Volume 3, Number 1

UNIQUE™

September 1983

Your Independent UNIX* and C Advisor

Now Including PIPES & FILTERS

From the Editor

It's been a busy time here. First, there was tallying all the reader questionnaires. Then there was the strike at the paper mill (that's why last issue was printed on white vellum instead of ivory bond). Then we managed to get three computers in-house for review in as many days! Naturally, we were planning for this **not** to happen. The good news, of course, is that we now have lots of software packages to test, including UNIFY, CrystalWriter, Horizon Word Processing and Spreadsheet, MicroIngres, the NEX editor, RM/COBOL, SMC Basic, and Silicon Valley Software's Basic-Plus and Pascal/300. This all came on one machine, the **Codata 3300**, which will also be the subject of a major hands-on report.

Because the other machines are so new, we'll save their regular listings for the review articles so you won't have to read about them twice. We'll be doing a story on the **Sage**, courtesy of the Sage factory and **Logos Information Systems** (201-782-1533), who ported Idris to this compact 68000-based machine. The Sage has been selling like hotcakes in the UCSD Pascal market, primarily for scientific and engineering uses, and the addition of Idris was a logical step towards multiuser use. Finally, there is the **Cadmus 9790**, a new machine by a new company in Lowell, MA (617-453-2899). It's built around the fast PCS QU68000 board that we raved about two issues ago. It has a 1024 x 800 pixel graphics terminal, 512 KB of RAM, a 65 MB Winchester disk, and a streaming tape for backup. And it lists for only $17,900, so we bought one.

Why did we buy a machine from a brand-new company? First, we're fascinated by the availability of high-performance graphics on a reasonably-priced machine. Second, the people behind Cadmus have a track record we admire -- like starting up the Pixel operation -- and have thus proved to us they can deliver the goods. As the tax commercials say, you'll be hearing more about some of our other reasons in our review (you wanted depth, you'll get depth).

As mentioned above, we've completed our survey of the questionnaires we sent out a while ago, and the findings are summarized in this issue. We think you'll be interested in learning what your fellow readers had to say, and we hope to keep you all satisfied -- especially now that we know **exactly** what you want! But don't hesitate to continue giving us your opinion; we really do appreciate knowing.

In This Issue

UNIQUE: Your Independent UNIX and C Advisor™ (ISSN 0736-4083) is published monthly by InfoPro Systems, PO Box 33, East Hanover, NJ 07936. Telephone (201) 625-2925, TLX 4994412 PERCHW UI. Editor: David Fiedler. Associate Editor: Susan Fiedler. West Coast Editor: Walter Zintz. Circulation Assistant: Christina Gardner. Subscriptions to UNIQUE are $54 per year (add $16 for overseas airmail). Discounts are available for non-profit organizations, schools, bulk and multi-year subscriptions, and home computer hobbyists: for details, contact our Subscription Department. Each additional subscription sent in the same envelope costs $15/year ($24 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. *UNIX is a trademark of Bell Laboratories. Printed in the United States of America.

Rumors

HOT STUFF! Commodore is reportedly negotiating with **Mark Williams Company** for the right to use the latter's **Coherent** (UNIX look-alike) operating system on the upcoming Commodore Z8000-based system. If this takes off like the Commodore 64 has, the Z8000 could well regain some of its market share...We've heard that **Texas Instruments** will announce a 68000 plug-in (with UNIX) for **their** PC. If true, this would mean TI would be essentially going head-to-head with DEC and IBM: good luck, TI...**Apple** is unbundling the software from its **Lisa**, making the new list price $6999 and opening the way for further UNIX implementations such as UniPlus+ to be sold by third parties like UniPress...New computer installations at the Independent Operating Companies, as well as inside AT&T, are reported to be virtually all 3B20S machines. Is the 3B20 so good nobody can pass it up? How about someone from the Labs sending us some benchmarks?

DEC Doings

DEC may have **three or four different** UNIX-style operating systems for its Professional series. Whitesmiths' **Idris** has already been announced as one of them. Inside DEC sources have claimed Idris is one of the smallest and most solid of these systems...Meanwhile, early 1984 should see the release of their **J-11 conversion board** for the Micro-PDP/11. This will give you the power of an 11/70 on your desktop for about the price of an 11/24 -- maybe more, since the J-11 (being introduced at the chip level this October) will be rated at 20 MHz, one-third faster than current 11/70s. Both Q-bus and Unibus boards will be made available...Yet another rumor (based on hearsay through an inside source) claims the proposed VAX-11/790 will not be out for another year, but DEC will be announcing it sooner than expected, to forestall competition. I hope not. Remember the Osborne?
-- DF

We Have Mail.

Dear Editor,

After reading your July issue, especially on the "Request for Proposal" and the new "hello" benchmarks, I couldn't help but write. I have been using an Altos 586-10 (serial #41897) with XENIX V1.0 for several months. Your benchmark times as published (2/83) seem awfully high. Just sitting down after reading the July issue, and running your benchmarks 4 times, the average compile time was 11.5 "real" seconds, with dual compiles coming in at 23.75/24.00 seconds. That's 50%-60% faster than yours.

I cannot create a file called "mkbig" as large as suggested on the Altos with 10 MB capacity with the full XENIX development system on disk. Following your directions I get "device full" errors after **mkbig** attains a size of about 220000 bytes. Thus your **mkbig** file may be too big for benchmarking microcomputers with small disk capacity.

Marc A. Ries
Whittier, CA

Thank you! For those who don't remember, our results in February (on a just-in-production Altos 586) were 37 seconds single, and 38 & 39 seconds for simultaneous compiles. Within the last few weeks, running the benchmark on a 586 of more recent vintage, we got results of 21 seconds single, and 24 seconds simultaneous. What does this mean? Altos has been tuning their product, of course. It also brings up a point we try to make every time: when we print a benchmark, **we run it ourselves.** We advise you to run the same programs yourself: that's why we publish what we do, for the use of all our readers. At this time, let me turn the floor over to two of our independent contractors:

Natasha: Boris, dahling, now we've broken into most of the UNIX-based computers in North America. Why do you suppose they all have the Multiuser UNIX Benchmark typed in from the June 1983 issue of **UNIQUE?**
Boris: They're probably all trying to find out who has the fastest machine. But they'll never know!
Natasha: Vy not, dahling?
Boris: Because hardly anyone's been sending the results in to be published! So only we know what the results are, and we'll never tell! Nyaa-ha-ha!

That's right! Benchmarks are no good unless the results are known. Unless you want to wait until we get every possible machine in-house for an evaluation (even at one a week, that's 2 years from now), you'll just have to send your own results in. If you have any questions, call us up, but **we need your benchmark results** if we're to help tell all our readers what's happening. Subscribers who didn't receive our June 1983 issue with the Benchmark article can send us $4.00 for the entire back issue or send Julie Geers at Plexus Computers (2230 Martin Ave., Santa Clara, CA 95050) a self-addressed, stamped envelope for a reprint of the article alone.

Mr. Ries is right about the file size problem, of course: this is why the original benchmark used the raw disk. We'll accept either figure.
-- DF

Taking a closer look at Software

Software Tools

Software Tools User Group (STUG)
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For those whom want the proceedings from the January 1983 UNICOM conference, a few copies are still available. The proceedings include transcripts or abstracts of papers given at the conference and technical session descriptions. The price is $25.00 each -- or $35.00 for foreign orders (to cover postage). Definitely worth the price, although be advised that much of this material is pretty technical.

Arthur P. Gaughan, Jr.
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Cymric's **cross-assembler software** packages will run under the following operating systems: UNIX V6, V7, System III; TNIX, VENIX, and XENIX (as well as RT-11, RSX-11M, TSX, and VMS). They have had some trouble porting to Idris, and are still working on it. Eight and 16-bit processors including 68000, Z8000, Z80, 8080, 9900, 6800, 6502 and the PDP-11 and VAX lines of computers can use this software. According to the vendor, it's "based on the same Macro and Conditional Assembly features as the standard DEC MACRO-11 assembler distributed on RSX and RT systems". Additional features include many "data and storage allocation directives" and the availability of **structured code constructs** such as REPEAT-UNTIL, DO-WHILE, IF-THEN-ELSE, FOR, CASE, and CALL.

There are four packages available (Level 0 through Level 3). Level 2 includes the relocating assembler, a linker and object module librarian. Prices have recently been reduced, they say -- a binary license for an 8-bit machine is $1000, for a 16-bit machine it's $1,250. The structured assembly language option costs an extra $250 to $500. A limited warranty and support are included in the price. If you just want a demo package, you can get one for $50.00.

Phil Hughes
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We recently received a copy of SSC's C **Programming Language Reference Card.** It measures 8 1/2" by 3 1/2" and the non-glossy white card stock is imprinted with red and blue ink in small but clearly readable 5 point type. The C Reference Card summarizes those commands, variable declarations, character constants and other assorted tidbits that all C programmers should (and may not) memorize. They have come up with some interesting ways of jogging your memory with regards to C syntax. Common UNIX system calls for file I/O are covered too. The only thing we noticed missing is the syntax for bit fields. The card is $2.50 each or two for $4.00 (includes postage and handling), and we feel it's **well worth the low cost.** We'd be glad to see a plastic-coated version, though, even at a higher price.

Just released by SSC was a 16 page booklet entitled **"The C and UNIX Library Reference"** which covers the UNIX library calls found in Bell Labs' **UNIX Programmer's Reference Manual** (sections two and three). Calls and subroutines are listed in logical groupings, such as Buffered File I/O, Process Environment, and Character Manipulation. The C Reference Card comprises the cover of this carefully indexed booklet, which costs $4.00 (even a better bargain than the card alone). Those who desire larger quantities should contact them for more information.

Applications Software

Jerry Morlock
Pacific Rim Software
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This company has developed a specialized vertical market package for the general dentist's office called **The Dental Practice System.** While it was developed on a Dual 83/20 microcomputer, it should run as a turnkey program on any machine that has UNIX Version 7, as long as you brush your disks after each reboot. In order to create this product they interviewed about a dozen local dentists concerning their record keeping and information needs, and examined other dentistry-oriented packages already on the market. Finding fourth-generation micros and UNIX to be the best environment, they proceeded. A UNIX-based Dental System could well make sense, especially for larger offices where several people might need access to the data at once.

The package, written in C, is menu-driven, requiring the user to have no immediate knowledge of UNIX. Each record holds information such as name, address, employer, responsible party, and insurance company. An "electronic wastebasket" prevents the loss of accidentally deleted information. There are various forms of data entry validation. Each data field has its own help line and default information to save typing. There are a number of special features such as: general ledger (with allowance for "Cash Basis" accounting), accounts receivable, automatic posting for insurance forms as work is done, previewing of financial data before it is posted into the accounting system, and patient referral records. Over 30 types of forms, lists, and reports can be generated from the data stored by the system. The program uses **curses** and **termcap** for terminal independence.

This product is in beta-test now and will be released this fall. It will retail for about $5000 (we were told this is the median price for dental packages of this type). They are planning to port the Dental Practice System to UNIX System V when it becomes more prevalent on micros. Also, future changes will include specialized adaptations for oral surgeons and orthodontists.

Dick Churchill
UniSource
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A new UNIX software publishing house has just begun operation. **UniSource** intends to ease the present difficulties of buying applications software for any of the scores of different machines available. Founded by Dick Churchill (formerly of Cambridge Digital), UniSource has already signed agreements with VenturCom, Urban Software, Mark of the Unicorn, and several other software houses. Access to Cambridge Digital's facilities insures virtually instant software availability on machines such as the PDP-11, VAX, PCS QU68000, NCR Tower, and IBM PC. More formats will be coming soon, they say.

UniSource's first coup is being named the exclusive distributor of VenturCom's **VENIX** for the IBM PC. We've discussed VENIX on several occasions. It's a nice product, and based on real UNIX. However, we're a bit surprised at UniSource's pricing for the PC. At $800 for the single-user version, and $1000 for multiuser -- **without** the extra applications programs VenturCom was planning to include for that price range -- they're surely reducing their potential market share.

Donald P. Anderson
UniComp Corporation
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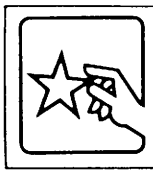
Their new product called **UniComp™** is designed to be a "user-friendly" office automation interface to UNIX. End users need not know about UNIX to use UniComp, while programmers can use it to generate customized applications software. It is also billed as being useful for introducing users to UNIX, and for creating a specialized sales demonstration package for your potential customers. The main menu screen for UniComp shows selections such as electronic mail, communication facilities, document control and word processing, and UNIX utilities. What they call the Office Automation System contains more menus to perform most common functions under UNIX without having to learn all the commands, much like the menu system on the Fortune 32:16.

UniComp includes several useful programs such as **Mengen** and **Promptgen** which help you create your own menus and prompts, as well as a full menu system for UNIX and **UniRite™**. This last program puts help, menu, and function key facilities to work aiding a user's work with the standard Berkeley **vi** editor (it is not necessary to use UniRite if you already have a word processor). UniRite can be altered to let the **vi** user emulate other word processors; however it is dependent on certain functions of "intelligent" terminals. Under UniRite, the main menu shows selections such as assemble documents, deformat documents, spelling checker, archive maintenance, and change document directory.

Upcoming products include **UniFile** (a set of programs and utilities supporting hashed, keyed access to random data files (with automatic space recovery) for $4,500), **UniCount** (a complex general accounting system (**finally** one written in C)), and **UniLaw** (law office support software as a special function of UniComp). A screen generator for use with C and other languages -- which also runs under MS-DOS -- is available now for $4500.

At present the company is looking for OEMs who would like to sell these products with their hardware, and also to port them to various machines. Meanwhile, UniRite is available to end-users for $400. The more involved packages are really priced for manufacturers.



Feature
Article

Selecting a Small UNIX System -- Part 3
CPU Selection

by David Fiedler

In our last installment (**UNIQUE** Volume 2 Number 7), we looked at system speed, mentioning several of the factors that influence the ultimate throughput of a UNIX-based computer system. Disdaining current industry vogue (as usual), we concentrated on the true issues: average access time and transfer speed of the disk, clock speed, amount and speed of memory, peripheral intelligence, and quality of the UNIX implementation.

It's the type of microprocessor used as the central processing unit (CPU), though, that captures most people's attention. Comparing CPU types without the other information described above is like comparing automobiles by brand name alone. What model? How much horsepower? What type of suspension? Nevertheless, we'll try to keep to the basic facts about each of the major CPU chips in the UNIX market today, while looking a bit to the future.

There are other considerations involved when choosing a chip besides speed, of course. The amount of software available is certainly important: but how much of it will run on your specific machine? It does no good to buy a 68000-based machine "because there's a lot of software for it" if it isn't available in your disk format. And if you're not interested in being a maverick, it's nice to know what other people are using.

The most important microprocessors in today's market are the DEC PDP-11/23, Intel 8086 (iAPX86), Motorola MC68000, National Semiconductor NS16032, and Zilog Z8000. Of these, clearly the most influential is the 68000. In terms of either number of companies using it or number of units sold, the 68000 probably rules 80% of the market. This is due to a number of factors:

1. The 68000 has a large (16 megabyte) linear address space, and does not require programmers to resort to overlay loaders, segmentation, or other techniques in order to write large programs. This, along with its rich instruction set, has made it popular with programmers.

2. The 68000 is perceived as being a 32-bit processor internally, and as an extremely fast CPU. When it was introduced 3 years ago, it was looked upon as being further advanced than the 8086 and Z8000. This has helped its reputation tremendously with marketing personnel as well as hardware designers.

3. The availability of a **de facto** industry standard UNIX for the 68000 -- UniSoft's product **UniPlus+** -- as well as a popular CPU board design -- the so-called Sun-board for the Multibus -- are the major factors in the rapid growth of this chip in the UNIX world. These common features have allowed many small hardware companies to enter the UNIX market, and assured small software companies of a guaranteed compatible market for their wares.

These are all reasons why the 68000 has been well-received. But is it the fastest? An article by Martin De Prycker in **IEEE Micro** ("A Performance Comparison of Three Contemporary Microprocessors", April 1983, pps. 26-37) explores the performance of the 68000, 8086, and Z8000, concluding that the Z8000 is faster than the 68000, and "the performance of the i8086 is much poorer than that of the MC68000". Further, De Prycker stated as an important conclusion that "the relationships among the performances of the microprocessors are almost independent of program and input data". The article was based on actual performance using programs coded in Algol and Pascal.

We have noted that the Z8000 is underrated. Several years ago, we saw a Zilog (Model 21?) running 8 terminals merrily at 9600 baud -- when the 68000 had been in production for only a matter of months. The Z8000 is also the base for the

Onyx, which was the first microprocessor-based UNIX system -- when the 8086 had been around quite a bit longer. And Plexus chose to use the Z8000 when it came time to design their first high-performance machines.

What Happens on UNIX?

A few recent issues (**UNIQUE** Volume 2, Numbers 6 and 11) contained the results of running a simple "benchmark" program which showed that seemingly similar hardware configurations can yield quite different results due to their particular implementation of operating system. While almost everyone starts with Bell Labs UNIX at one point or another in their development, the point at which they depart is often critical to their end result.

According to Marlin Prowell of **Contel Computers** (4204 Meridian, Bellingham, WA 98226, (206) 733-6571), another simple benchmark can show up the effects of these factors. Prowell's benchmark consists of a short C program that simply calls **getpid** 10,000 times. Execution speed of this program is not dependent on disk speed, but on CPU speed and kernel throughput alone. Compilation of this program was reported to us on these machines:

CPU	Machine	Time (sec)	Avg. Access	Disk
Z8000	Onyx	11	35 ms.	IMI
68000	Forward Tech.	15	25 ms.	Fujitsu
68000	Dual	19	25 ms.	Fujitsu
Z8000	Ithaca	23	85 ms.	Quantum
11/23	DEC PDP-11/23	35	68 ms.	RL02
68000	Codata	41	n.a.	

Execution time tells a different story:

Machine	Seconds
Codata	5
Forward Tech.	5
Dual	6
Onyx	7
Ithaca	8
PDP-11/23	13

In the execution test, the 68000-based machines seem to line up at the fast end of the chart, while the Z8000s trail. But looking at the compilation times (and speed of the disks involved) shows that Z8000s with competitive disks do very well indeed. The Ithaca machine would no doubt be quite a bit faster with a faster disk. This is borne out by its showing in execution time; also, Prowell reported that when wait states were removed from memory, the Ithaca executed the benchmark in 5 seconds. This almost proves the folly of "which chip is faster", since so much depends on disk speed, number of intelligent controllers, wait states, clock speed, cache memory, how memory is managed, how many other processes were running at the time, and the like. In short, it's almost impossible to compare machines fairly and come to real conclusions without literally spending weeks in a lab.

Other and Future CPUs

While the 8086 has no memory management (generally required for UNIX systems), clever designers have added this feature with external circuitry in computers such as the Altos 586, making this popular chip (remember the IBM PC?) available for the UNIX world. Those who like IBM compatibility will gravitate towards 8086-based machines, since IBM's predicted UNIX computer is likely to use the upwards-compatible iAPX286 or the even more powerful iAPX386.

The NS16032 is attempting to capture the 68000 market with an expensive advertising campaign claiming elegance in architecture. In actual fact, the 16032 **does** have a more sophisticated design than the other processors, but it's still fairly new: full-speed devices are not yet available. We don't believe the 16032 will have a major impact in this market for another year or so. Their full 32-bit chip, the 32032, is even further off.

The PDP-11/23 is well-known in the UNIX marketplace due to its compatibility with the larger PDP-11 machines that were the first to run UNIX. Its limited address

space and comparatively mediocre performance have held it back, along with DEC's curiously non-aggressive marketing stance. Help for DEC will be on the way in the form of the J-11, a PDP-11/70 on a chip, and probably a Micro-VAX in early 1985.

68000 and Z8000 fans also have a 32-bit future. The 68020 and Z80000 CPUs are the final actors in the complex drama that will be played in the next few years. And despite pundits' protestations to the contrary, it will be anyone's guess as to market shares. Our advice is repeated: choose a computer on the basis of cost, support, total performance in your application, and the tools -- software or otherwise -- you need to get your work done.

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Questionnaire Results

We were very pleased to see the interest so many of you took by returning the questionnaires we sent out regarding your feelings about **UNIQUE**. Fully 25% of you responded, and many of you took the time to give us specific suggestions on how to improve our product. Because so many of you also requested that we present the results, we'll summarize most of the important findings here, and print some of your individual suggestions and comments with our own notes.

19% of you work for OEMs or systems houses, 17% for computer manufacturers, and 16% for software firms. 12% classified their companies as end users. The vast majority of readers are in software development (43%); the next largest group (17%) are management. Slightly less than half your firms (46%) are vendors of UNIX or C-related products.

Some of Your Views

- Very opinionated and biased. Rather narrow viewpoint, limited scope of coverage.
- I prefer your opinionated and judgemental style over the bland, "everything's great" style of most publications...
- You only say positive stuff, never negative.
- I think you do a good job -- especially in exposing and publicizing nonexistent suppliers whose budget is 100% advertising...

- February and March were good, April and May weren't (especially May).
- May issue was A+!

You tended to like the job we've been doing as far as writing goes, although you felt we should raise the technical level of our prose. By far, the most often heard suggestion was that we should go into **more depth and detail** in our writing. You may have noticed that individual articles have been longer and more detailed in the last few issues since the questionnaire; please let us know if this is more to your liking.

Interest in Individual Topics

- A tutorial each month for novices.
- Less "UNIX Primer" articles.
- More meat, less gossip.
- Needs more gossip.

As far as coverage of individual topics goes, you were quite specific in your opinions. We expected the large turnout in favor of more Applications Software and New Computer Systems (over 70%). Similar interest was shown for Communications/Networks, Database Management Systems, Graphics, and Editors/Word Processors. On the other hand, over half of you would prefer never to hear about 8-bit operating systems again, few of you care about CP/M software, and surprisingly little interest was shown for Instruction and Courses. Many write-in ballots were cast for articles on portability, benchmarks, and comparative product reviews. We've already begun to cover

some of these topics. Expect more focus now that we know exactly what you want.

Beauty is Only Skin-Deep

What is your opinion of our appearance?
- Dave needs a haircut! Susan looks O.K.

Over 85% of you liked our appearance; more than 25% were against typesetting our issues (we were hoping you'd say that, since typesetting takes lots of time and money) and you don't want photos either. However, about 6% didn't think we had any format whatsoever! 88% were happy about our no advertising policy, but 40% either actually **wanted** ads or didn't care if we accepted them. Another 28% thought maybe some ads would be acceptable, while many moderated this reply with "but not if they would affect your ability to evaluate products". The last 32% represented the diehards: no ads, ever.

To Ad or Not To Ad

- Merge with UNIX REVIEW.
- Make it more like a PC World-type magazine.
- Let the freebies take on advertising. More steering us away from trouble -- give us the dirt. Tell us what's bad about products.
- Don't sell out to Ziff-Davis!
- Don't end up like BYTE.
- Don't ever become "commercial", please. I love newsletters like this -- you get the real facts, even if it hurts a manufacturer's feelings. If I wanted ads I'd buy BYTE magazine.

We must admit the questions about the ads were put in to see if our ideas about our audience were correct. We believe we were right in not accepting ads from the beginning, and we're glad to see that most of you agree.

UNIX REVIEW is not a crassly commercial magazine, as such things go, but they do take ads. In the course of editing only three issues, I've already been exposed to all sorts of subtle and not-so-subtle pressures on the part of some advertisers. A good many telephone calls to the editor start like this: "Hi, I'm from XYZ Computers and Software. I wanted to find out about getting an article in your new magazine. By the way, we just sent an ad in...". And this is in a magazine that has the advertising and editorial offices on opposite sides of the country! Except for these gratuitous phone calls, I generally don't even know who's advertising until I see the finished issue.

In my own newsletter, I like to be able to say whatever I want without worrying about losing advertising. In a small venture like this one, advertising revenue could quickly become a major source of income. UNIX REVIEW has already lost a major advertiser due to a candid product review. While the publisher has high moral standards -- they knew what could happen when the review was printed -- don't think it didn't hurt. Our view is simple: UNIQUE is written for the benefit of the readers, and anything that could possibly hurt our objectivity is something we don't need. If you doubt the importance of such a policy, just take a look at newsletters that take advertising or which write up their own clients without identifying them as such.

Frequency of Issues

- Would like to see semi-monthly distribution.
- Come out weekly.

Are you kidding?

Heavy Stuff

- A dirky rag -- big ripoff at the price. Grow or die.
- Nice job. Clear, concise. Other UNIX newsletters are overly windy. You know when to stop talking.
- You have occasionally based reviews on PR fluff.
- Are reviews written by UNIQUE staff or principals of the offering companies? Credits in this area would be nice.

- BS -- you already accept advertising -- Perchwell and NewsNet for two. Bring back **Pipes and Filters**, you guys are a waste of money [followed by bad language -- DF].

- Could do without sales pitches such as Steve Blank's piece [Convergent Technologies -- DF] in April issue.
- Stuff like the writeup of Convergent Technologies is what we're looking for.

We will address some of these issues as calmly as possible. As we've already explained, we're printing as much material as we get from Uni-Ops. If Uni-Ops members want to see more material, they have only to send it in as they previously did, with the exception that they will now get paid for it. As far as accepting advertising, fooey. We are contractually bound to display a small notice regarding NewsNet in each issue, which alerts readers to the fact that UNIQUE is available on that electronic network. The listing (**not** an ad by any stretch of the imagination) for The Perchwell Corporation was in one issue only and was smaller than almost every other listing we've published -- not exactly outlandish for a company we own, was it? Or look at the similar small listing for UNIX REVIEW in the May issue.

Unlike many other newsletters we've seen (some of which range from being 25% to 100% self-advertising -- and at several hundred dollars per year too), we have gone out of our way to keep our own interests to a minimum. This has worked to our detriment, and that of our readers. We have received too many calls asking how to subscribe, what our rates are, whether we can recommend any good UNIX consultants, etc. While much of this material is on the front page in small type, perhaps we've been assuming that most of you have been reading every single issue of UNIQUE since day one. If that were the case, you would know about our conflict of interest policy, and several of the other ethical issues we feel are important.

We don't think it's too "commercial" for new readers to know who we are. Accordingly, we plan to print information about ourselves, our policies, and our backgrounds in every issue (we'll keep it as small as possible). We also intend to make it easier for prospective readers to find out how to subscribe.

As far as authorship, we thought it was clear that in the absence of a byline, all material is written by the editors, and that a person's name mentioned at a vendor's address is the **contact person** at the vendor for the products listed. The Convergent Technologies piece? At least two people (not from C.T., thank you) called to praise our recognition of potentially one of the most important advances in computer science of the decade, which few other publications noted. **That** was what impressed us, not their big press conference.

Thanks for reading all this.
-- David and Susan Fiedler

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Choosing an Accounting System -- Part Two
by Walter Zintz

The general journal and ledger are the heart of any bookkeeping system, even a computerized one, and their functionality is accordingly crucial. Here are the areas that have to be checked in any computer accounting package, and what you should look for.

EFFICIENCY: Bookkeeping is characteristically disk bound; the limiting factor is storage space, I/O speed or both. That's why an accounting system should be built on top of a quality database manager that is designed to deal with bookkeeping data. A general-purpose DBMS is definitely second choice; ordinary files studded with overlaps and riddled with gaps should be out of the question. The database does not need to be relational, though. Excellent bookkeeping systems have been built on good hierarchical and network databases. Beyond this, efficiency depends on a myriad of small details that cannot all be

investigated in real time. One good bellwether is data typing for monetary amounts; they should be stored as integers rather than as floating-points (that is, the system should store the number of cents, not the number of dollars).

SECURITY: In computerized accounting, unauthorized access by outsiders is a very small problem when compared to the occasions where insiders use their access privileges to juggle the books for one purpose or another. Unless system access is limited strictly to the sole owner of the business, and possibly his/her spouse, this will be a constant hazard. There are three program safeguards that have been found generally effective against juggling: 1) having the system make an ineradicable record of the user and time whenever a human-originated entry is made; 2) providing that any change to an entry after it has been written to disk must leave a permanent record showing that there has been a change made, who made it, when, and what the original entry said; 3) maintaining the ability to look at any item, anywhere in the books, and readily track it upstream to its input sources or downstream to the outputs it affects (accountants call this maintaining audit trails).

FLEXIBILITY: Setting up books is not as cut and dried as most non-accountants seem to think. Even such basics as what accounts will appear in the ledgers and how they will feed into each other (the chart of accounts) vary widely between different kinds of organizations and different styles in accounting. Any good bookkeeping system must have a lot of flexibility here, and the factors you cannot alter must suit both the nature of the organization whose books are to be kept and the approach of the accountant who will be in charge of the books.

But the heart is not the whole -- there are a lot of other jobs to be done in bookkeeping.

Many of the transactions that are the raw material for the financial books are usually computerized as part of the overall bookkeeping system, if only to save the labor and errors of hand-transferring data from the transaction documents to the system. Which transactions are programmed in, and how, depends mainly on the organization's size and operations. The one obvious rule of thumb is, the more often a job is done, the better to computerize it.

Taking orders, delivering products and billing for them are likely candidates for automation in most businesses. A professional services office can usually use one of the numerous vertical market packages available for UNIX systems, saving the trouble of integrating modules. Even an unusual service business can adapt a package meant for a more common industry; just remember that some types of service businesses, such as the health field, bill by services performed, while others, such as the commercial field (lawyers, accountants, consultants, etcetera), bill by time spent. It's practical to cross-adapt a bookkeeping package within either type class, but not between the two.

If the organization's business is commercially more complex than professional services, the next question is whether it involves products or services done individually to each customer's specifications (a job shop), or producing them to fixed specifications for general sale (a production shop). Again, the gulf between the two types is so great that a bookkeeping system suited to one type would be worthless to the other. For example, take the matter of comparing costs to sales to see where money is being made and where it's being lost. A job shop needs a system that assigns every expense item to one job or another, even to a specific part of a job, as far as possible. That way management can know what parts of their business are profitable. But a production shop that tried this would fall on its face.

Imagine for a moment two consecutive production runs of a product that ordinarily costs $30 apiece to make. Actual costs on the first run come to only $17 per piece because the purchasing department got a tremendous one-time bargain on the materials at a bankruptcy auction. In the second run actual costs are $53 per piece because someone's error in setting up the machine caused half the pieces to come out scrap. Should the company sell pieces from the first batch for a lot less than usual, and from the second for a good deal more? Obviously the answer must be no, which is why production shops usually use standard costs. In the standard cost system, each run is charged at what that run would have cost had everything been normal. Windfall profits and calamity losses go into separate non-recurring accounts, where they will not bias the picture on that product's profitability.

Organizations that just buy and sell finished products have special needs, too. They usually have large inventories to keep track of, and a large assortment of items in those inventories. There are inventory control modules that handle the inventory as a database of items and values, with proper interfacing to the general books as inventory changes are recorded. The best of them will also supervise reordering as needed, and even generate the purchase orders. Manufacturers who build complex products out of myriad raw components also use inventory systems.

Leasing companies, real estate trusts and others who deal largely in fixed assets use programs specifically to account for them. These programs usually cover depreciation and/or amortization, asset maintenance if applicable, and cost versus current value.

The other area where a series of special programs is needed is the selling cycle: quoting prices, taking orders, checking credit, filling orders, shipping, invoicing, statements, collections, and receiving payments. This is an area where so much depends on the individual nature of each company that I can't say much about what to look for, except that this is also the area where many parts of the work should be farmed out to outside suppliers. Receiving payments, for instance, is often turned over to bank lockbox services. Quite often these selling cycle programs must be custom written.

The selling and buying cycles are the biggest users of printed forms, because they deal with outsiders who are not on the company's computer system. Up to now this was a major factor in selecting a bookkeeping package -- only the well established packages had enough users that business form houses would bother to stock invoices, checks, statements and such that worked with the software. But recently a few companies have been offering to do completely custom forms in small quantities, and if your organization needs a specialized accounting package from a small firm, or even custom accounting software, it's now practical to go that way. Among the most impressive of the short run forms printers is **Deluxe Check Printers**, the company that prints so many of the checks you buy from your bank. They do full-custom computer checks and other forms in runs as short as 500, with five working day turnaround, and guarantee that their computer checks can be processed by bank machines -- that's been a problem with some computer check suppliers. To get the Deluxe catalog, phone them at (800) 328-0304 or (612) 483-7300.

That leaves payroll, a good area to stay away from unless the company has several dozen employees at least. Payroll is such a complicated business that an outside payroll preparation service can handle it more accurately and less expensively. This is even more certain when employee fringe benefits are involved.

Modularity would be as big a boon to accounting software as it has been to UNIX. It isn't happening, though. Some software developers have broken accounting down to a few large lumps, such as a receivables module, a payroll module, etcetera. But modules of really useful size, such as a check writer, are just not available in the commercial market -- there aren't any interface standards in sight, either. So, for the moment, the practical choices are to find a full package that meets your needs with perhaps a little customization or to write a package virtually from scratch. Fortunately, the selection of packages on UNIX is getting broader quite steadily.

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