1 July 1983

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Things start easy

In the beginning (70's) there was a minicomputer (the DEC PDP-11 machine) and UNIX. At that time the world was simple, the operating system source text was bedtime reading-matter, and the computer needed some cooling. Then a manufacturer thought he could make the computer smaller and cheaper. Then programmers thought they needed more options, and we all started to plant seeds from that original tree, which we all liked. And look what we did: we made a jungle. The old trees are still there and we still love them. The new ones are like the little bonzai trees, we can put them on our desk. Still there is seed left.

This catalogue is meant to make sure you know there is a jungle. It does not provide you with a map through the jungle, and it does not provide you with a manual for buying bonzais. But perhaps it gives you some alternatives.

Most details in this catalogue are gathered from advertisements and product sheets. What we could glean from those publications was sent for remarks to the manufacturer. Some companies sent their remarks back, and those remarks were processed back into the catalogue. Beware that none of these details are binding on any manufacturer or distributor. Manufacturers tend to change their products and prices daily, so this catalogue is already out of date.

Catalogue Layout

The catalogue will give you per page an overview of a UN*X system. The keywords used are:

Company: The company name and address.

Name system: The name or the type of the system.

CPU and speed: The processor type i.e. 68000, Z8000 etc. and the speed specification of the processor f.i. 8 MHz.

System bus: The type of backplane bus or I/O bus, f.i. Multibus.

Max. physical memory, spec. mem bus, dual ported mem.: The minimum and maximum physical memory allowed f.i. 256Kb-1Mb, possibly together with some specification f.i. dual ported, special own memory bus, etc.

Type UNIX system: The version of the UN*X system or the name of the UNIX port, f.i. XENIX (UNIX V7).

Company of UNIX port: The name of the company who did the port of the UNIX kernel to the system, f.i. the company itself.

Vendor of controllers:

cpu board: vendor of the processor board.
floppy contr.: vendor of the floppy controller board.
raster contr.: vendor of the raster controller board for the raster display.
asynch. contr.: vendor of the possible asynchronous lines (multiplexer).
(cart.) tape contr.: vendor of the (cartridge) tape controller board.
LAN contr.: vendor of the local area network controller board.

Vendors of peripherals:

disk: vendor(s) of the disk drive.
(cart.) tape: vendor of the tape drive (cartridge).
floppy: vendor of the floppy drive.

Basic configuration: The basic configuration for the system and the user price, or the board price. F.i. cage 7 slots, cpu, raster 1024*768, keyboard, raster board, 256 Kb, 20 Mb Winch., 1 Mb floppy, $18K.

Applications: If the system is meant for special applications this is noted. F.i. CAD/CAM.

Remarks: If there are remarks about the system, we tried to put them here.

Distributors: Location of distributors in different countries.

The ideal system

It is not an easy job to find the ideal system in this jungle. But if you try please note the following:

- What kind of CPU is used? Does the CPU meet your system requirements? What is the speed of the CPU? (The meaning of a wait state is unknown to me.)
- What kind of bus is used for I/O? Is there special memory necessary for DMA devices (i.e. is there a special memory bus)? Is the bus standard and/or are the lines of the bus used for special internal use? If it is a standard bus, can you easily put another CPU board in it?
- Is there enough disk space (It is never enough!)? How easy is it to put other drives on it from other vendors? Or do you need to buy another controller board in that case? Some disk drives require lots of maintenance. Winchesters tend to be cheap and reliable. What about the noise of the drives?
- Do you get all the software tools you need? What does it cost if you want more? How easy is it to bring your own or other manufacturers tools up on it? Is the system interface 'standard'?
- How easy is it to change your configuration and to add drivers to the kernel. Are there examples? What about bugs showing up later (and they do!) or changes to the kernel for your sake?
- Is the system human friendly? I.e. looks awfull, is noisy, is producing lots of heat and is painted orange?
- How difficult is it to do diagnostics. Or are you depending on a system which runs for ever without any sign what it is doing? How long does it take to provide you with a spare board?
- Does the manufacturer keep his promises? Has he already delivered some systems?
- Don't be fooled into thinking that you are the lucky man with the bargain and the system of the year. Be sure you get what you want for the right price. Software and hardware go hand in hand, always.

Disclaimers

This catalogue was made via a database. I would like to thank UNIX for the help to set this up. Mrs K. van Gemert did the original typing job. A.C. IJsselstein did the impossible job of correcting my errors, and made it work with TROFF. Some manufacturers made it possible to cut the costprice via their advertisements.

Addresses

Any corrections, and there should be a lot of them, are welcome and can be sent to the EUUG secretary, Owles Hall, Buntingford, Herts SG9 9PL, England.

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Two programs, many UNIX systems

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UNIX† meetings gives a splendid opportunity to run test programs on the machines present at the exhibition. At the recent meetings in Leeds and San Diego, we have run two test programs on a wide variety of machines. Test program #1 measures CPU/memory speed; test program #2 measures I/O speed. Program #1 was tested six times, with the 'TYPE' declared in six different ways: short, register short, int, register int, long, register long. On the small machines, the test were generally made in single user mode; on the large mainframes we had the share the machine with other users.

The programs:

```
/* Test 1 - CPU/memory */
main()
{ TYPE i, j, k;
  for (i = 0; i < 1000; i++)
          for (j = 0; j < 1000; j++)
                  k = i + j + 1983;
}
```

```
/* Test 2 - I/O */
        main()
        { int i, j, n;
          char a[512];
          if ( (n=creat("foo",0755)) < 0)
                  perror("error: foo");
          for (i = 0; i < 500; i++)
                  write(n, a, 512);
        }
```

Notes:

The times reflect a combination of several factors, among them, the CPU type, the clock rate, the speed of the memory management unit, the speed of the memory itself, the width and speed of the bus, and last, but certainly not least, the quality of the C compiler used on the machine. Also, the times were obtained using the time(I) command. There is reason to believe that not all vendors understand that 50 Hz != 60 Hz, which makes some of the times slightly suspect.

Conclusions:

None. You should take these measurements with a grain, or better yet, an imperial gallon, of salt. For example, comparing the PDP-11/70 with the SUN, we see that for test #1 and register short, the PDP-11/70 is nearly three times faster, but comparing register long for the same two machines, the SUN is twice as fast. The difference can be explained by the fact that the PDP-11/70 really is faster, but uses memory instead of registers for register longs, whereas the the SUN uses the 68000's hardware registers.

Goal:

Our goal in making these measurements is to stimulate you into making your own measurements and to make you cautious when looking at (carefully selected) comparisons thoughtfully supplied by vendors. Remember: Figures don't lie, but liars figure. If anyone wants to run the tests on other machines, we would appreciate hearing from you.

† UNIX is a Trademark of Bell Laboratories.

times in seconds: machine	MHz	usr short	usr short reg	usr int	usr int reg	usr long	usr long reg	real cc#1	real cc#2	run#2	rem
DEC:											
VAX 780		8.8	8.6	6.7	4.7	6.7	4.7	3	3	2	
VAX 750		18.9	19.3	13.0	8.5	11.6	8.6	4	4	2	
VAX 730		37.4	37.5	23.9	14.4	24.1	14.4	11	12	6	
11/70		7.4	2.8	7.4	2.8	14.3	14.3	11	12	14	
11/60		10.4	4.2	10.4	4.2	20.2	20.2	17	19	16	
11/44		11.2	5.7	11.2	5.7	21.8	21.8	16	8	21	
11/45		19.1	7.9	19.1	7.8	38.5	38.5	12	20	12	
11/34		22.0	10.9	22.0	10.8	44.8	44.8	18	19	14	
11/24		27.7	12.2	27.4	12.4	57.0	57.5	21	20	19	
AEDS11(/23)		34.5	14.9	34.6	14.9	72.2	72.2	28	30	8	
micro 11(/23)		36.8	16.2	36.9	16.2	76.8	76.8	29	31	24	
68000's:											
Parallel	10	11.6	7.0	13.5	6.7	13.5	6.7	17	18	8	
QU68030	12.5	12.0	6.0	13.0	6.0	17.0	8.0	8	11	4	
SUN	10	13.0	7.8	14.6	7.6	14.6	7.5	9	10	5	
Pacific	10	18.1	10.7	20.7	9.7	20.8	9.7	24	23	13	
QU68000	10	24.5	11.9	24.5		33.0	15.1	10	10	7	
Altos	8	13.9	13.9	13.9	13.9	17.8	17.8	18	25	5	
Cyb	8	15.3	9.0	15.3	8.2	17.5	8.2	27	28	12	
Codata	8	17.1	10.5	19.3	10.5	19.3	10.5	28	30	28	
Power 520	8	21.1	9.2	20.7	9.2	31.4	12.5	16	16	19	
Hawk 32/E	8	19.0	11.3	21.5	10.3	21.5	10.3	29	19	27	
Pixel 100/AP	8	18.6	11.0	21.5	9.6	22.9	9.6	44	47	10	
Corvus	8	19.8	11.6	22.5	10.1	22.6	10.1	40	42	no sp	
Fortune	8	21.7	12.8	25.0	12.4	25.0	12.3	18	20	6	
Apple Unisoft	5	22.6	13.7	25.9	12.1	25.9	12.1	41	43	28	
Apple Xenix	5	22.7	13.9	26.0	13.0	25.9	13.0	58	65	no sp	
Altos-12	5	26.7	14.1	26.7	14.1	53.7	53.9	31	33	13	
Wicat WS150	8	24.8	14.4	28.1	13.1	28.1	13.1	19	21	12	
TRS80	8	25.2	14.9	28.3	14.0	28.4	14.2	23	28	16	
Dual	8	26.9	15.6	30.7	13.3	30.7	13.3	21	20	27	
Ch Rivers	8	28.2	15.8	31.7	15.8	31.7	15.8	28	42	14	
Unistar 200	8	28.7	16.5	32.8	14.3	32.8	14.3	36	40	28	
IBM PC Xenix	8	30.3	17.6	34.2	17.3	35.1	16.9	31	35	18	usr>real?
IBM PC Idris	8	37.9	22.7	37.9	22.7	73.3	73.3	18	26	39	
Cosmos Antaris	8	34.1	19.5	38.7	16.4	38.7	16.4	26	27	9	
ULAB	8	37.2	21.0	44.1	18.9	44.1	19.0	38	44	15	
Masscomp	did	not	permit	me							
Z8000's:											
Zilog	6	14.7	7.3	14.7		25.7	13.3	20	20	8	
Plexus	5	15.2	7.0	15.4	7.0	27.5	27.6	24	26	13	
ONYX	4	15.9	7.2	15.9	7.3	23.8	14.1	14	14	8	
Bleasdale	4	33.3	15.6	33.3		56.2	56.2	20	21	16	
8086's:											
Altos	10	13.7	7.2	13.7	7.2	27.8	27.7	18	20	7	
Intel	did	not	permit	me							
SBC 86/12A			68.1								
others:											
Amdahl		0.5	0.5	0.5	0.5	0.5	0.5	10	5	1	24 usrs
Concept32/87		1.5	1.5	0.9	1.4	1.0	1.4	10	16	2	1 usr
Concept32/27		12.0	11.0	10.0	10.0	10.0	10.0	18	20	5	
HP 9000		9.4	9.4	7.4	7.4	7.4	7.4	28	26	3	

BBN C/60		14.5	8.2	14.6	8.2	47.2	30.3	7	9	3
PE3210		16.7	6.7	15.9		15.9	6.7	4	4	3
Perq		44.5	15.6	22.2			15.0	25	25	7
IBM S/1 4954		37.2	37.1	37.1	37.1	62.3	62.3	28	30	32
NS16032	4	49.9	45.0	56.7	23.3	57.4	27.2	47	49	m flt

An overview of some popular buses

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"The question is," said Humpty Dumpty, "which is to be master -- that's all."

1. Introduction

A bus is a communication pathway, connecting two or more electrical devices. In the context of computer design, buses are the physical and electrical structures connecting the various parts of a computer system. All of the UNIX-implementations by various manufacturers are based on computers with a bus organisation. In this type of organisation, the processor, memory and controllers are tied to one or more buses, over which the main transport of data takes place. One of the advantages of a bus organisation is its flexible and modular character. The system is easily adapted and expanded to different configurations, with minimal hardware changes. A drawback is that the structure and speed of a particular bus can be a bottleneck in the performance of the system, so the busparameters have to be chosen carefully. This paper will give an overview of the most popular buses.

Definition of terms

Different buses are often specified in different ways. In comparing different buses, we have to agree on the terms used. We will specify **bandwidth** as the maximum burst rate of data transfer in Megabyte per second (Mbyte/sec). The figures for bandwidth are the figures specified by the manufacturer, standard-committee or the figures calculated from the specification. Note, that this is a theoretical speed. The actual implementation by a manufacturer may be slower. For example, from an article about the Plexus P/40[1] microprocessor it can be concluded that the P/40 Multibus has a bandwidth around 0.7 Mbyte/sec while the official specification gives a 10 Mbyte/sec maximum. Also, comparing speeds for different types of buses is not easy. For instance, the Versabus has a bandwidth up to 20 Mbyte/sec and the SBI-bus a (fixed) speed of 13.3 Mbyte/sec. This doesn't make the the Versabus necessarily faster, since bus arbitration overhead has to be taken into account, which is hardly the case for the SBI-bus. So be very cautious in comparing these figures. The **length** of a bus refers to the maximum possible physical distance along the pathway from one connection to another. Maximum length is important because it affects both the performance and cost of a bus. In general the length of a bus can be between 0.1 and 30 meters. The **data path** is the number of bits of data that can be transported (in parallel) in one bus-operation. Some buses has also an extra serial data path, for f.i. interprocessor communication or maintenance purpose. The **address path** is the number of addresse bits that the bus is capable of handling. **Interrupts** on the bus are mostly used to inform a processor that a device requires attention. There may be one or more interrupt **levels**, the highest level having the highest priority. Interrupts may also be **daisy-chained**. In this case, a device can block another device interrupt when it is closer to the processor. A bus may have a central **master** which has complete control of the bus (**arbitration**), and which can (temporarily) give control to one or more **slaves** or the bus may have many potential masters, which have to negotiate between themselves to obtain control over the bus. This arbitration can either be democratic, or non-democratic, which means that there are no priority rules. A device might want to be a master of the bus for doing direct memory access. If all transactions on the bus are of a fixed duration the bus is **synchronous**. In most other cases the buses are B asynchronous . Most buses are of the last type. Even on an asynchronous bus some synchronisation of a data transfer is necessary. The synchronisation signals may be clock pulses (periodic) or something else, for instance by hanshake signals. Sometimes a combination of the two is used. In general, buses also play a role in distributing power to devices. A general bus is one whose primary function is to connect processor(s), memory(ies) and controllers. A peripheral bus is intented for interconnecting controllers and devices. Some buses are not in the public domain but more or

less heavily protected by a manufacturer. Using these will tie the user to a certain manufacturer.

2. General buses

2.1. The Unibus

The Unibus was designed by Digital Equipment Corporation. This bus is for the first time used in the PDP11 family of minicomputers. The arbitration method is centralised master, priority by groups There are 4 interrupt levels. The data path is 16 bits wide, the address path is 18 bits wide. Initially 2 bits were reserved for parity, but they have never been used. The bus is asynchronous, the synchronisation is a-periodic and done by handshaking. Although the maximum bandwidth is sometimes specified as up to 2.5 Mbyte/sec,[2] a more accurate figure is 1.7 Mbyte/sec.[3] Of course, this doesn't imply that the actual implementation of the bus will let you do this. For instance in [4] access times via the UBA (Unibus Bus Adapter), the SBI (Synchonous Backplane Interconnect, see 2.3) to unibus interface and bus controller are given. These are, for a non-buffered data path, 0.85 Mbyte/sec for writing and 0.626 Mbyte/sec for reading. For a transfer via a buffered data path, the maximum transfer rate is 1.39 Mbyte/sec. This slows down to 1.17 Mbyte/sec in the longword 32 bit random access mode. Bob Kridle at. al[5] found an absolute maximum transfer rate of 1.2 Mbyte/sec possible through a VAX 11/780 Unibus adapter. As for the non-buffered data path,[6] they have not been able to use it with some devices as slow as 50 Kbyte/sec. Also, the speed of the memory has some influence. In the chapter about buses, in [7], is stated that the Unibus is capable of approximately 1.7 Mbyte/sec when operating with the equivalent speed of memory which is attached to the SBI. On the PDP-11/70,[3] the Unibus has a bandwidth of around 1 Mbyte/sec. This lower figure is caused by the map delay, the cache cycle, and the main memory bus redriving and synchronisation. Physically, the Unibus consists of two parts, the Unibus-cable, and the Unibus backplane (or system unit). This backplane has 6 slot (called A,B,C,D,E, and F). The cable (or jumper) will come in on slots A and B. So an interface can occupy up to six slots (a hex-board). The bus is rated to drive 20 bus loads and a length of 50 feet without a bus repeater. Digital has published a booklet[8] which discuses these details. Some buses have a wider address path (22 bits), for instance for the PDP-11/44 and PDP-11/24, and these slots are specially marked. So some backplanes used for the Unibus may not be compatible with others. There are a lot of peripherals available which can be connected to the Unibus. As consequence they can be swapped between a wide range of processors. This possibility was one of the design goals of the Unibus. Some firms now build their own (micro-)processor systems based on the Unibus. Some caution must be exercized when you mix DEC and non-DEC hardware on the Unibus. This is sometimes a source of trouble.

2.2. The LSI-11 bus or Q-bus

The LSI-11 bus, better known as the Q-bus, was designed to allow low cost peripheral interfaces for micro-computer applications. By reducing the number of conductors it needs less power, logic and has lower connection costs than the Unibus. The reduction is primarily achieved by time-multiplexing memory and address on the same lines. The bus is more or less a scaled down version of the Unibus. So it is also an a-periodic bus, with a central master. Although the bus has 4 interrupt priority levels defined, not all need to be supported by the attached processor. The LSI 11/03 just uses 1, while the LSI 11/23 uses 4 priority levels. Initially the bus had only a 16 bit[9] wide data and address path. With the introduction of the LSI11-23 this was augmented to 18 bits, using the two extra lines (in the data path) which were reserved for "memory parity error and memory parity error enable".[8] Later on, another 4 bits where added.[10] for use with the MICRO/PDP11, the PDP-11/23PLUS. This configuration is called the extended LSI-BUS. The bus is not only used with DEC processors, some manufacturers are selling 68000 based systems with a Q-bus. The Q-bus is still evolving. With the introduction of block mode DMA the bandwidth will triple to about 4 Mbyte/sec.[11] This is implemented by permitting the memory to increase its own address counter, which eliminates the need for most of the address transmissions during DMA. But according to DEC,[10] the speed-up will be less drastic. Block mode DMA will "almost double" the transfer rate. Allthough there are no exact figures available, the general belief is that the bandwidth is around 1.2 Mbyte/sec. DEC is also known to be working on processors, disks and memory boards to handle bus-parity data.[11] As a matter of fact, the ADAC Corporation[12] supports block move transfers and bus parity on its bidirectional bus repeater.

2.3. The SBI-bus

The Synchronous Backplane Interconnect (SBI) was originally conceived in 1974 for use on a PDP-11 processor ("Dragon", not released) and later planned for use on a PDP-10 processor. It is tailored to the 32-bit environment and used as the primary bus in the VAX-11/780 processor. Devices connected to the SBI[13] are typically CPU, memory controllers, Unibus and Massbus adapters. The SBI is a centralised periodic bus, with a clock of 200 nsec. With a 32-bit data path, this results in a maximum bandwidth of 13.3 Mbyte/sec.

The information on the data lines can be 32 bits of information, or 28 bits of address and 4 bits of command code. The bus is really dedicated to the VAX-11/780. The 750 uses a different style bus (CMI) and the 730 has a Unibus. Some manufacturers make disk controllers which plugs directly into the SBI or CMI.

2.4. The Multibus (IEEE P-796)

In 1976 Intel introduced their single board systems.[14] Design engineers using this system started to use the development system as part of their own products, so Intel began to make available the system bus specification, now known as the Multibus, to the world. Around 1977-78 the Multibus specification were significantly expanded to cover operation with both 8 and 16 bit system modules and an auxiliary power bus.[15] In March 1978 a working group of the IEEE (MSBG, Microprocessor System Bus Group) began to turn the Multibus into a suitable, generally acceptable standard. Later, the project number P796 was assigned. The committee made more changes in the specification,[16,17] and the bus became an official IEEE standard[18] in December 1982. This standard may change yet. The IEEE is considering improvements and enhancements to the 796 bus.[19] Intel now considers the Multibus as foundation of Intel's Total System architecture.[20] This architecture consists of the Multibus itself, the iLBX Execution bus, the iSBX I/O expansion bus (IEEE P-959) and the Multichannel I/O bus.
The Multibus itself is based on two connectors. P1, which contains all Multibus signals, and the auxiliary P2 connector which contains the 4 extension lines and the (optional) iLBX bus. The extension allows up to 16 Mb addressing. The full Multibus interface is an asynchronous, multimaster bus. Its address path is 24 bit wide, the data path is 16 bit. The I/O addressing path is 16 bits. There are 8 interrupt levels. It will support a maximum of 16 devices (Master and Slave). Maximum backplane length is 18 inches. The maximum bus bandwidth is 10 Mbyte/sec (16 bit wide transport).[20] The older manual[15] claims a maximum of 5 Mhz, but "due to bus arbitration and memory access time, a typical maximum transfer rate is often on the order of 2 Mhz". From the latter figure, it can be concluded that the practical maximum bandwidth is around 4 Mbyte/sec. Apart from the standard implementations there are "Multibus compatible" boards. These are mostly versions which should meet military specifications and use the standard signals, but have stronger and different mechanical connections.

2.5. The S100 bus (IEEE P-696)

The S100 bus started off in 1976 with the introduction of the MITS's Altair microcomputer. In August 1977 the started to turn the bus into an IEEE standard 696.[18] The first draft of the standard[21] upgraded the S100 bus thereby eliminating many of it's problems and making it suitable for 16-bit processors. The bus has a centralised master. There areeight levels of vectored interrupts and a non-maskable interrupt. The maximum number of devices supported is 22, 16 of which can be temporary masters. Provisions have been made to permit mixing of 8- and 16-bit memory cards. The data path is 8 or 16 bits wide, the address path is 22 bits wide. There is no specification for the bandwidth, although it is supposed to be "one of the highest performance buses in existence today."[22] Looking at the timing diagrams, it be concluded that the maximum bandwidth is around 4 Mbyte/sec (with 16-bit transfers). In the beginning there were problems with mixing various brands of S100 products, not all manufacturers products were compatible. There is also a difference between the first draft and the now official standard, especial with boards from before 1981,[23] although the incompatibilities may be resolvable.

2.6. STD-bus (IEEE P-961)

The STD standard bus is a bus for 8-bit microprocessors. It was started by Pro-Log in 1973 and redefined in 1976. In May 1981 a working committee of the IEEE was formed under project number P961, and in August 1982 a working group started work a bus derived from the STD bus, called the STE and designated P1000. This latter one is to be implemented with the DIN 41612 (IEC 603-2) Eurocard connector. The STD bus is to some extent dependent on the processor family being used. Mixing different processor families can be difficult.[24,23] Although there are hardly any figures available, it can be concluded from available timing diagrams,[25] that the bandwidth will be around 2.5 Mbyte/sec. The bus is designed to be used for low cost interfacing as in for instance data-acquisition systems. It is in principle a single master bus, although in the future this can be expanded to multimaster. Initially, it can have just one DMA-master. Interrupts can be daisy chained and vectored. Its data path is 8 bits wide, the address path is basically 16 bits wide. There are extra lines for enlarging the address space.

2.7. VERSAbus (IEEE P-970)

The VERSAbus[26] is a new generation computer bus designed for microprocessor-based systems. It was developed by Motorola, and is currently in the being standarized as IEEE P970.[27] The bus supports multiple masters, has 5-levels of bus arbitration (daisy chained per level) and is asynchronous. There are 7 (vectored) interrupt levels. For each level, the interrupt acknowledge is daisy chained. The (standard) data path is 16

bit wide with 2-bit even parity, which can be extended to 32 bits and another 2 parity bits. The address path is 24 bit wide with 1 odd parity bit and can be extended to 32 bit with an extra parity bit. The maximum bandwidth is 20 Mbyte/sec, for 32 bit data transfers, but when in the future semiconductor devices will be capable of supporting 100 nanosecond cycle times on data transfers, the bandwidth will be upgraded to 40 Mbyte/sec. An interesting feature is the interintelligence bus. This is a serial link which may be employed for interprocessor communication, bus monitoring, (down-)loading diagnostics, etc, without putting an extra load on the bus. You will see this feature on more modern buses, Intel will put it on its new version of the Multibus (Multibus 2)[28] and on the FASTBUS[29] (not the same bus as used in DEC 11/45 and 11/70 processors). It is suggested to make this link, for the FASTBUS, Ethernet compatible. A similar technique is also suggested for the Futurebus (IEEE P-896).[30] The Versabus has, like the Multibus, two connectors. P1 contains all the basic signals, while P2 contains the signals for the extensions, the serial link and a 50-pin I/O bus.

2.8. VME-bus

The definition of the VME bus (Versa Module Europe)[31,32] has been a joint effort of Mostek, Motorola and Signetics/Philips. Although the organisation of the bus is similar to that of the Versabus, there are a number of differences. The basic VME-bus consistsof 4 groups of signal lines called buses. These four (sub-)buses are the Data Transfer Bus (DTB), Priority Interrupt, the DTB Arbitration and a Utilities Bus. For the fifth bus, the InterIntelligence Bus (IIB), a protocol has been proposed, but this is still being reviewed.[33] The bus definition breaks down into different modules or options, which can be freely mixed. These options differ with respect to the data transfer width, the addressing capabilities, arbitration and interrupt options etc. A fully expanded VME-bus has the same data and address path as the expanded Versabus. There are 6 additional address lines, called the Address Modifiers (AM), to be used for memory management purposes and for indicating supervisory or non-privileged transfers. This makes it possible in a VME-bus based system to have memory management distributed over various boards of the system. The AM is also used to implement a sequential address cycle (block mode transfers). The bandwidth of the VME-bus is not specified, but will be about the same as that for the Versabus, i.e. 20 Mbyte/sec. Of course, with the sequential address option this figure is higher. As with the Versabus, the VME-bus has two connectors, P1 and P2, both of them DIN 41612 (IEC 603-2) Eurocard connectors. If P2 is not used for the 16-bit option, the board can be just a single Eurocard. If P2 is also used, a double Eurocard is necessary. The bus supports multimaster operation, is asynchronous, and has a maximum of 4 bus arbitration levels (daisy chained per level). There are 7 (vectored) priority interrupt levels. For each level, the interrupt acknowledge is daisy chained. For a detailed description of the differences between the Versabus and the VME-bus see also [33].

3. Peripheral buses

There are a lot of peripheral buses in existence. Some of them are very much tied to a single manufacturer, like the Massbus. Others were introduced by one manufacturer, used with a different specification by a second and upgraded by a third, allthough all refer to it as an "Industry standard". This practice is widely used by floppy, Winchester and other hard disk manufacturers. See for an example [34]. Another nice term often loosely used in the OEM-world is "ANSI-compatible". There are ANSI standards, proposals to ANSI standards and *de facto* standards which might become a standard.[35] An average end-user of a system normally doesn't have to know about this jungle, but when one wants to integrate one's system self from components of different brands oneself, one has to be sure that things are really compatible, whatever label maybe attached.

MASSBUS. One of the better known peripheral buses is the MASSBUS, a peripheral controller bus that has no arbitration.[7] The Massbus controller is always master and the peripheral (controller) is the slave. Behind the peripheral controller another bus, for instance the SMD bus, is sometimes hidden.

SMD. The SMD or Storage Module Drive first appeared on the CDC 14-inch disk drives. It became a *de facto* industry standard and later an ANSI standard. It was intended for a disk with a a rotation speed of 3600 rpm, 832 cylinders and a transfer rate of 9.6 Mbits/sec (1.2 Mbyte/sec). But is is also used by an 8-inch Fujitsu disk with 589 cylinders. The bus itself consists of a daisy-chained control bus, the "A cable", and a data bus, the "B cable". The latter may be daisy-chained as well, or be a separate cable for each disk from the controller. The ANSI X3.91M-1982 standard is based on the SMD-interface.

RDI. The RDI or Rigid Disk Interface is a proposed ANSI standard for high performance drives with 10 Mbits/sec transfer rate. The RDI may replace the SMD for 8-inch disks drives. The ST506, developed by Seagate Technology, is a *de facto* industry floppy-like standard for 5¼ inch disks drives. It allows bit serial transfer rates of 5 Mbits/sec.

SA1000. The SA 1000, developed by Shugart Associates, is another floppy-like *de facto* standard interface for low-end 8-inch disk drive.

SASI. Also developed by Shugart, is a general purpose system bus with a bandwidth of 5 Mbyte/sec. It needs an adapter at each host computer and a controller/formatter at the peripheral system. This way it can

connect 8 nodes together. The **SCSI** or Small Computer Systems Interface is the proposed ANSI version of the SASI.

IPI. Yet another ANSI standard proposal is the IPI or Intelligent Peripheral Interface, which connects a computer up to eight disk units. It has an 8- or 26-bit data bus, and two 8-bit command and status buses. The bandwidth will be about 5 Mbyte/sec with a maximum length of 125 meters.

4. Table

This table gives a short overview of the general purpose buses, discussed in the previous sections:

name	Multimaster	Data path	Address path	Bandwidth Mbyte/sec	Interrupt Levels	DMA Levels	IEEE standard
Unibus	no	16	22	1.7	4	1	no
LSI-bus	no	16	22	1.2	4	1	no
SBI	no	32	28	13.3	—	—	no
Multibus	yes	16	24	10	8	1	P 796
S-100	yes	16	32	4	8	16	P 696
STD	no	8	16	2.5	1	1	P 961
VERSAbus	yes	32	32	20	7	5	P 970
VME	yes	32	32	20	7	4	no

Trademarks

UNIX is a trademark of Bell Laboratories.
Multibus, iLBX, iSBX and Multichannel are trademarks of Intel Corporation.
SBI, UNIBUS, PDP, DEC, VAX, MASSBUS, LSI-11, Micro/PDP-11 are trademarks of Digital Equipment Corporation.
VERSAbus is a trademark of Motorola Incorporated.
Ethernet is a trademark of Xerox Corporation.

References

1. Monte Pickard, "Communications processor speeds UNIX-based multiuser system," *Mini-Micro Systems* **XVI No. 3** pp. 153-158 (March 1983).
2. Anonymous, *PDP11 peripherals handbook,* Digital Equipment Corporation, Maynard, Mass. (1973-1974).
3. C. Gordon Bell and J. Graig Mudge, "The Evolution of the PDP-11," pp. 379-408 in *Computer Engineering*, ed. C. Gordon Bell, J. Craig Mudge, John E. McNamara, Digital Press, Bedford, Mass. (September, 1978).
4. Anonymous, *VAX hardware handbook,* Digital Equipment Corporation, Maynard, Mass. (1980-1981).
5. Bob Kridle, Bill Joy, Sam Leffler, *Hints on configuring VAX systems for Unix (Draft).* 31 Jan. 1983.
6. Bob Kridle, Sam Leffler, *Hints on configuring VAX systems for Unix, Revised for 4.2BSD.* 15 Mar. 1983.
7. John V. Levy, "Buses, The Skeleton of Computer Structures," pp. 269-299 in *Computer Engineering*, ed. C. Gordon Bell, J. Craig Mudge, John E. McNamara, Digital Press, Bedford, Mass. (September, 1978).
8. Anonymous, *PDP11 bus handbook,* Digital Equipment Corporation, Maynard, Mass. (1979).
9. Anonymous, *microcomputer handbook,* Digital Equipment Corporation, Maynard, Mass. (1976-77).
10. Anonymous, *MICRO/PDP11 Handbook,* Digital Equipment Corporation, Bedford, Mass. (1983-84).
11. Anonymous, "DEC adds muscle to Q bus," *Electronics*, p. 41 (May 31, 1983).
12. Anonymous, "Q-bus repeater dodges delays," *Electronics*, pp. 149-150 (June 16, 1983).
13. Anonymous, *VAX hardware handbook,* Digital Equipment Corporation, Maynard, Mass. (1979-1980).
14. Robert N. Noyce and Marcian E. Hoff Jr., "A History of Microprocessor Development at Intel," *IEEE micro*, pp. 8-21 (February, 1981).
15. Joe Barthmaier, *Intel MULTIBUS Interfacing,* Intel Corporation (1979). Application Note AP-28A

16. Rich Boberg, "Major standardization issues of the proposed IEEE 796 bus - Multibus," *Microprocessors and microsystems* **6 no. 9** pp. 471-474 (November 1982).

17. Richard W. Boberg, "Status of the IEEE P796 Multibus," *Interfaces in Computing* **1** pp. 85-87 (1982).

18. Robert G. Stewart, "microSTANDARDS," *IEEE micro*, pp. 69-70 (February, 1983).

19. Louis Costrell, "Institute of Electrical and Electronis Engineers activities," *Interfaces in Computing* **1 no. 2** p. 186 (May, 1983).

20. Anonymous, *MULTIBUS data book,* Intel Corporation (1983).

21. Kells A. Elmquist, Howard Fullmer, David B. Gustavson, George Morrow, "Standard Specifications for S-100 Bus Interface Devices," *Computer*, pp. 28-51 (July, 1979).

22. Mark Garetz, "P696/S100 — a bus which supports a wide range of 8- and 16-bit processors," *Microprocessors and microsystems* **6 no. 9**(November, 1982).

23. Carl Warren, "A mix of standard and proprietary buses marks the latest μC systems," *Electronic Design*, pp. 101-112 (March 17, 1983).

24. Tim Elsmore, "Standard bus for 8-bit microprocessor systems," *Microprocessors and microsystems* **6 no. 9**(November, 1982).

25. Anonymous, *Intersil data sheets STD bus products,* Intersil Inc, System Division, Sunnyvale, California (1980).

26. Anonymous, *VERSAbus, Preliminary Specifications,* Motorola Inc. (1979).

27. Paul Borill, "Backplane bus standards - why we need them, what we have got, and who makes them," *Microprocessors and microsystems* **6 no. 9**(November, 1982).

28. Robert G. Stewart, "microSTANDARDS," *IEEE micro*, pp. 56-58 (June, 1983).

29. R. S. Larsen, "Introduction to the FASTBUS standard data bus," *Interfaces in computing* **1** pp. 19-31 (1982).

30. Hubert Kirrman, "Proposed standard specifications for advanced microcomputer system backplane P896/D 3.3," in *Minutes of twelfth metting of the EDISG*, (February 14, 1981).

31. Sven Rau, "Advanced processor-independent bus rides on Eurocard hardware," *Electronics*, pp. 62-66 (December 29, 1982).

32. Anonymous, *VME bus Specification Manual,* Motorola ().

33. Richard de Bock, "VERSAbus - a multiprocessor bus standard - and VMEbus - its Eurocard counterpart," *Microprocessors and microsystems* **6 no. 9**(November, 1982).

34. Robert A. Sehr, "Maxtor ST-506 enhancement may force 'interface-off' in high-capacity, 5¼-in. drives.," *Mini-Micro systems*, pp. 34-39 (July 1983).

35. Single-board controllers manage more than one mass storage medium, "John Bond," *Electronic Design*, pp. 131-138 (March 17, 1983).

UN*X micro systems manufacturers:

Alcyon Corp.
Altos Computer Systems
Apollo Computer Inc.
Apple Computer Inc.
BBN Comp. Corp.
Bleasdale Computer Systems Ltd.
Bunker Ramo
Cadmus Computer Systems Inc.
Callan Data Systems
Campac Microelectronics Inc.
CCI
Charles River Data Systems
CIE Systems
CoData Systems Corp.
Columbia Data Products Inc.
Convergent Technologies Inc.
Corvus systems
Cosmos Systems Inc.
Cyb Systems
Dansk Data Electronik AIS
Digital Equipment Corp.
Dual Systems Corporation
Elite Corporation
Force Comp. GmbH
Fortune Systems Corp.
Forward Technology
Gould S.E.L. Computer Systems
Heurikon Corp.
Hewlett Packard S.A.
IBC
ICL Comp. Ltd.
Instrumentation Laboratory Inc.
Integrated Micro Products Ltd.
Integrated Solutions Inc.
Intel Corporation
Intellimac Inc.
Ithaca Intersystems
Kontron Micro Computer GmbH
Masscomp
Metheus Corp
Microbar Systems Inc.
MicroDaSys
Microproject BV
Momentum
Mostek Corp.
Motorola Inc.
NCR Corp.
NHCS BV
Omnibyte
Onyx Systems Ltd.
Pacific Microcomputers Inc.
Parallel Computers
PCS Periphere Computer Systems GmbH
Perkin Elmer
Pertec Data Systems Div.
Philips Gloeilampen NV
PIXEL
Plessey Microsystems Ltd.
Plexus Comp. Inc.
Plexus Computers Inc.
Plum Computer
Scan Computer Systems Ltd
SGS-ATES Componenti Eletronici
Sharp Corp.
Signetics Corp.
Sritek
SUN Microsystems Inc.
Telcon
Televideo Systems
Terak Corp.
Thomson CSF
Three Rivers Computer
TSD
Tycom
Valid Logic Systems Inc.
Victory Comp. Systems Inc.
WICAT Systems
Zehntel Inc.
Zilog Inc.

Company: Alcyon Corp., 8716 Production Ave, San Diego CA 92121, USA ; tel. (619) 578-0860.

Name system: AWS A68KPM

CPU and speed: 68000, 8MHz
System bus: Q-bus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-4Mb dual port mem.

Type UNIX system: Regulus
Company of UNIX port: Alcyon

Basic configuration: CIT-101 CRT, A68KPM board, 256Kb, 4 × RS232, par. port, 5Mb Winch. 5MB removable, floppy, $13K

Remarks: 256Kb cpu board $2900, (512 Kb mem $1600), MC 68451 MMU

Company: Altos Computer Systems, 2360 Bering Drive, San Jose, CA 95131, USA ;
tel. (408) 946-6700, twx. 171562/470642 .

Name system: 586-2(10,12,14,18), ACS 8600-IX (12,14,18)

CPU and speed: 8086, (5MHz) 10MHz
Max. physical memory, spec. membus, dual ported mem.: 256Kb (512Kb)-?Mb

Type UNIX system: Xenix (UNIX V7)
Company of UNIX port: Microsoft

Vendors of controllers:
cpu board: own
LAN contr.: own

Basic configuration:
586: CPU 10MHz, 6 × RS232, 10Mb Winch, ?Kb floppy, 256Kb, $ 4,500 .
ACS 8600: CPU 5MHz, 8 × RS232, 1 par, floppy, 20Mb Winch., 512Kb, $ 37,000

Applications: Altos-net, MP/M-86, MS-DOS

Distributors:
D : Altos, tel. +49 89 871-1071
F : Altos, tel. +33 1 7722662
GB : Altos, tel. +44 3446 77911
NL : INAD Comp. Groep, Eindhoven, The Netherlands.

Company: Altos Computer Systems, 2360 Bering Drive, San Jose, CA 95131, USA ; tel. (408) 946-6700, twx. 171562/470642 .

Name system: Altos 568-2(10,12,14,18), ACS 68000-12(14,18)

CPU and speed: 68000, 8MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1Mb

Type UNIX system: Xenix (UNIX SIII)
Company of UNIX port: Microsoft

Basic configuration:

568: 6 × RS232, floppy, 10(-80)Mb Winch., 256Kb (512Kb), $? .

ACS 68000: 8 × RS232, par port, floppy, 20(-80)Mb Winch., 256Kb (512Kb), altosnet, real time clock, $? .

Applications: Altos-net, COBOL

Remarks: RM/COS op.system

Distributors:

D : Altos, tel. +49 89 871-1071
F : Altos, tel. +33 1 7722662
GB : Altos, tel. +44 3446 77911
NL : INAD Comp. Groep, Eindhoven, The Netherlands.

Company: Apollo Computer Inc., 15 Elizabeth Drive, Chelmsford, MA 01824, USA ; tel. (617) 256-6600.

Name system: DN300 (400, 420, 600)

CPU and speed: 68000/68010, 10Mhz
System bus: own
Max. physical memory, spec. mem bus, dual ported mem.: 512Kb-3.5Mb

Company of UNIX port: own

Vendors of controllers:
cpu board: own
floppy contr.: own
raster contr.: own
asynch. contr.: own
(cart.) tape contr.: own
LAN contr.: own

Vendors of peripherals:
disk: own
(cart.) tape: own
floppy: own

Basic configuration: 512Kb, 34Mb Winch., 1.2Mb floppy, raster 800 × 1024, Keyboard, UKL 20,000.

Applications: CAD/CAM, Expert Systems, Scient. Research

Distributors: Subsidaries in France and West Germany.
GB : Apollo Computer (UK) Ltd., Berkhamsted, Herts. HP4 3LP, UK.
S : DICO AB, Stockholm, Sweden.

Company: Apple Computer Inc., 20525 Mariani Avenue, Cupertino, CA 95014, USA ; (408) 973-3019

Name system: Apple Lisa

CPU and speed: 68000, 5MHz
System bus: own
Max. physical memory, spec. membus, dual ported mem.: 256Kb-?Mb

Type UNIX system: UNIX V7
Company of UNIX port: Unisoft, Microsoft, Virtual Microsystems

Basic configuration: keyboard, raster ? × ?, ?Mb Winch., ?Kb floppy, ?slots, $?

Company: BBN Comp. Corp., 33 Moulton St., Cambridge, MA 02238, USA ;
tel. (617) 491-1850.

Name system: C/60, C/70

CPU and speed: own
System bus: own
Max. physical memory, spec. membus, dual ported mem.: 128Kb-2Mb

Type UNIX system: UNIX V7
Company of UNIX port: BBN

Basic configuration:
C/60: ?Kb, ?Mb Winch, $? .
C/70: ? .

Applications: networking

Remarks: Bitgraph

Distributors:
NL : Arsycom, Amsterdam, The Netherlands.

Company: Bleasdale Computer Systems Ltd., Francis House, Francis Street, London SW1P 1DE, UK. tel. +44 1 828-6661, twx. 28905 .

Name system: BDC 680

CPU and speed: 68000/68010, 8 / 10 MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 380Kb-16Mb

Type UNIX system: Uniplus
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: 68000 Sun board
LAN contr.: 3 COM. Ethernet

Vendors of peripherals:
disk: Quantum,Micropolis
floppy: Shugart

Basic configuration: CPU, 3.75Kb, 10 × RS232, 10Mb Winch., 1.0Mb floppy, UKL 6900.

Applications: Software Development, Phototypesetting, Microprocessor Software Development, Image Analysis, CAD/CAM, Office Automation

Company: Bleasdale Computer Systems Ltd., Francis House, Francis Street, London SW1P 1DE, UK; tel. +44 1 828-6661, twx. 28905 .

Name system: BDC 680A

CPU and speed: 68000, 10 MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 512Kb-2Mb

Type UNIX system: System III
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: 68000 Sun board
LAN contr.: 3COM. Ethernet

Vendors of peripherals:
disk: Quantum,Micropolis,Fujitsu
floppy: Shugart

Basic configuration: 6 (9) slot cage, CPU board, 256Kb multibus mem., UNIX, 20(33/46)Mb Winch., 10 × RS232, 5Mb floppy or card disk, UKL 8,800.

Applications: Software Development, Phototypesetting, Microprocessor Software Development, Image Analysis, CAD/CAM, Office Automation

Company: Bleasdale Computer Systems Ltd., Francis House, Francis Street, London SW1P 1DE, UK; tel. +44 1 828-6661, twx. 28905 .

Name system: BDC 680X

CPU and speed: 68000, 10 MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 512Kb-2Mb

Type UNIX system: System III
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: 68000 Sun board
LAN contr.: 3COM. Ethernet

Vendors of peripherals:
disk: Quantum,Micropolis,Fujitsu
floppy: Shugart

Basic configuration: as BDC 680A, 80(160/474)Mb Winch., mag. tape, UKL 23,479.

Applications: Software Development, Phototypesetting, Microprocessor Software Development, Image Analysis, CAD/CAM, Office Automation

Company: Bunker Ramo, E.L. Systems, 35 Nutmey Drive, Trumbull, CT 06609, USA.

Name system: Intellimation 20

CPU and speed: 68000, 6MHz

Type UNIX system: UNIX

Basic configuration: CRT, keyboard

Applications: Office systems

Remarks: see Fortune

Distributors:

NL : Bunker RAMO, J.H. Mayer, Vermon bv, Amsterdam, The Netherlands.
D : Bunker RAMO EDS GmbH, 8000 Munchen 80, West Germany.
E : Bunker RAMO ED S.A., Madrid 20, Spain.
CH : Bunker RAMO EDS AG, CH-8050 Zuerich, Switzerland.

Company: Cadmus Computer Systems Inc., 600 Suffolk St., Lowell, MA 01853, USA ; tel. (617) 453-2899.

Name system: Cadmus 9790

CPU and speed: 68000, 10Mhz
System bus: Q-bus
Max. physical memory, spec. membus, dual ported mem.: 512Kb-?Mb

Type UNIX system: UNIX V7 + enhencements SIII, BSD

Basic configuration: 1024 × 800 raster, 512Kb, 65Mb Winch., 16Mb tape cart., keyboard, 16 slot Q-bus cage, multi user UNIX, $ 17,900 , (Ethernet + software $ 5,000).

Remarks: 4 slot Multibus cage for inside the Q-bus cage $ 1,800. Configuration with Ethernet, without disk and tape costs $ 9,500. Fiberoptic network available +25%.

Company: Callan Data Systems, 2645 Townsgate Road, Westlake Village, CA 91361, USA ; tel. (805) 497-6837, twx 910-336-1685.

Name system: Unistar 100

CPU and speed: 68000, 8MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1Mb

Type UNIX system: UNIX V7
Company of UNIX port: Unisoft

Basic configuration: CRT, keyboard, 2 × RS423, par, timer, 10Mb Winch., 600Kb floppy, 6 slots, 256Kb, $9950.

Applications: 752 × 323 raster $1450, UniCalc, MicroIngres

Company: Campac Microelectronics Inc., 3561 Ryder Street, Santa Clara, CA 95051, USA ; tel. (408) 773-0444

Name system: CEC 8000 S

CPU and speed: Z8001
Max. physical memory, spec. membus, dual ported mem.: 12Kb-8Mb

Type UNIX system: UNIX V7

Basic configuration: CPU, 512Kb, 20Mb Winch., card. tape ?Mb, ? × RS232, $? .

Company: CCI, Computer Consoles Inc, The Flour Mill, Suite 401, 1000 Potomac Street, N.W. Washington, DC 20007, USA ;
tel. (202)965-6655

Name system: Power 5/20

CPU and speed: 68000, 8MHz
System bus: Versabus
Max. physical memory, spec. membus, dual ported mem.: 512Kb-4Mb

Type UNIX system: PERPOS (UNIX SIII)
Company of UNIX port: CCI

Basic configuration: cage, 35 Mb (70 Mb) Winch., 20Mb tape, 1Mb mem, ? RS232, $? .

Applications: C, COBOL 74, F77, BASIC, Office Power

Company: Charles River Data Systems, 4 Tech Circle, Natick, MA 01760, USA ; tel. (617) 655-1800, twx. (710) 386-0523

Name system: Universe68/05 (37A, 47A, 80A)

CPU and speed: 68000, 12.5MHz
System bus: Versabus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-2 (6)Mb

Type UNIX system: UNOS
Company of UNIX port: CRDS

Vendors of controllers:
disk contr: own, SASI-bus

Basic configuration: 256Kb (512Kb), 10Mb(-80Mb) Winch., 1Mb floppy, par port 7 slot cage, 4 × RS232, $11,900 (UNOS $3,000, C $500)

Applications: Cobol, DBMS, F77, Pascal

Remarks: 4Kb cache mem

Distributors:
GB : Ch. Rivers DS, 24 Palm Close, New Inn/Pontypool, NP4 0DE, UK.
NL : Moekotte Automatisering bv, Enschede, The Netherlands.

Company: CIE Systems, 2515 McCabe Way, Irvine, CA 92713-6579, USA ;
tel. (714) 95751112

Name system: PRO-IV

CPU and speed: 68000, 8MHz
System bus: Multibus

Type UNIX system: UNIX SIII

Basic configuration: CRT, keyboard, $? .

Remarks: REGULUS, RM/COS

Company: CoData Systems Corp., 285 North Wolfe Road, Sunnyvale, CA 94086, USA ; tel. (408) 735-1744.

Name system: Codata 3300 series

CPU and speed: 68000, 8MHz
System bus: multibus
Max. physical memory, spec. membus, dual ported mem.: 320Kb-1.5Mb, own mem bus

Type UNIX system: UNIX V7, System III
Company of UNIX port: Microsoft (and UNISIS own), Unisoft

Vendors of controllers:
cpu board: Codata
floppy contr.: Codata
raster contr.: Codata
asynch. contr.: Codata
(cart.) tape contr.: Alloy
LAN contr.: 3Com, Exelan (Ethernet)

Vendors of peripherals:
disk: Seagate, Atasi, Fujitsu
(cart.) tape: DEI
floppy: Tandon (mag.) tape: Datum or Cipher

Basic configuration: Series 3300: 68000, 320Kb, 1Mb floppy, 10 I/O ports, 12, 33 or 84Mb Winch. ($8,580, $10,560, $14,850 OEM)

Applications: Dev. systems, office auto., scientific and graphics

Remarks: board L 1750 (256Kb, 2 × RS232)

Distributors:
GB : Cambridge Micro Computers Ltd., Milton Road, Cambridge CB4 4BN, UK.
GB : Robotech Europe Ltd., Tower Hill, London EC2, UK.
CH : CSP AG, 3074 Muri/BE, Switserland.
CH : Aronco Comp. Systems, Dietlikon, Switzerland.
B : Distraco S.A., Brussels, Belgium.
NL : Manudax Nederland B.V., Heeswijk, The Netherlands.
F : Tekelec-Airtronics, Sevres, France.

Company: Columbia Data Products Inc., P.O. Box 1118, 460 Muenchen-Gladbach, West Germany ; tel +49 2161 35159, twx 852452.

Name system: Multipersonal Comp system

CPU and speed: 8088
System bus: IBM-PG
Max. physical memory, spec. membus, dual ported mem.: 128Kb-?Mb

Type UNIX system: XENIX (UNIX V7)
Company of UNIX port: Microsoft

Basic configuration: 128Kb RAM, 2 × RS232, Centr.par., 2 × 640Kb floppy, Winch. rem, $ 199b + Winch. $ 4,995.

Applications: OASIS, CP/M, MS DOS, 1RM-PC comp.

Company: Convergent Technologies Inc., Santa Clara, CA, USA.

Name system: MegaFrame

CPU and speed: 68010, 10MHz
System bus: own 11Mb
Max. physical memory, spec. membus, dual ported mem.: 512K-4Mb

Type UNIX system: CTOS
Company of UNIX port: own

Basic configuration: 512Kb, 10 × RS232, 2 × RS422, SMD contr, Multibus adaptor, < $ 20,000.

Company: Corvus systems, 2029 O'Toole Avenue, San Jose, CA 95131, USA ;
tel. (408) 9467700, tlx 278976.

Name system: CONCEPT

CPU and speed: 68000, 8 MHz
System bus: own
Max. physical memory, spec. membus, dual ported mem.: 512Kb, 1Mb

Type UNIX system: System III
Company of UNIX port: Unisoft

Basic configuration: 512Kb Progam RAM, 256Kb Video RAM, 2 × RS232C, OMNINET LAN, 4 slots; 6, 11, 20Mb Winch., CRT 720 × 560 Keyboard.

Applications: Office Automation Workstation, Personal workst. $6.5K.

Remarks: Optional 8 × RS232C

Distributors: Contact CORVUS
NL : Rodelco, Rijswijk (NH), The Netherlands.

Company: Corvus systems, 2029 O'Toole Avenue, San Jose, CA 95131, USA ;
tel. (408) 9467700, tlx 278976.

Name system: UNIPLEX

CPU and speed: 68000, 8 MHz
System bus: own
Max. physical memory, spec. membus, dual ported mem.: 512Kb, 1Mb

Type UNIX system: System III
Company of UNIX port: Unisoft

Basic configuration: 512Kb, 2 × RS232, Omninet LAN, 4 slots; 6, 11, 20Mb Winch.

Applications: Network Node, Fileserver Host, Gateway, etc. $5K.

Distributors: Contact CORVUS
NL : Rodelco, Rijswijk (NH), The Netherlands.

Company: Cosmos Systems Inc., 430 Toyama Drive, Sunnyvale, CA 94086, USA ; tel. (408) 744-0721 .

Name system: Starfield Series – Orio, Antares + Lyra

CPU and speed: 68000, 8MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 6 Mb, dual ported

Type UNIX system: UNIX V7 with Berkeley Enh.
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: Cosmos
floppy contr.: OMTI
asynch. contr.: Systech + Intelligent I/O
(cart.) tape contr.: Systech.
LAN contr.: 3Com/Fusion-Ethernet

Basic configuration: <40Mb, 1Mb storage, 5 boardslots, compilers for programming and access control

Applications: OTM + Systems Integrations Image Processing, Graphics, Medical, CAD/CAM, Lab. Analysis, Seismic, Scientific.

Remarks: Have Array Processor, floating point, PVI graphics, 474 Mb Fujitsu.

Distributors: World Trade in Computers, Inc. Brussels will establish European distributors.
HK : MMC Inc., Hong Kong.

Company: Cyb Systems, 6448 Hwy. 290E., Suite D 106, Austin, TX 78723, USA ; tel. (512) 458-3224.

Name system: Multibox I

CPU and speed: 68000, 8MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1.5Mb

Type UNIX system: UNIX SIII
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: own
floppy contr.: Konan
LAN contr.: 3Com

Vendors of peripherals:
disk: Rodime
floppy: Mitsubishi

Basic configuration: Cyb/SUN MC68000, 256Kb On-board, 32Kb Multibus, 1Mb floppy, 27Mb Winch., 2 × serial I/O, 5 slots.

Applications: Merlin op.system

Remarks: single board SUN 68K 256Kb ?$

Distributors: Internat. Representative is David Stubbs, twx. 910-260-370, Pewaukee, WI 53072, USA.

Company: Cyb Systems, 6448 Hwy. 290E., Suite D 106, Austin, TX 78723, USA ; tel. (512) 458-3224.

Name system: Multibox II

CPU and speed: 68000, 8MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1.5Mb

Type UNIX system: UNIX SIII
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: own
floppy contr.: Konan
LAN contr.: 3Com

Vendors of peripherals:
disk: Rodime
floppy: Mitsubishi

Basic configuration: Cyb/SUN MC68000, 256Kb On-board, 512Kb Multibus, 1Mb floppy, 27Mb Winch., 10 serial ports, 4 slots.

Applications: Merlin op.system

Remarks: single board SUN 68K 256Kb ?$

Distributors: Internat. Representative is David Stubbs, twx. 910-260-370, Pewaukee, WI 53072, USA.

Company: Cyb Systems, 6448 Hwy. 290E., Suite D 106, Austin, TX 78723, USA ; tel. (512) 458-3224.

Name system: Multibox IIa

CPU and speed: 68000, 8MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1.5Mb

Type UNIX system: UNIX SIII
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: own
floppy contr.: Konan
LAN contr.: 3Com

Vendors of peripherals:
disk: Rodime
floppy: Mitsubishi

Basic configuration: Cyb/SUN MC68000, 256Kb On-board, 256Kb Expansion, 32Kb Multibus, 1Mb floppy, 27Mb Winch., 10 serial ports, 3 slots.

Applications: Merlin op.system

Remarks: single board SUN 68K 256Kb ?$

Distributors: Internat. Representative is David Stubbs, twx. 910-260-370, Pewaukee, WI 53072, USA.

Company: Cyb Systems, 6448 Hwy. 290E., Suite D 106, Austin, TX 78723, USA ; tel. (512) 458-3224.

Name system: High Performance System I

CPU and speed: 68000, 8MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1.5Mb

Type UNIX system: UNIX SIII
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: own
floppy contr.: Konan
LAN contr.: 3Com

Vendors of peripherals:
disk: Rodime
floppy: Mitsubishi

Basic configuration: Cyb/SUN MC68000, 256Kb On-board, 256Kb Expansion, 1Mb Multibus, 1Mb floppy, 84Mb Winch., 18 serial ports, 1/2" mag. tape.

Applications: Merlin op.system

Remarks: single board SUN 68K 256Kb ?$

Distributors: Internat. Representative is David Stubbs, twx. 910-260-370, Pewaukee, WI 53072, USA.

Company: Cyb Systems, 6448 Hwy. 290E., Suite D 106, Austin, TX 78723, USA ; tel. (512) 458-3224.

Name system: High Performance System I

CPU and speed: 68000, 8MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1.5Mb

Type UNIX system: UNIX SIII
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: own
floppy contr.: Konan
LAN contr.: 3Com

Vendors of peripherals:
disk: Rodime
floppy: Mitsubishi

Basic configuration: Cyb/SUN MC68000, 256Kb On-board, 256Kb Expansion, 1Mb Multibus, 1Mb floppy, 2 × 84Mb Winch., 18 serial ports, 1/2″ mag. tape.

Applications: Merlin op.system

Remarks: single board SUN 68K 256Kb ?$

Distributors: Internat. Representative is David Stubbs, twx. 910-260-370, Pewaukee, WI 53072, USA.

Company: Dansk Data Electronik AIS, Herlev Hovedgade 207, DK-2730 Herlev, Denmark ; tel. +45 2 855011 .

Name system: UNIMAX

CPU and speed: 68000, 8MHz
System bus: own, spec. I/O bus
Max. physical memory, spec. membus, dual ported mem.: 5212Kb-16Mb

Type UNIX system: UNIREX (V7)
Company of UNIX port: DDE

Applications: Pascal, C, Cobol, F, Ext Basic

Remarks: I/O controllers; SIOC, NIOC, DIOC, HIOC, selfconfiguring multiprocessor

Company: Digital Equipment Corp., Comm. Ind. Group, MK02-1/C11, Merrimack, NH 03054, USA .

Name system: UNIX V7M-11

CPU and speed: own
System bus: UNIBUS, Q-bus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-2Mb

Type UNIX system: UNIX V7 (BSD 2.9, System III, or System V)

Vendors of controllers:
cpu board: own
floppy contr.: own
asynch. contr.: own
(cart.) tape contr.: own
LAN contr.: own

Vendors of peripherals:
disk: own
(cart.) tape: own
floppy: own

Basic configuration: 256Kb, 800Kb floppy, 10Mb Winch., 1 × RS232, UNIX-V7M, $? .

Remarks: PDP 11 series 11/23, 11/24, 11/44 provide wide variety of system configurations.

Company: Digital Equipment Corp., Comm. Ind. Group, MK02-1/C11, Merrimack, NH 03054, USA .

Name system: VAX

CPU and speed: own
System bus: Unibus (for I/O), own
Max. physical memory, spec. membus, dual ported mem.: 1Mb-32Mb

Type UNIX system: UNIX BSD4.2

Vendors of controllers:
cpu board: own
floppy contr.: own
asynch. contr.: own
(cart.) tape contr.: own
LAN contr.: own

Vendors of peripherals:
disk: own
(cart.) tape: own
floppy: own

Basic configuration: 1Mb, 120Mb disk, 8 × RS 232, UNIX, $? .

Remarks: VAX series 11/730, 11/750, 11/780 provide wide variety of system configurations.

Company: Dual Systems Corporation, 2530 San Pablo Avenue, Berkeley, CA 94702, USA ; tel. (415) 3854/3890, twx 172029.

Name system: System 83/20

CPU and speed: MC68000, 10MHz
System bus: IEEE 696/S-100
Max. physical memory, spec. membus, dual ported mem.: 512Kb-3.25Mb

Type UNIX system: UniPlus+ (UNIX System III with Berkeley Enhancements)
Company of UNIX port: Unisoft Systems, Berkeley, California, and Dual Systems Corporation.

Basic configuration: 20 slot cage, CPU MMU, 2 × 256Kb, 4 × RS232, 1Mb floppy, 20Mb Winch., UniPlus+ OS, 'C', assembler, loader, $ 16,660.

Applications: Used for software development, process control, education, robotics, database management.

Remarks: Dual Systems Terminal I/O; 9-track Cipher/Datum (magn.) tape (projected). Wide variety of configurations available.

Distributors:

NL : Andinfo, Amsterdam, The Netherlands.
FR : A2M, Les Chesney, France.
GB : Hall Kentec Ltd., Sevenoaks, Kent TN15 6QP, UK.
D : Scientific Microsystems, Aachen, West Germany.
CH : Alkon AG, Zuerich, Switzerland.
HK : Intelligent Computer Systems Ltd., Hongkong.
ZA : Micromation Systems Ltd., Edenvale, South Africa.
USA: Wild & Rutowski, Jericho, NY, USA.
USA: Wild & Rutowski, Pompton Lakes, NJ, USA.
USA: Wild & Rutowski, Lansdale, PA, USA.
USA: Deerfield Systems, Deerfeeld, IL, USA.
USA: J.J. Wild Inc. of New England, Needham, MA, USA.
USA: J.J. Wild Inc. of New England, Merrimack, NH, USA.
USA: Advanced Data Systems, Salt Lake City, UT, USA.
USA: Focus Data Systems, Mountain View, CA, USA.
USA: Time Line Corporation, Honolulu, HI, USA.

Company: Dual Systems Corporation, 2530 San Pablo Avenue, Berkeley, CA 94702, USA ; tel. (415) 3854/3890, twx 172029.

Name system: System 83/80

CPU and speed: MC68451, 10MHz
System bus: IEEE 696/S-100
Max. physical memory, spec. membus, dual ported mem.: 512Kb-3.25Mb

Type UNIX system: UniPlus+ (UNIX System III with Berkeley Enhancements)
Company of UNIX port: Unisoft Systems, Berkeley, California, and Dual Systems Corporation.

Basic configuration: 20 slot cage, CPU MMU, 2 × 256Kb, 1Mb floppy, 80Mb Winch., UniPlus+ OS, 'C', assembler, loader, $ 20,990.

Applications: Used for software development, process control, education, robotics, database management.

Remarks: Dual Systems Terminal I/O; 9-track tape drive is recommended. Wide variety of configurations available.

Distributors:

NL : Andinfo, Amsterdam, The Netherlands.
FR : A2M, Les Chesney, France.
GB : Hall Kentec Ltd., Sevenoaks, Kent TN15 6QP, UK.
D : Scientific Microsystems, Aachen, West Germany.
CH : Alkon AG, Zuerich, Switzerland.
HK : Intelligent Computer Systems Ltd., Hongkong.
ZA : Micromation Systems Ltd., Edenvale, South Africa.
USA: Wild & Rutowski, Jericho, NY, USA.
USA: Wild & Rutowski, Pompton Lakes, NJ, USA.
USA: Wild & Rutowski, Lansdale, PA, USA.
USA: Deerfield Systems, Deerfeeld, IL, USA.
USA: J.J. Wild Inc. of New England, Needham, MA, USA.
USA: J.J. Wild Inc. of New England, Merrimack, NH, USA.
USA: Advanced Data Systems, Salt Lake City, UT, USA.
USA: Focus Data Systems, Mountain View, CA, USA.
USA: Time Line Corporation, Honolulu, HI, USA.

Company: Elite Corporation, 906 N.Main, Wichita, KS 67203, USA ;
tel. (316) 2650959

Name system: Consultant

CPU and speed: 16032, ?MHz
System bus: VME
Max. physical memory, spec. membus, dual ported mem.: 512Kb-1.75Kb

Basic configuration: CPU, 512Kb, 768 × 624 raster, keyboard, 5Mb + 5Mb Winch., 10 (5 free) slots, 3 × RS232, par, $? .

Applications: Pascal, Lisp, ISE/16, NSx/16, Poet, Smpl

Company: Force Comp. GmbH, Freischuetzstr. 92, 8000 Muenchen 81, W.Germany ;
tel. +49 89 951041-44, tlx. 524190 forc-d.

Name system: Sys68K/CPU-1

CPU and speed: 68000, 8MHz
System bus: VME
Max. physical memory, spec. membus, dual ported mem.: 128Kb-16Mb

Basic configuration: single board, 128Kb (512Kb), 3 × RS232, par, timer, no MMU, $1420, 128Kb EPROM Area, Real Time clock with Battery backup.

Distributors:
NL : Alcom El. Cap. B.V., Capelle a/d IJssel, The Netherlands.

Company: Fortune Systems Corp., 1501 Ind. Road, San Carlos, CA 94070, USA ; tel. (415) 5958444, twx. 172632/9103765014.

Name system: Fortune 32/16

CPU and speed: 68000, 6MHz
System bus: own
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1Mb, dual ported for I/O

Type UNIX system: UNIX OS
Company of UNIX port: Fortune

Vendors of controllers:
cpu board: Fortune
floppy contr.: Fortune
raster contr.: Fortune
asynch. contr.: Fortune
(cart.) tape contr.: Fortune
LAN contr.: Fortune

Vendors of peripherals:
disk: Segate, Miniscribe, Rodime
floppy: Tandon, Shugart

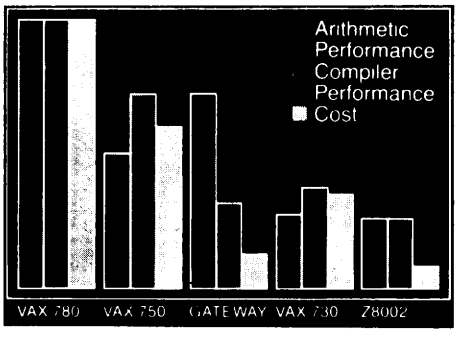
Basic configuration: System 1: 256Kb, RS232, floppy 720Kb, CRT, keyboard (Winch. 5/10/20Mb), (colour graphics). $6K. (5Mb Winch. $10K). (Ethernet).

Distributors:
NL : Manudax, Heeswijk, The Netherlands
GB : Fortune Systems Ltd., Hammersmith, London W6, UK.

Look Forward for High Performance Gateway™ Workstations.

The Forward Technology Gateway Series of workstations provide minicomputer performance at microcomputer prices. The system's architecture centers around a 10mhz 68000 processor. High speed memory management allows memory access with no wait states and supports a multi-tasking multi-user operating system environment.

The system peripherals and controllers are specially designed for fast access and throughput. The standard Multibus™ card cage permits the addition of a variety of peripherals and controllers. The systems support multiple users and can be networked via industry standard Ethernet™ hardware and software. A high resolution graphic option is also available. System software centers around the XENIX operating system and provides powerful language processors and development tools. For more specific information, call or write:



Forward TECHNOLOGY INC
2175 Martin Avenue, Santa Clara, CA 95050
Telephone (408) 988-2378
303 Wyman St., Suite 300, Waltham, MA 02154
Telephone (617) 890-6131
Thame Components Ltd.
Thame Park Road, Thame, Oxon, OX9 3XD
Telephone 084 421 4561, TELEX 837917

Company: Forward Technology, Inc., 2175 Martin Avenue, Santa Clara, CA 95050, USA ; tel. (408) 9882378, twx. 9103382186.

Name system: FT-68M

CPU and speed: 68000, 10MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 1Mb Spec. Mem. Bus, 8Mb Total Sys. Mem., 1Mb Dual ported mem.

Type UNIX system: Xenix TM (UNIX V7)

Vendors of controllers:
cpu board: Forward
raster contr.: Forward
asynch. contr.: Forward
(cart.) tape contr.: Forward
LAN contr.: Forward

Vendors of peripherals:
disk: Forward
(cart.) tape: Forward
floppy: Forward

Basic configuration: Gateway Workstation, FT-68X, 32 bit 68000 processor, 256Kb, 2 serial ports, 6 slot cage, 20Mb Winch.,20Mb Cartr. Tape, XENIX, C, $22,995 , Graphics Option $6,325.

Remarks: Single Boards available also.

Distributors:
GB : Thame Systems, Thame, Oxon OX9 3XD, UK.

Company: Gould S.E.L Computer Systems, 6901 West Sunrise Blvd, PO Box 9148, Fort Lauderdale, FL 33320, USA ;
tel. (305) 587-2900x377.

Name system: Concept 32/27

CPU and speed: own
System bus: Selbus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-16Mb

Type UNIX system: UNIX V7
Company of UNIX port: own

Vendors of controllers:
cpu board: own
floppy contr.: own
raster contr.: own
asynch. contr.: own
(cart.) tape contr.: own
LAN contr.: own

Vendors of peripherals:
disk: CDC
(cart.) tape: Pertec, STC, Kennedy
floppy: CDC

Basic configuration: 1Mb mem., console, 80Mb disc, tape cartr., 8 async., cabinet, $ 55.000, $9,000 16 terms, $118,000 32 terms.

Applications: CAD/CAM, simulation, scient. calculations, data bases, factory automation, number crunching, seismic calculations.

Remarks: System V in 1984

Distributors:
NL : Gould S.E.L. Computer Systems BV, tlx. 70667, Tiel, The Netherlands.

Company: Gould S.E.L Computer Systems, 6901 West Sunrise Blvd, PO Box 9148, Fort Lauderdale, FL 33320, USA ;
tel. (305) 587-2900x377.

Name system: Concept 32/67

CPU and speed: own
System bus: Selbus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-16Mb

Type UNIX system: UNIX V7
Company of UNIX port: own

Vendors of controllers:
cpu board: own
floppy contr.: own
raster contr.: own
asynch. contr.: own
(cart.) tape contr.: own
LAN contr.: own

Vendors of peripherals:
disk: CDC
(cart.) tape: Pertec, STC, Kennedy
floppy: CDC

Basic configuration: 32Kb cache, !Mb mem., console, 80Mb disc, 45IPS tape unit, 8 async., distr. panel, cabinet, $150,000 , $9,000 16 terms, $118,000 32 terms.

Applications: CAD/CAM, simulation, scient. calculations, data bases, factory automation, number crunching, seismic calculations.

Remarks: System V in 1984

Distributors:
NL : Gould S.E.L. Computer Systems BV, tlx. 70667, Tiel, The Netherlands.

Company: Gould S.E.L Computer Systems, 6901 West Sunrise Blvd, PO Box 9148, Fort Lauderdale, FL 33320, USA ;
tel. (305) 587-2900x377.

Name system: Concept 32/87

CPU and speed: own
System bus: Selbus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-16Mb

Type UNIX system: UNIX V7
Company of UNIX port: own

Vendors of controllers:
cpu board: own
floppy contr.: own
raster contr.: own
asynch. contr.: own
(cart.) tape contr.: own
LAN contr.: own

Vendors of peripherals:
disk: CDC
(cart.) tape: Pertec, STC, Kennedy
floppy: CDC

Basic configuration: 32Kb cache, 2Mb mem., console, 300Mb disc, 75IPS tape unit, 8 async., distr. panel, cabinet, $235,000 , $9,000 16 terms, $118,000 32 terms.

Applications: CAD/CAM, simulation, scient. calculations, data bases, factory automation

Remarks: System V in 1984

Distributors:
NL : Gould S.E.L. Computer Systems BV, tlx. 70667, Tiel, The Netherlands.

Company: Heurikon Corp., 3001 Latham Dr., Madison, WI 53713, USA ;
tel. (608) 2718700.

Name system: HK68A

CPU and speed: 68000, 8MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1Mb

Type UNIX system: Uniplus System III
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: own
floppy contr.: own
raster contr.: own
asynch. contr.: own
(cart.) tape contr.: Archive
LAN contr.: 3Com

Vendors of peripherals:
disk: Quantum
(cart.) tape: Archive
floppy: Qume, Tandon

Basic configuration: 6 slot, HK68A, 40Mb Winch., 1Mb floppy

Remarks: MMU, DMA, 4 serial ports, 2 iSBX connectors, Winch. and tape interface, 3 CTC.

Company: Hewlett Packard S.A., Rue du Bois-du-Lan 7, CH-1217 Meyrin, Switzerland ;
tel. +41 22 838111 .

Name system: HP 9000 (Models 20, 30, 40)

CPU and speed: own
System bus: own
Max. physical memory, spec. membus, dual ported mem.: 512Kb-2.5Mb

Type UNIX system: HP-UX (UNIX V7)
Company of UNIX port: HP

Basic configuration:

HP9020: CRT, Keyboard, 512Kb, 4 × RS232, Hfl 89,040 ; 10Mb disk (Hfl 14,310).
HP9030: 512Kb, rack, 7 × RS232, Hfl 72,822 ; 16.5Mb disk, cartr. tape (Hfl 33,066).
HP9040: mini cabinet, 512Kb, 7 × RS232, Hfl 76,002 ; 16.5Mb disk, cartr. tape (Hfl 33,066).

Remarks: HP-UX and C (Hfl 23,850).

Distributors:

NL : HP bv, Amstelveen, The Netherlands.
B : HP Belgium nv., Brussel, Belgium.

Company: Hewlett Packard S.A., Rue du Bois-du-Lan 7, CH-1217 Meyrin, Switzerland ;
tel. +41 22 838111 .

Name system: HP 200 (M16, 26, 36)

CPU and speed: 68000, 8MHz
System bus: HP-113

Type UNIX system: UNIX V7

Basic configuration:

HP216: CRT, keyboard, 128K (768Kb), RS232, $? .
HP226: CRT, keyboard, floppy 264Kb, <2Mb, $? .
HP236: CRT, keyboard, floppy 258Kb, <2Mb, $? .

Applications: HPL language

Remarks: got no product sheet, see HP9000

Distributors:

NL : HP bv, Amstelveen, The Netherlands.
B : HP Belgium nv., Brussel, Belgium.

Company: IBC, Integrated Business Computers

Name system: IBC cadet

CPU and speed: 68000, 8MHz

Type UNIX system: OASIS (UNIX SIII)
Company of UNIX port: Unisoft

Company: ICL Comp. Lmd, ICL House Putney, London SW15 1SW, UK ;
tel. +32 1 7887272

Name system: Perq

CPU and speed: own
System bus: own
Max. physical memory, spec. membus, dual ported mem.: 512Kb-1Mb

Type UNIX system: UNIX V7
Company of UNIX port: ICL

Basic configuration: raster 1024 × 768, keyboard, 1Mb floppy, 24Mb Winch, $? , tablet, Ethernet, RS232

Company: Instrumentation Laboratory Inc., One Burtt Road, Andover, MA 01810, USA ; tel. (617) 470-1790.

Name system: Pixel 100/AP

CPU and speed: 68000, ? MHz
System bus: S100
Max. physical memory, spec. membus, dual ported mem.: 128Kb-6Mb

Type UNIX system: UNIX SIII

Basic configuration: 512Kb, 128Kb, 20Mb Winch., 2 × 630Kb floppy, 2 terminals CRT, 8 × RS232, 2 × par, UNIX SIII, $12825, (1Mb, 40Mb Winch., 8 CRTS, $19,900)

Distributors:

NL : Instrumentation Laboratory Inc., IJsselstein, The Netherlands.

Company: Integrated Solutions Inc., 1350 Dell Avenue, Campbell, CA 95008, USA ; tel. (408) 374-2441.

Name system: 68000-board

CPU and speed: 68000, 8,10,12 Mhz
System bus: Q-bus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-4Mb, sep. mem bus

Type UNIX system: UniPLus+ (UNIX SIII)
Company of UNIX port: UniSoft

Basic configuration: single board: 256Kb dual ported, 2 × RS232, MMU, $ 2,395.

Company: Integrated Micro Products Ltd., Medomsley Road, Consett, Co Durham DH8 6SY, UK :

Name system: IMP-68

CPU and speed: 68000, 8MHz
System bus: S100 (IEEE 696)
Max. physical memory, spec. membus, dual ported mem.: 256Kb-2Mb

Type UNIX system: Idris
Company of UNIX port: Whitesmiths I.M.P.

Vendors of controllers:
cpu board: I.M.P.
floppy contr.: Godbout
raster contr.: I.M.P.
asynch. contr.: I.M.P.
(cart.) tape contr.: I.M.P.

Vendors of peripherals:
disk: Rodine, Fujitsu (8" SMD)
(cart.) tape: Cipher
floppy: Tandon

Basic configuration: 10Mb Winch., 256Mb, 1Mb floppy, 10 slots, Idris, par, Pascal, UKL 7500.

Applications: Programming/Business

Remarks: 6 spare slots, RAM card upgradable from 256k-1Mb.

Company: Intel Corporation, 3065 Bowers Ave, Santa Clara, CA 95051, USA .

Name system: 86/30 X (330,380)

CPU and speed: 8086, 8MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 384Kb

Type UNIX system: (UNIX V7) Xenix
Company of UNIX port: Microsoft

Basic configuration: CPU, UNIX kernel, C, as-86, 10-slot cage, 35Mb Winch., 384Kb, 5 × RS232, $? .

Applications: C

Company: Intellimac Inc., 6001 Montrose Rd., Sixth floor Rockville, MD 20852, USA ; tel. (301) 984-8000, twx 710-828-9800.

Name system: IN/7000M

CPU and speed: 68000 8Mhz
System bus: Multibus (IEEE-796)
Max. physical memory, spec. membus, dual ported mem.: 256Kb-8Mb

Type UNIX system: UNIX V7
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: Pacific Micro
floppy contr.: Zendex disk contr.: Interphase
asynch. contr.: Central Data

Vendors of peripherals:
disk: CDC, Fujitsu
floppy: CDC

Basic configuration: 21 slots, 256Kb RAM, 1Mb ECVRAM, 8 × RS232, 160Mb Winch., 8+8Mb fixed/remov., 1.6Mb floppy, 72″ cabinet, $46,695.

Applications: Software development/target/host system

Remarks: System also being used for Ada software development.

Company: Ithaca Intersystems, Inc., 200E. Buffalo Street, P.O. Box 91, Ithaca, NY 14850, USA ; tel. (607) 273-2500, twx. 510-255-4346.

Name system: DPS-8000-Z8002

CPU and speed: Z8002, 6MHz
System bus: S100
Max. physical memory, spec. membus, dual ported mem.: 256Kb-2.5Mb

Type UNIX system: XENIX
Company of UNIX port: Microsoft

Vendors of controllers:
cpu board: Ithaca Intersystems, Inc.
floppy contr.: Ithaca Intersystems, Inc.

Vendors of peripherals:
disk: CMI, Quantum, Evotech
floppy: Shugart

Basic configuration: CPU, 256Kb, 3 × par, 8 × RS232, 1.2Mb floppy, 5-40Mb Winch., card tape, $ 12,000.

Remarks: separate board ? $ available.

Company: Kontron Micro Computer GmbH, Breslauer Strasse 2, D-8037 Eding b. Muenchen, West Germany ;
tel. +49 89 31901-313, tlw. 522122 .

Name system: PSI 8000

CPU and speed: Z8001, ?MHz
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1.1Mb

Type UNIX system: Xenix (UNIX V7)
Company of UNIX port: Microsoft

Basic configuration: raster 512 × 512, RS232, keyboard, (Kobus network), 616Kb floppy, (10Mb Winch.), 256Kb.

Applications: KOS op.system

Distributors:
NL : Tekelec TA Airtronic, Zoetermeer, The Netherlands.

Company: Kontron Micro Computer GmbH, Breslauer Strasse 2, D-8037 Eding b. Muenchen, West Germany ;
tel. +49 89 31901-313, tlw. 522122 .

Name system: PSI 9068

CPU and speed: 68000 10MHz
Max. physical memory, spec. membus, dual ported mem.: ?Kb-2Mb

Type UNIX system: UNIX V7

Distributors:
NL : Tekelec TA Airtronic, Zoetermeer, The Netherlands.

Company: Masscomp, 543 Great Road, Littleton, MA 01460, USA ;
tel. (617) 486-9425.

Name system: MC-500

CPU and speed: 2 × 68000, 10MHz
System bus: Multibus, Enhanced STD bus, High-speed bus
Max. physical memory, spec. membus, dual ported mem.: 512Kb-6Mb special bus (plus 4Kb cache)

Type UNIX system: UNIX System III, Virtual Address Extensions, Real-Time Extensions, Menu System, and Window Management
Company of UNIX port: Masscomp

Vendors of controllers:
cpu board: Masscomp
raster contr.: Masscomp (68000, 8MHz)

Vendors of peripherals:
disk: Fujitsu, Ampex
(cart.) tape: Cipher 0.5″ drive
floppy: Control Data

Basic configuration: 2ea 68000, 4K cache, 512Kb ECC Memory, 1Mb floppy, 27Mb Winch. UNIX, Fortran, C, Video Terminal: $ 25K.

Applications: Data Acquisition Processor, Graphics, Computation (Scientific Applications)

Company: Metheus Corp, 5289 Northeast Elam Young Parkway, Hillsboro, OR 97123, USA ; tel. (503) 640-8000.

Name system: Micro 750

CPU and speed: 68000, 12.5MHz (2)
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 1Mb-4Mb own bus

Type UNIX system: UNIX V7

Basic configuration: 30Mb Winch., 1Mb, color raster, 1074 × 768, 1Mb floppy, 6 × RS232, 2 × RS449, mouse remote diagn, 13 slots, (Ethernet), (tapedrive), ? $.

Applications: VLSI design station

Company: Microbar Systems Inc., 1121 San Antonio Road, Palo Alto, CA 94303, USA ; tel. (415) 9642862.

Name system: DBX68K-'Dual Bus Unix'

CPU and speed: 68000, 8/ 10/ 12MHz ; and 8086, 5/ 8MHz.
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 512Kb-16Mb own membus

Type UNIX system: Uniplus (SIII) and XENIX
Company of UNIX port: Unisoft and Microsoft

Vendors of controllers:
cpu board: Microbar Systems
floppy contr.: Zendex, Intel, Data Syst. Design, or Scient. Microsyst.
(cart.) tape contr.: Data systems design or Computer Products Corp.

Vendors of peripherals:
disk: Data Systems Design, Interphase, Computer Products Corp., Scientific Micro Systems.
(cart.) tape: Cipher
floppy: Shugart

Basic configuration: Systems Integrators Package: 68000 CPU (with 68451 or SUN-style MMU) and 512Kb RAM dual ported; 2 × RS232 (8274) for $4980 (includes CPU, RAM, and software only).

Remarks: Dual Bus Multibus architecture allows many megabytes of high-speed dual ported memory.

Distributors:
D : Stemmer Elektronik, Puchheim, West Germany.
F : AMM, Le Chesnay, France.
GB : Perdix Components Ltd., Crofton Park, London SE4, UK.

Company: MicroDaSys, 2811 Wilshire Blvd., Santa Monica, CA 90403, USA ;
tel. (213) 8296781, twx. 910-3212378 .

Name system: system 256/S (512/S, 2M/M, 2M/MV, 128/S)

CPU and speed: 68000, 8/12.5MHz
Max. physical memory, spec. membus, dual ported mem.: 256Kb-2Mb

Type UNIX system: Xenix
Company of UNIX port: Microsoft

Basic configuration: 1Mb floppy, 6 × RS232, 4 × par., 128Kb, $8995 (12.5MHz, 512Kb, Xenix, $14199)

Applications: F77, Basic interpr., C Basic, Cobol, Pascal, APL, C, LISP, Forth.

Remarks: 6809 MMU, Shugart disk

Company: Microproject BV, Wilhelminapark 17-g, 2012 KB Haarlem, The Netherlands ; tel. +31 23 312312, tlx. 71189 micro nl.

Name system: MICROPROJECT VME SYSTEM

CPU and speed: 68000+68451, 10MHZ
System bus: VME
Max. physical memory, spec. membus, dual ported mem.: 256Mb, 16Mb per processor module, 16 processor modules per system. Each processor module has a local bus for memory and/or function extension.

Type UNIX system: UNIX SIII
Company of UNIX port: ACE-Amsterdam / TNO-Delft

Vendors of controllers:
cpu board: Microproject
floppy contr.: Microproject
raster contr.: Microproject
asynch. contr.: Microproject
(cart.) tape contr.: Microproject
LAN contr.: Microproject

Vendors of peripherals:
disk: CDC, or any SMD or SASI compatible drive.
(cart.) tape: any SMD or SASI compatible drive.
floppy: any industry standard drive.

Basic configuration: 2501-1983-7 system controller module, 2501-2328-4 68000 mpu/68451 mmu/128Kb RAM module, 2501-4605-4 512Kb/parity RAM module, 2501-5982-5 8 channel serial interface module, 25Mb fixed/25Mb removable disk subsystem, J1/J2 VME backplane, power supply, $ 25K.

Applications: multi-purpose, CAD/CAM.

Remarks: multi-processor UNIX port under development.

Distributors:
NL : Manudax Nederland BV, Heeswijk, The Netherlands.

Company: Microproject BV, Wilhelminapark 17-g, 2012 KB Haarlem, The Netherlands ; tel. +31 23.312312, tlx. 71189 micro nl.

Name system: ULAB

CPU and speed: 68008, 12MHz
System bus: LABBUS(tm)
Max. physical memory, spec. membus, dual ported mem.: up to 1Mb memory.

Type UNIX system: UNIX V7, UNIX SIII.
Company of UNIX port: ACE-Amsterdam / TNO-Delft.

Vendors of controllers:
cpu board: Microproject
floppy contr.: Microproject
raster contr.: Microproject
asynch. contr.: Microproject
(cart.) tape contr.: Microproject
LAN contr.: Microproject

Vendors of peripherals:
disk: BASF, CMI, or any ST-506 or SASI compatible drive
(cart.) tape: any SASI compatible drive
floppy: TEAC

Basic configuration: 68008 cpu/mmu/buscontroller module, 256Kb RAM module, 2 channel RS232 async. serial interface module, 5.24" flexible disk subsys., 10Mb Winch. subsys., $ 8K.

Applications: multi-purpose

Remarks: low-cost UNIX personal computer

Distributors:
NL : Manudax Nederland BV, Heeswijk, The Netherlands.

Company: Momentum, 965 West Maude Avenue, Sunnyvale, CA 94086, USA ;
tel. (408) 245-4033, Tlx 184806 (TRT), 172509 (WUT).

Name system: Momentum 32

CPU and speed: 68000, 8MHz
System bus: own, multibus adapter
Max. physical memory, spec. membus, dual ported mem.: 512Kb-1Mb

Type UNIX system: UNIX V7 (soon UNIX SIII) with Berkeley enhanc.
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: own
floppy contr.: own
raster contr.: own
asynch. contr.: own
(cart.) tape contr.: own
LAN contr.: own

Basic configuration: 512Kb, 2 × RS232, 10(20,40)Mb Winch.

Applications: C,PASCAL, BASIC, FORTRAN, COBOL, Word Processing, Spread Sheet packages, XED, DMBS, Unify.

Remarks: own MMU for 150 nsec RAM, desk top multi user sysyem, optional 1024 × 700 raster

Distributors:
CH : Momemtum Computer Systems Internatinal, Belmont, Switserland.

Company: Momentum, 965 West Maude Avenue, Sunnyvale, CA 94086, USA ;
tel. (408) 245-4033, Tlx 184806 (TRT), 172509 (WUT).

Name system: Momentum 32/E

CPU and speed: 68000, 8MHz
System bus: own, multibus adapter
Max. physical memory, spec. membus, dual ported mem.: .5Mb-1Mb

Type UNIX system: UNIX V7 (soon UNIX SIII) with Berkeley enhanc.
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: own
floppy contr.: own
raster contr.: own
asynch. contr.: own
(cart.) tape contr.: own
LAN contr.: own

Basic configuration: 512Kb, 2 × RS232, 10(20,40)Mb Winch. stepper,
15(25,35)Mb Winch. (coil)

Applications: C,PASCAL, BASIC, FORTRAN, COBOL, Word Processing, Spread Sheet packages, XED, DMBS, Unify.

Remarks: own MMU for 150 nsec RAM, desk top multi user sysyem, optional 1024 × 700 raster

Distributors:
CH : Momemtum Computer Systems Internatinal, Belmont, Switserland.

Company: Momentum, 965 West Maude Avenue, Sunnyvale, CA 94086, USA ;
tel. (408) 245-4033, Tlx 184806 (TRT), 172509 (WUT).

Name system: Momentum 32/4

CPU and speed: 68000, 8MHz
System bus: own
Max. physical memory, spec. membus, dual ported mem.: .5Mb-1Mb

Type UNIX system: UNIX V7 (soon UNIX SIII) with Berkeley enhanc.
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: own
floppy contr.: own
raster contr.: own
asynch. contr.: own
(cart.) tape contr.: own
LAN contr.: own

Basic configuration: 512Kb, 4 × RS232, 2 × 5Mb Winch.

Applications: C,PASCAL, BASIC, FORTRAN, COBOL, Word Processing, Spread Sheet packages, XED, DMBS, Unify.

Remarks: own MMU for 150 nsec RAM, desk top multi user sysyem, optional 1024 × 700 raster

Distributors:
CH : Momemtum Computer Systems Internatinal, Belmont, Switserland.

Company: Mostek Corp., 1215 West Crosby Rd., Carrolton, TX 75006, USA ;
tel. (214) 466-6000

Name system: MK 7564

CPU and speed: 68000, 8MHz (68020)
System bus: VME

Type UNIX system: UNIX

Basic configuration: MK7564 board $1695, MK 75701 RAM $2395, MK 75801 I/O RS232/422, $ 925,
floppy contr. ? , disc. contr.?

Company: Motorola Inc., P.O. Box 20912, Phoenix, AZ 85036, USA ; tel. (602) 2445714 .

Name system: VME module

CPU and speed: 68000, ?MHz
System bus: VME
Max. physical memory, spec. membus, dual ported mem.: 128Kb-16Mb

Basic configuration: single board: <128Kb, RS232, 3 × timer, ?$

Company: NCR Corp., OEM div., Dayton, OH 45479, USA ;
tel. (800) 222-1235 .

Name system: Tower 1632

CPU and speed: 68000, 10Mhz (68010/68020)
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-2Mb sep. membus

Type UNIX system: UNIX V7

Basic configuration: 256Kb, 2 × RS232, 1Mb floppy, 32Mb Winch., OEM < $ 10,000

Company: NHCS BV, Postbus 5325, 2000 CH Haarlem, The Netherlands ;
tel. +31 23 324951, tlx. 41210 etraf .

Name system: LUNiX/PS-600

CPU and speed: 68000, 12.5MHz
System bus: VME
Max. physical memory, spec. membus, dual ported mem.: 512Kb-4Mb

Type UNIX system: MC-UNIX level 3 (UNIX V7)
Company of UNIX port: ACE BV

Vendors of controllers:
cpu board: TNO-IBBC
(cart.) tape contr.: Xebec
disk contr: TNO-IBBC

Vendors of peripherals:
disk: Micropolis, PRIAM
(cart.) tape: CIPHER (streamer)
floppy: MPI

Basic configuration: monitor, cpu board, 512Kb, 4 × RS232 + 1 par., 1Mb floppy, 40Mb Winch., $ 23,500.

Applications: LEX-11, EIDS (CAD-volume modeller), relational-DBMS, Spread Sheet.

Remarks: F77, Basic, ISO-Pascal, Oregon Pascal 2, LISP, Ada, GKS, Prolog, Cross software

Company: NHCS BV, Postbus 5325, 2000 CH Haarlem, The Netherlands ;
tel. +31 23 324951, tlx. 41210 etraf .

Name system: LUNiX/PS-800

CPU and speed: 68000, 8MHz
System bus: VME
Max. physical memory, spec. membus, dual ported mem.: 128Kb-16.5Mb

Type UNIX system: MC-UNIX level 3
Company of UNIX port: ACE BV

Vendors of controllers:
cpu board: Microproject BV
(cart.) tape contr.: Xebec, DTC
LAN contr.: Microproject BV
disk contr: Microproject BV

Vendors of peripherals:
disk: PRIAM, CDC
(cart.) tape: CIPHER (streamer)

Applications: LEX-11, EIDS (CAD-volume modeller), relational-DBMS, Spread Sheet.

Remarks: F77, Basic, ISO-Pascal, Oregon Pascal 2, LISP, Ada, GKS, Prolog, Cross software.
Principally designed for multi-processing on the VME-bus.

Company: Omnibyte, 245 West Roosevelt Road, West Chicago, IL 60185, USA .

Name system: OB68K/SYS

CPU and speed: 68000
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 128Kb dual port mem., 16Mb.

Type UNIX system: IDRIS (version E), Regulus (version 7)
Company of UNIX port: Whitesmiths LTd. (IDRIS), ALCYON Corp. (Regulus)

Vendors of controllers:
cpu board: Omnibyte corp.
floppy contr.: Scientific Micro Systems (SMS)

Basic configuration: single board

Applications: Software development/Target applications

Remarks: Designed to support our 68000/IEEE 796 product line.

Distributors:
AUS: Rank Electronics Ltd., Burwood, Victoria, Australia.
DK : Master Data AB, Solna, Sweden.
SF : Master Data AB, Solna, Sweden.
N : Master Data AB, Solna, Sweden.
S : Master Data AB, Solna, Sweden.
CH : Omni Ray, Zurich, Switserland.
RC : Strong Electronics Co., Taipei, Taiwan.
IND: International Trade Agencies, Hyderabad, India.
GB : Measurements Systems Ltd., Newbury, Berks., UK.
D : Claus Polack, Stuttgart, West Germany.
B : De Gidts & Veldman, Almere Haven, The Netherlands.
L : De Gidts & Veldman, Almere Haven, The Netherlands.
NL : De Gidts & Veldman, Almere Haven, The Netherlands.
E : Lana Sarrata SA, Barcelona, Spain.
I : AURIEMA Italia, Milano, Italy.
F : AURIEMA France, Fontenay-Sous-Bois, France.
NZ : E.C. Gough Ltd., Cristchurch, New Zealand.

Company: Onyx Systems, Ltd., Chanctonbury House, Church Street, Storrington, West Sussex, UK.

Name system: C8002A

CPU and speed: Z8001, 6MHz.
System bus: None standard internal bus

Type UNIX system: System III
Company of UNIX port: Onyx Systems Inc. (USA)

Vendors of controllers:
cpu board: Onyx Systems Inc.
asynch. contr.: Onyx systems Inc.
(cart.) tape contr.: Onyx Systems Inc.
LAN contr.: Onyx Systems Inc.

Basic configuration: 256Kb, 21Mb Winch. disc storage, 5 RS232C ports. 1 × 8 bit parallel port, disc expansion port. UKL 11,200.

Applications: Wide range of business systems.

Remarks: New system March 1983 (UK).

Distributors:
NL : Koopmans, Krimpen a/d IJssel, The Netherlands.
GB : Keen Computers, Nottingham, NG1 6EP, UK.
F : UNIXsys sa, Paris, France.

Company: Onyx Systems, Ltd., Chanctonbury House, Church Street, Storrington, West Sussex, UK.

Name system: C5002A

CPU and speed: Z8001, 6MHz.
System bus: None standard internal bus

Type UNIX system: System III
Company of UNIX port: Onyx Systems Inc. (USA)

Vendors of controllers:
cpu board: Onyx Systems Inc.
asynch. contr.: Onyx systems Inc.
(cart.) tape contr.: Onyx Systems Inc.
LAN contr.: Onyx Systems Inc.

Vendors of peripherals:
disk: IMI/Onyx
(cart.) tape: DE1 12Mb CRC
floppy: Shugart

Basic configuration: 256Kb, 14Mb Winch. disc storage, 5 RS232C ports, 1 × 8 bit parallel port, UKL 10,500.

Applications: Wide range of business systems.

Distributors:
NL : Koopmans, Krimpen a/d IJssel, The Netherlands.
GB : Keen Computers, Nottingham, NG1 6EP, UK.
F : UNIXsys sa, Paris, France.

Company: Onyx Systems, Ltd., Chanctonbury House, Church Street, Storrington, West Sussex, UK.

Name system: Sundance-16

CPU and speed: Z8001, 6MHz.
System bus: None standard internal bus

Type UNIX system: System III
Company of UNIX port: Onyx Systems Inc. (USA)

Vendors of controllers:
cpu board: Onyx Systems Inc.
asynch. contr.: Onyx systems Inc.
(cart.) tape contr.: Onyx Systems Inc.
LAN contr.: Onyx Systems Inc.

Vendors of peripherals:
disk: IMI/Onyx
(cart.) tape: DE1 12Mb CRC

Basic configuration: Integrated CITO 101 VDU, 256Kb mem. 14-21Mb Winch., IMI Integrated disc, 5 × RS232C Serial Ports, 1 × 8 bit parallel port, UKL 10,000.

Applications: R.M. COBOL/C-BASIL/C/FORTRAN/PASCAL, Commercial Ledger System etc.

Distributors:
NL : Koopmans, Krimpen a/d IJssel, The Netherlands.
GB : Keen Computers, Nottingham, NG1 6EP, UK.
F : UNIXsys sa, Paris, France.

Company: Onyx Systems, Ltd., Chanctonbury House, Church Street, Storrington, West Sussex, UK.

Name system: C8002

CPU and speed: Z8002
System bus: None standard internal bus

Type UNIX system: ISI (V7)
Company of UNIX port: Onyx Systems Inc. (USA)

Vendors of controllers:
cpu board: Onyx Systems Inc.
asynch. contr.: Onyx systems Inc.
(cart.) tape contr.: Onyx Systems Inc.
LAN contr.: Onyx Systems Inc.

Vendors of peripherals:
disk: IMI/Onyx
(cart.) tape: DEI 12Mb CRC

Basic configuration: 512Kb mem., 20Mb Winch. disc storage, * × RS232 ports, 1 × 8 bit parallel port. UKL 14,500.

Distributors:
NL : Koopmans, Krimpen a/d IJssel, The Netherlands.
GB : Keen Computers, Nottingham, NG1 6EP, UK.
F : UNIXsys sa, Paris, France.

Company: Pacific Microcomputers Inc, 119 Aberdeen Drive, Cardiff, CA 92007, USA ; tel. (619) 436-8649.

Name system: PM100

CPU and speed: 68000, 10 MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1.5Mb

Type UNIX system: UNIX V7, Uniplus
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: Pacific Microcomputers Inc.
floppy contr.: Konan
(cart.) tape contr.: Systech

Vendors of peripherals:
disk: Rodime, Fujitsu
(cart.) tape: Archive, Tanberg, Cipher
floppy: Teac, Tandon

Basic configuration: PM68K board + 256Kb mem., 64Kb Multibus mem., CRT, 20Mb Winch., 1Mb floppy, 8 slots cage, UNIX, $ 15,290

Remarks: Also sell microprocessor board in a 8 or 10MHz, 256Kb spec. mem. ($1089), 512Kb Multibus mem. ($1650), 8 × RS232 ($660), 20Mb Winch. ($3300), 1Mb floppy ($2970), 84Mb Winch. addon ($6600), multi user UNIX addon ($550), reconf.unix ($3300).

Distributors: DIAMOND POINT International Inc., Cleveland, OH, USA.

Company: Pacific Microcomputers Inc, 119 Aberdeen Drive, Cardiff, CA 92007, USA ; tel. (619) 436-8649.

Name system: PM200F

CPU and speed: 68000, 10 MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1.5Mb

Type UNIX system: UNIX V7, Uniplus
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: Pacific Microcomputers Inc.
floppy contr.: Konan
(cart.) tape contr.: Systech

Vendors of peripherals:
disk: Rodime, Fujitsu
(cart.) tape: Archive, Tanberg, Cipher
floppy: Teac, Tandon

Basic configuration: PM68K board + 256Kb mem., 64Kb multibus mem., 20Mb Winch., 1Mb floppy, 8 slots cage, single user UNIX, $ 13,750.

Remarks: Also sell microprocessor board in a 8 or 10MHz, 128 or 256K, standard or dual ported, beginning at $ 1,990.

Distributors: DIAMOND POINT International Inc., Cleveland, OH, USA.

Company: Pacific Microcomputers Inc, 119 Aberdeen Drive, Cardiff, CA 92007, USA ; tel. (619) 436-8649.

Name system: PM200C

CPU and speed: 68000, 10 MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1.5Mb

Type UNIX system: UNIX V7, Uniplus
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: Pacific Microcomputers Inc.
floppy contr.: Konan
(cart.) tape contr.: Systech

Vendors of peripherals:
disk: Rodime, Fujitsu
(cart.) tape: Archive, Tanberg, Cipher
floppy: Teac, Tandon

Basic configuration: PM68K board + 256Kb mem., 64Kb multibus mem., 20Mb Winch., 1/4" cart.tape, 8 slots cage, single user UNIX, $ 17,490.

Remarks: Also sell microprocessor board in a 8 or 10MHz, 128 or 256K, standard or dual ported, beginning at $ 1,990.

Distributors: DIAMOND POINT International Inc., Cleveland, OH, USA.

Company: Pacific Microcomputers Inc, 119 Aberdeen Drive, Cardiff, CA 92007, USA ; tel. (619) 436-8649.

Name system: PM300

CPU and speed: 68000, 10 MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1.5Mb spec. mem. bus

Type UNIX system: UNIX V7, Uniplus
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: Pacific Microcomputers Inc.
floppy contr.: Konan
(cart.) tape contr.: Systech

Vendors of peripherals:
disk: Rodime, Fujitsu
(cart.) tape: Archive, Tanberg, Cipher
floppy: Teac, Tandon

Basic configuration: PM68K board + 256Kb mem., 256Kb spec.mem. 64Kb multibus mem., 84Mb Winch., 1/4" cart. tape, 12 slots cage,
10 serial I/O, 0.5Mb memory, multi user UNIX, $ 23,650

Remarks: Also sell microprocessor board in a 8 or 10MHz, 128 or 256K, standard or dual ported, beginning at $ 1,990.

Distributors: DIAMOND POINT International Inc., Cleveland, OH, USA.

Company: Pacific Microcomputers Inc, 119 Aberdeen Drive, Cardiff, CA 92007, USA ; tel. (619) 436-8649.

Name system: PM400

CPU and speed: 68000, 10 MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1.5Mb

Type UNIX system: UNIX V7, Uniplus
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: Pacific Microcomputers Inc.
floppy contr.: Konan
(cart.) tape contr.: Systech

Vendors of peripherals:
disk: Rodime, Fujitsu
(cart.) tape: Archive, Tanberg, Cipher
floppy: Teac, Tandon

Basic configuration: PM68K board + 256Kb mem., 256Kb spec.mem.., 84Mb Winch., 9-track tape, 12 slots cage, 10 serial I/O, multi user UNIX, $ 32,890

Remarks: Also sell microprocessor board in a 8 or 10MHz, 128 or 256K, standard or dual ported, beginning at $ 1,990.

Distributors: DIAMOND POINT International Inc., Cleveland, OH, USA.

Company: Parallel Computers, 501 Cedar St., Box 1187, Santa Cruz, CA 95061, USA.

Name system: CPU-16(Continous Processing Unit)

CPU and speed: 68000, 10MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1Mb

Type UNIX system: UNIX V7 with System III and Berkeley 4.1 Enhanc. (XENIX)
Company of UNIX port: Microsoft

Vendors of controllers:
cpu board: own
floppy contr.: own
raster contr.: own
asynch. contr.: own
(cart.) tape contr.: own
LAN contr.: Execelan

Vendors of peripherals:
disk: Fujitsu, Atasi, Seagate
(cart.) tape: Cipher
floppy: Shugart

Basic configuration: 2-10MHz M68000 Parallel Processing Units (PPU) with 256Kb of RAM each, 2-20Mb Winch. Disk Drives, 2-8 channel I/O Processors, 1-1Mb Floppy Disk Drive, Dual Uninterruptable Power.

Applications: Applications that can benefit form an affordable ($25,000 list price) fault tolerant computer. Medical, office automation, communications, transaction processing.

Remarks: Fully redundant architecture.

Distributors: Currently in the process of selecting distributors for foreign markets. Contact Parallel Computers if you are interested in distributing the CPU-16.

It's Time for MUNIX+...

UNIX* Workstation on QU 68000

Our MUNIX computer family for 1 to 32 users offers V 7/System III (no look-alike!) plus many extra features for the software tool environment.

PERFORMANCE: Our customers proved in many benchmarks that our 10 MHz system falls between the 750 and the 780.

FEATURES:

- ☐ Q Bus-based, plus 5 MB/s memory bus
- ☐ 10 – 160 MB disks, plus floppy, streamer, tape,...
- ☐ Office-Style with 19" rack option

OPTIONS:

- ☐ ETHERNET with a communication package similar to the Newcastle connection, covering ISO-levels 1 through 6
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- ☐ Bit-Map Display with pixel processor for 1024 x 800 screen
- ☐ Fast Floating-Point Processor

SOFTWARE:

- ☐ Eight, languages, from COBOL to LISP
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- ☐ Relational Database
- ☐ Software Engineering Tools
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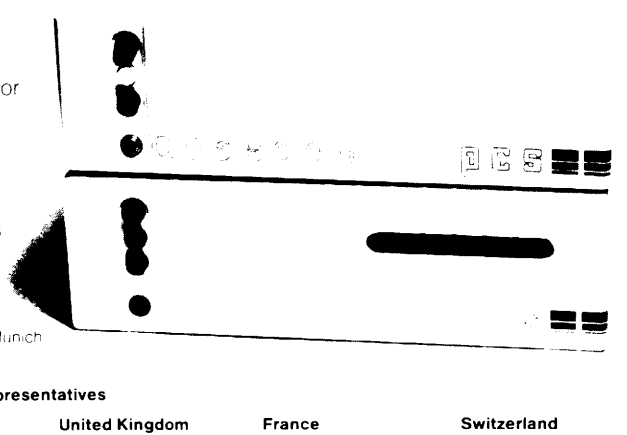
PRICE: from **DM 29.000,–**



+ MUNIX is a reg. trademark of PCS, Munich
* UNIX ist a trademark of AT & T

Periphere Computer Systeme GmbH

Pfälzer-Wald-Straße 36
D-8000 München 90
Telefon 089/681021
Telex 523271
contact: W. Friedrich

GS Düsseldorf
Borsigstraße 12
4030 Ratingen 1
Tel. 02102/46083
Telex 0858315

International Representatives

USA
CAMBRIDGE DIGITAL
Phone: 617-491-2700
Telex: 921401

United Kingdom
ARROW
Phone: 44-1-6470962
Telex: 262469

France
DOMEL
Phone: 33-3-4115454
Telex: 696462

Switzerland
DIGICOMP
Phone: 41-1-4611213
Telex: 812035

Netherlands
DIODE
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Austria
CTA
Phone: 43-222-8852 61
Telex: 135128

Hongkong, Australia
SPM
Phone: 852-5-3810259
Telex: 38975

Company: PCS Periphere Computer Systems GmbH, Pfaelzer Waldstr. 36, 8000 Muenchen 90, West Germany.

Name system: QU68000 Model 210

CPU and speed: MC68000, 10MHz
System bus: Q-bus
Max. physical memory, spec. membus, dual ported mem.: 0.5-4Mb dualport (own memory bus)

Type UNIX system: MUNIX (UNIX V7, System III)
Company of UNIX port: own

Vendors of controllers:
cpu board: PCS
floppy contr.: Andromeda
raster contr.: PCS
asynch. contr.: PCS
LAN contr.: 3Com

Vendors of peripherals:
disk: Tandon
floppy: Tandon

Basic configuration: CPU, 512Kb, 10Mb Winch., 1Mb floppy, 4 ser. lines, 1 par.line, $14K

Applications: Toolmachine

Distributors:
USA: CAMBRIDGE DIGITAL, tlx. 921401, USA.
GB : ARROW, tlx. 262469, UK.
F : DOMEL, tlx. 696462, France.
CH : DIGICOMP, tlx. 812035, Switzerland.
NL : DIODE, tlx. 47388, The Netherlands.
B : ASAC, tlx. 63793, Belgium.
A : C.T.A., tlx. 135128, Austria.
HK : SPM, tlx. 38975, Hongkong.
AUS: SPM, tlx. 38975, Hongkong.

Company: PCS Periphere Computer Systems GmbH, Pfaelzer Waldstr. 36, 8000 Muenchen 90, West Germany.

Name system: QU68000 Model 230

CPU and speed: MC68000, 10MHz
System bus: Q-bus
Max. physical memory, spec. membus, dual ported mem.: 1-4Mb dualport (own memory bus)

Type UNIX system: MUNIX (UNIX V7, System III)
Company of UNIX port: Siemens

Vendors of controllers:
cpu board: PCS
raster contr.: PCS
asynch. contr.: PCS
(cart.) tape contr.: own
LAN contr.: 3Com Winch. contr.: Emulex

Vendors of peripherals:
disk: Fujitsu
(cart.) tape: Cipher

Basic configuration: CPU, 1Mb, 65Mb Winch., 16Mb cart. tape, 8 ser. lines, 1 par.line, $25K

Applications: Toolmachine, CAD/CAM/CAE

Distributors:
USA: CAMBRIDGE DIGITAL, tlx. 921401, USA.
GB : ARROW, tlx. 262469, UK.
F : DOMEL, tlx. 696462, France.
CH : DIGICOMP, tlx. 812035, Switzerland.
NL : DIODE, tlx. 47388, The Netherlands.
B : ASAC, tlx. 63793, Belgium.
A : C.T.A., tlx. 135128, Austria.
HK : SPM, tlx. 38975, Hongkong.
AUS: SPM, tlx. 38975, Hongkong.

Company: Perkin Elmer, 227 Bath Rd., Slough, Berkshire, UK.

Name system: Series 3200

CPU and speed: own, models 3210, 3230, 3250
System bus: (3210) 8Mb/s, (3230) 8Mb/s, (3250) 64Mb/s
Max. physical memory, spec. membus, dual ported mem.: 4Mb, 16Mb, 16Mb (4-way memory interleaving)

Type UNIX system: UNIX V7 + SCCS + Berkeley enhanc.
Company of UNIX port: Original port done by University of Wollongorg (1975) Taken over by Perkin Elmer in 1981

Vendors of controllers:
cpu board: Perkin Elmer
floppy contr.: Perkin Elmer
asynch. contr.: Perkin Elmer
(cart.) tape contr.: Perkin Elmer
LAN contr.: 3Com

Vendors of peripherals:
disk: Perkin Elmer
(cart.) tape: Perkin Elmer
floppy: Perkin Elmer

Basic configuration: 3210, 512Kb, 32Mb Disc (16+16), 10 RS232 ports

Applications: Commercial, Education, Research, Database, etc.

Remarks: no clear survey. 1st 32 bit UNIX implementation done on Perkin Elmer at Bell Labs in 1975. System 5 implementation being done in England for worldwide distribution.

Distributors:
GB : Perkin Elmer, Slough, Berks SL1 4AX, UK.
F : Perkin Elmer, Arcueil, France.

Company: Pertec Data Systems Div., 17112 Armstrong Ave, Irvine, CA 92714, USA ;

Name system: Pertec 3000

CPU and speed: 68000
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1Mb

Type UNIX system: UNIX, UniPlus+
Company of UNIX port: UniSoft

Basic configuration: CPU, 256Kb, 26Mb Winch., 1.6Mb floppy, ? Mb, tape cart, 3 × RS232, $ 19,000 .

Company: Philips Gloeilampen NV, Science/Ind. Eq.Div., TQ 111-4, Eindhoven, The Netherlands.

Name system: PM4422

CPU and speed: 68000, 8MHz
System bus: own
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1.5Mb

Type UNIX system: UNIX V7
Company of UNIX port: ACE BV

Vendors of controllers:
asynch. contr.: own
(cart.) tape contr.: own
disk contr.: own

Vendors of peripherals:
disk: Rodine
(cart.) tape: Archive
floppy: own

Basic configuration: 5.6Mb Winch., 256Kb, CRT, Keyboard, UNIX kernel, 3 × RS232, 320Kb floppy, Hfl 50,000.

Applications: cross assemblers, C, Pascal, PLM86, F77, micro processor development machine

Remarks: special hardware for debugging software/hardware integration.

Company: PIXEL, One Burtt Road, Andover, MA 01810, USA ;
tel. (617) 470-1790.

Name system: Pixel 100/AP

CPU and speed: 68000, 8 / 10 MHz
System bus: own
Max. physical memory, spec. membus, dual ported mem.: 512Kb-6Mb

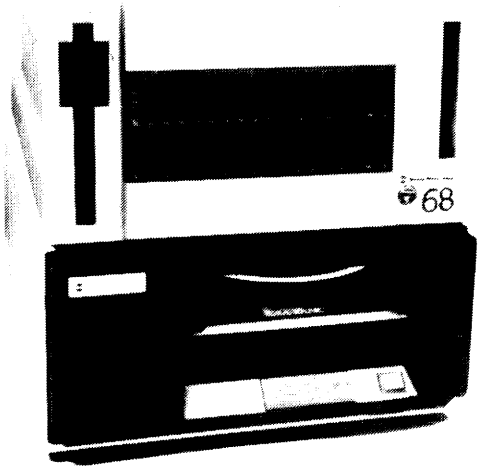
Type UNIX system: UNIX SIII
Company of UNIX port: Unisoft

Vendors of controllers:
cpu board: own
floppy contr.: own
raster contr.: own
asynch. contr.: own
(cart.) tape contr.: own

Vendors of peripherals:
disk: Quantum
(cart.) tape: Kennedy
floppy: Shugart

Basic configuration: 512Kb, 128Kb, 1 Winch. Ctlr, 1 × 630Kb floppy, 4 × Pixel ports 4 × RS232, 2 × par, UNIX SIII, $11K, (1Mb, 8 × Pixel Ports, 8 × RS232, $ 14K)

Distributors:
NL : Instrumentation Laboratory, IJsselstein, The Netherlands.
GB : PIXEL Div., Instrumentation Lab Ltd., Warrington, WA3 2BR, UK.
CH : High Tech. Systems S.A., Geneva, Switzerland.



Plessey System 68

- Multibus/IEEE 796 compatible
- 16 Mbyte Address space
- Memory Management
- 1 to 16 users
- Winchester disc and back-up options
- Hardware floating point option

Built around the Motorola 68000 processor the Plessey System 68 offers UNIX users a complete package supplied and supported by one of Europe's leading electronics companies.

Talk to us today about your UNIX system requirements.

System 68 is one of many Plessey Microsystems products. These range from single board processors and memory boards to complete processing systems.

Plessey Microsystems in Europe:

Water Lane,
Towcester
Northants
NN7 12JN
Tel: 0327 50312
Telex: 31628

Germany
Bahnhofstrasse 38
6090 Russelsheim
Tel: 0614-26 80 04
Telex: 17614293 pml ger

France
7-9 rue Denis Papin
78190 Trappes

Company: Plessey Microsystems Ltd., Water Lane, Towcester, Northants, NN12 7JN, UK. ; tel. +44 327 50312. tlx 31628.

Name system: System 68

CPU and speed: 68000, 8MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 512Kb-16Mb

Type UNIX system: UNIX SIII UNIPLUS+
Company of UNIX port: Root Computers Ltd., Hayne St., London

Vendors of controllers:
cpu board: Plessey Microsystems
floppy contr.: Central Data Corp/Plessey Microsystems
asynch. contr.: Central Data Corp.
(cart.) tape contr.: Computer Products Corp/Xylogics

Vendors of peripherals:
disk: PRIAM/Fujitsu
(cart.) tape: Cipher
floppy: Tandon

Basic configuration: 512Kb, 8 users, Winch., tapestreamer, floppy 8 × RS232, 9 slots, UNIX SIII , UKL 17.5K.

Remarks: 4Mb or 16Mb mem. map, 8232 FPU chip.

Distributors:
NL : Plessey Fabr. BV, Noordwijk, The Netherlands.

Company: Plexus Computers Inc., 2230 Martin Ave., Santa Clara, CA 95050, USA ;
tel. (408) 988-1755, Twx 910-338-2223.

Name system: P/35

CPU and speed: 68000, 12.5MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 2Mb memory

Type UNIX system: UNIX SIII
Company of UNIX port: Plexus

Vendors of controllers:
LAN contr.: Plexus

Vendors of peripherals:
floppy: no

Basic configuration: 16/32 proc., 512Kb ecc. mem., Mass Storage Processor, 22Mb Winch.
cartr. tape , $? .

Applications: UNIX applications which demand high processor performance.

Remarks: 4K cache memory. This tabletop computer is ideal for supporting up to 16 users in demanding UNIX applications. The P/35 offers excellent performance and reliability.

Distributors:
F : Unixus, Paris, France.
GB : Plexus Computers, Langley Hill, Notts, NG16 4AN, UK.

Company: Plexus Computers Inc., 2230 Martin Ave., Santa Clara, CA 95050, USA ; tel. (408) 988-1755, Twx 910-338-2223.

Name system: P/60

CPU and speed: 68000, 12.5MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 4Mb memory

Type UNIX system: UNIX SIII
Company of UNIX port: Plexus

Vendors of controllers:
LAN contr.: Plexus

Vendors of peripherals:
floppy: no

Basic configuration: 16/32 proc., 512Kb ecc. mem., Mass Storage Proc., Comm. Proc. with 8 × RS232 and 1 parallel port, tape controller, $? .

Applications: Data Analysis, heavy computation.

Remarks: With 4Kb cache memory the P/60 is a powerful supermicrocomputer that offers performance, reliability, and industry standard hardware and software interface.

Distributors:
F : Unixus, Paris, France.
GB : Plexus Computers, Langley Hill, Notts, NG16 4AN, UK.

Company: Plexus Comp. Inc., 2230 Martin Ave, Santa Clara, CA 95050, USA ; tel. (408) 988-1755, Twx 910-338-2223.

Name system: P/40

CPU and speed: Z8000, 5MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 4Mb memory

Type UNIX system: UNIX SIII
Company of UNIX port: Plexus

Vendors of controllers:
LAN contr.: Plexus

Vendors of peripherals:
floppy: no

Basic configuration: 16-bit processor, 512Kb ecc. mem., Disk controller, Comm. Proc. with 8 × RS232 ports and 1 parallel port, Tape Contr., 72Mb Winch. and 1600 bpi 9-track streaming tape drive, $?

Applications: Office Automation, Information Management.

Remarks: The P/40 is ideal for the OEM or end user who demands high performance and high capacity in I/O intensive applications.

Distributors:
F : Unixus, Paris, France.
GB : Plexus Computers, Langley Hill, Notts, NG16 4AN, UK.

Company: Plexus Comp. Inc., 2230 Martin Ave, Santa Clara, CA 95050, USA ; tel. (408) 988-1755, Twx 910-338-2223.

Name system: P/25

CPU and speed: Z8000, 5MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 2Mb memory

Type UNIX system: UNIX SIII
Company of UNIX port: Plexus

Vendors of controllers:
LAN contr.: Plexus

Vendors of peripherals:
floppy: no

Basic configuration: 16-bit proc., 512Kb ecc. mem., Mass Storage Proc., 22Mb 8" Winch., Streaming Cartridge, $? .

Applications: Software Development, Database Management.

Remarks: The P/25 has innovative processor design, large main memory , and it's high performance peripherals bring users exceptional capabilities.

Distributors:
F : Unixus, Paris, France.
GB : Plexus Computers, Langley Hill, Notts, NG16 4AN, UK.

Company: Plum Computer

CPU and speed: NS16032
Max. physical memory, spec. membus, dual ported mem.: 512K-16Mb

Type UNIX system: UNIX SIII

Basic configuration: 512Kb, 46Mb Winch., < $ 10,000

Company: Scan Computer, Systems Ltd, Chanctonbury House, Church Street, Starrinton, Sussex RH20, 4LZ, Great Britain.

Name system: Scan 3

CPU and speed: 28000, ?MHz
Max. physical memory, spec. membus, dual ported mem.: 256Kb-?Mb

Type UNIX system: Unix V7

Basic configuration: 256Kb (512Kb), 10(18)Mb Winch., 12Mb cart tape, UNIX, 4 users, C, Pascal, UKL 11,000

Company: SGS-ATES Componenti Eletronici, Via C. Olivetti 2, 20041 Agrate Bianza, Italy .

Name system: UX16-20

CPU and speed: Z8000, ?MHz
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1Mb

Type UNIX system: UNIX V7
Company of UNIX port: SGS

Basic configuration: CPU, 10 × RS232, RS422, par, 256Kb, MMU, 10Mb Winch., 12Mb tape cart, $? .

Distributors:

NL : Microtronica, Utrecht, The Netherlands.

Company: SGS-ATES Componenti Eletronici, Via C. Olivetti 2, 20041 Agrate Bianza, Italy .

Name system: UX8-22

CPU and speed: 68000, ?MHz

Type UNIX system: SUNIX
Company of UNIX port: SGS

Basic configuration: 2 × 1Mb floppy

Applications: CP/M

Distributors:

USA: ??, 7117, East 3rd Avenue, Scottsdale, AZ 85251, USA.
B : ??, Winston Churchill Ave 122, B 1180 Brussel, Belgium.
F : ??, Avenue de Choisy 17, 75643 Paris, France
D : ??, Haidling 17, 8018 Grafing, West Germany
GB : ??, Planar House, Walton Street, Aylesbury, Bucks, UK.

Company: Sharp Corp., tlx AAB Labometa J63428, Japan.

Name system: MZ-8100

CPU and speed: 68000, ?MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-4Mb

Type UNIX system: UNIX SIII

Basic configuration: 256Kb, colour raster 768 × 550, ?Mb floppy, ?Mb Winch., mag.cassette, (Ethernet), $?

Applications: graphics, DBM

Remarks: ACM-CORE 2D level III, IBM 3780,3270.

Distributors:
NL : Ormas, Bilthoven, The Netherlands.

Company: Signetics Corp., 811 East Arques Ave, P.O. Box 409, Sunnyvale, CA 94085, USA ; tel. (408) 739-7780 .

Name system: SM VME 2000 (2010)

CPU and speed: 68000, 8MHz
System bus: VME
Max. physical memory, spec. membus, dual ported mem.: ?Kb-16Mb

Basic configuration: single board, SCN 68451 MMU, <48Kb ROM, 8Kb RAM, 2 × RS232, par, timer, $?, SMUME 3100 mem. board 256Kb $? .

Company: Sritek, 3637 S. Green Rd., Cleveland, OH 44122,USA ;
tel. (216) 292-0011

Name system: Microcard

CPU and speed: 8086, 68000, 16032
System bus: IBM PC
Max. physical memory, spec. membus, dual ported mem.: 512Kb-?Mb

Type UNIX system: Xenix (UNIX V7), Uniplus
Company of UNIX port: Microsoft, Unisoft

Basic configuration: 8086 board $ 595, 68000 $795, Xenix $ 495 (multiuser)

Remarks: board for IBM PC

Company: SUN Microsystems Inc., 2550 Garcia Ave, Mountain View, CA 469327, USA ; tel. (415) 960-1300, tlx 469327.

Name system: SUN M100

CPU and speed: 68010, 10MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 1Mb-2Mb separate high-speed memory bus.

Type UNIX system: UNIX BSD4.2 (V7)
Company of UNIX port: own

Vendors of controllers:
cpu board: own
raster contr.: own
(cart.) tape contr.: own
LAN contr.: 3Com

Vendors of peripherals:
disk: Fujitsu, Lark
(cart.) tape: Archive 1/4″ streaming, on 1/2″ tape

Basic configuration: 1000 × 800 raster, keyboard, 1Mb, 2 × RS232, Color, Ethernet, 7 slot cage, UNIX, $12,000

Applications: General purpose high-performance engineering/scientific workstation.

Distributors:
USA: SUN Microsystems Inc., Lexington, MA, USA.
USA: SUN Microsystems Inc., Fort Lee, NJ, USA.

Company: SUN Microsystems Inc., 2550 Garcia Ave, Mountain View, CA 469327, USA ; tel. (415) 960-1300, tlx 469327.

Name system: SUN M150

CPU and speed: 68010, 10MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 1Mb-2Mb separate high-speed memory bus.

Type UNIX system: UNIX BSD4.2 (V7)
Company of UNIX port: own

Vendors of controllers:
cpu board: own
raster contr.: own
(cart.) tape contr.: own
LAN contr.: 3Com

Vendors of peripherals:
disk: Fujitsu, Lark
(cart.) tape: Archive 1/4" streaming, on 1/2" tape

Basic configuration: 1000 × 800 raster, keyboard, 2 × RS232, 1Mb (color raster), (Ethernet), 15 slots, $16,900

Applications: General purpose high-performance engineering/scientific workstation.

Distributors:
USA: SUN Microsystems Inc., Lexington, MA, USA.
USA: SUN Microsystems Inc., Fort Lee, NJ, USA.

Company: SUN Microsystems Inc., 2550 Garcia Ave, Mountain View, CA 469327, USA ; tel. (415) 960-1300, tlx 469327.

Name system: SUN 1004

CPU and speed: 68010, 10MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 1Mb-2Mb separate high-speed memory bus.

Type UNIX system: UNIX BSD4.2 (V7)
Company of UNIX port: own

Vendors of controllers:
cpu board: own
raster contr.: own
(cart.) tape contr.: own
LAN contr.: 3Com

Vendors of peripherals:
disk: Fujitsu, Lark
(cart.) tape: Archive 1/4″ streaming, on 1/2″ tape

Basic configuration: without raster and keyboard

Applications: General purpose high-performance engineering/scientific workstation.

Distributors:
USA: SUN Microsystems Inc., Lexington, MA, USA.
USA: SUN Microsystems Inc., Fort Lee, NJ, USA.

Company: SUN Microsystems Inc., 2550 Garcia Ave, Mountain View, CA 469327, USA ; tel. (415) 960-1300, tlx 469327.

Name system: SUN 1504

CPU and speed: 68010, 10MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 1Mb-2Mb separate high-speed memory bus.

Type UNIX system: UNIX BSD4.2 (V7)
Company of UNIX port: own

Vendors of controllers:
cpu board: own
raster contr.: own
(cart.) tape contr.: own
LAN contr.: 3Com

Vendors of peripherals:
disk: Fujitsu, Lark
(cart.) tape: Archive 1/4" streaming, on 1/2" tape

Basic configuration: without raster and keyboard

Applications: General purpose high-performance engineering/scientific workstation.

Distributors:
USA: SUN Microsystems Inc., Lexington, MA, USA.
USA: SUN Microsystems Inc., Fort Lee, NJ, USA.

Company: Telcon, 1401 NW 69th Street, Fort Lauderdale, FL 33309, USA .

Type UNIX system: Unix ?V

Basic configuration: 160Kb, (320 Kb), floppy, 6Mb Winch., ? × RS232, $? .

Company: Televideo Systems

Name system: Telesystem II

CPU and speed: 68000, 8MHz

Basic configuration: 512Kb, 16 × RS422, par.

Company: Terak Corp., 14151 N 76th street, Scotsdale, AZ 85260, USA .

Name system: 8510 comp. system

CPU and speed: 68000
System bus: Q-bus

Type UNIX system: VENIX
Company of UNIX port: Venturcom

Basic configuration: 640 × 840 raster, 4-8 RS232C, Q-bus colour graphics

Company: Thomson CSF, 23 Rue de Courcelles, PO Box 96- 08, 75362 Paris Cedex 08, France .

Name system: Micromega 32

CPU and speed: 68000, 8MHz
System bus: own
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1Mb

Type UNIX system: UNIX V7

Basic configuration: 256Kb, 800Kb floppy, CRT, (graphics), 1 user, Basic, $ 7,400 , 5Mb Winch., $10K, 4 × RS232, (Ethernet).

Applications: Basic, Cobol, F77, Pascal, C, Msdb, Multiplan, IDOL, Visicalc .

Remarks: see Fortune 32/16

Distributors:

B : Sems Comp. Benelux NV, Brussel, Belgium .
NL : Thomson-CSF, Sems Comp., Eindhoven, The Netherlands .

Company: Three Rivers Computer, 720 Gross Street, Pittsburgh, PA 15224, USA ; tel. (412) 621-6250, twx. 710-664-4490.

Name system: Perq

CPU and speed: own
System bus: own
Max. physical memory, spec. membus, dual ported mem.: 256Kb-1Mb, Dual Porter to Video

Type UNIX system: UNIX V7 (PNX)
Company of UNIX port: ICL

Vendors of controllers:
cpu board: own
floppy contr.: own
raster contr.: own
asynch. contr.: own
(cart.) tape contr.: own
LAN contr.: own

Vendors of peripherals:
disk: Microlis
(cart.) tape: Archive
floppy: Shugart

Basic configuration: CPU, 512Kb, 24Mb Winch., 768 × 1024 raster, keyboard, tablet, RS232, PNX, $ 27K (Ethernet)

Remarks: Also available from ICL

Company: TSD, Display Products, Inc., 35 Orville Drive, Bohemia, NY 11716, USA ; tel. (516) 5896800 .

Name system: Mega data

CPU and speed: 68000, 8MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 256Kb-?Mb

Basic configuration: Single board, 256Kb, 3 × timer, 2 × RS232, 3 × par, Keyboard i.f., $? .

Company: Tycom

CPU and speed: 68000, 8MHz

Type UNIX system: Xenix (UNIX V7)
Company of UNIX port: Microsoft

Basic configuration: 6 × RS232, 600Kb floppy, 128Kb

Applications: CP/M

Company: Valid Logic Systems Inc., 1-9 Wexham Road, Slough, Berkshire SL1-1TP, Great Britain

Name system: SCALDsystem

CPU and speed: 68000, ?MHz
Max. physical memory, spec. membus, dual ported mem.: 256Kb-4Mb

Type UNIX system: UNIX V7

Basic configuration: 1024 × 800 raster, tablet, 33Mb Winch., tapestreamer, printer

Applications: Graphics Editor, Timing Verifier, Logic Stimulator, Post processor, Net Verification, < $ 50,000 .

Company: Victory Comp. Systems Inc., 2055 Gateway Place S 300, San Jose, CA 95110, USA ; tel. (408) 295-4600, twx. 171-135 .

Name system: Victory Spirit

CPU and speed: 68000, 8MHz
System bus: VME
Max. physical memory, spec. membus, dual ported mem.: <16Mb

Type UNIX system: UNIX V7 + VRTX, UniPlus+
Company of UNIX port: UniSoft

Basic configuration: 256Kb, 7 × RS232, RS422, Centr.par., 6Mb Winch., (1Mb exp $ 3,500), (i.o. 280.128Kb 7 × RS232, 1 × RS422, centr.$2,000), 6 slots, 1Mb floppy, $ 13,950 (20/30/40/80/Mb Winch., $4,000-$12,000)

Applications: CP/M-80

Remarks: spec. I/O bus, dual CPU capability ($ 4,000)

Company: WICAT Systems , P.O. Box 539, 1875 South State St., Orem, UT 84057, USA ; tel. (801) 224-6400, tlx. 910-971-4027.

Name system: WS 150

CPU and speed: MC68000L8, 8MHz
System bus: Multibus, IEEE-796
Max. physical memory, spec. membus, dual ported mem.: 256Kb-12Mb

Type UNIX system: WICAT UniPlus (UNIX V7)
Company of UNIX port: own

Vendors of controllers:
cpu board: WICAT
floppy contr.: WICAT
raster contr.: WICAT
asynch. contr.: WICAT
(cart.) tape contr.: WICAT
LAN contr.: WICAT

Vendors of peripherals:
disk: Fijitsu, CMI
(cart.) tape: DEI
floppy: CDC

Basic configuration: 512Kb RAM, 10Mb Winch., 616Kb floppy, 6 × RS232, 1 parall. port, CRT/keyboard, MCS, Pascal, $ 12,850.

Applications: COBOL, PASCAL, C, F, BASIC, APL, CP/M (extra charge), UltraCalc, Wise

Distributors:
GB : WICAT Systems, Edgebaston, Birmingham B16 8NH, UK.
AUS: WICAT Computer of Australia Pty., St. Leonards, NSW, Australia.

Company: WICAT Systems , P.O. Box 539, 1875 South State St., Orem, UT 84057, USA ; tel. (801) 224-6400, tlx. 910-971-4027.

Name system: WS 155

CPU and speed: MC68000L8, 8MHz
System bus: Multibus, IEEE-796
Max. physical memory, spec. membus, dual ported mem.: 256Kb-12Mb

Type UNIX system: WICAT UniPlus (UNIX V7)
Company of UNIX port: own

Vendors of controllers:
cpu board: WICAT
floppy contr.: WICAT
raster contr.: WICAT
asynch. contr.: WICAT
(cart.) tape contr.: WICAT
LAN contr.: WICAT

Vendors of peripherals:
disk: Fijitsu, CMI
(cart.) tape: DEI
floppy: CDC

Basic configuration: 2Mb RAM, 2 × 15Mb Winch., cartr. tape, 12 × RS232, 1 parall. port, MCS, Pascal, $ 30,103 .

Applications: COBOL, PASCAL, C, F, BASIC, APL, CP/M (extra charge), UltraCalc, Wise

Distributors:
GB : WICAT Systems, Edgebaston, Birmingham B16 8NH, UK.
AUS: WICAT Computer of Australia Pty., St. Leonards, NSW, Australia.

Company: WICAT Systems , P.O. Box 539, 1875 South State St., Orem, UT 84057, USA ; tel. (801) 224-6400, tlx. 910-971-4027.

Name system: WS 160

CPU and speed: MC68000L8, 8MHz
System bus: Multibus, IEEE-796
Max. physical memory, spec. membus, dual ported mem.: 256Kb-12Mb

Type UNIX system: WICAT UniPlus (UNIX V7)
Company of UNIX port: own

Vendors of controllers:
cpu board: WICAT
floppy contr.: WICAT
raster contr.: WICAT
asynch. contr.: WICAT
(cart.) tape contr.: WICAT
LAN contr.: WICAT

Vendors of peripherals:
disk: Fijitsu, CMI
(cart.) tape: DEI
floppy: CDC

Basic configuration: 2Mb RAM, 80Mb SMD, 9-track tape, 12 × RS232, 1 parall. port, MCS, Pascal, $ 42,370 .

Applications: COBOL, PASCAL, C, F, BASIC, APL, CP/M (extra charge), UltraCalc, Wise

Distributors:
GB : WICAT Systems, Edgebaston, Birmingham B16 8NH, UK.
AUS: WICAT Computer of Australia Pty., St. Leonards, NSW, Australia.

Company: WICAT Systems , P.O. Box 539, 1875 South State St., Orem, UT 84057, USA ; tel. (801) 224-6400, tlx. 910-971-4027.

Name system: WS 200

CPU and speed: MC68000L8, 8MHz
System bus: Multibus, IEEE-796
Max. physical memory, spec. membus, dual ported mem.: 256Kb-12Mb

Type UNIX system: WICAT UniPlus (UNIX V7)
Company of UNIX port: own

Vendors of controllers:
cpu board: WICAT
floppy contr.: WICAT
raster contr.: WICAT
asynch. contr.: WICAT
(cart.) tape contr.: WICAT
LAN contr.: WICAT

Vendors of peripherals:
disk: Fijitsu, CMI
(cart.) tape: DEI
floppy: CDC

Basic configuration: 3Mb RAM, 160Mb SMD, 9-track tape, 16 × RS232, 1 parall. port, MCS. Pascal, $ 55,130 .

Applications: COBOL, PASCAL, C, F, BASIC, APL, CP/M (extra charge), UltraCalc, Wise

Distributors:
GB : WICAT Systems, Edgebaston, Birmingham B16 8NH, UK.
AUS: WICAT Computer of Australia Pty., St. Leonards, NSW, Australia.

Company: WICAT Systems , P.O. Box 539, 1875 South State St., Orem, UT 84057, USA ; tel. (801) 224-6400, tlx. 910-971-4027.

Name system: WS 220

CPU and speed: MC68000L8, 8MHz
System bus: Multibus, IEEE-796
Max. physical memory, spec. membus, dual ported mem.: 256Kb-12Mb

Type UNIX system: WICAT UniPlus (UNIX V7)
Company of UNIX port: own

Vendors of controllers:
cpu board: WICAT
floppy contr.: WICAT
raster contr.: WICAT
asynch. contr.: WICAT
(cart.) tape contr.: WICAT
LAN contr.: WICAT

Vendors of peripherals:
disk: Fijitsu, CMI
(cart.) tape: DEI
floppy: CDC

Basic configuration: 3Mb RAM, 474Mb SMD, 9-track tape, 32 × RS232, 2 parall. ports, MCS, Pascal, $ 70,755 .

Applications: COBOL, PASCAL, C, F, BASIC, APL, CP/M (extra charge), UltraCalc, Wise

Distributors:
GB : WICAT Systems, Edgebaston, Birmingham B16 8NH, UK.
AUS: WICAT Computer of Australia Pty., St. Leonards, NSW, Australia.

Company: Zehntel Inc., 2625 Shadelands Drive/Walnut Creek, CA 94598, USA ;
tel. (45) 932-6900, twx. 910-385-6300 .

Name system: SDM

CPU and speed: Z8001, 4MHz
System bus: Multibus
Max. physical memory, spec. membus, dual ported mem.: 5121Kb

Type UNIX system: Xenix + BSD2.8, UniPlus+
Company of UNIX port: Microsoft, UniSoft

Basic configuration: 34Mb, Winch., 17Mb tape cart., 4 × RS232, 8 slots, $? .

Company: Zilog Inc., 1315 Dell. Ave., Campbell, CA 95008 , USA ;
tel. (408) 370-8000, Twx. 910-338-7621 .

Name system: system 8000 (Z-lab 8000) 3 models: 11, 21, 31

CPU and speed: Z8001, 6MHz
System bus: Zilog ZBI
Max. physical memory, spec. membus, dual ported mem.: 8Mb, parity or ECC, including dual ported memory of I/O processors

Type UNIX system: Zeus v2.n = UNIX V7, ZEUS v3.n = UNIX System III
Company of UNIX port: Zilog

Vendors of controllers:
cpu board: Zilog
asynch. contr.: Zilog
(cart.) tape contr.: Zilog
LAN contr.: Zilog

Vendors of peripherals:
disk: CDC, Memorex, Disctron, IMI
(cart.) tape: DEI, CDC

Basic configuration: Model II: CPU, 18Mb Winch., tape card., 256Kb, 8 × RS232, UNIX, $ 14,950

Remarks: Multiple Z8010A MMUs used for highly effective memory management. (Zilog Inc. is an affiliate of Exxon Corporation)

Distributors:
GB : Zilog Ltd, Maidenhead, Berks. SL6 8PL, UK.
D : Zilog GmbH, Taufkirchen, West Germany.
F : Zilog France, Paris La Defense, France.
NL : Tekelec Airtronic BV, Zoetermeer, The Netherlands.
J : Zilog Japan, Minato-Ku Tokyo 107, Japan.