February, 1983
Volume , Number 6

UNIQUE

Formerly
The UNIX* Software List
TM

Your Independent UNIX* and C Advisor

From the Editor

This is our semi-annual **UNIX Conference Issue**, so we've tried to concentrate almost exclusively on companies, products, and announcements relating to the Unicom conference. Our regular coverage of the industry, new products, feature articles and otherwise, resumes with the March issue.

We are pleased to announce that **Pipes and Filters**, the official newsletter of the **UNI-OPS** users' group, will also be included in **UNIQUE** starting with the March issue as a regular feature. This means that current UNI-OPS members will be getting **UNIQUE**, current **UNIQUE** subscribers will be getting **Pipes and Filters**, and Walter Zintz and friends will keep a close eye on things on the West Coast for us all. And expect much **bigger, better** issues to come -- we're getting ready some more of those articles we've been promising.

Quote of the Month

"They didn't change a thing -- but they started a revolution": **Doug Michels**, one of UniForum's Directors, regarding AT&T's announcement that they would provide UNIX System V with full support.

/dev/rumor

Perkin-Elmer is jumping on the bandwagon with a **68000-based workstation**, initially running Idris on the Versabus from their Business Systems Division... **Whitesmiths** is about to release a new version of its **Idris** operating system, but more interesting is the pricing that will be announced. This should prove the beginning of the oft-predicted price war in UNIX and UNIX-like software that can only benefit us users. Hope everyone can stay in business...Here's what we understand to be the **complete** story about the **Radio Shack Model 16** episode (guaranteed to be from non-official sources): after initial rounds of talks with various vendors, Tandy asked **Microsoft** if it could have **Xenix** running within **X** months (the revelation of **X** would likely cause some embarrassment). Microsoft didn't want to commit to this schedule. So Tandy made a deal with **CRDS** for its UNIX-compatible **UNOS.** Someone at Microsoft, no doubt realizing **(a)** it was not a good idea to let such a big contract go down the tubes and **(b)** software engineers can be coerced into accepting working hours that were illegal in the 1800's, asked their contact at Tandy whether they would go with Xenix if it were ready in **n** weeks (I understand **n** was something ridiculous, like 3). Tandy said (figuring Microsoft could never do it, but it would be fun to watch them try, and Xenix wouldn't be a bad idea anyway) Sure, go ahead. So they did it.

In This Issue

UNIQUE™, (ISSN 0736-4083) is published monthly by InfoPro Systems, P.O. Box 33, East Hanover, NJ 07936, U.S.A. (201) 625-2925. Editor: David Fiedler. Circulation Manager: Susan Fiedler. Data Processing: Al Tair.

Subscriptions to UNIQUE are $54 per year (add $12 per year for overseas airmail). Discounts are available for non-profit organizations, schools, bulk and multi-year subscriptions, and individuals at a home address: for details, contact our Subscription Department. Each additional subscription sent in the same envelope costs $10/year extra ($15 overseas). Back issues cost $4 each ($5 overseas), including postage and handling. Checks should be made payable to InfoPro Systems, and should be in U.S. funds, drawn on a U.S. bank.

We've also been hearing reports that Tandy is having a bit of trouble selling Model 16s because of the past lack of software, and problems getting the hardware to run reliably (notably the Model 2-to-16 conversion boards). Any other feedback?...**Microsoft**, by the way, has just bought the rights to sell the Lattice C compiler (**UNIQUE** V2N2) and will be doing so on MS-DOS. This gives them a product they can market under their own name, without having to worry about AT&T licensing.

It's become **de rigeur** for industry pundits to state their opinion of the new **Apple Lisa.** So here are the fruits of my punditry, based on working with Lisa at Unicom and my contacts in the spirit world. The Lisa is a machine whose hardware was state-of-the-art two years ago, whose price makes it a liability in a market where 5-figure prices went out with TTL-based word processors, and whose manufacturer is known for getting game computers to be accepted in Fortune 500 offices. It **also** has a software package that was science fiction just a short while ago. My feelings are that the Lisa will point the way of the future -- totally integrated end-user software bundled with fairly sophisticated hardware -- but that Lisa itself will **not be a raving success** at this price and performance level. It is slow, and having weird floppy disks doesn't help.

AT&T Watch

FLASH! You heard it here first (as usual)! Some of the things to come out of AT&T this year will be:

1. a PERSONAL COMPUTER.
2. a DBMS for UNIX, commercially available now from another vendor.
3. and again I predict a desktop UNIX machine, based on the MAC-32 processor.

-- DF

UNICOM Report
by David and Susan Fiedler

The most exciting news of the last few months has been the **Unicom** conference held in San Diego in late January -- not only the show itself, but some of the announcements that were made there (details in this issue). While the show was underway, it was announced that /usr/group, the commercial users' group, had decided to change its name to **UniForum.**

General Impressions

The sessions were split between two large rooms, with fairly decent acoustics, but what needed the most improvement was the scheduling. Too many talks of interest to the same people were scheduled simultaneously. The keynote address by **John Mashey** of Bell Labs was extremely interesting, entertaining, and nicely illustrated with nice graphics and slides. The talk, entitled "Software Army on the March", used an analogy between software development teams and military strategy that brought his points home very well. A quick survey of the audience showed that most agreed that John's talk represented real-life experiences quite accurately.

There were about 1,800 people there this time, and almost enough coffee and danish.

Political Battles

Towards the end of the week, it became apparent that too many acrimonious debates had gone on regarding scheduling the wrong talks opposite one another, not enough marketing sessions, not enough technical sessions, etc. Finally it was announced that there are currently **no plans for Usenix and UniForum** to meet together in the near future. As we understand it, Usenix committed themselves a while ago to meeting in Toronto in July 1983 and Salt Lake City in January 1984. UniForum doesn't want to go to Toronto because of the problems in bringing equipment across the border, and they don't want to go to Salt Lake City, period. Rather than diluting the importance of the July Usenix show by having their own in September (as some UniForum people had suggested), they asked Usenix to cancel Salt Lake City and join them somewhere else. Usenix, unwilling to break its contracts, said no. UniForum's position was summed up by one source in the following way: "Usenix has been invited to join us in January 1984. If they won't, we'll have no choice but to go **head-to-head** with them."

It would be a pity to go back to the way things were before. Surely a happy medium can be found that would benefit both the technical and marketing camps.

Technical Sessions

Due to this issue's concentration on product presentations, we will give more details on the technical sessions in an upcoming issue while the information is still fairly current. Many of the technical sessions dealt exclusively with the proprietary products of vendors; a few of these were useful nonetheless.

System V Announcement

This particular session was **packed to the gills.** For while everyone was pretty sure of the **substance** of the announcement, there was great excitement over what the **details** would be. Here, then, are the details, condensed from presentations by **W.R. Guffey** and **Dave Sandel:**

1. System V now replaces System III as **the** standard version of UNIX, both inside and outside the rapidly-changing Bell System.

2. **Full support** is now being offered to UNIX **source** licensees. This support is available in two "levels": Level 1, costing $150/month (assuming you have one CPU) includes a newsletter, trouble reporting system (both by mail and **uucp** (dial the **nwuxd** machine at (312) 260-1844, login is **unixml** and password is **bellmail**)), and periodic updates. This is the same type of support offered within the Bell System in the past. Level 2 costs $350/month and includes all Level 1 support plus a toll-free "hotline" through which you can contact GOD (the **Guru On Duty** there, anyway) or other support personnel directly.

3. The committment has been made to preserve the "sanctity" of the kernel: what is there now is **unalterable** -- drivers and utilities may be added, but no more hacking will be done.

4. A specific request for **feedback** from users and outside vendors is being made: an open channel for communication, both ways, is expressly desired.

5. The folks doing UNIX ports were reassured that **AT&T has no desire to work on binary licensing.** AT&T would like to strengthen the market, working with firms currently in this business.

6. **Training and Technical Seminars** will be offered, beginning this year. Reassurances were given to the people currently making their living giving such seminars and training that AT&T doesn't intend to "displace" them, however AT&T did not express any desire to "work with" firms in this part of the market. This should not scare anybody out of the training business who has ever seen a Bell DSEC course.

7. As penance for the ways of the past, shipment of UNIX tapes/materials is now guaranteed **within 24 hours** after a signed agreement and money has been received.

Larry Isley spoke about licensing, fees, and related matters. The current size of the AT&T (source) licensed UNIX community is 1958 licensees and 4615 installations, as of December 1982. For the first time, binary "demonstrator" licenses are available, enabling software to be shown to prospective clients. As long as the demo-licensed machine is not used for "productive" work (including development and running your business), the demo license is free to approved licensees. UNIX can now be offered on **leased** machines as well.

License fees have not gone up from System III: they're still $43,000, and you can upgrade all current CPUs from III to V for a one-time charge of $1,000 (or, as before, from Version 7 to System V for $18,000). A new license agreement must be executed for this upgrade. Educational license fees have been brought back down to $800; an upgrade from System III here is free. Administrative licenses, which let you run business activities of the school on your UNIX machine, are $16,000. For all these licenses, a certain amount of credit for previous fees is available: contact AT&T for more information.

Some new products of note include C compilers for the IBM 370, Gould SEL machines, Cyber 6000, Data General, and **Cray-1.** These license for $4,000 each, and binary licenses to these (or any UNIX C compiler) may be sold for $200 each -- no advance payment of fees -- after the execution of the correct Customer Provisions Agreeement. The long-awaited Typesetter-Independent **troff** is licensed under the same provisions and fees.

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Bell Labs' **Larry Wehr** discussed general improvements made in System V, as well as a bit of history. When Version 7 was introduced, you had the advantage of increased capacity over Version 6, but with a costly conversion due to the **incompatible file systems.** System III kept compatibility, but System V brings us file systems with 1K blocks for higher performance. However, the old 512 bytes/block systems are **still supported** (in fact, you can run both types of file systems on the same pack)! This state of nirvana was attained by adding another magic number in an unused part of the super-block, followed by a new code for the file system type. If the code isn't there, the default is 512 bytes/block. This not only keeps compatibility, but allows for future expansion. System V even includes a utility called **fsba** which will help you calculate **how much it will cost you** to convert old filesystems.

Jerry Feder concluded the AT&T presentation by summarizing System V performance issues. Cautioning that "performance depends a lot on usage patterns" (which is not only true but could be an article by itself), he stated that System 5 is 25% faster on a VAX than older versions of UNIX, running a benchmark designed at Bell to simulate typical timesharing usage. Speedup on an 11/70 is not that great, since a good deal of System V enhancement has to do with **internal information transfer** -- one of the major roadblocks to UNIX performance. It seems that the VAX executes **instructions** only 15% faster than an 11/70, but copies **data** twice as fast due to its 32-bit word size. So the smaller VAX-11/750 turns out to be a bit more powerful than the 11/70. Some other assorted goodies:

- the kernel now takes only about 50% of CPU time, down from 67%.
- **init** can do a periodic **sync** call without running an extra process all the time.
- the ordering of writes to disk has been improved for reliability.
- the lovely **volcopy** utility now has double buffering.
- greatly simplified utilities for incremental tape backup have been added.
- if you have extra RAM, you can use it for system buffers rather than to prevent swapping.
- changes to **stdio** library of interest:
  a. an assembler version available for extra speed
  b. it now buffers a full line to the terminals
  c. has been changed to support the new 1K block size
  d. raw mode characters are **not processed at all** by UNIX
- **hashed search** algorithms are finally used in the inode table and system buffers.
- interprocess communication is supported through semaphores.

What of the future? Yes, Bell is finally looking into record and file locking. They are also examining support of **multiprocessors.** That sounds a lot more exciting than having 8 people share a single 8086...

Vendor Exhibits

About 60 firms in booths of various sizes were represented. The most striking difference between this and previous UNIX conferences with vendor exhibits were the **professional design and appearance** of most of the current booths. Evidently, even the larger firms are taking more of an interest in presenting their position in the UNIX market. **NCR,** who had just introduced their **Tower** (see **UNIQUE** V2N5), and **Whitesmiths** (a long-time exhibitor at these shows) were conspicuous by their absence.

Interviews with the Marketing heads of most companies confirmed the usefulness of the Unicom show. We constantly heard comments like, "Orders up 300% over January" and "My Production people are up to their ears now". One spokesperson made the interesting comment, "It shows we (the UNIX industry) are now a force to be reckoned with".

At the end of the listing of vendors, we've provided a tabulation of times we obtained running a benchmark that's guaranteed to make most techies groan. But there's method in our madness (or is it the other way around?). What we did was run a C compile of the famous K&R "hello.c" program, then run two of the same, simultaneously. No, it's **not** an exhaustive test of the CPU, disk access time, or any of that. It **does** cause large programs of known size and complexity to be read from other file systems and executed, tests the forking mechanism, and shows up **swapping delays** in machines

ithout enough RAM. And it takes less than two minutes to type in and finish, not a matter of small importance when there are 60 vendors in a room. Even with the limited power of this test, interesting results were found. Besides, when you're developing software, the **speed of a C compilation** may well be more important to you than how fast a FORTRAN matrix is inverted. If you have a better benchmark, your specific recommendations will be appreciated.

We'll cover Unicom **software** vendors in the March issue. There was just no way to get it all in and still do justice to everyone.

Alcyon

Regulus, this firm's UNIX-like operating system, is now being used by CIE and Motorola. Meanwhile, they're now selling single-board, 68000-based computers on the DEC Q-bus (LSI-11) with 512 KB of RAM, 4 serial ports, and 1 Centronics port for $3,800 -- Regulus is $800 extra. They had one of these packaged in their new AWS workstation VT-100 look/workalike, with an Atasi Winchester disk (5 fixed, 5 removable), 256 KB of parity RAM, 4 serial ports, and one Centronics port for $13,000. We did have a bit of a problem running the benchmark on this system, though: it was unable to fork enough processes for our simultaneous compiles. **Analysis:** we're glad Regulus is being accepted, because it has some nice features (System III compatibility, file locking, ISAM support). But are they a hardware company with their own operating system or a software company selling hardware?

Altos Computer Co.

Altos is making many friends among retailers with its aggressive marketing and strong support, as well as its ability to come out with new products quickly. They are about to announce between 40 and 60 new applications packages for their **586** product line, and a **Direct-to-Dealer** program that should make dealers ecstatic, but maybe not distributors. In any case, we got a chance to look at both their cutthroat-priced 586 and newer 68000 boxes.

The 586 runs its 8086 CPU at 10 Mhz, has 6 serial ports, and costs $7,990 with a 10 MB Winchester and minifloppy backup. The 68000, on the other hand, runs at 8 Mhz and comes with a 20 MB hard disk and 16 ports for $12,990 (or 40 MB for $14,990). Both systems have 512 KB of RAM and are currently being shipped. **Analysis:** Which is a better choice? Current "smart money" would bet on an **electric toothbrush** if it had a 68000 in it; but look at the amount of support and software offered for the 586, the small size of its package, and our benchmark results, and you'll see that the 68000 machine has a way to go. Some markets are **ready** for a $13,000 machine, but many more are **waiting** for one that costs $7990.

Callan Data Systems

We had a long, fascinating meeting with Dave Callan and one of his top technical people. As a good many OEMs are aware, Callan began by selling enclosures with your choice of a Q-bus or Multibus backplane, CRT, keyboard, and power supply. But many customers found it to their advantage to let someone else handle the system integration, so ten months ago, Callan began showing its first complete UNIX workstations. Instant success, and you can still reconfigure the hardware if it's not exactly what you want.

The basic **UNISTAR 100/25** system is set up for a single user (but with 2 extra RS-423(!) ports) running an 8 MHz 68000, a 10 MB disk, 600 KB minifloppy backup, and 256 KB of RAM with no wait states (1 MB maximum). UNIX V7 with Berkeley enhancements is included for $9,950, or add another measly $1,000 to get a 21 MB disk. The multiuser version has 512 KB of RAM and swaps the RS-423 ports for four RS-232 ports; the 21 MB disk is standard for $13,950. A nifty option for any of these lets you emulate a **Tektronix 4010** graphics terminal: 752 x 323 pixels for just $1450; Pan, zoom, fill, downloadable character set and point-by-point plotting are supported on UNIX with an included driver. OEM discounts begin at quantity 25.

Callan has done a good job gathering software (and according to Callan users calling us, a good job in general: several are upgrading already). Available are FORTRAN 77, Pascal, DEC-type BASIC, RM/COBOL, EasyType, UNICALC, MicroIngres, and a 68000 assembler.

ADA and Ethernet are coming. **Analysis:** a nicely packaged system, at a good price, with a standard bus. After seeing the insides, we know they didn't get where they are by cutting corners. We expect to see more good stuff from Callan in the future, and the present looks pretty good too.

Charles River Data Systems

Their **Universe 68/05** machine, first described in **UNIQUE** V1N3, can manage the entire 16 MB address space of the 68000 processor, running at 12.5 MHz with no wait states thanks to a 4 KB cache buffer. Architecture is classical mainframe style, with front-end communications running on a multiplexor channel. In fact, all peripherals work through channel controllers, and the computer is viewed as being 32 bits due to the width of the bus data paths (I will go along with this when the 68020 processor is used, with true 32-bit external data --DF).

The 68/05 includes a 10 MB disk, 1.25 MB 8" floppy, 256 KB of RAM, 4 serial ports, and the UNOS real-time operating system for $9996. While some view CRDS as being limited to a proprietary product line, they actually use the standard Versabus and SASI bus internally. This machine is supposed to be faster than a VAX-11/750. **Analysis:** This machine shouldn't be overlooked by OEMs because of its non-Bell software. The hardware is well thought-out and the people are good at their business. Our next issue will have a closer look at CRDS.

Codata

Codata is currently generating a good deal of excitement with a good deal: their Model 3300, with a 33 MB voice coil Winchester, 1 MB minifloppy, 320 KB of parity RAM (max. 1.25 MB), and 10 ports (max. 18) is being sold for $10,400 quantity 1 with UNISYS (their name for the UniSoft Version 7 it runs). Their high-end system includes an 84 MB Fujitsu disk in a separate box for $14,300, which also ran reasonably fast. A 10 MB cartridge tape is available for $2100, and is recommended for backups, while 9-track drives are also available. You can also buy the system with an SMD controller and hook your own disk in, at a big savings. **Analysis:** large and small OEMs alike should be delighted by this pricing, and Codata is providing an 800 number for support, so it's not just a loss leader, we feel. Expect to see a lot of these machines around.

Corvus

Corvus, familiar from the 8-bit world as a supplier of disks and local networks, has entered the fray with a UniSoft Systems port of System III on a Sun-like board. While not currently available to end users, the **UNIPLEX** is interesting since networking is obviously going to be well supported. Pricing is still being set, but the machine comes with 512 KB of parity RAM, 2 ports, Omninet built in. Winchester and 8" floppies are available. **Analysis:** Enabling current 8-bit computers as diverse as Apples, IBM PCs, and anything running CP/M to hook into a local network with their **Omninet** provides a better upgrade path than software emulators and program translators. It lets end users **keep their current machines and software** while enjoying the speed and high capacity of the UNIPLEX. A winner if this concept (pun intended) is brought to market quickly and properly.

Cosmos

Cosmos is moving fast -- the company was showing three configurations at Unicom. Their "Starfield series" are all Multibus-based running a 68000 CPU. **Orion**, their high-end machine, is made for the scientific market and is claimed to be faster than a VAX-11/750. At $45,950 with an array processor, it has **474 MB** of SMD disk, a 9-track streaming tape backup, 1 MB of ECC RAM, and 8 serial ports. **Antares** is their next fastest, for $25,950 including a 40 MB Winchester, 1/4" streaming tape, 1 MB of ECC RAM, and 16 serial ports. **Lyra**, at $16,500, has a 20 MB Winchester, a 1 MB floppy, 512 KB of ECC RAM, and 8 serial ports. It's intended for development and business applications, and available for $12,500 in a single-user version. **Analysis:** a nice lineup with a machine for everyone. A new machine, to be called **Orion Plus**, will be a small Lyra-type machine with a 10 MB Winchester and a 30% throughput increase, probably priced around $10,000.

CYB Systems

Another Sun board-UniSoft success story, CYB was incorporated in April 1982 and introduced their machine at the June NCC! Their **Multibox 2** has a 27 MB Winchester, a 1 MB minifloppy, and 768 KB of RAM in a 9-slot Multibus cage for $16,750 (UNIX V7 is $1500 additional). The 68000 CPU runs with no wait states at 8 MHz, and 10 serial ports are supplied -- of which two run directly from the CPU for high speed (CYB is planning to go to intelligent I/O boards for even more speed). The Multibox 3 has **two** 80 MB fast Winchesters and a 1 MB minifloppy -- but also a Cipher streaming 9-track tape, 1.5 MB of RAM, and 18 serial ports for $49,900. An Ethernet interface is available now. **Analysis:** while their prices are on the high side, they plan to be around for awhile, and will go to great lengths to satisfy OEMs and volume buyers. Reportedly, they've been signing some good deals, so don't forget these prices are quantity one...

Digital Equipment Corporation

DEC's announced support of an industry standard UNIX was expected, but it's great to see DEC move so fast as to have it on everything from the 11/70 to the new **MICRO/PDP-11** to even the DEC Professional personal computer. **V7M-11** is what DEC calls its UNIX (a real catchy name, guys), which includes Version 7 DEC device drivers, the **vi** editor, bad block support, and **full DEC support.** At the same time, **VNX** is available for the VAX computers (as we predicted but spelled wrong in **UNIQUE** V2N1), providing things like a supported C compiler, an SCCS-like **Code Management System**, run-time libraries providing VMS-to-UNIX support, and promises of more and better to come.

We think their new MICRO/PDP-11 is just great: at $9,200, including the PDP-11/23+ (4 MB max. addressing) processor, a 10 MB Winchester, 800 KB minifloppy, 256 KB of parity RAM, and 2 serial ports, DEC has finally come up with a reasonably-priced answer to 68000-, 8086-, and Z8000-based systems. It's hard to argue DEC quality, support, and strength, especially with the nice packaging provided. While not the fastest CPU around, the 11/23 has that famous upwards compatibility. The only drawback is those two ports: that's probably the limit without lots more memory and a faster disk. **Analysis:** we don't think it's too late for DEC to show its muscle if it really wants to -- and these new products prove it doesn't want to be counted out.

Fortune Systems

Those who have been hearing things about the speed of the **Fortune 32:16** can relax in the knowledge that they're working on it! The most recent revision of the operating system is 1.3 (you should all have it already) with a few extra speedups, but the real news is Release 2.0, due in May. This will optimize access to the hardware and provide major speed gains (I estimate 10 to 20%, depending on what you're running -- DF). **WordPlus**, the new version of Fortune's word processing software, will have math capabilities, multi-column moves, appendix and dictionary enhancements built in (grammatical error handling is rumored as well). This, and COBOL, should be ready at press time.

Fortune is making 150 machines a day.

Gould - S.E.L.

Gould's brochure says "Awesome Computer Power". And it is, especially for a line of machines that is being heavily promoted to the UNIX market. The **Concept 32** series includes the 32/87 and the even newer 32/8780; they both share features like a 32-bit CPU with a 4-step pipeline, ECL architecture, 75 ns. instruction cycle, hardware floating point, I/O processors, extensive diagnostics, and writable control store. The difference? The 8780 has an additional processor they call an IPU which runs in parallel with the main CPU. It's physically identical to the CPU (and can be switched in to replace it in case of failure) and is managed by algorithms in their MPX-32 operating system, so that tasks can be assigned to one processor or another. UNIX on this machine should eventually support this as well. Each has its own 32 KB cache memory.

An 8780 will set you back $395,000, which includes 2 MB of ECC RAM, a 300 MB SMD disk, 9-track tape drive, 8 serial ports, a 600-lpm printer, a superb FORTRAN compiler, and a console. However, it runs 6.6 MegaWhetstones/second, good for impressing your mainframe friends.

The 32/87 is $199,900 (peripherals a bit extra) and still manages a respectible 3.9 MW or so (by comparison, a VAX-11/782 runs about 2 MW). **Analysis:** we've seen quite a few overburdened data centers that could use one of these. CAD/CAM and military markets are natural applications for these superminis, and Gould's available **ADA** and **Pascal** translators (to C, what else?) will help a great deal in that market.

International Business Machines

Yes, they were here, if only in the guise of their local sales office providing a Series/1 for Dick Cavanaugh. Expect a bit more participation in the future.

International Data Services, Inc.

IDS President Dick Cavanaugh took great delight in showing us the IBM Series/1 with CPIX (as previewed briefly in UNIQUE V2N4). The little blue fellow was driving an IBM 6670 laser printer/-copier, but we couldn't get it to work with **troff** yet. Dick says they've been using it quite a bit at IDS for the past 1 1/2 years, remarking that it supports from 16 to 24 users. For IDS, the Series/1 was a new experience: it's the first time they've been involved with non-DEC hardware. As far as specs go, the Series/1 is available with a 64 MB disk, 9-track tape drive, definitely IBM compatible 660 KB floppy disks, 512 KB of RAM, and 16 serial ports for $83,557 including CPIX. The laser printer would be another $49,000. **Analysis:** IBM pricing has always been interesting. The price list shows that the tape drive costs $287 less than the computer itself, that the floppy disk costs $3,880 (much more than an IBM PC with about the same storage), and that the serial ports alone cost $8,520. But if it runs 16 to 24 users at that price...

Masscomp

After the big writeup in **UNIQUE** V2N4, all we'd like to say is that after sitting through a demo of the MC-500 scientific/engineering computer, we were even **more impressed** than we were by the original specs. Kent Blackett and his team who developed the menu and user interface software for this are way ahead of their "business world" colleagues. We especially liked the "Next" as a help key, which shows what the next step will be. The software will **automatically** draw and scale graphs from data collected by the machine or stored on file -- and it colors the graph for you too. **Analysis:** puts all other lab tools in the Dark Ages. And it is **fast.**

Microsoft

Arriving at this booth, we finally got to see the **Radio Shack Model 16** running Xenix, and were impressed. Tandy has been known to do odd things with hardware, and there was some concern that somehow a non-standard system would result. But both Microsoft and Tandy did a nice job, and the end product is completely normal...almost (later for that).

The subset of Xenix being shipped with all new Model 16s (and being sent free or nearly so to current users) includes the kernel, the file system, and enough utilities and shell files to administer the system with up to three simultaneous users. The kernel has been **shrunk** to a mere 92K (not at all shabby on a 68000). Full Xenix, with all the utilities, compilers, and stuff that you would get on any other 68000-based Xenix machine, costs $750. The system is **fast** -- they use Microsoft's famous "scatter-loading" technique for allocating memory -- and even runs fairly decently from floppy disks alone.

The problems come up with the Model 16's memory management facilities, or the lack of them. There is no hardware protection against writing into text space, so shared text is put into the highest segments of memory. This, according to a spokesman, makes crashes "unlikely, but possible" (wasn't everyone complaining about the 8086 having no memory protection a while back?). Further, the stack can't grow dynamically, so Xenix defaults to 8K worth of stack unless another amount is specifically requested by the user program. This isn't such a big thing, though, unless you plan to run Lisp and don't have the source code for the interpreter.

Apple's Lisa was in Microsoft's booth, too. The Lisa had just been announced at the time, but there weren't huge crowds around it: UNIX people tend to cluster around exotic graphics and new CPUs, not mass-market **anythings.**

Analysis: while the average small businessperson knows nothing about Xenix, the offer of a Model 16 with Xenix, 2 extra CRT terminals, and an 8.4 MB hard disk (barely enough when you think about it) for under $10,000 is hard to resist, especially from a "name brand". The big scramble will be among the applications software firms as they attempt to hit this market.

In terms of Xenix itself, our impressions are that Microsoft has not gotten the respect it deserves for the amount of good work it's done: probably because the really **hard** stuff on the inside is not as visible as a menu might be. But for those of us who know...

Momentum

Momentum, once Computhink, was the first company outside Motorola to announce a 68000-based computer. Their current lineup lets OEMs choose between price and performance by supporting several disks of varying capabilities. What's so good about that? In this fierce segment of the market, generally if an OEM wants a faster disk, he has to **switch computer suppliers!**

The **Hawk 32** lists for $11,950 with a 10 MB Winchester, an 800K minifloppy, 512 KB of RAM (no wait states), 2 serial ports, and a Centronics printer port. The hard disk in this case uses a stepper motor with 90 ms. average access time. Moving up to the **Hawk 32/E** (all other features equal) gets you a DMA disk controller that can run a 15 MB disk with linear voice coil head at 30 ms. access time: this configuration costs you $13,350. These faster disks are available in capacities up to 25 MB; the stepper motor types up to 40 MB. A 20 MB streaming mag tape option is available for faster backups, or you can put in an 8" floppy disk instead. Discounts on these two models start at quantity 10, and all these machines run their 68000 processor at 6 MHz.

The **32/4** is a tabletop machine built into a Bertone-designed terminal with tiltable screen. It sports two 5 MB removable SyQuest disks (75 ms. access time), and has 512 KB of RAM and 4 serial ports. An option is a graphics board that has its own 68000, 256 KB of RAM, and 16 KB of PROM. Including UNIX and Horizon word processing and spreadsheet, the 32/4 lists for $9995. Large OEMs only for this one: quantity discounts start at 50/year. If you're buying 5000 of them, the 32/4 will cost under $5000. **Analysis:** Momentum is giving its buyers lots of options. These are nice packages as 68000s go, even more so with bundled software. The 32/4 has a big advantage with those SyQuest disks, especially if larger capacity cartridges become available, and it is an attractive desktop unit.

National Semiconductor

Here was the famous 16032, running Berkeley 4.1 BSD, in a prototype unit under (plexi)glass for all to see. By the time we got to the booth, everyone had run their CPU benchmarks, and we were told many wonderful tales. When we ran our 2 simultaneous C compiles, a bus error occurred, which we were told was caused by the assembler not being able to open a temporary file. The people at the booth wanted us to know that the system was still under development and that they only had a 4 Mhz chip, and so on. We don't want to turn anyone off to the chip itself, as this **does** look like an implementation problem (I did feel the shell response was slow -- DF). National Semi could **at least** give its own engineers 6 Mhz chips if they're being delivered to customers, as we've heard, especially if they're going to a show like this one. We've heard from various engineers working with 16032s, and each one of them felt the chip was not yet living up to the glowing spec sheets. **Analysis:** This showing was inconclusive, the booth small, as if the company was not too sure what they were presenting. We'll reserve decision on the chip, but the system obviously isn't ready yet. HCR might have better luck with the port.

Onyx

Onyx recently got into the work-station market with their **Sundance-16,** essentially a repackaged version of their **C5002A** System III machine. A typical configuration for these 6 MHz Z8001-based machines would include a 14 MB disk, 12 MB cartridge tape backup, 256 KB of RAM, 5 serial ports, and 1 parallel port. As a Sundance-16, this would all be housed in a VT-100 style CRT and cost $13,990; as a C5002A, in a standard-looking computer box, it costs $11,990. A prototype of their upcoming 68000 machine is running in-house now, while the C5002A is just

beginning to be delivered to beta test sites, according to their representative. **Analysis:** they've become well-known due to being first in the microcomputer UNIX market, and having a solid product that has steadily improved. The 68000 machine will be a departure from the desktop market, as it reportedly has Plexus-like architecture and a $30,000 - $40,000 price range.

Pacific Microcomputers

Another manufacturer of 68000 Multibus boards who has branched out into small systems, Pacific has been selling a great deal of them lately. Perhaps this was caused by their announcement of the **PM400**, with a 10 MHz clock, 84 MB Fujitsu SMD Winchester disk, Cipher 9-track streaming tape, 512 KB of RAM, 10 serial ports and 7 free slots for $29,900 including UNIX. In any case, they're eager to please OEMs -- from a board to a system. **Analysis:** with intelligently-designed, powerful systems like this, how can they go wrong? They're not even **talking** about floppies to back up that Fujitsu, which definitely puts them in a class by themselves.

Perkin-Elmer

The PE **Megamini** is available in several models:

3210: entry level, with 512 KB RAM standard (4 MB maximum), and a 64 MB Winchester.
3230: adds a writable control store and cache buffering for more speed.
3250: expandable from 4 to 10 MB of main memory.

The standard CDC cartridge disk on the larger systems has 48 MB on a fixed disk, and 16 MB on a removable cartridge, while all come with 8 serial ports and one for the console. A floating point option is available. Software, apart from Wollongong's Edition VII UNIX port, includes the **e** Rand editor, SCCS, Horizon word processing, and a "poor man's" DBMS called TAB. Also coming are RM/COBOL, Mistress, FORTRAN, and a C compiler with new optimization. The 3210 is bundled with Edition VII for $49,950, and discounts on UNIX now begin at quantity 2. **Analysis:** Perkin-Elmer has quality hardware, true 32-bit architecture, with factory-supported UNIX. OEMs looking for something more than a 68000 and less than a VAX 750 shouldn't miss checking these out, especially in traditional P-E markets.

Pixel

Pixel wasn't showing any new hardware -- their "old" hardware is nothing to sneeze at, of course -- but they had quite a bit of new software, including a new release of their UNIX system, 2 spreadsheet packages, 3 word processors, SMC Basic, SVS BASIC-PLUS and Pascal, APL, RM/COBOL, Micro Focus COBOL, Telesoft ADA, as well as a host of DBMS packages (Unify, MDBS III, MicroINGRES, SMC IDOL). Applications include the "big five" from both MBSI and ABS, and an accounting system especially for consultants, called CAMIS.

Pixel has subsequently announced the **Pixel 80**, which includes a 10 MHz 68010 CPU, 38 MB Winchester (30 ms. access time), and 512 KB of RAM. You get your choice of backup from a 20 MB cartridge tape, a 5 MB cartridge Winchester disk, or two floppy disks. All this, plus System III, for $13,900 yields 30% higher performance over their older 100/AP for 23% less $$. Their graphics-oriented system (they **are** named Pixel, you know) will soon be available for less than $20,000 with 40 MB of Winchester, 1 MB of RAM, 512 KB of graphics memory and a 1728 x 2180 pixel bit-mapped raster CRT. Expect 3D graphics software and typesetting, too. **Analysis:** we like writing about Pixel because they're always doing something **better.** Expect them to break off soon from their parent company Instrumentation Labs and go public.

Plexus

Plexus was showing its **P/25** and **P/40** Z8000-based machines. According to a spokesperson, "The computing power is the same; choose your model on the basis of the number of users it can support". This is essentially the case. The P/25, while physically smaller and with fewer expansion slots, has the same architecture as the P/40. The smaller unit is billed as supporting 16 users, while the P/40 should run 40, says Plexus. While we're a bit skeptical of those figures, we believe them, more so than similar figures being quoted by manufacturers of machines we

know to be slower. Plexus has not rested since their initial introduction; much work has been done in tuning and enhancement. For instance, the CPUs are now running at a higher clock speed (though now still only 5 MHz: why so slow? Ask Zilog, maybe). Plexus has been at the **leading edge** of performance since their inception two years ago, correctly identifying the barriers to speed under UNIX and addressing these in their product.

Plexus compares their P/25 to the DEC PDP-11/70, and we found the response time while sitting at the keyboard about the same as an 11/70 in single user mode. **Analysis:** Plexus is making big inroads into previous DEC markets (even reportedly signing a $6 million contract with Interactive Systems, one of the UNIX world's most steadfast DEC boosters (or was that Onyx boosters...)). As we said, they know their stuff: we expect them to be around for a long time.

Sun Microsystems

The **Sun Workstation**, a terrific hit when it was first unveiled at the last Winter Usenix conference, has been upgraded to allow what we call the "virtual mouse" option: UNIX 4.2bsd (with virtual memory support), a 68010-based board (allowing virtual memory in the first place), and an optical mouse with window management support (similar to what Lisa has now). Ethernet is an integral part of their design, allowing you to buy one workstation with big storage ($32,100 will include an 84 MB Fujitsu disk and 20 MB streaming cartridge tape) and "bare" stations to use that storage (at $17,200 each including Ethernet, virtual mouse, and the workstation).

Each Workstation, by the way, includes a 10 MHz CPU, 1 MB of RAM, 2 serial ports, a 1024 x 800 pixel graphics board, a **17" CRT** monitor, keyboard, and single-user UNIX license. Emulation of both a VT100 and Tektronix 4014 is included. Working on one of these shows you what state-of-the-art graphics plus one of the best UNIX implementations around can do. **Analysis:** not only are their systems in great demand, but Sun is doing a land office business licensing their CPU board design and selling them for $3500 a pop. A talented bunch like this will be around for quite a while.

Wicat

We're a bit confused about Wicat. Although they claim to have had System III running with Berkeley enhancements for about a year on their Model 150 workstation, a report from one Wicat user claims that it still doesn't work. In fact, this user says he's been waiting a year for UNIX to run on his Wicat! We did see what certainly appeared to be UNIX running on a Wicat at the show, but were unable to work with it for any length of time. We do recall UNIX not being available at the show held last year in Santa Monica, though. In any case, their Model 150 is built into a CRT, running an 8 MHz 68000 with a 10 MB Winchester, 960 KB minifloppy, 256 KB of parity RAM (max. 1.5 MB), and 2 serial ports for $9,450. Their System 160 and 200 are available with SMD disks as well as Winchesters, and 9-track tape drives. **Analysis:** we'd like to see more about their delivery before we comment further.

Zilog

"A tremendous response" was the answer we got when we asked Zilog how their newest **Model 11, 21, and 31** were being received. Aimed at OEMs and large end users with their own technical staffs, the new models all share the same hardware (all have a 17 MB cartridge tape backup and 8 serial ports), except for the actual disk used and the size and type of RAM. In addition, the Models 21 and 31 have 8 slots left in the Zilog bus for expansion, can each take up to 4 MB of RAM and 24 serial ports, and have a 9-track tape backup as option. Here are the other quick specs:

11: 18 MB Winchester disk, 256 KB of parity RAM (1 MB max.) for $14,950.
21: 32 MB Winchester disk, 512 KB ECC RAM for $26,200.
31: 80 MB SMD disk, 1 MB ECC RAM for $37,950.

Analysis: Zilog is beginning to announce software packages and other types of support that should make these more attractive. Without a concentrated effort towards support, they could have only limited success at these price levels considering the 68000 craze and eroding prices in general.

The Benchmarks

1. Read our explanations at the beginning of this issue.
2. All results were obtained during the show.
3. Anybody not listed was missed for one reason or another.
4. We will be glad to hear from anyone who questions our results, if they don't use naughty words.

Manufacturer & Model	Compile Time	Simultaneous #1	Simultaneous #2	
Alcyon Regulus	0:21	0:43	0:46	no more processes
Altos 586	**0:37**	**0:38**	**0:39**	
Altos 68000	0:31	0:58	0:59	
Callan Unistar	**0:36**	**n.a.**	**n.a.**	
Codata 3300	0:20	0:37	0:37	
Cosmos Lyra	**0:41**	**0:58**	**1:02**	
CYB Multibox 2	0:35	0:50	0:50	
DEC Micro/PDP-11	**0:37**	**0:45**	**0:45**	
IBM Series/1	0:25	0:38	0:40	
Masscomp	**0:10**	**0:27**	**0:27**	
Momentum Hawk 32	0:31	n.a.	n.a.	
National Semi 16032	**0:35**	**0:59**	**1:06**	**bus error**
Plexus P/25	0:18	0:20	0:20	
Tandy Model 16	**0:23**	**0:41**	**0:43**	

Notice how some of these machine almost **double** their times when asked to do simultaneous compiles. That seems to be a sign of not using shared text, which we feel would be essential for a C compiler used in a development environment. Since you can't recompile it yourself, you would be stuck with the performance gremlin in this case. Of course, if the problem is due to swapping, you should just be able to add more memory...

Vendors, Take Note

We will be glad to hear your comments on our evaluations of your products and services. If you would like more in-depth coverage of your firm, have your Marketing Department get in touch with our Editor regarding an in-house evaluation or to get permission to quote from **UNIQUE** for advertising purposes.

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(thanks to Sharon Fudim)

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Callan Data Systems
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Westlake Village, CA 91361
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Charles River Data Systems
4 Tech Circle
Natick, MA 01764
(617) 655-1800

Codata Systems Corp.
185 N. Wolfe Road
Sunnyvale, CA 94086
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Corvus Systems
2029 O'Toole Avenue
San Jose, CA 95131
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Cosmos Systems, Inc.
525 University Avenue, #A60
Palo Alto, CA 94301
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CYB Systems, Inc.
6448 Hwy, 290 E., #D-106
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Digital Equipment Corporation
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Fortune Systems Corporation
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Belmont, CA 94002
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Gould S.E.L.
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International Data Services, Inc.
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