F14

SILICON GULCH GAZETTE

Microcomputer Drafting System Boosts Technical Illustrator's Output by 40%

Technical writers and illustrators are using low-cost computer-aided drafting (CAD) systems on microcomputers to enhance their abilities and productivity. These documentation specialists are retiring the traditional tools of their trade in favor of those based on personal computers.

Bruce Miller, a veteran freelance tech illustrator, provides a case in point. Miller recently made the switch from his drawing board, T-square and mechancial pencil to a microcomputer-based CAD system.

Miller works from his home in the quiet coastal town of Half Moon Bay, just over the ridge from Silicon Valley. He reports that his personal computer, running AutoCAD drafting software, is boosting his productivity by up to 40%!
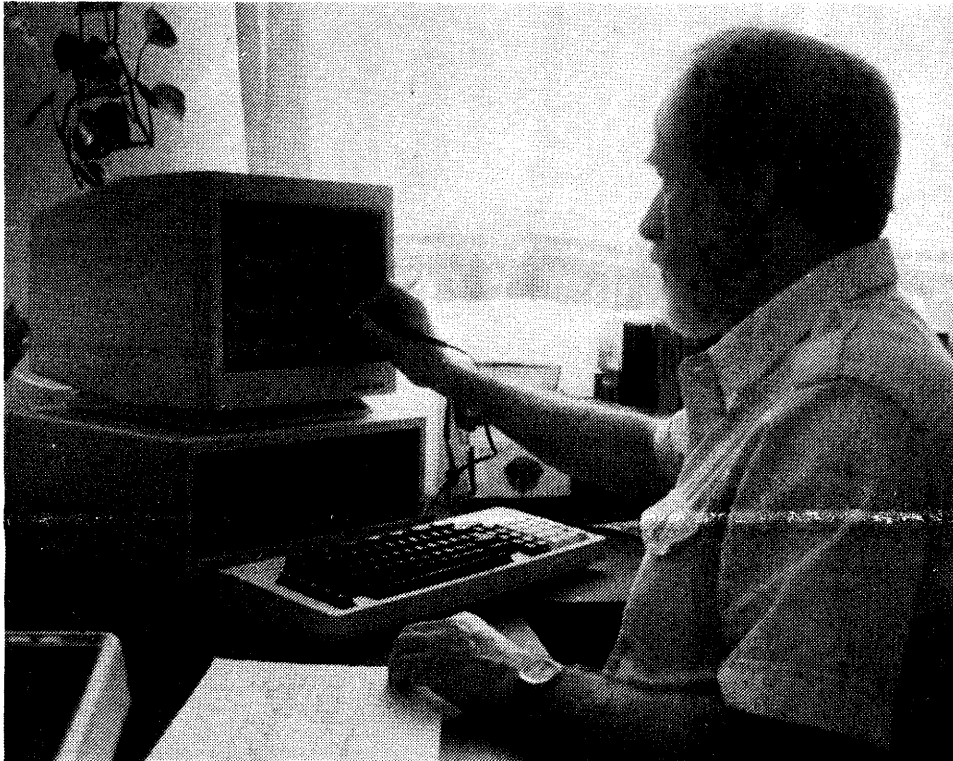
Avoids Inking & Pasteup Revisions are Easy

"Although it takes me as long to do a layout with my micro as it did with a pencil, I now have a finished product when I've completed the layout," says Miller. "My CAD set-up eliminates the need to ink the drawing and paste it up. Those steps often took as long as the layout itself. What's more, I can easily make revisions. Extensive changes no longer mean starting the drawing over. Checking for errors is also much simpler, since I only need to proof the redrawn areas."

Self-Employed for 14 Years

Miller — whose background includes several years of courses in commercial art, 3-D isometric drawing, *etc.* — has been a technical illustrator for 25 years — including 14 years, self-employed. Previously, he was a draftsman for an aerospace company.

Since setting out on his own, Miller has discovered that he is often more effective as part of a coordinated documentation team. To that end, he cofounded Service and Consulting Associates in 1974. SCA is an ad hoc group of independent consultants who prepare technical manuals on a subcontract basis. Miller's colleagues include an electrical engineer, a technical writer and a documentation specialist.

Documents produced by SCA typically run about 300 pages and average a 100 drawings. On occasion they can reach 1,000 pages and over 300 drawings. Miller estimates that 60%-70% of his work is line drawings — schematics, wiring diagrams, signal flow diagrams and "exploded" drawings that show the components of a piece of equipment and their relationships.

Miller and his associates each have microcomputers with about a half megabyte of memory and word processors. His system had added peripherals to assist with the CAD. His monitor has a Sunflex Touch Pen that provides "pointing" input to the AutoCAD drafting package. He has a Hayes Smartmodem 1200 and Crosstalk software fror telecom with his SCA associates.

An Epson MX100-III dot matrix printer produces rough drafts of his work, but he plans to purchase a servo-driven plotter within a year, for higher-quality output. Until then, he is buying plotter time from Integrated Computer Technology, a systems integrator that configured his CAD system, located in nearby San Mateo.

More Work Required More Tools

Miller's work grew over the years, and he launched a quest for greater productivity with the purchase of a personal computer in 1983. Six months later, he was in the market for a drafting package.

"It was obvious to me when I first saw a CAD system in 1969 that CAD was the wave of the future," he says. "I knew

Campbell Soup Uses Tutsim for Chicken Broth

To produce a richer broth, flow-through evaporators at the Campbell Soup plant in Camden, New Jersey, extract thousands of pounds of water per hour from chicken stock.

"Chicken broth is pretty watery when it comes from the cooker," explained Campbell Soup engineer Warren Helmer. Inexpensive TUTSIM continuous simulation software, running on a microcomputer, allowed the food processing engineers to improve their control of the chicken broth evaporators. Helmer reported that it resulted in a better product and lower operating costs.

The energy used by the evaporators is expensive. Small changes in the control of heat, pressure, and other parameters of the process result in large differences in the quality and cost of the product.

Tutsim Models Complex System

Helmer and his group easily created a TUTSIM simulation, modeling the evaporator system and its controls. They found that TUTSIM provided an accurate simulation of their continuous processes and helped them easily visualize ways to optimize the control system.

Geographic Problem Resolved

As is often the case, their actual evaporator system was in a southern state while the design engineers were in New Jersey. For these engineers to conduct experiments with the the real system would have been extremely expensive, as well as risky. The simulations allowed design work to be done in the engineers' labs, which were best equipped for such experimentation.

Lower Cost, Better Soup

"It was rewarding to file a report showing we have been able to change procedures in the processing that will save the company a few thousand dollars a month in operating costs and in addition result in a higher quality product," Helmer told Walt Reynolds, President of Applied i — TUTSIM's exclusive supplier in the U.S.

"That is certainly better," Helmer added, "than saying 'Oops, we had to discard several thousand gallons of broth that didn't meet our quality standards.'"
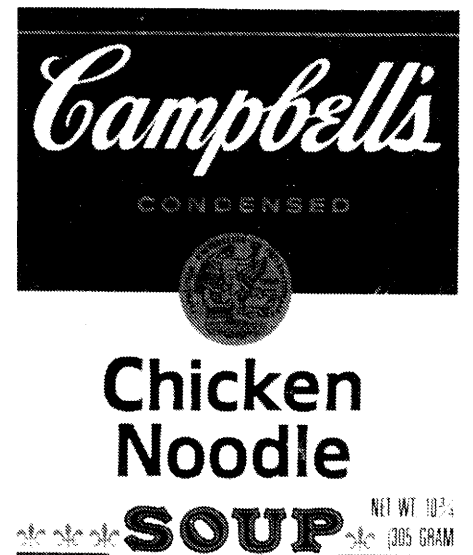
Imbedded Controller Ap Note

Helmer also enhanced their control loop by developing an imbedded digital computer for the PID algorithms — Proportional, Integral, and Derivative control channels. This allowed extensions to the basic analog PID functions.

A technical application note describing a comparable general imbedded digital computer may be requested from Applied i, 200 California Ave, Suite 214, Palo Alto CA 94306, (415)325-4800.

Rambling Rumors and Computer Comics

by Jim Warren

This curious column is a tradition for this ribald rag — erotica for egalitarian elektronikers. (Of course, in microcomputing, "tradition" is anything that happens more than once.) Most of this is even true.

Insights Into Apple

Perhaps this is how Steve Jobs acquires his revolutionary visions of the future: Not too long ago, he walked out of the bathroom, frowning and shaking his head. Then, his face brightened and, as he turned back to the sink, he said, "Oh ... I know what's wrong. I have both contact lenses in the same eye."

And, while discussing IBM's most noble competitor, here's a note found in a recent invitation to a Silicon Valley "synergistic beer drinking" and 'puter planning session: "Sad, but true, Apple ain't the company it once Woz," observed Aaran Stardrake.

[I bet at least three people in the world don't know that Jobs and Wozniak created Apple. Woz recently left Apple to do (more of) his own thing.]

Then there's the official business card of one of Apple's official representatives — Eric Zarakov. It lists his title as, "Macintosh Software Evangelist."

Precise Scheduling Syntax

Word-mongering, continued: Programmers are often notoriously late sleepers. Devoted to precision, I offer the following logical terminology for their first meal of the day ("brunch" is far too vague):

Let us name the one-hour periods beginning with 8am as: breakfast, brea*ch*, br*u*nch, b*l*unch, lunch (12-1pm), lunc*nr* and *linner* — thus covering *most* of the hours when software artists are likely to break their fast.

For novices: One should know that "WYSIWYG" — pronounced "wisiwig" — means "What You See Is What You Get", and "Ms. Dos" is the MS-DOS disk operating system from Microsoft. And, in the early days, "Proc-tology" referred to Processor Technology — butt it met a dead end.

Poor Microsoft

Completely unsubstantiated: We hear that Microsoft's original deal with IBM for PC-DOS paid a paltry royalty of $50 per copy with a cap of about $5M-$6M — not much in the bigbuks world of PC software.

Friendly Software Design & An Alternative to Windows

In a more serious vane*(sic)*: Paul Heckel has created a fascinating alternative to "windows"

****

MYTYPEtm **Typeset This Newspaper**

****

Computer Graphics for Building Trades & Professions

A set of microcomputer-based software drawing tools designed for use by architects, engineers and other members of the building construction industry has been announced by Archsoft Corp. of San Francisco. The software — named AE/CADD — enhances the use of the AutoCAD computer-aided drafting/design system produced by Autodesk, Inc.

AE/CADD offers a series of digitizer-pad overlays and symbol libraries that allow the rapid creation of an entire set of working drawings for architects, as well as construction-related engineering drawings.

Bid Schedules Automated, Created from the Drawings

Database attributes are assigned to symbols — doors, windows, *etc.* — during the drawing process. These are then extracted to create appropriate schedules, thus automating the process of bid preparation.

AE/CADD-MASTER is the first overlay/symbol library in the AE/CADD drawing set. It enables the architect to create complete floor plans, serving as the basis for a set of working drawings.

Support for All Aspects of Construction Planning

Other digitizer overlays and symbol libraries due for release in 1985 include:

AE/CADD-ARCHITECT is the second AE/CADD package. It consists of four additional overlays that include symbol libraries and attribute extractions: (1) Site Plan/Survey, (2) Sections/Details, (3) Reflected Ceiling/Lighting/Electrical, and (4) Interior/Exterior Elevations. Combining these two packages enables development of a full set of working drawings by architects and other building designers.

AE/CADD-LANDSCAPE — drawing tools and complete symbols for preparing landscape and irrigation drawings;

AE/CADD-STRUCTURAL — for structural engineers, including symbols and attributes to produce structural sections and details;

AE/CADD-ELECTRICAL — for electrical engineers use in producing complete electrical plans;

AE/CADD-MECHANICAL — for mechanical engineers and preparation of mechanical plans;

AE/CADD-PLUMBING — for plumbing plans, including preparation of isometric diagrams of piping systems;

AE/CADD-CIVIL — for civil engineering, including site plan and land survey support; and

AE/CADD-SPACE PLANNING — for use in facility management planning.

Runs on Large Variety of Lowcost Personal Computers

AutoCAD — the support system underlying AE/CADD — is a multi-purpose, two dimensional drafting package, implemented on a wide range of microcomputers. Among others, it runs on the IBM-PC, PC/XT, PC/AT and 3270 G and GX PC, the Wang Professional Computer, NEC APC, Texas Instruments Professional, *etc.* AutoCAD also permits use of over 70 peripheral devices.

Other discipline-specific symbol libraries are available as well as AutoLink, a micro-to-mainframe communication package, linking AutoCAD drawings to INTERGRAPH. For more information contact: Autodesk, Inc., 2320 Marinship Way, Sausalito CA 94965; (415)332-2344.

Corrections & More: Fire in the Valley Very Smokey

by Jim Warren

This is the first ink with which to "set some records straight", to which I've had access since escaping from the Computer Faire in June, 1983:

In early 1984, Paul Freiberger and Michael Swaine wrote *Fire in the Valley* — the first in a rushed rash of books about Silicon Valley, micro-preneurs, etc. Though it is an entertaining attempt to chronicle the early daze of microcomputing, and is often factual, its accuracy is disturbingly shaky. For instance:

All Bob's Are Not the Same

Fire says I started the Computer Faire with Bob Albrecht. Not so. Bob Reiling was my initial Faire partner, joined a few months later by Eric Bakalinsky. Albrecht — the founder of People's Computer Center and, later, *People's Computer Company* newspaper — had nothing to do with the Faire, except to cheer us on.

Even more irritating is that *The Computer Entrepreneurs* by Levering, Katz and Moskowitz must have used *Fire* as a reference, for they reiterated this inaccuracy.

Aside: In March, 1975, Bob Reiling was one of the founding members of the Homebrew Computer Club — the first microcomputer club in the world. Now, ten years later, he remains a principal figure in HCC — unheard-of staying power in this flighty industry.

When Could You Stroke a PET?

Fire reported that the Commodore PET was exhibited at the 1st Computer Faire in April, 1977 [page 182]. But ... Commodore wasn't listed as a Faire exhibitor until the 2nd Faire in early 1978.

In fact, Chuck Peddle once told me that he used the sardine mobs at the 1st Faire to convince Jack Tramiel, then Commodore's Commodore, that consumer computing was a good potential market. Chuck is the engineer-turned-entrepreneur who created the 6502 microprocessor for MOS Technology (later bought by Commodore), then designed the PET, then created Sirius Systems. Sirius became Victor Technologies, then became almost-bankrupt (perhaps Chuck was a better engineer than he was a company prexy).

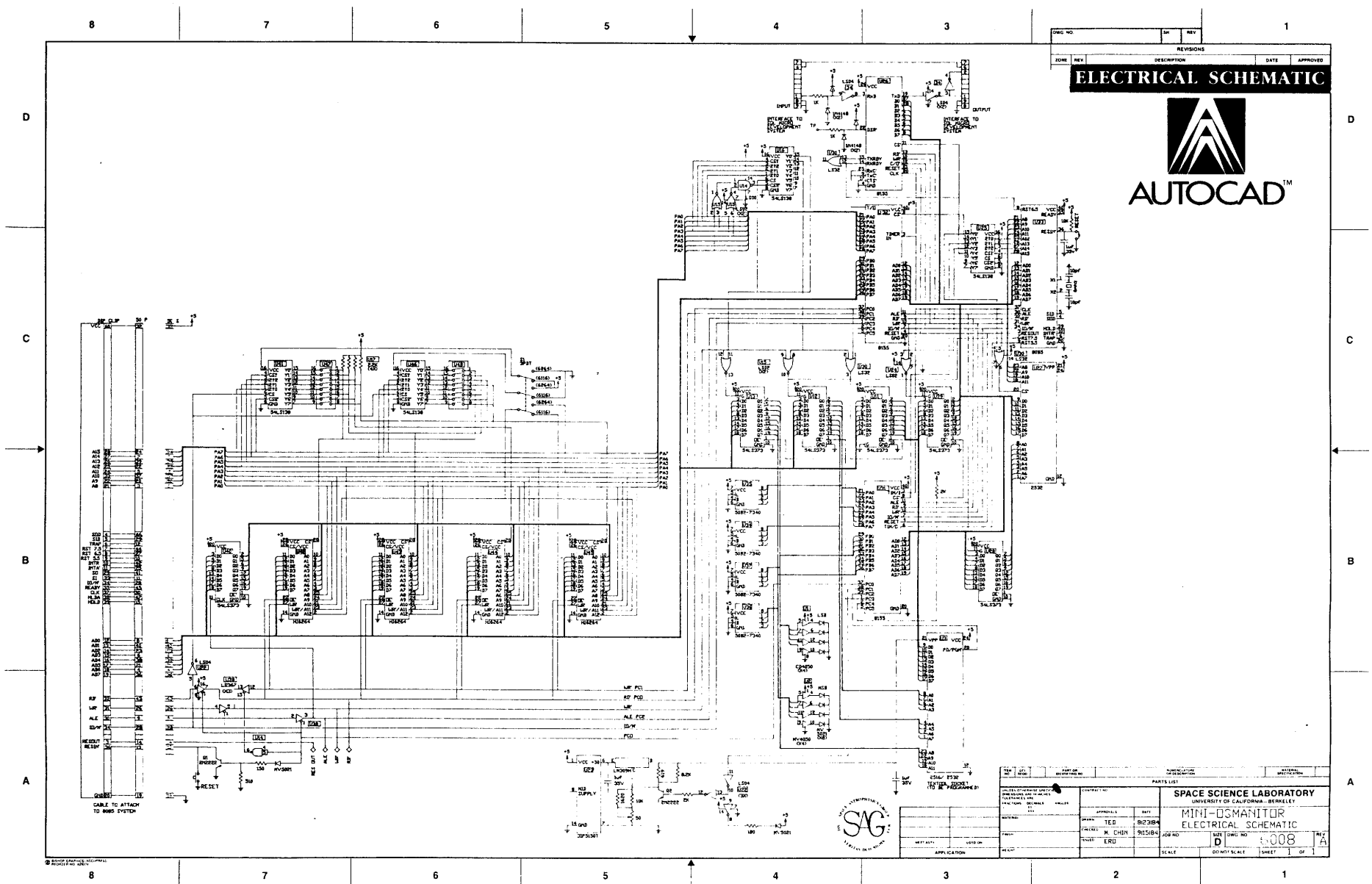### Spealing (sic) Errors and Un-Recollections

And, *Fire* contains little errors — like spelling John Dilks name "John Dilkes". John was the organizer of the Personal Computing trade shows in Atlantic City and Philadelphia, beginning in sweltering August of 1976. His show, and several smaller micro-events — all east of the Mississippi — were what prompted me to propose the Computer Faire, to be held on "the right coast."

Incidentally, Dilks' PC'76 was the first use I recall of the phrase "personal computing" — a name that John unsuccessfully attempted to trade mark.

Fire also states, "even before the first Faire opened, Warren had decided to hold a second one." Also false. Bob, Eric and I were totally consumed, just trying to run the 1st Faire. We didn't decide to do a

— Want to Draw It? Use AutoCAD —

ELECTRICAL SCHEMATIC

AUTOCAD™

SPACE SCIENCE LABORATORY
UNIVERSITY OF CALIFORNIA · BERKELEY
MINI-DSMANITOR
ELECTRICAL SCHEMATIC

RUMORS ...
(continued from front page)

for viewing multiple pages on a single screen at the same time — more or less. Among other things, it applies automatic abbreviation for compressing information when squeezing pages onto a screen. And, unlike many current software offerings, it works — I've seen it running.

Also, Paul has written a highly readable book detailing this — and lots more — *The Elements of Friendly Software Design,* published by Warner Books. Larry Tesler, a Xerox-PARC spin-off who is now a high-up Macintosh software guru for Apple, has said the book is, "Unique and indispensable, by far the most important and practical book on the subject." Well, I don't know whether I'd go that far, but — software designers should consider it absolutely essential reading.

Computer Links to FBI Farce

Ya watch the news, an' ya wonder: San Francisco's KRON-TV has just reported that — in a "Red under every bed" paranoic extravaganza — the FBI has wasted time and resources spying on the 30,000 member anti-war group known as Physicians for Social Responsibility (PSR), in San Francisco, Boston and New York. (PSR physicians seem to feel that nuclear war would be unhealthy.)

I have personal knowledge of that suspicious mob and its nefarious activities — their local newsletter editor lives next door, known to me for two decades. She uses an IBM PC to create the *PSR Newspetter.* She's also the research librarian for Nobel Laureate Linus Pauling, another inveterate peacenik.

Furthermore, she and her husband once took a trip to

Coin Collecting Computerized
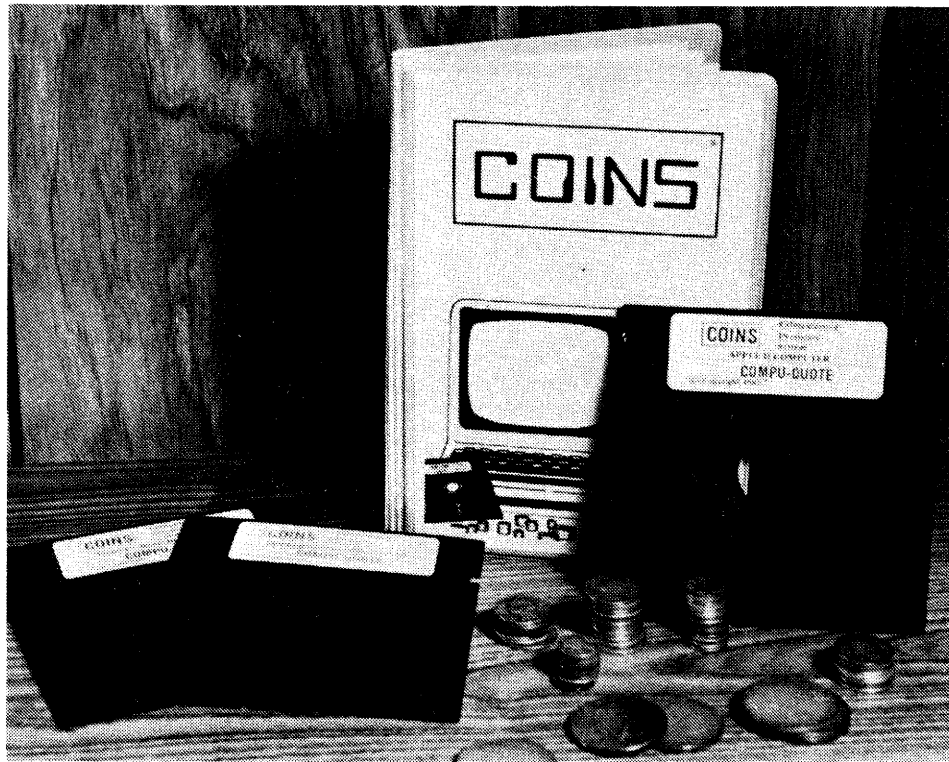
An enhanced version of the COINS program for coin collectors has been released by Compu-Quote. COINS (Computerized Inventory of Numismatic Stock) enables the serious numismatist to catalog his or her collection and obtain various reports for personal investment information.

The built-in Standard Coin file lists 1600 common U.S. coin descriptions and their latest market value. To track the value of a coin collection, special reports showing yearly purchases and sales are included. Quarterly update diskettes are available which let the user keep current on all new coins as well as the latest market prices.

This update service provides for automatic re-evaluation of the user's collection. Non-standard coins may also be listed and maintained.

The program is priced at $95, which includes the latest value file. A manual/information package only is available for $10 which can be applied to the program purchase. Quarterly updates are available for $25.

COINS is available for the IBM, Apple and Radio Shack personal computers.

For more information, contact: M. Mallon, Compu-Quote, 6914 Berquist Avenue, Canoga Park CA 91307, or phone (818)348-3662.

The Phoenix of Silicon Valley

Bet you tho't you'd seen the last of this quixotic fish wrapper. It jus' goes to show ya that *Computers Never Forget* — at least, not handy things like 130,000-name mailing lists.

The *Gazette* offered its first incantations dated Feb. 14, 1977. That was "Volume 0, Number 0" — numeration appropriate for bit-bangers, but undoubtedly traumatizing for periodicals librarians.
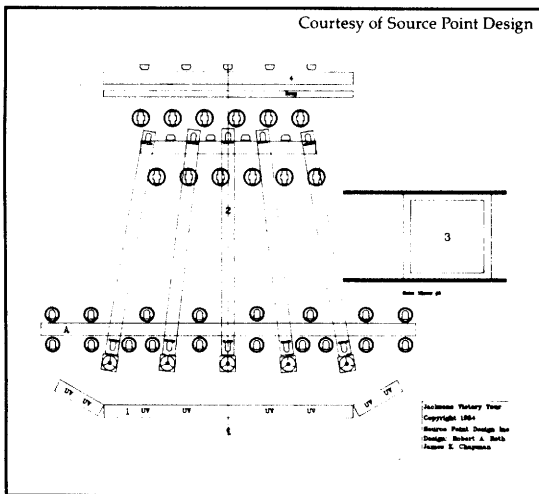
The *Gazette* was created, partially to babble 'bout the 1st West Coast Computer Faire (April, 1977) — which had far too much going on to cram into three or four scrawny 7"x10" mag-ads — and partially to indulge a strong predeliction to micro-gossip.

The Faire published forty of these kindling-starters in its first seven years, named *SGG* and the *"Business Systems Journal."* 100,000 to 400,000 copies of several issues were distributed per Faire, without cost to the recipients (thus being worth at least what their readers paid for 'em).

When Prentice-Hall bought the Faire from Jim Warren in June, 1983, Warren kept the *Gazette* — just so he could continue publishing provocative pontifications such as this.

$49 PC Data Base

At $49 postage paid, PC-File offers features not found on other data base programs costing hundreds of dollars.

PC-File is a general purpose data base manager program designed for both business and professional users, and currently in use on over 100,000 computers. It allows you to retrieve data, change it, resequence it, perform queries, and prepare reports for display, printing or subsequent retrieval by your word processing program. Reports can be designed in many different layouts.

PC-File III, Version 3.0, is now available. It has more than 25 improvements including an increased maximum of 32,767 records per data base and a larger maximum field size of up to 1,665 characters.

Uses of PC-File III include mailing lists with label printing, inventory records, customer files, price lists and bibliographies. It contains features such as a "browse" mode, global update and delete, full screen editing, data exchange with other programs, hard disk support and select on any field.

It can be used on any MS-DOS computer with 128K RAM memory and double-sided disk drive. PC-File III is not copy-protected and comes with a money-back guarantee.

For more information, contact: Jim Button, ButtonWare, Inc., Box 5786, Bellevue WA 98006, (206)746-4296.

Weather Prediction: TUTSIM Illustrates a Problem

Mark Twain said that one of the brightest gems weather has to offer is its dazzling uncertainty. He might have taken a dim view of current efforts to predict weather using some of the world's most powerful computers.

But he would find little cause for concern. All of that computing power seems unable to improve on the accuracy of certain types of weather simulations, and the weather remains unpredictable. Part of the problem is a class of "disorderly" differential equations.

New, New Math: Strange Attractors

Mathematicians have a new area of study — "strange attractors." These are equations with solutions that are similar to the asymptotic solutions found in high school analytic geometry — where the solution curve gets closer and closer to a known point, line or plane, but never reaches it.

Strange attractor equations have smooth solutions curves that are "attracted" to an apparent asymptote. However, just as the curves get really close to what "should be" their asymptotic solution, they become almost unpredictable.

The equations have solutions in the neighborhoods of multiple points contained in an asymptote plane. However, between those solution neighborhoods, the equations' values jump around wildly.

Simulation on Micro Shows Behavior of Strange Attractor

The Lorenz differential equation shows such abberations. Edward Lorenz was modeling the weather when he found the following equation:

$$dx/dt = -10x + 10y$$
$$dy/dt = -xz + Rz - y$$
$$dz/dt = xy - 8z/3$$
$$R = 28$$

The microcomputer-based TUTSIM continuous simulation system was used to plot the solutions to Lorenz' problem. It quickly illustrates that the solutions to these complex differential equations jump irregularly from encircling one asymptotic point to another. The equations seem to act "stochastically" even though they are deterministic.

Lorenz Indeterminate Equation
Time Response Computed by TUTSIM Simulation.
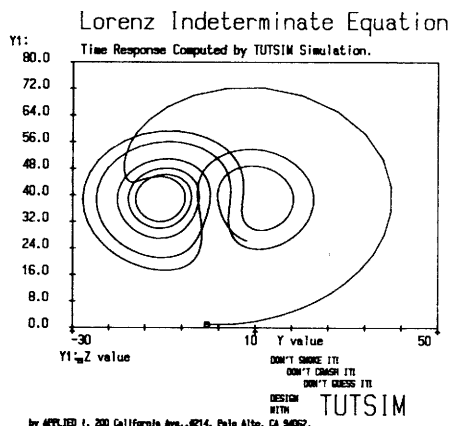
TUTSIM

These equations are used to model turbulence. The Lorenz model is difficult to deal with by normal techniques but was a simple simulation with TUTSIM.

For more information on TUTSIM contact Applied i in Palo Alto, California, (415)325-4800.

Interactive Database & Report Generator

An enhanced version of Keymailer, a database mail list management and report system, is available from SoftKey Software Products.

Keymailer 2.0 provides automatic mail merging compatibility with MultiMate, WordStar, Word Perfect and SuperWriter. Personalized form letters and documents can be created from these word processing packages and merged directly with the mail list residing in the database created from Keymailer 2.0. It can also be used as a stand-alone mail list manager.

The product is priced at $149, and available for the IBM PC and compatibles, as well as the Texas Instrument Professional.

For further information, contact: Gary Babcock, Vice President of Marketing, SoftKey Software Products, Inc., 18480 Decatur Road, Monte Sereno CA 95030, (408)395-1974.

RUMORS ...
(continued from page 3)
Russia. They have also taken trips to England, Holland, Germany and even Los Angeles — obviously pinkos.

They found the Russian people nice and the Russian system repressive and depressing. I can state, unequivocably: They are against war; not in favor of communism — though, in the hippie '60's, they did teach a Free University course in the art of baking and giving away bread.

The husband is president of Applied i, the gloriously capitalistic company that offers the Tutsim continuous simulation system, detailed elsewhere in this issue. Prior to *Tutsiming*, he was the resident computer wizard for Josh Lederberg — the father of modern genetics — until Lederberg left Stanford Medical Center to become director of the Rockerfeller Institute (my gosh, they're infiltrating everywhere!).

Oh yes, there's one other computer connection ... the local *PSR Newsletter* is typeset, monthly, using MyType in my basement. What's more, all three of us peacemongers have gone to breakfast — twice! — with neighbor Chuck Moore, the inventor of Forth and honcho behind Novix's recent Forth microprocessor. (No matter what you hear, Forth is *not* a communist plot!)

Infiltrate-It-Yourself
There is a computer counterpart of PSR — Computer Professionals for Social Responsibility. Severo Ornstein — another Xerox-PARC spin-off and another mountain neighbor — Chairs the CPSR Board. One of the chief implementation wizards behind Smalltalk — Dan Ingalls — is co-editor of their newsletter. (CPSR, P.O.Box 717, Palo Alto CA 94301; (415)322-3778.)

Both PSR and CPSR actively encourage infiltration by all loyal Americans. Wouldn't it be nice if the FBI was as effective at penetrating organized crime and illegal trusts as it is in spying on these wide-open pacifist groups? ("pacifist" — that's someone who's always trying to start a peace.)

An Anti-Communist Plot
Here's a capital idea: Let's sell our vast supply of obsolete personal computers — plus

Software for Crop and Livestock Accounting
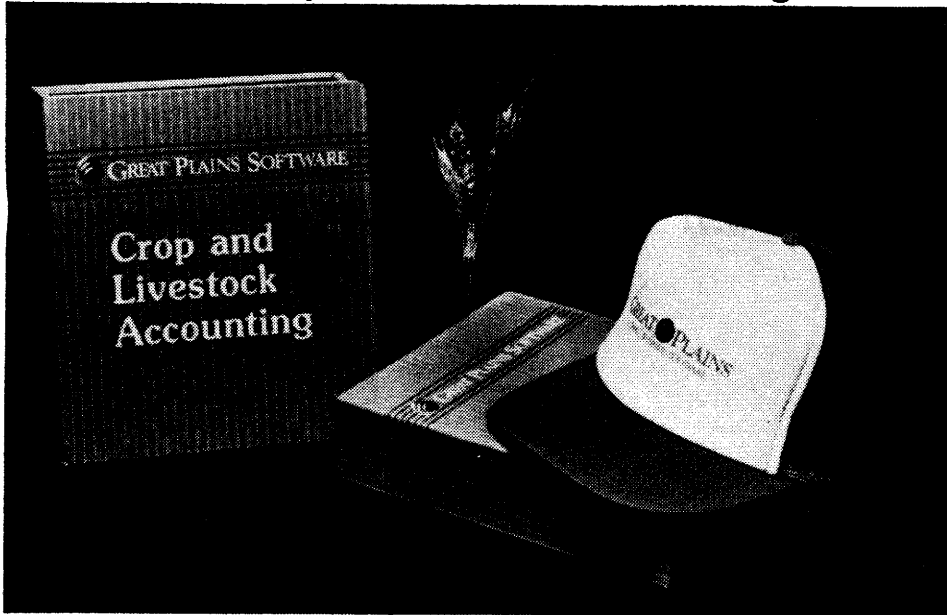
Great Plains Software has begun shipment of Crop and Livestock Accounting, a software product for farmers and ranchers.

According to Douglas Burgum, Great Plains Software president, "Crop and Livestock Accounting software will provide farmers and ranchers with the accounting functions they need most, including financial reporting, check writing and inventory management. The software also generates valuable analysis reports on production costs, giving farmers the information they need to make sound business decisions."

Features of the software include the ability to track all transactions and produce reports for specific enterprises within a farmer or rancher's total operation, such as cattle or wheat. Revenue loss can be divided to reflect percentage ownership. A Schedule F worksheet is also provided to assist with required federal income tax forms.

Crop and Livestock Accounting is available for the IBM PC, Tandy 2000 and IBM compatibles. Retail price is $995.

For more information, contact: Kathleen Bryant, Great Plains Software, 1701 S.W. 38th Street, Fargo ND 58103, (701)281-0550.

Aspen Ribbons in Colors

Two new ribbons are available from Aspen Ribbons, both fully compatible to printers using ribbons of the same name from the OEM,and available in red, blue, green, brown, and purple ink colors for an extra $2 per ribbon.

Aspen Ribbons replacement for the Radio Shack DMP 120/200 ribbon is also known as the Facit 4510/4511 nylon ribbon. Specifications are 1/2" x 20 yards, 5 mil nylon. Prices range from $5-$10 per ribbon depending on quantity.

Aspen ribbons replacement for the Radio Shack DMP 500 ribbon is 1/2" x 15 yards, 5 mil nylon. Prices range from $6.70-$10 according to quantity.

For more information, contact: Aspen Ribbons Inc., 555 Aspen Ridge Drive, Lafayette CO 80026, (800)525-0646, Telex 45-0055.

A Guide to DB2

Addison-Wesley has published *A Guide to DB2* by C.J. Date, one of the designers of the IBM program. The one volume tutorial and reference describes this relational database management system and its user language SQL from an insider's point of view.

A Guide to DB2 serves as a user's guide to the IBM product IBM Database 2', a relational database managemnent system for the MVS environment, and its companion products QMF and DXT. In addition to its examination of DB2 and SQL, this book provides a discussion of the relational model and a methodology for relational database design.

For additional information, contact: Carolyn Berry, Marketing Manager, Computer Science Division, Addison-Wesley Publishing Company, Reading MA 01867, (617)944-3700.

Gazette Typeset with "MyType," Using $3,000 Tabletop Printer

Most of this *Gazette* was typeset on plain paper using a home computer and laser printer. The printer also creates price lists, catalogs, newsletters, and correspondence, including the stationary letterhead.

The software is "MyType," created by editor/publisher Jim Warren. Its design is based on ten years of publication production experience, plus 18 years of programming experience.

MyType, priced under $800, contains most features found in commercial typesetting systems costing $15,000-$50,000 or more (including hardware), plus others unique to Warren's design. It accepts ASCII text files created by a text editor or program, and works with any ASCII terminal. Currently running on one computer/printer combination, it is being ported to most micros that have a C compiler, use MS-DOS, CP/M or Unix, and have any of a number of laser printers, daiseywheels or commercial typesetters.

See page 15 for more details.

RUMORS ...
(continued from page 4)

phone modems — into the consumer market in all communist countries. The machines aren't fast enough to plot missile trajectories — in time. But, they'd wreak havoc with governments where control of information and its distribution is a cornerstone of successful repression.

Oh well, this suggestion will probably meet with the same fate as the Viet Nam era suggestion — that we take all the money allocated to that nasty little war, and drop it on all North Viet Nam villages — instantly creating an entire nation of wild-eyed capitalists. Of course, our Washington leaders — all over draft-age — preferred to spend it for bombs and bodies.

Note that the war was stopped only after we had our own information leaks — about covert bombings, falsified figures and the Pentagon Papers.

Also, consider what a little 20-minute tape recording did for a U.S. President.

Free flow of information is a capitalist plot — more power to us!

Pets to China; Loot to Japan

On the topic of myopic protectionism: In the late '70's, I spent several weeks touring Japan at the invitation of Kazuhiko Nishi, creator of two of the first personal computing magazines in that nation. One evening, we had dinner with Tony Tokai, President of Commodore-Japan — the Japanese affiliate of the USA's Commodore, which manufactured the Pet microcomputer.

At the time, Pets were hard to get in the U.S. Mentioning this to Tony, I was told that he could get all the Pets he wanted. Why? Easy — Commodore profited more from his Japanese sales than from their U.S. sales.

Furthermore, he was selling them like hotcakes to mainland China. Of course, at the time, our government prohibited U.S. companies from selling micros to that evil communist country — so much of the profits from CommiePet sales went to Japan instead of the U.S.

H-P: Different Caliber Canons

A Peaceful warning: The inexpensive toner cartridges

S-100 Slave Processor is MS-DOS Compatible
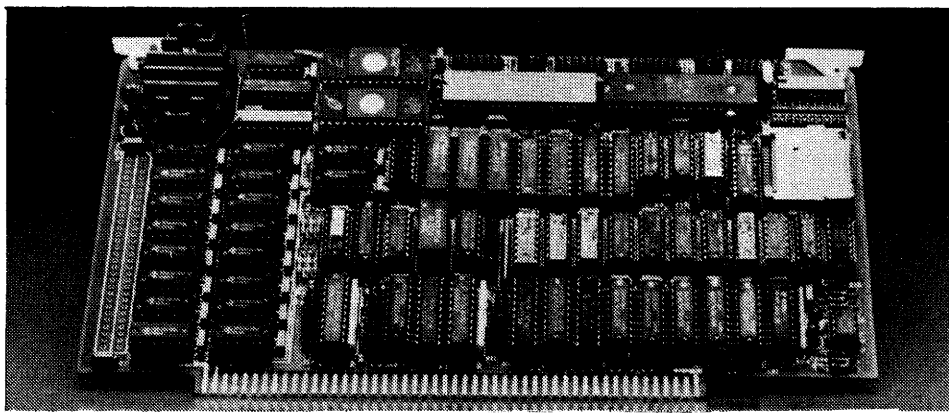
Advanced Digital Corporation has announced the Super 16 Slave Processor Board.

The Super 16 Slave provides a method of adding users to an 8-bit or 16-bit S-100 bus-based system. Any number of users may be added, limited only by the number of slots on the motherboard. Each Slave is linked to the Master, and thus to the disk I/O, through the S-100 bus. The addition of multiple users does not have a detrimental effect on the system performance because only the disk access is shared. Each user functions as if he had his own computer.

Designed to operate both with 8-bit and 16-bit master CPU's, the Super 16 Slave Processor comes with an 8-Mhz Intel 80186 CPU, 256 KBytes of RAM, and four serial ports. The Super 16 will run under the TurboDOS and Network/OS multi-user operating system.

Suggested price for the Super 16/256 Slave Processor board is $1195.

For additional information, contact: Hossein Asadi, Advanced Digital Corporation, 5432 Production Drive, Huntington Beach CA 92649, (714)891-4004, Telex 183210.

MasterForth for IBM PC

MicroMotion has announced the release of MasterForth for the IBM PC family. MasterForth is an implementation of the Forth programming language which provides a programming environment for the IBM PC, including an 8088 macro-assembler and a full interface to MS DOS 2.1. Relocatable utilities and transient definitions make it possible to run software packages on the PCjr. The string package, screen editor, and resident debugger are standard features. MasterForth matches the Forth-83 standard dialect described in *Mastering Forth* (Brady, 1984), which is included in the package.

MasterForth version 1.0 is also available for the Macintosh, the IBM PC, the Apple II series, CP/M, and the Commodore 64. Software can be written on one system and run on all the others. MasterForth retails for $125.00.

For further information, contact: MicroMotion, 12077 Wilshire Boulevard, #506, Los Angeles CA 90025, (213)821-4340.

[IL]LOGIC SYMBOLS

In the early '70's, the bulletin boards of Stanford's Digital Systems Lab were covered with a wide range of "new logic" symbols, illustrating the rigorous research interests of the students at that top-rated institution. I am unable to locate my notes on those important scientific proposals, however the following gives the flavor of some of the suggested syntax. —*JW*

AND gate   OR gate

GOLDEN gate   MATE gate

WATER gate   (alternate symbol)
used by R.M.Nixon

PEARLY gates   TAIL gates
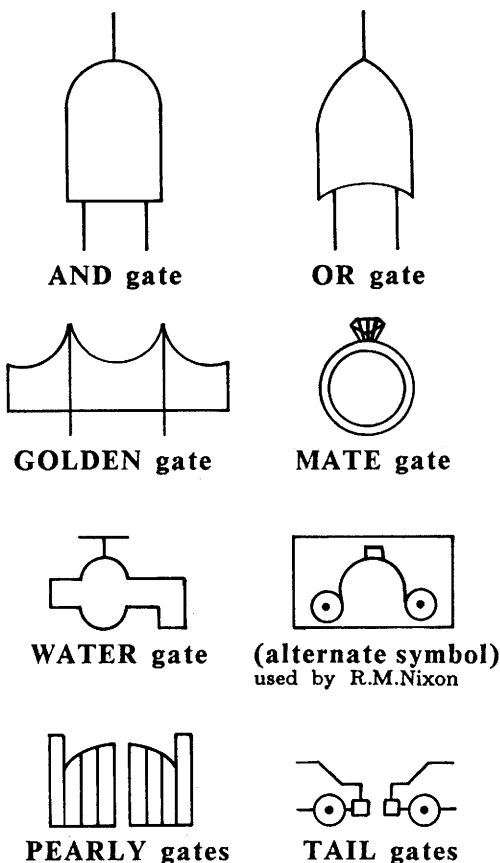
Earn fame! Earn glory! Increase your list of important contributions to knowledge that you have authored!

Submit you own [Il]Logic Symbols for publication in future Gazette's, or wherever else we have the inclination. We promise to give full attribution for first submissions — or, we promise never to divulge the source, if you prefer.

Synd your Syntax to: [IL]Logic Symbols, 345 Swett Rd., Woodside CA 94062. Include name and address for attribution — the usual compensation offered for submitting innovative proposals to sophisticated technical journals such as this.

"[IL]Logic Symbols" is a trade-mark of the Silicon Gulch Gazette, and all submissions become the property of the Gazette.

CAD on a Pad Offered for Digitizing Tablet

PENCAD is a new software interface connecting the Penpad 320 digitizing tabled from Pencept to the AutoCAD computer-aided design and drafting (CAD) system from Autodesk.

Recognizes Hand-Printing

Pencept developed the PENCAD software interface to simplify the command execution process. "The Penpad 320 is the only digitizing tablet for personal computers that recognizes handprinted letters and numbers," stated Leo Shpiz, president of Pencept. "With the Penpad 320 you have the ability to combine text and graphics functions with one input device, and the ability to invoke a series of commands with a single handprinted letter. When you combine these capabilities with a sophisticated package like AutoCAD, you have a very powerful drafting tool," said Shpiz.

"PENCAD draws on the strengths of AutoCAD through its character recognition technology and the convenience of using a pen to draw and write into the computer," stated Kevin O'Lone, Systems Integration Manager at Autodesk. "PENCAD works the way people do"

PENCAD is bundled with the Penpad 320 tablet for $1,495. AutoCAD software is available from Pencept for $2,000 — including two of AutoCAD's extended-feature drafting packages. A PENCAD upgrade is available to current Penpad-AutoCAD owners for $395.

FIRE, *continued from page 2*
2nd Faire until a May meeting, following a month of recuperating from that chaotic, exciting first Faire.

Drop-out University

Elsewhere, *Fire* reported that Stanford Medical Center "was the home of the Stanford Free University." Two errors per sentence. The Free U centered around Stanford University; not its peripheral Medical Center. The Med Center was merely where I first worked as a programmer — using a DEC PDP-8 minicomputer with 4,096 words of 12-bit core memory.

And, the Free U was first named the "Palo Alto Free University," and then the "Mid-peninsula Free University" — but never the "Stanford Free University."

However, *Fire* was accurate in reporting that the hippie '60's Free University — filled with courses on utopian communities, candle making, massage, and Mao ... and somewhat reflecting Tim Leary's acidic call to "tune in, turn on, and drop out" — was where I met Bob Albrecht, as well as Dennis Allison, a long-time Bay area computer priest. (Note that Leary is now a fellow computer junkie.)

Aside: The "Dobb's" Mnemonic

In 1975, Dennis wrote a series of articles about Tiny Basic for micros. Albrecht published them in his *PCC* newspaper, oriented to computer education, games and dragons(??).

Tiny Basic's eager acceptance — in the software desert of 1975 — prompted Dennis and Bob to propose the first microcomputer software periodical. Eric Bakalinsky — the pun-laden part-time PCC employee who later became a Faire partner, created its name: *Dr. Dobb's Journal of Tiny Basic Calisthenics and Orthodontia*, subtitled *Running Light Without Overbyte*. "Dobb's" was a pseudo-

Gusher for Oil and Gas Well Operators

Gusher, a software package for oil and gas well operators, has been released in new versions for the IBM PC and PC/XT by High Technology Software Products, Inc.

Gusher 5.6P is faster than previous releases and can hold up to 25 wells, 400 owner records and 200 vendors in one billing/distribution group. It is also available for Apple computers.

For more information, contact: Stephanie Goldberg, High Technology Software Products, Inc., Box 60406, Oklahoma City OK 73146, (405)848-0480.

Dear Word from Honeybit

Dear Word, a word processing program for the IBM PC and compatibles, is available from Honeybit Software for the low price of $15 including postage. The 25-page user's manual resides on the disk, and may be printed out by the purchaser. Dear Word is the first product from Honeybit Software of Corvallis OR, and was released on Valentines Day, 1985.

Features include screen-oriented editing, menu-driven approach, use of windows, global search and replace, cut and paste commands, word wrap, paragraph reform, horizontal scrolling, a center-between-margins command, a directory command, a delete-file command, and a built-in printing module to allow simultaneous editing. The program also supports ASCII files, as well as bold, underlining and subscripts.

Dear Word was written in C and assembly languages for IBM PCs and PC compatibles running MS DOS 2.x, with 128K or more of memory.

To order Dear Word, or for further information, contact: Richard Hilberger, President, Honeybit Software, 5430 S.W. Helen Avenue, Corvallis OR 97333, (503)754-9124.

New Microsoft Word

A year long strategy to gather information and feedback from thousands of word processing users has culminated in the release of the new Microsoft Word Version 2.0.

The new Microsoft Word incorporates the word processing features most often requested by users and supports the most recent advances in printing technology and high-resolution graphics cards. Microsoft's computer-based training program, *Learning Microsoft Word*, is included with the new package, so users can gain proficiency with the program in a matter of hours.

On-screen formatting and support of popular printers combine to make the new Word able to print professional-quality documents.

Microsoft Word will be sold, for a limited time, with a 30-day, 100% money-back guarantee, the first such guarantee to be offered by a major software company.

The suggested retail price for the new Microsoft Word Version 2.0 is $375. The Microsoft Mouse, bus or serial, is available separately for $195, with a $50 rebate to Word buyers. Microsoft Word requires an IBM PC, PC/XT or PC/AT with 256K memory, DOS 2.0 or higher, and two double-sided disk drives or one hard disk.

For more information, contact: Marty Taucher, Microsoft Corporation, 10700 Northrup Way, Box 97200, Bellevue WA 98009, (206)828-8080, Telex 328945.
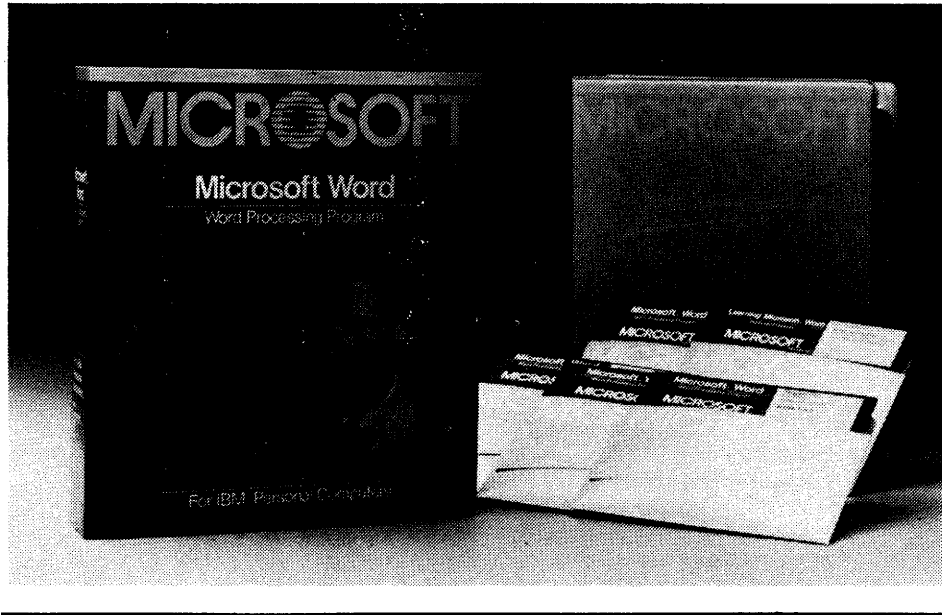
Operating Systems Concepts

Addison-Wesley has published *Operating Systems Concepts, Second Edition* by James Peterson and Abraham Silberschatz, both of MIT.

This new edition looks at the fundamental concepts of operating systems as they apply to any system. It includes a case study of Unix that illustrates the basic concepts in action. The book is for readers who know general assembly language programming and computer organization.

For more information, contact: Carolyn Berry, Marketing Manager, Computer Science Division, Addison-Wesley Publishing Company, Reading MA 01867, (617)944-3700.

Software for Property Management

Franklen Computer Systems has announced the release of its Property Management System, PMS-11, for the IBM PC.

The system provides billing, collection and management reporting capabilities for commercial, industrial and residential properties. PMS-11 bills monthly rent and up to ten other items, such as parking or security, automatically, each billing cycle. The statement shows details of all charges and credits and can be printed in a self-return mailer for fast turnaround.

For further information, contact: Frank O'Kane, Franklen Computer Systems, Inc., 456 Central Avenue, Glendale CA 91204, (818)247-0400.

Wall Street Information Vendors Join Up

Over 50 companies compromising this country's community of authorized vendors of stock exchange information have announced their decision to affiliate with the Information Industry Association (IIA), a 16-year-old trade group of information companies, rather than form their own association.

Taking the name, "Financial Information Services" division, the stock exchange information vendors add a third division to IIA, along with Videotex and Database Publishing.

Membership in the IIA, an organization of over 320 companies, is open to the full spectrum of companies engaged in all aspects of creating, storing, managing, or distributing information electronically or through traditional publishing means.

For further information, contact: Liz Nanni, Information Industry Association, 316 Pennsylvania Avenue SE, #400, Washington DC 20003, (202)544-1969.

— Curves by AutoCAD —

Intelligent Data PBX's
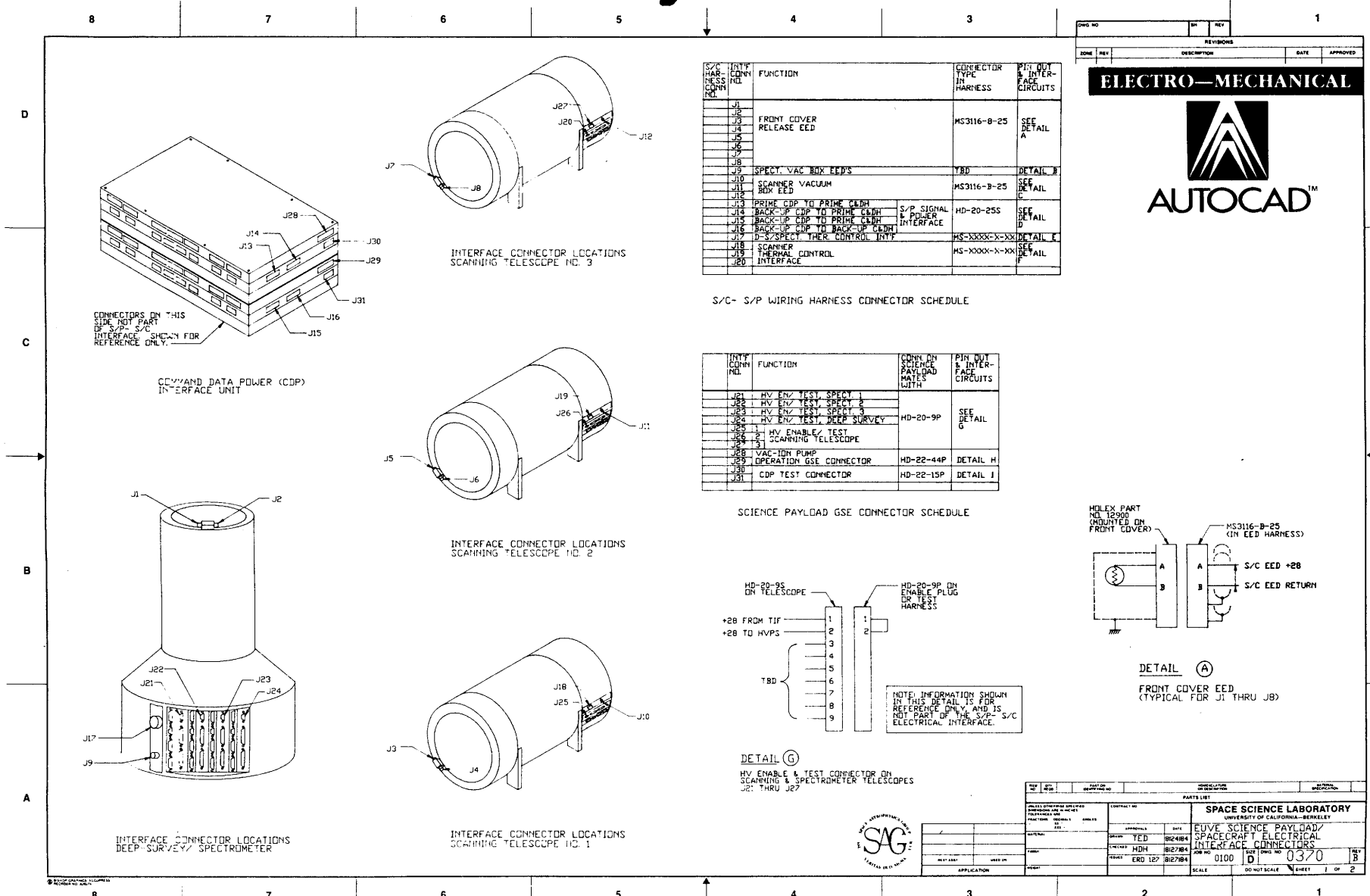
Landscape Architecture Upgrades to Micro-based CAD Systems

The Pipe series of intelligent data PBX's, which can be used to interconnect up to 16 different computer components having RS-232, RS-422 or Centronics interfaces, has been introduced by Quasitronics, Inc.

The Pipe's internal software allows control of all network links and communication functions. Asynchronous communications are possible from any port to any port, any port to all ports, any speed to any speed, any protocol to any protocol. It allows communications between dissimilar systems operating at different baud rates, word structures and flow control.

The system has 54K bytes of dynamically allocated RAM that are used automatically as
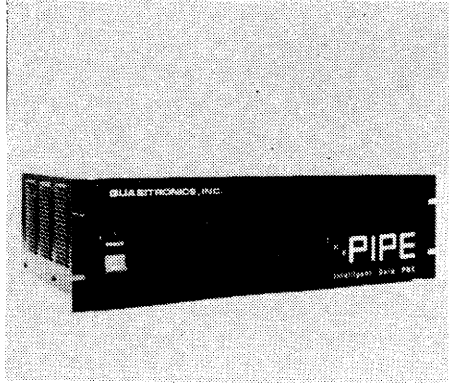
needed for speed conversions between ports, printer buffering, bulletin board memory and message storing. All system functions are controlled by the resident system configurations when powered down.

Quasitronics supports The Pipe with a communications software that allows most systems (CPM, MS-DOS, and Apple) to communicate with each other, upload and download files between dissimilar systems and support most printers.

For further informaton, contact: Bob Kreeger, Quasitronics, Inc., 211 Vandale Drive, Houston PA 15342, (800)245-4192.

Miami landscape architect Larry Henderson says his profession has seen little change in its methods during the last 150 years — until the microcomputer came along. The typical landscape designer's tools consisted of a drafting table, pens, pencils, paper and templates aplenty. They considered the mechanical pencil a major advance.

"Homegrown" is Six-Figure Loss

Four years ago, Henderson decided to bring his profession "kicking and screaming into the last quarter of the 20th Century." He hired three programmers to develop graphics programs that would streamline his office's heavy drafting load by shifting it to microcomputers. But problems arose — the programmers had little experience in micro-based graphics applications, and little appreciation for the needs of Henderson's profession.

Nevertheless, Henderson doggedly pursued the R&D effort required to create a customized computer-aided design (CAD) system. Two years and nearly six figures later, he was all but ready to concede defeat.

The Sausalito Saviors

Then, in May of 1983, Henderson discovered an off-the-shelf, micro-based drafting package called AutoCAD, newly offered by Autodesk of Sausalito, California. AutoCAD provided for virtually all of his drafting needs and cost a fraction of his homegrown package.

Painfully aware of the difficulty of creating such a package, Henderson proceeded with caution. He tested the waters by purchasing a single copy, and installing it on one of his office's microcomputers.

Savings by Factor of 10 or 20

"The software successfully performed the entire gamut of 2-D drafting functions that we needed," he says. "I was astounded — it meant that we could have a powerful design workstation for about $10,000. Mini- and mainframe-based CAD systems, then and now, cost many times that amount.

"What's more, at that price, we didn't have to worry about keeping the workstations going full-time to make them cost-effective. We figure that each of our three AutoCAD-based workstations cost us only about two dollars an hour to run."

Serves Govt., Fortune 500

Henderson is a partner in Henderson, Rosenberg, Scully & Associates, a landscape architecture firm established in 1970. Focusing on "everything above the ground and outside the building," Henderson and his colleagues take on commercial projects, residential developments and parks for clients that include Fortune 500 companies, city and country governments, developers, architects, engineers and law firms.

Much of the company's work depends on drafting — both illustrative and technical. Master-plan sketches depict the location of buildings and roads. Landscape development plans typically include plantings, fountains, sculptures and paintings. Detailed site plans, complete with dimensions and specifications for construction materials, provide the client with a document for approval purposes.

"Although a tremendous volume of drawings comes out of our office, we've always insisted on a high level of quality," says Henderson. "To do otherwise is simply unacceptable. Clients are annoyed if the workmanship is poor, and

our profitability is at stake if there are errors."

Henderson's firm uses three micros, with 640K of memories, math co-processors, floppies, 10MB hard disks, and monochrome touch-screens and digitizing pads for input and editing of drawings.

For hardcopy output, the workstations share a Houston Instrument DMP-42 plotter, capable of producing full-size 36"x44" drawings.

Software Easy-to-Use

Henderson characterizes the AutoCAD software as easy to use, with its straightforward commands that are readily understandable by a professional drafter. The package's command structure even includes an option for "macros," commands that initiate a series of frequently used commands with a single keystroke.

Looking to the future, Henderson believes that his firm's CAD workstations will do more than just increase drafting productivity. Through a telecommunications link, for example, he and a client will be able to view and modify a drawing together on their respective monitors. Likewise, he will be able to exchange information with other professionals involved on a project; field personnel such as surveyors will even be able to input data into a drawing from a job site.

"I've got a lengthy wish list, and Autodesk has assured me that upcoming releases of AutoCAD will address most of my applications," he says. "After my foray into software development a few years ago, it's comforting to know that a crew of world-class programmers has taken over the R&D work."

— AutoCAD Draws the Shortest Distance Between Two Points —

Silicon Gulch Gazette
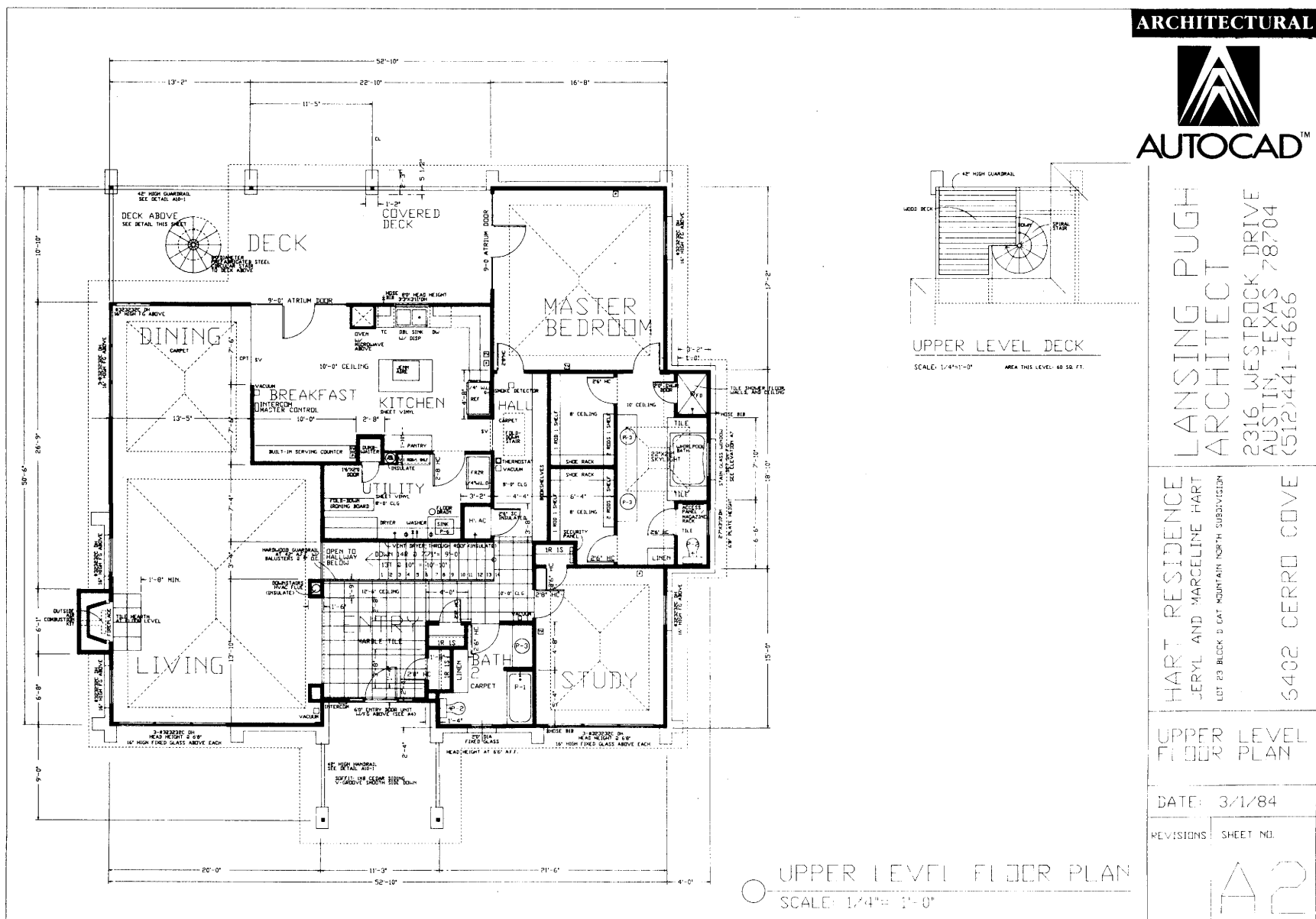
Ancient Arms Race Theory Remains Accurate Today

Over 2,000 years ago, the Greek writings of Thucydides proposed a theory on an "arms race" between two hostile nations. At that time, Athens and Sparta were two city-states that regarded each other as enemies. Each was certain that the other was preparing for war. This suspicion resulted in a build-up of weapons. Thucydides attributed the Peloponnesian War (431-404 B.C.) to that arms race.

Now, mathematician Lewis Fry Richardson has designed a mathematical model based on Thucydides' theory. "Running" the model on an IBM PC, using the TUTSIM continuous simulation system, indicates that mutual fear fuels such arms races and can precipitate wars.

Models for Arms Build-up

In his mathematical representation of this cause and effect situation, Richardson created the following model:
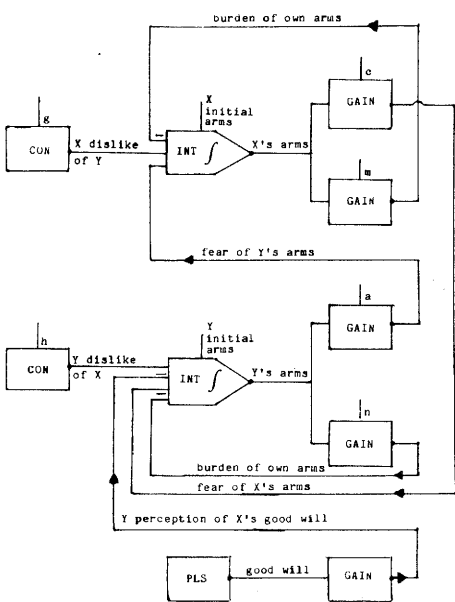
Let x be the arms budget on nation A, and y equal the arms budget of nation B. The growth of x is taken to be proportional to the perceived hostility — namely the arms budget of nation B, ay — plus a constant. This results in a pair of differential equations:

$$dx/dt = ay + g$$
$$dy/dt = bx + h$$

The constants g and h represent a reservoir of ill feelings. The constants can also be made negative to account for goodwill feelings.

Richardson also introduced a constraint on the arms race, namely the cost of the weapons. He assumed that this constraint is proportional to the present cost of the arms. The equations with m and n as cost coefficients become:

$$dx/dt = ay - mx + g$$
$$dy/dt = bx - ny + h$$

The model now has six parameters and allows consideration of various situations, remembering that x and y represent relatively the number of weapons.

Tutsim Shows Alternatives

1. If both nations are disarmed (x=y=0) but there still exists ill feelings between them (g and h are positive), an arms race will follow since both dx/dt and dy/dt are positive. If on the other hand, g and h are negative, then dx/dt will remain at zero.

Examples that follow this model include the relationship between the United States and Canada since 1817, and between Sweden and Norway since 1905.

2. If there is unilateral disarmament, (say, y=0), and the constants of g and h are positive, there still will still be an arms build up, since dy/dt will be positive. This result shows that unilateral disarmament is not permanent.

An example would be Germany after the First World War, when her army was reduced to levels far below her neighbors by the Treaty of Versailles.

3. Then there is the common case where armament and hostility exist between adversaries (y, x, g, and h are positive). The TUTSIM graph shows the rate of armament build-up that ensues.

DoD Spends Millions on Such Simulations

The Department of Defense spends millions or billions devising accurate models of this type and exercising them, trying different "scenarios." Now, even rather large models can be run on an IBM PC.

These examples indicate that an uncontrolled arms race/hostility leads to widespread war. A preferable solution is to make g or h negative, i.e. introduce goodwill.

Although TUTSIM cannot tell how to achieve goodwill, it can model the results if it were to be infused. An altered model is shown in the illustration: A pulse of goodwill is injected at 20 years and the dotted lines show the results.

For more details on this model see Richardson's book, Arms and Insecurity, Quadrangle Press, 1960. The TUTSIM continuous simulation system is available through Applied i of Palo Alto, California.

RICHARDSON'S ARMAMENT EQUATIONS

Y1: Y's Armaments
Y2: X's Armaments
Y3: Goodwill amount

White House Distributes News Electronically

News and information from the White House is now being distributed to the media and other subscribers over an electronic mail network operated by ITT Dialcom, Inc.

The White House News Service electronically transmits news releases, speech texts, statements, personnel appointments, announcement of new legislation and other news to subscribers throughout the U.S.

The Service, developed by the White House Office of Media Relations and the Office of Administration, provides information from the White House Press Office, the Office of the Vice President and the Office of Management and Budget.

Merrie Spaeth, White House Director of the Office of Media Relations, said the news service is designed to speed dissemination and expand the availability of White House news beyond Washington D.C.

"The primary objective of the service is to allow timely distribution of important news to those media which do not have a representative based directly at the White House," she said. "Editors and reporters across the country should have direct access to original news material. I expect White House news to be of particular interest to a city, state or region affected by a particular policy or event."

The White House News Service is available through ITT Dialcom and costs $15 per hour, plus Dialcom's normal rates which range from $12 to $20 per hour, depending on time of day. Other news services provided by ITT Dialcom are the Associated Press and United Press International.

For further information, contact: Paul Warren, ITT Dialcom, Inc., 1109 Spring Street, Silver Spring MD 20910, (301)588-1572.

— Plan Ahead with AutoCAD —

RUMORS ...

that fit into the inexpensive Canon xerographic copiers do *not* fit into the Hewlett-Packard LaserJet, even though it uses the Canon print engine. They have some wee tiny physical differences — and a $30-$40 price difference.

The Lazy LaserJet

Speaking of H-P's LaserJet, it appears that H-P is absolutely determined to lounge around and watch other laser makers gobble up the lowcost laser market that H-P proved was there. I am referring to their anemic output of font cartridges and limited printer design.

Few of their font cartridges have proportional-spaced character sets — such as was used by MyType to create this *Gazette*. None have "pi"-characters — the non-ASCII characters universally found in commercial typesetting systems, such as ¢, □, †, ‡, stars, bullet-dots, *etc.* They do, however, have numerous foreign character sets — *yawn.* An' hyar I tho't H-P was a 'merican company.

Similarly frustrating is their penny-pinching decision to offer only enough memory to bit-map one fourth of a page image. Haven't they heard Jack Grimes' semiconductor axiom — "Memory is free"? (Of course, Jack also offered the corrolary: "Demand is infinite" — illustrated in this complaint.)

These, coupled with unCanonized toner cartridges, the inability to download full fonts from the "mainframe", and font cartridges that contain few sizes and few faces of few fonts (Murphy guarantees that two fonts needed by each user will be in different cartridges) seem designed to support H-P's fast-growing competition. H-P — the hippie, sharing-caring company!

A History of Move-Asides

Don't think H-P is too smart to blow it in this market. The industry has a history of such bloopers: MITS created the first personal computer — then, by sloppy engineering and poor customer support, managed to give up the marketplace to Imsai and others. Delightfully, H-P is rarely accused of sloppy engineering.

Imsai, by arrogant unresponsiveness to their customers, gave up their market to more responsive competitors. Well, no one is saying that H-P is arrogant — on the contrary, they are very congenial and friendly as they fail to respond.

Then there's good ol', congenial, benevolent Jack Tramiel who used to command Commodore. By making the Pet-with-the-awful-keyboard they politely stepped aside so Tandy/Radio Shack could trample Tramiel by offering the TRaSh-80 with a decent keyboard, and even with software support!

H-P Hopefuls

I hope H-P decides to remain a major player in laser printing — they're good folks. If so, they should immediately offer *(1)* comprehensive font cartridges for the 'merican market, *(2)* competitively priced field upgrades to full-page bit-maps for their LaserJets, *(3)* mainframe downloading of fonts, and *(4)* design future models to use *standard* toner cartridges.

The cost-consious, fairness-favoring computer consumers will not long tolerate a lazy laser company.

Removable Winchester for IBM PC/AT

A removable cartridge Winchester disk subsystem that will provide removable data storage, data security and allows multiuse of a single PC/AT has been introduced by Interface, Inc.

Because the unit is removable, the incidence of damaged or erased data can be minimized since the user simply removes the disk cartridge when finished working on a particluar program. Designed for the IBM PC/AT which functions as a multiuser/multitasking machine, more than one person may work on a single PC/AT, with each person having their personal Winchester cartridge.

With 10.5 megabytes of formatted storage per cartridge, the cartridge drive fits into the B drive slot of the PC/AT. The drive has a track-to-track access time of 22.5 milliseconds and an average access time of 98 milliseconds, including head settling time. There is a 5 megabit per second data transfer rate and the system is plug-compatible with the PC/AT. External versions of the Disksystem are also available for the IBM PC in primary or slave drive configurations.

The price of the removable cartridge for the IBM PC is $2295, and for the PC/AT it is $1695.

For more information, contact: Gilbert Gautereaux, Interface, Inc., 21101 Osborne Street, Canoga Park CA 91304, (818) 341-7914.

MacChoice Decides Logically

MacChoice, a decision-making program for the Apple Macintosh, is now available from Superex Business Software for $49.95.

MacChoice, "the logical decision-maker," lets the user compare anything from types of cars and vacation spots to stocks and bonds. MacChoice accommodates two, three or four items simultaneously, and lets the user rate them in as many as 20 categories. The user picks the categories in order of importance and then rates each item in each category. MacChoice tabulates the ratings and displays the results in a graphic bar chart. The chart compares the choices and indicates the most logical decision based on the ratings given.

For more information, please contact: Superex Business Software, 151 Ludlow Street, Yonkers NY 10705, or phone toll-free (800)862-8800.

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contraction of "Dennis" and "Bob."

They hired me as *DDJ's* founding Editor, for the handsome salary of $350/month. That was ok; it was exciting and worth doing, as had been the Free University a half decade earlier. I did, however, promptly change it from the "Journal of Tiny Basic Calisthenics" to "Journal of Computer Calisthenics" — lest it encourage use of John Kemeny's primeval language, designed only to teach fundamental programming concepts to beginners.

Hippie Heritage

There were other computer notables who comingled in that anarchistic Free University. One was John McCarthy, inventor of LISP and then-Director of Stanford's Artificial Intelligence Laboratory, one of the foremost AI research facilities in the world (now shut down).

Another was Larry Tesler. He was the Free U's Treasurer about the time I was its General Secretary. He created one of the first graphics editors in the '60's. Later, he worked with Alan Kay and Smalltalk at Xerox Palo Alto Research Center (X-PARC), then moved to Apple (didn't everyone?). He was a senior member of the Lisa and Macintosh software mobs.

Still another Free U hanger-on was Stewart Brand. He and his wife lived in a canvas teepee next to a secluded creek, just west of Stanford. He went on to create the *Whole Earth Catalog,* then *Co-Evolution Quarterly,* and, now the *Whole Earth Software Review.*

Microwave Maddness

Another rebellious, long-haired, anti-establishment Free U activist was a kid named Marc Porat. Dr. Porat is now President of Private Satellite Network on Park Avenue in New York City. PSN's Board Chairman was the U.S. Secretary of the Treasury under Jimmy Carter.

Still another participant in some of the more exotic Free U gatherings was David Leeson, now Dr. Leeson, President of California Microwave.

And, the list goes on and on. Yup, everybody knew them anti-war, long-haired, dope-smokin', acid-eatin' hippie beatniks would never amount to nothin' (negatives *do* cancel).

More Mythology

Continuing with pasts, revisited, and errors, corrected: In August, 1976, I first announced plans for a Computer Faire. *Fire* states:

David Bunnell contacted Warren "on behalf of MITS. Bunnell said MITS was also planning a west coast show and suggested that they merge their efforts and stage a conference sponsored by *Personal Computing* magazine [about to be started by Benwill Publications]. Warren could have 10 percent of the gate ...

"[Warren] did not think it would be appropriate for himself, as Editor of *Dr. Dobb's,* to be involved in a show sponsored by *Personal Computing* or any other magazine. He was also uneasy about the emphasis on money.

"I wasn't thinking about doing a bucks thing at all," he recalled. "I just wanted to have this event. I'd done be-ins in the '60's. I just wanted this stuff to be happening out here [in the San Francisco Bay area]."

Erroneous. MITS had nothing to do with this — except that Dave was about to

Planning for Ever-Changing Installation Uses Micro-Based Drafting

Imagine having to increase and then re-arrange your collection of furniture every couple of months for the last two years, and that the task must continue for at least two more years. Now transfer that spector to a high-tech assembly plant, where the "furniture" is sophisticated equipment with special utility connections, the room is hermetically sealed, and the placement is influenced by an ever changing work flow that is expensive to shut down.

Such is the situation confronting Clifford Buckner, senior facilities engineer for Synertek, an integrated circuit manufacturer. He is responsible for planning the ongoing reconfiguration of Synertek's office space and in particular its clean room, where the delicate silicon wafers that hold the circuits are fabricated. Until six months ago, this meant drafting a few basic layouts by hand and piecing in new equipment represented by paper cut-outs on a trial-and-error basis. Now Buckner uses in the most efficient way, while at the same time keeping control of more details than was ever before possible with traditional space-planning methods.

The software that has modernized Buckner's job is AutoCAD Version 1.40 from Autodesk Inc. of Sausalito, California. It is a generic, two-dimensional drafting system that transforms a personal computer into a sophisticated, computer-aided-drafting (CAD) workstation.

Old Approach Too Time-Consuming

"I have to see where we're heading with expansion, how much equipment we need to handle, and then fit it in logically to accommodate the work flow — all the while pleasing a variety of management interests," says Buckner. "The old approach with T-squares, drafting boards, and pen and ink was so time-consuming that we had to cut corners with estimates and keep readjusting as problems arose. Now with AutoCAD, we can draw the before, or 'as-built', map out how we want it to end up, and then go back and break down the moves step-by-step on the computer in a way that would normally require a whole roomful of full-time drafters. Plus, before there is any construction, the detailed plans let concerned users in the plant visualize the proposed changes, spot problems, and then suggest revisions. By going back to the computer, we can easily adjust the plan, make a new drawing and know if things will fit without several weeks' worth of work."

Buckner's Synertek plant is a Honeywell subsidiary in Santa Cruz, employing 600. The facility takes chip designs and, in special clean rooms, fabricates silicon wafers 4" in diameter that hold from 200 to 600 circuits.

The Santa Cruz building for which Buckner plans is two stories. The basement under the production area holds electrical equipment, exhaust ducts and the process gases that go up to the fabrication area. The main floor consists of not only the business offices, but also the sealed clean room, which is glassed in on two sides to showcase its activities.

Production Increases Outgrew Traditional Planning Methods

Buckner's space allocation problem was pretty straightforward, until about two and a half years ago, when Synertek added clean room facilities with plans to expand it to a maximum output of 10,000 wafers a week by early 1986. He says that, with planning the growth of the clean room, his job took on the nature of a laboriously haphazard game of chess, in which the rules were constantly changing. There are constant changes in work flow, new equipment and positioning requirements.

"Management hesitated [to get AutoCAD] at first because they envisioned the prohibitive cost of a mainframe or minicomputer system," recalls Buckner. "But since AutoCAD runs on micros, we were able to set up the program and hardware for less than $20,000."

The Synertek System Configuration

A systems integrator that Buckner contacted assessed Synertek's needs and chose an IBM PC-XT with 512KB memory, a 10MB hard disc and an 8087 math co-processor to run AutoCAD. For input there are two digitizer tablets: an 11"x11" Hitachi Tiger Tablet with a 12-button puck and a 36"x48" Calcomp with a 16-button puck for tracing large architectural drawings into the XT.

Screen output is on a Micro Vitech CUB high-resolution color monitor run by a Tecmar color/graphics board. Hard copy is generated on a Houston Instruments DMP-41 plotter with three pens of different widths.

"Making Drawings the First Day"; One Month Output = All Last Year

The effect the program had on facilities planning after its introduction in May, 1984, was immediate and dramatic.

"The program makes extremely logical and natural use of the computer equipment as a drafting tool," says Buckner. "We were making drawings the first day, and within the first month I had produced more blueprints with detailed phase work than had been possible the entire previous year. And the control was fantastic. We could respond to management's suggestions almost immediately, which means less down time for the clean room and a more accurate solution to our production expansion."

By now Buckner has converted all 40,000 square feet of building space to AutoCAD files, each of which he saves on a disc just like a word-processing program does written documents. He can call them up at any level of detail, then combine, edit, copy or manipulate them in any way he chooses. This feature alone makes the program worthwhile, he says, for it allows him to project the space-planning "what-ifs" just like an electronic spreadsheet does financial forecasts.

Most of AutoCAD's input control takes place with the pucks and digitizer tablets. Buckner can position the puck's crosshairs on the tablet in order to trace existing drawings, to insert previously saved drawings as part of his present work or to call in any number of basic elements, such as lines, circles, arcs and solid-filled areas. Synertek also purchased an option package called the Advanced Drafting Extension (ADE), which among other things allows free-hand sketching as well. In addition, the ADE permits filling in an object, like a grilled ceiling for instance, with either a user-defined pattern or any of several standard ones from AutoCAD's library.

Specific directions for some of AutoCAD's features are typed in on the keyboard, although portions of tablets and the buttons on the pucks can be reserved for a user-defined menu of the most often repeated commands.

Used Standard and Optional Tools

Of AutoCAD's standard functions, Buckner praises several as essential to his work. The bi-directional zoom, for example, lets him move through any level of detail in the drawing, with a ratio of at least a trillion-to-one between the largest and smallest objects. Consequently, he can view the clean room's entire floor plan, then zero in a specific machine's utility connection — or even the bolts holding it down. A continuous status line at the screen's bottom displays the condition of various features, as well as any text he may have entered for annotating his drawing. Buckner can turn the status area off for a bigger drawing space, or switch to a full screen of text to keep track of commands that have already scrolled up out of sight. AutoCAD provides an alignment grid system for easy positioning, with definable units of distance between the grid's points. With the ADE Synertek purchased, Buckner can even use the semi-automatic dimensioning option, which measures linear distances and then positions the text to fit inside automatically generated lines and arrows.

"Layers" Sorts Out Details

Buckner reserves special mention, however, for the feature that assigns various portions of his drawings to different layers. The layering concept is similar to the transparent overlays used in conventional drafting applications. It allows viewing and plotting related aspects of a drawing separately or in any combination. For instance, he can choose overlays of different colors on his monitor to represent the machinery placement, the electrical plan, the plumbing connections, exhaust ducts and several dozen more categories he may find useful for organizing his drawing.

"I can work with any or all of the nine or ten layers we usually include on each drawing," says Buckner, "and then output them on the plotter. Even in black ink, the plotter differentiates among the layers with ten separate line types, such as dashes, dots or ultra-wide lines filled in. It's perfect for blueprints."

Mainframe Abilities on a Micro

When asked how AutoCAD compares to other CAD software packages that Synertek considered, Buckner says he cannot even name one that is in the same league. He has, however, attended a demonstration given on a large firm's mainframe CAD unit, which did feature a slightly faster zoom and pan across the screen than he now uses. It also cost $120,000 — a price difference way out of proportion, says Buckner, to all the power that AutoCAD offers on a much more affordable personal computer.

For the future, Buckner says that his plant will probably get a duplicate AutoCAD system in 1985 to handle the increased work load as the Santa Cruz clean room gears up for maximum production. The Santa Clara headquarters of Synertek apparently believes in the benefits of Buckner's new CAD system as well; it is ordering three of them for its facilities department. Both plants will also undoubtedly handle a growing number of inquiries from various other departments, which have discovered AutoCAD's usefulness in other applications and now pepper Buckner with repeated requests for flow charts and Gantt drawings. The former is a management tool for keeping track of how a project's steps interconnect; the latter is for project scheduling and management. Buckner keeps empty masters of both these tools in the computer to call up and use, just as he does standard drawings for his floor plans.

— AutoCAD Shows It All! —
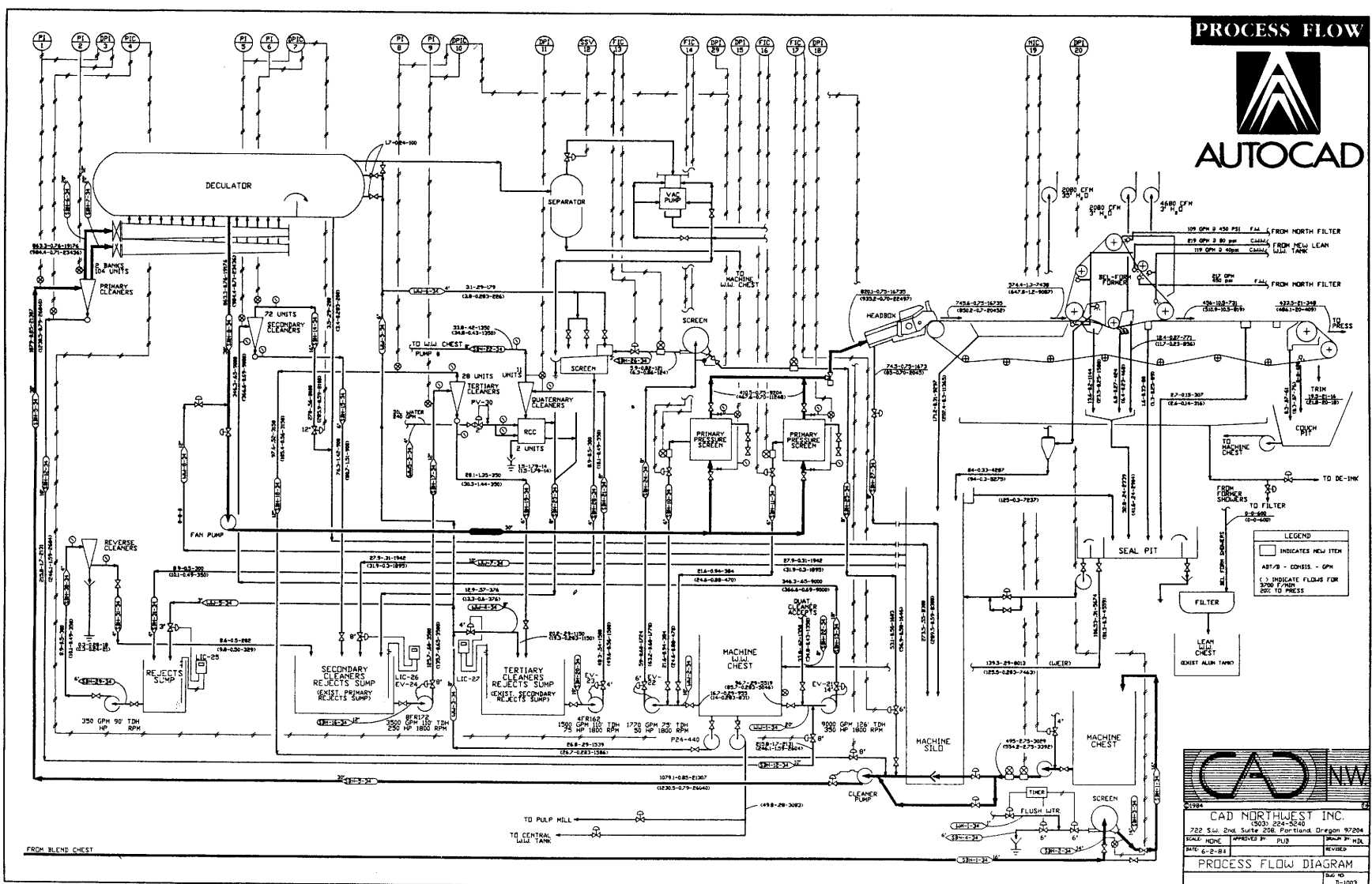
Glassmaker Sends Engineering Drawings by Electronic Mail

For many manufacturing companies, the role of data communications is expanding beyond the transmission of business and financial information. Engineers and production managers are beginning to use telecommunications links to speed the delivery of key technical documents and drawings.

For instance, PPG Industries, Inc., is one of the world's largest automotive glass producers. PPG recently began using the CompuServe electronic mail network and IBM PC's to transmit engineering specs and drawings from its Detroit sales office to tooling and production plants in Ohio, Indiana and Pennsylvania.

According to Larry York, Manager of General Office Staff Systems at PPG's headquarters, the E-mail network enables the firm's design engineers to quickly implement windshield and window design modifications based on information from the firm's automaker customers.

Hours Instead of Weeks

"We can now send detailed specs — complete with drawings — to our engineers in a matter of hours, rather than the week or more we had come to expect from the U.S. mail," says York. "As a result, we get the glass prototypes back to the automaker all the sooner — no small benefit for good customer relations."

Design engineers from PPG's glass division work closely with General Motors, Chrysler and Ford to develop glass products for new auto models. When an automaker is developing a prototype, PPG engineers work from the automaker's specifications to create glass parts for the test vehicles.

Computer files containing the specifications and drawings are created on IBM PC's, then sent over PPG's network. The specs set out the dimensions, drill hole locations, etc., for the part. The drawings are created and electronically filed using AutoCAD, the computer-aided drafting software package from Autodesk, Inc..

PPG's network employs twelve IBM PCs and PC-XTs at eight sites. Each PC's system board includes an 8087 math coprocessor to speed the mathematical calculations of the AutoCAD drafting software. All of the sites are equipped with Houston Instruments DMP-29 plotters, and most sites have Okidata Microline 92 printers. Each PC uses a Houston Instruments DT-11 digitizer tablet for input. The PCs communicate with CompuServe via Hayes Smartmodem 1200s.

Mail & Courier Bottleneck

Before PPG launched its E-mail network, its drawings were sent by mail or courier service from the company's office near Detroit to its production and tooling plants.

"Delivery delays were causing a serious bottleneck," York recalls. "It was taking us longer than necessary to implement design changes, and all too often our engineers had to play catch-up to meet our customers' schedules. We needed a way to speed delivery of the specs and drawings to ensure an orderly workflow."

In January 1984, York began to investigate electronic mail as a means of sending the documents. One of his criteria

page 12

for an E-mail scheme was that it provide a means of transmitting drawings as well as alphanumeric text. To that end, he needed computer-aided drafting (CAD) software that created ASCII files. York also wanted a package that ran on the IBM PC, machines PPG already had in use.

AutoCAD Solved PPG Problems

At the time York was in the market for a drafting package, AutoCAD was the only product that met his particular set of requirements.

"The fact that AutoCAD was priced well below the turnkey CAD systems we initially looked at confirmed our decision. The low-end turnkey systems started at $20,000 per workstation, but by running AutoCAD on our PC's, we could configure entire workstations for less than $12,000.

CAD User Digitizes Blueprints for Tooling Engineers

PPG initiated its electronic mail network in June 1984. One of the network's most frequent users is Larry Hollier, supervisor of engineering services at PPG's Troy sales office. Hollier is responsible for generating the specification files that are transmitted to PPG's tooling center in Ford City, Pennsylvania. Engineers at the tooling center use the specifications and drawings in these files as the basis for designing the production "irons" used to bend and shape the glass.

To create a drawing with the AutoCAD software, Hollier works from a full-scale, two-dimensional blueprint supplied by the automaker. With the blueprint next to his PC or taped on the wall in front of him, he uses the digitizer and keyboard to draw those portions of the glass — such as curves or bends — that the tooling engineers need to focus on closely.

Coordinates on the blueprint enable him to identify the end points of lines and arcs. To draw an arc, he simply keys in the numerical coordinates of three points on the arc, and uses the digitizer to place the cursor on the ARC command in the menu along the right edge of the screen.

Hollier, who had no previous drafting experience, also annotates the drawings with pertinent tooling information, such as drill hole positions, curves, defroster wire locations and any areas around the edge of the glass that must be painted.

When the drawing is complete, he incorporates it into a file along with the written specifications, and sends the file over the network. At any time, he can also generate a hardcopy plotout of the drawing on standard 8-1/2 by 11-inch paper.

The specifications Hollier sends includes crucial geometric dimensioning and tolerancing (GD&T) information. This information is highlighted on a drawing by special GD&T symbols that establish data points on the glass from which tolerancing is performed. The most frequently used GD&T symbols include a circle with crosshairs, a set of parallel lines and a pair of perpendicular lines.

Hollier has tailored the drafting package by employing ordinary text files to build a library of these symbols, which permits him to easily pull any symbol into a drawing.

Free PC Software

The PC Software Interest Group (PC-SIG), the largest and most comprehensive source of public domain and user-supported programs for the IBM PC and compatibles, is now accessible via Tradenet.

Tradenet is a public information network accessible via local phone numbers to computer users with a modem and communications program.

Available from PC-SIG via Tradenet are: PC-SIG's public domain software index, online newletter, bulletin board, Q & A forum, software reviews, uploading and downloading of files, and online ordering.

While there is an hourly charge for using this service, it is less than the cost of calling long distance.

PC-SIG now has over 270 disks of programs and is a major source of public domain software for the IBM PC. There are a variety of programs both for new and experienced computer users. Most disks are compiled for the user with specific needs. These run the gamut from word processors to spreadsheets, data management to games, BASIC language instructors and utilities to statistics, financial programs to bowling league records, assemblers to communications programs and from DOS utilities to printer utilities.

A printed directory is available from PC-SIG for $6.95 plus $1.50 postage. A set of five introductory disks with the directory is $36. PC-SIG membership is $15 per year.

For more information, contact: PC Software Interest Group (PC-SIG), 1125 Stewart Court, #G, Sunnyvale CA 94086, (408)730-9291.

PC-SIG News

Public Domain and user-supported software for the PC issue #3 November 1984

What's new

Disk numbers 199 through 238 have been added to the library since the last newsletter. These include many new user-supported programs and other material assembled from various sources. Jim Button has a spreadsheet program, PC-CALC (disk #199). Some printer specific utilities from Soft & Friendly are on disks #220-#222. Other new user-supported programs include an accounting system (disks #214, #215), MAPMAKER (#219), another spreadsheet (#224), font generator (#225), finance (#227), printer utilities (#236, #238), encryption program (#230), games (#228, #229), BASIC program lister (#231), statistical package (#232), data base management (#233), reference lister (#231), parts inventory control (#235), general ledger (#237), and sprite graphics (#238). In addition,there are additional new c library subroutines (#216), 123 templates (#207), games (#203, #209, #210, #228), and DOS utilities. Information on how to make backup copies and use popular programs on a hard disk without always having to put the master disk in drive a: is listed on disk #184 and #238.

Memberships

We have decided to change our policy regarding memberships. Many people have asked, "How do I join your organization?". We did not want memberships because of the work involved in keeping track of names and the bad experience many people have had with some other PC support organizations. But, because of the desire many people had to receive the latest listings of new disks and the expense of sending out periodic mailings to people who may or may not want them, we have decided to offer a membership. For $15 per year members will receive all publications from our organization including a new directory which we expect to be out in the first quarter of 85. Membership is not required to purchase disks, however, members will receive one free disk for each 10 disks ordered on all prepaid disk orders. The purchase price of $6.00 per disk will be the same for members as nonmembers.

Disk Reviews

A user submitted reviews for the following disks. We hope to print reviews of additional disks to allow users to have a better idea of what to expect of programs in the library. If you found a disk particularly interesting or useful and would like to write a review please let us know.

Disk No. 94 LADYBUG

LadyBug is a graphics language based on LOGO Turtle Graphics. It contains most of the graphics commands, procedure making commands, and control commands from the Apple II(1) implementation of LOGO done by Terrapin, Inc. This version is described in the book LOGO FOR THE APPLE II, by Harold Abelson.

The program author makes several recommendations for good tutorial type textbooks covering the LOGO language in general. He is also quick to acknowledge that for those with a serious need for LOGO, their best option is to purchase a commercial LOGO implementation. The major strengths of LADYBUG over versions of LOGO are:

A large library of procedures adapted from a variety of sources.
Painting of areas.
Clipping of drawings (as well as wraparound).
A fast full screen editor.
Support for using both displays if both are present.
Sounds — PLAY statement like Basic.

The major features missing are:

List manipulation.
Variable numbers of parameters to primitives.
Saving screen images.

Disk No. 95 - Math Tutor 2X2=4

This program is one of the most sophisticated which I have seen for the mathematical training of students (be they young or old). The variability of each of the facets of this tutorial is truly amazing.

First, the entire program is menu driven. Absolutely no knowledge of BASIC or anything to do with computers is needed. Secondly, anytime that the program is performing any housekeeping/calculation type chores, the user is advised to "PLEASE STANDBY"

$50,000 Software Donation by Autodesk to SME

Autodesk Inc. announced the donation of $50,000 worth of AutoCAD software to the Education Foundation of the Society of Manufacturing Engineers (SME) in Dearborn, Michigan. The contribution is part of SME's Capital Equipment Grants program, which every year administers equipment and cash grants for educational programs in manufacturing technology. Twenty-five institutions will be awarded individual AutoCAD grants in June of 1985, to support the growth of manufacturing coursework and curriculum.

"Autodesk's contribution marks the first major grant by a microcomputer software company," said Mark Stratton, Executive Director of SME's Education Foundation. The grant has led to the establishment of SME's Microcomputer Software Awards program, which disburses software grants to schools and colleges.

SME established the Manufacturing Engineering Education Foundation in 1979 "to improve the quality of instructional curricula and research in manufacturing productivity through university, industry and society cooperation," according to Stratton. The Foundation has awarded nearly $2 million in cash and equipment grants since 1979 to 155 colleges and schools involved in manufacturing engineering and technology.

"The grant was awarded to SME's Education Foundation to stimulate computer-aided drafting education and ultimately improve manufacturing productivity through the use of CAD technology," said Josef Woodman, Autodesk's Manager of Education Markets. According to Woodman, "Software firms need to take some responsibility for training future industry leaders in the latest technology. Autodesk has lived up to this responsibility through grants and discounts to educational institutions, the establishment of nationwide training centers, and conferences held with industry, education, and government agencies."

Autodesk was founded in 1982 to develop productivity tools for microcomputers, and has over 13,000 installations worldwide. AutoCAD was recently named the "Technical/Scientific Program of the Year 1984" by eight leading computer publications in Europe and the United States.

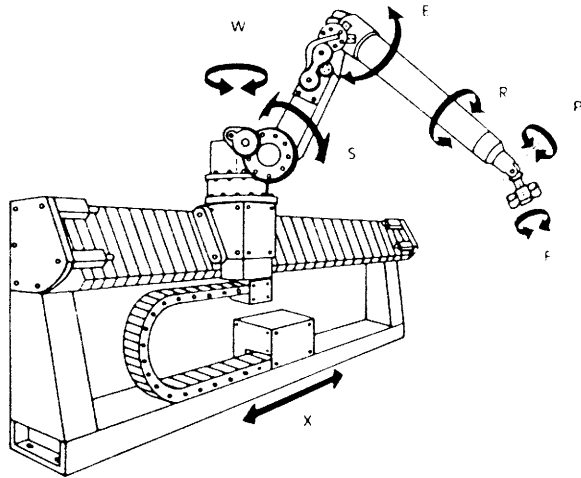Autodesk is in Sausalito, California, at (415)331-0356.

A ROBOT ARM GAINS MUSCLE AND FINESSE

In the advanced industrial world one new laborer is the robot. Unusual in many ways, this new worker has one familiar human feature — an arm that can reach, bend, and grasp. Designers of robots have found that nature's configuration of arm, elbow, forearm, wrist and fingers is an efficient model. Thus the common term of reference for industrial robots is "robot arm."

Arms may range in size from a modest foot-and-a-half that plucks small parts off a conveyor belt to units that reach from 6 to 15 feet, weigh hundreds or thousands of pounds, and process many thousands of dollars worth of products per hour.

A robot arm may rest on a base, hang from a swivel, or travel along a track. The "fingers" may push, grasp, weld, or spray paint. A single arm may be capable of a number of independent motions — like elbow, wrist, and finger joints. These are called "degrees of freedom." Each degree of freedom needs a control circuit. In most designs, this circuit is a servo system.

The speed and accuracy of each servo loop relates directly to the arm's desired capability and thruput, and thus to its industrial application. Design optimization that affects performance by even a few percent can have a large financial impact. Accurate modeling and simulation are among the techniques used for experimentation and for verification of proposed design changes in robot arms.

ROBOT ARM STEP RESPONSE — Time Response Computed by TUTSIM Simulation.
Y1: Input signal
Y2: Digital PID out, volts
Y3: Gear tooth velocity
Y4: Carriage position
TUTSIM

Designing for Good Robots (Modeling for Good Designs)

Good robot arm design calls upon virtually every aspect of the science and art of control engineering. Linear control theory is the basis of good design. However, nonlinear elements abound in actual practice. These elements are best modeled and studied using a continuous simulation system. One of the least expensive, full-capability systems is TUTSIM which runs on microcomputers. This example illustrates the robust capabilities TUTSIM offers to the practicing control engineer.

TUTSIM blocks directly implement the servo system equations in the time domain. The blocks have other implementations, like "dead zone" and "stiction," that are not immediately apparent.

The TUTSIM users first sketch their system in block diagram form. Then, they enter it into the TUTSIM program, a line for each block, somewhat like the spreadsheet programs that are so useful for discrete simulations. With that, and some timing information, the user can quickly simulate the system and obtain time responses — easily revising the model until it responds in an acceptable manner.

The illustrations show a typical designer's block diagram sketch, a listing of the TUTSIM "program", and some examples of the response of the model. The block diagram shows a typical control loop for one axis of a robot arm. Major sections of the loop include the following:
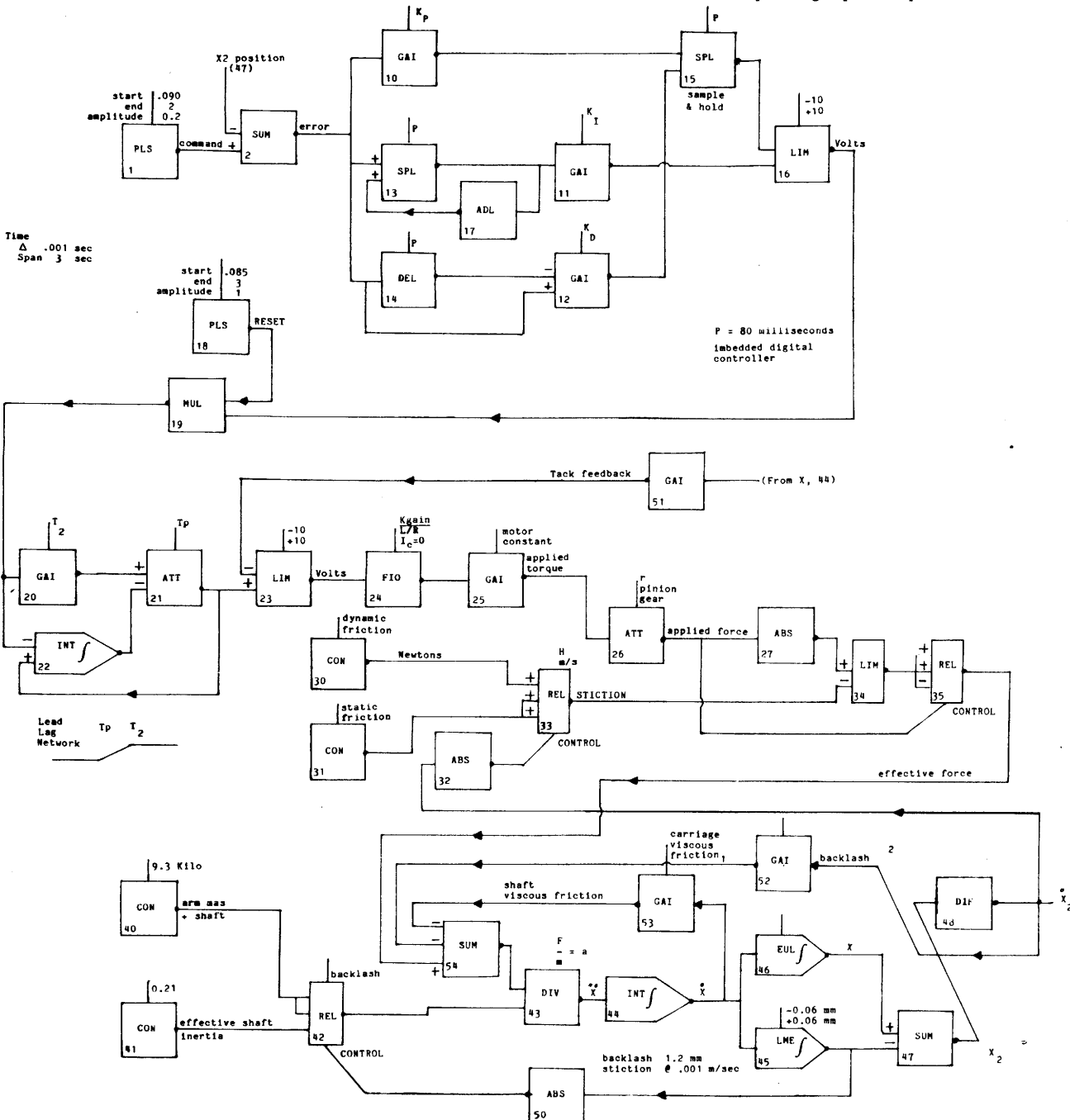
The Imbedded Digital Controller

This design assumes that imbedded in the control loop is a digital computer element. Often this element is a simple single-chip computer processor that periodically samples inputs and position, calculates error, perhaps performs a PID-type control algorithm — Proportional, Integral, Derivative function — then outputs a new control value. This new value is held until the next periodic recalculation. Typically, this periodic time is some milliseconds, slower than the faster components of the system but faster than overall response.

The TUTSIM Sample and Hold block makes it possible to simulate an imbedded digital computer control. The error in position is picked up by three channels in the simulated digital controller. Blocks 10 and 15 are the gain of a Proportional channel. The SPL block samples the input every (simulated) 80 milliseconds and holds the value for the next period.

The Integrator channel comprises blocks 13, 17, 11, and 16. Most TUTSIM blocks have implied summing inputs. This feature, used on 13, faithfully simulates a digital integrator. Integration adds the new value to the sum of the old values.

The Derivative channel of the simulated PID comprises blocks 14 and 12. The old value, from 80 milliseconds back, is subtracted from the current value.
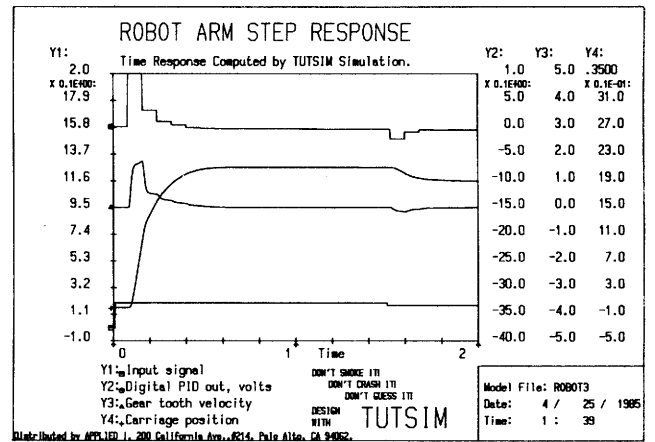
Gains from the three channels are kept separate for ease in changing parameters between simulation runs. This simple PID model may be augmented by any of the other algebraic blocks. Involved and non-linear algorithms may be implemented. Simple running-mask digital filters or limited cross-correlation techniques may be simulated. Applied i — the exclusive U.S. distributer for TUTSIM — has application notes illustrating that technique.

Frequency-Domain Function Blocks

TUTSIM is primarily designed for input of real component descriptions. However, there are times when the designer would like to specify LaPlace transfer functions directly. Often this occurs in the part of the system that is a linear amplifier and may have the designer's chosen compensation networks.

These specifications can be handled with TUTSIM blocks. An application note is available to help the designer with this technique. Actually, any ratio of polynomials in "s" may be implemented.

In the model shown, blocks 20, 21, and 22 simulate a lead/lag network. The parameters of 20 and 21 are time constants. The simulated amplifier has limited output voltages. The FIO block is a simple single-pole response block. In the example, real values of motor constants are implemented. The shaft of the motor could have been treated as a stiff torsion spring. That effect, however, is ignored in this model.

A virtue of TUTSIM models should be noted: If other physical features need to be incorporated, they can be added simply as more blocks in the model. The existing work need not be scrapped, nor altered — other than sketching in the added blocks and connections and typing the description of the new blocks, much like adding a line to a Basic program.

Deadzone (with Apology to Jerry Garcia)

```
Model File: robot3
Date:      4 / 28 / 1985
Time:      19 : 13
Timing:    0.0010000 ,DELTA ;   2.0000    ,RANGE
PlotBlocks and Scales:
Format:
        BlockNo,  Plot-MINimum,  Plot-MAXimum; Comment
Horz:     0 ,    0.0000     ,    2.0000    ; Time
Y1:       1 ,   -1.0000     ,    2.0000    ; Input Signal
Y2:      16 ,   -4.0000     ,    1.0000    ; Digital PID out, volts
Y3:      44 ,   -3.0000     ,    7.0000    ; Gear tooth velocity
Y4:      47 ,   -0.1000000  ,    0.9000000 ; Carriage position
```

	BlockNo	Type	in1	in2	in3	Comment
0.0100000 4.0000 0.2000000	1	PLS				;Input Signal
2.9000 0.8700000 0.8000000 0.0900000 40.0000 0.0000000 0.0000 0.0600000	2	SUM	1	-47		;Error
	10	GAI	2			;PID Proportional Gain
	11	GAI	13			;PID Integral Gain
	12	GAI	2	-14		;PID Differential Gain
	13	SPL	2	17		;Integral sum and hold
	14	DEL	2			
-10.0000 10.0000	15	SPL	10	12		
	16	LIM	11	15		;Digital PID out, volts
0.0000 0.0850000 100.0000 1.0000	17	ADL	13			;History block
	18	PLS				;Initalizing pulse
0.0750000 0.1150000 0.0000 -10.0000 10.0000	19	MUL	18	16		;initialize at zero
	20	GAI	19			;Tz of Lead/Lag
	21	ATT	-22	20		;Tp of Lead/Lag
	22	INT	-19	21		
	23	LIM	21	-51		
1.3000 0.0050000 0.0000	24	FIO	23			;L/R motor TC
1.0000 0.0550000	25	GAI	24			;Motor amps to torque
	26	ATT	25			;Applied torque
	27	ABS	26			;Applied force
0.3300000 0.6200000	30	CON				;Dynamic Friction
	31	CON				;Static Friction
0.0010000	32	ABS	48			;Carriage velocity
	33	REL	30	31	31	;Stiction
0.0000 100.003E+09	32					
	34	LIM	27	-33		
0.0000	35	REL	34	34	-34	
	26					
9.3000 0.2100000 0.0012000	40	CON				;Arm carriage mass + shaft inert
	41	CON				;Effective shaft inertia
	42	REL	40	40	41	;Effective mass
	50					
	43	DIV	54	42		;a=F/m
0.0000 0.0013000 0.0013000 0.0000	44	INT	43			;Gear tooth velocity
	45	LME	44			;Backlash zone
0.0000	46	EUL	44			;Gear tooth position
	47	SUM	46	-45		;Carriage position
0.0000 0.0000	48	DIF	47			;Carriage velocity
	50	ABS	45			;How far in backlash zone
0.8000000	51	GAI	44			;Tack feedback
0.6300000	52	GAI	48			;Carriage viscus friction factor
0.1300000	53	GAI	44			;Shaft viscus friction factor
	54	SUM	35	-52	-53	;Sum of forces

Gears and loose linkage have a deadzone effect. Whenever applied motion or applied force is reversed, there is some driving effort before the driven elements begin moving. During this time there is little or no load on the driving forces. Many simulation languages find this difficult or impossible to implement. However TUTSIM can simulate this real nonlinear effect:

Normally, velocity is integrated to give position. A variation of that technique, using the limited integrator blocks of TUTSIM, allows a generation of position from velocity that incorporates the elements of deadzones. Also, the correct load may be selected to reflect back the correct mass to the driving force. Blocks 44, 45, 46, and 47 create the deadzone effect. Blocks 40, 41, 42, and 50 cause the correct load to be used in the dynamics.

Friction and Stiction

These are always with us. There are actually nine cases when even a simple part slides on another. Forward and reverse force and zero force must be considered. Then forward and reverse and zero velocity modify the effective force.

TUTSIM blocks faithfully simulate these effects. The applied force of block 26 is modified and made an effective force at block 35. The technique is apparent from an inspection of the block diagram.

Total Simulation of Single Axis of a Robot Arm in Just 28 Seconds

All of these elements together give a faithful representation of this important industrial device. The total model is approximately 40 TUTSIM blocks. The block diagram is the designer's work sheet. The description accompanying the TUTSIM program is a listing, usually one line per block. Simulation over a 2 second movement in steps of 1 millisecond takes about 28 seconds on an IBM AT equipped with an 80287 coprocessor. The output of any block may be plotted or interrogated during the simulation run. Position and velocity for a step input are shown. Also note the stepped output from the imbedded digital controller. Any condition be be altered and the response from the change noted.

Application notes covering these major aspects are available from Applied i. They explain how the standard TUTSIM blocks can be used to implement these concepts in each case.

2nd International Forum on Microcomputer-based Computer-Aided Design

The Second International Forum on Micro-Based CAD, to be held August 14-16, 1985, will be hosted by Colorado State University in Fort Collins, Colorado.

The purpose of the Forum is to explore the field of computer-aided design and drafting with microcomputers. A mix of industry, education, government and financial communities will provide presentations on a wide variety of CAD/CAM-related topics.

Inquiries about the Forum may be directed to Colorado State University, Department of Industrial Sciences, Fort Collins CO 80523; (303)491-7240, or The MicroCAD Institute, 55 Upland Road, Cambridge MA 02140; (617)497-5300. This year's Forum, once again, will be by invitation only.

W.Va. Gets 495 Computer-Aided Drafting Systems

In the first instance of a statewide adoption of CAD for instruction, West Virginia officials announced the purchase of 495 Auto-CAD programs to be used in 125 occupational and vocational centers throughout the state.

"If our graduates are going to compete in today's job market, they're going to need computer-aided drafting and design skills," said Clarence Burdette, Assistant Superintendent of West Virginia's Schools for Vocational, Technical, and Adult Education. "As CAD becomes more and more prevalent in today's industry, the need for a skilled CAD workforce will continue to grow," remarked Burdette.

The purchase, part of the state's Microcomputer Educational Network program, was funded through a combination of Appalachian regional grant money and the Job Training Partnership Act, using both state and federal funds.

Initially, the AutoCAD-based systems will be placed in six area drafting centers, with up to ten stations at each site. Later, AutoCAD will be installed in such diverse classroom environments as automotive mechanics, wood shop, and even home economics. Autodesk Inc., makers of AutoCAD, will offer extensive teacher training and aid in curriculum development. "We see the computer as a powerful drawing and design tool," said Burdette. "By learning drafting skills on a computer instead of a drafting board, the student is exposed to the basic principles of CAD," said Burdette.

"Like so many other states, West Virginia recognizes the need to re-tool and re-train," said John Walker, President of Autodesk. "The extensive use of AutoCAD in industry and its reputation among professional societies provide a vital link between the classroom and the work environment," said Walker.

For more information, contact Autodesk at (415)331-0356 in California.

Jim Warren's MYTYPE™ Typeset This Newspaper

leave his job at MITS to become Publisher of Benwill's *Personal Computing.* It was a Benwill honcho and a small-time show promoter who approached me — Dave was just an idle observer.

Dave's Good Deeds

In fact, a few hours after the promoters tried to hard-sell me into canceling the Faire and joining 'em, Dave came to me confidentially and said that what the others had told me during the meeting, varied radically from what they said after I left — and Dave felt I should know it. Dave's candor and honesty, in this and other matters, have earned him my ongoing respect.

Almost all the players in that scene have since changed. Dave left *Personal Computing* fairly quickly, and later moved to the San Francisco Bay area. The magazine changed management and was eventually sold to Hayden Publishing.

SDS begats PC begats PCW

Several years later, after the IBM PC was announced, Dave entered an ill-formed partnership with New York's Tony Gold to become founding Publisher of *PC* magazine. After less than a year, Tony sold *PC* to Ziff-Davis Publishers, over the vehement objections of Dave and many of his staff. It took all of two weeks for Dave and his word wizards to cut a sweat-equity deal with megabucks Pat McGovern (of *ComputerWorld* and *InfoWorld,* etc.). Therein, Dave, *et al,* created *PC World* — and promptly circulated lapel pins saying, "There *Is* a Cure for Z-D." Dave went on to create *MacWorld,* and is still Publisher of both of these San Francisco-based mags.

No — Dave wasn't one of those free university hippies in the '60's. Instead, he was an activist in the radical Students for a Democratic Society.

Interesting, Useful, and Loot to Boot

The latter part of *Fire's* statement, however, is accurate. I didn't realize the Faire could mint money until a month after we announced it — as a micro conference and gadget show at Stanford's Memorial Auditorium. After we published the dates and location, based on tentative approval, Stanford turned us down.

This forced us to covet the City's Civic Auditorium, which we discovered rented for thousands of dollars a day! It was only then that Bob Reiling and I sat down at the Pete's Harbor cafe, did the computations to see if we could afford those huge rental fees ... and discovered that we could probably afford the rental and even make some profit for our time and energies.

What more could one ask for? We got to do something interesting and enjoyable, that made a positive contribution to the community, and allowed us to be self-supporting. Now *that's* a truly utopian "trip."

Avoiding Error Propagation

Hopefully, these are the only errors in *Fire.* And, hopefully, the only one that will find its way from there into other "historical fiction" is the one noted in *The Computer Entrepreneurs.* However, that's doubtful.

Therefore, I would be pleased to receive written corrections of any other errors — in any publications, including my own.

INTELLECTUAL LEVERAGE
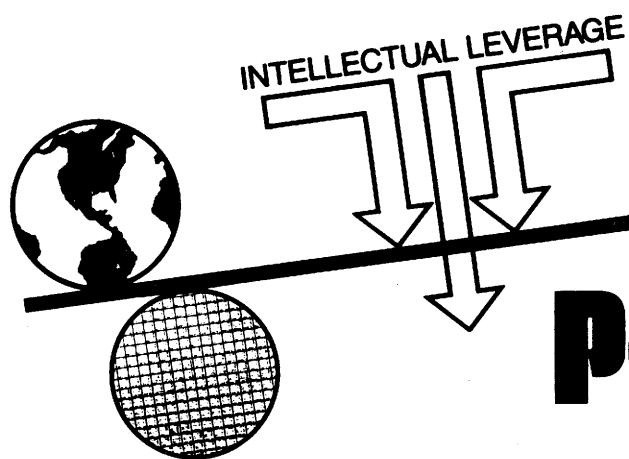
call for participation

Compcon Spring 86 will explore the leading-edge developments across the full computer hardware, software, and networks spectrum. The audience will be treated to a broad-based technical update by leading technical experts and developers. If you wish to make a technical presentation, or wish to organize a technical session, please contact the Program Chairman.

FOR FURTHER INFORMATION:

General Chairman
Glen G. Langdon, Jr.
IBM Dept. K54/282
5600 Cottle Road
San Jose, CA 95193
(408) 256-6454

Program Chairman
Alan G. Bell
Xerox Palo Alto Research Center
3333 Coyote Hill Road
Palo Alto, CA 94304
(415) 494-4326

TO SUBMIT A PAPER: If you wish to make a presentation, please send four copies of a 500-word abstract to the Program Chairman by July 15, 1985.

TO ORGANIZE A SESSION: If you have ideas and potential speakers for a lively session, please contact the Program Chairman by July 15, 1985.

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Dallas Adopts CAD in Drafting Curriculum

The Dallas, Texas, Independent Public School District purchased fifteen AutoCAD 2 computer-aided drafting workstations to provide computer-aided drafting instruction in fourteen of their nineteen drafting labs. Running on microcomputers, AutoCAD allows users up to 90% of the CAD capabilities of large-scale systems that cost up to a half-million dollars each.

A complete workstation, including the microcomputer, input and output devices and AutoCAD software can cost less than $15,000.

The Dallas School District program, which utilized just under $100,000 in local capital equipment funds, is designed to give each drafting student "at least two weeks hands-on experience with CAD," according to Dr. Ron Page, a Specialist in Occupational Education at Dallas Independent Schools. "Companies are now demanding that graduates know new technologies. If graduates don't know CAD, they've just dated themselves twenty years," said Page.

The new AutoCAD 2 software was selected after an extensive search and evaluation. "I was impressed by AutoCAD's speed and ease of use. I particularly like the less costly singe-screen format," commented Page.

Page expects to see strong teacher acceptance and student enthusiasm. "Teachers in designated drafting labs are eager to begin this program and explose their students to the latest industry worktools," said Page. "We think CAD will open up drafting to a much broader range of students."

Autodesk is at 2320 Marinship Way, Sausalito CA 94965; (415)332-2344.

Bar Code Book
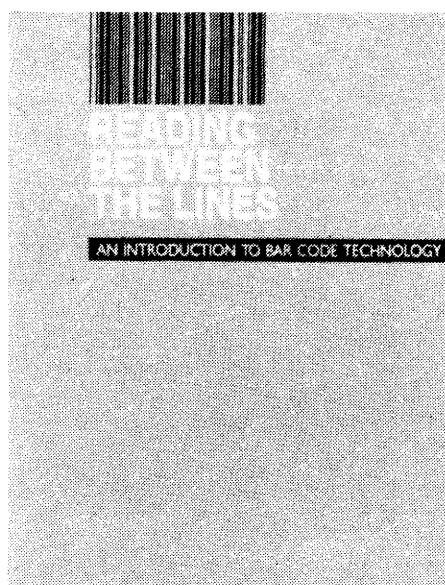
MYTYPE speaks for itself!

Inexpensive In-House Typesetting Using Your Personal Computer

by Jim Warren

On plain bond paper, you can now quickly create letters, documentation, articles, newsletters — and even entire newspapers like this one — fully typeset, using a program called "MyType" and a lowcost laser printer, hooked to your personal computer. MyType is less than $800; the printers are less than $3,000, and dropping fast. Often, these purchase costs can be recooped almost immediately in lower printing and mailing costs, plus being better able to communicate your information. MyType advantages include:

‡ **20%-to-30% text compression**
A 100-page catalog or report can be 70-80 pages, with savings for printing, storage and postage.

‡ **publication-quality, produced in-house**
Stop "suffering" from limited, "mere" letter-quality daiseywheels.

‡ **avoid problems of outside typesetting**
No miscommunication or reproofing.
No "slipped" deadlines by outsiders.

‡ **better communication via fonts, formatting**
Much better presentation of information to your readers.

MyType will be available, shortly, for IBM PC's, Apple computers, and Digital Research CP/M- and Microsoft MSDOS-based machines; using the Hewlett-Packard LaserJet, Apple LaserWriter, as well as some other laser-based printers, high-quality phototypesetters, and lower-quality daiseywheel and dot-matrix printers. ("MyType" is a trademark and trade-name of Jim Warren. CP/M, LaserJet, and LaserWriter are the trade-marks of the indicated companies.)
Here are some things MyType does:

Lines Any Length; Multiple Columns
You can specify any column width that will fit on the printing device, and can have text automatically printed however many columns you wish.
|< ----- *e.g.,* 3-1/3", user-specified width ----->|
All widths, heights and measurements can be given in inches, centimeters, millimeters, picas (6 picas/inch), points (12 points/pica), or decipoints (720 decipoints/inch).

All Justification Options
Paragraphs can be typeset in any mixture of full justification, left-ragged, right-ragged or centered lines. These are set up as single commands at the beginning of the text to be typeset in each of those formats.

Hyphenation
For ease of reading, maximum text compression, and pleasing asthetics hyphenation is an option that minimizes white space between words. When "turned on," it is semi-automatic:
MyType tries to fit words — using a 120% white-space allowance. If this fails, it asks the user for the best hyphenation of a line's final word, indicating the part of the word in which the hyphen — if any — will fit

An advanced version of MyType is planned for August release — MyType II. It will include fully automatic hyphenation (for extra loot, o' course). Those who register as purchasers of the current version of MyType will be offered the upgrade to automatic hyphenation — when available — for only the difference in price between the current version and the enhanced version (plus cost of recording media, shipping and C.O.D.).

Special Characters
MyType gives special treatment to certain character sequences — plus offering a growing "vocabulary" of non-ASCII characters. For instance ... if something weren't done, the preceding dot-dot-dot *ellipsis* would look like ... displeasingly compact. Or, consider the *em-dash* — the long dash splattered throughout this article. It is much preferable to a hyphen - , or the two hyphens -- which MyType quickly converts to the em-dash.
MyType includes other desirable non-ASCII characters, such as □, ¢, † and ‡ — and more are being added, weekly.

Leadering
Traditional typesetters have another useful command. It's called *leadering*.
A "dot leader" looks like . . . . this.
However, MyType can use any character for leadering, for instance - - - - - - - - - like this.
There can be -------- multiple .... leadering in a single line. Using the " " character quickly draws an underline, like this: _____.
Note that the earlier leadering was more widely spaced than the last line — the user can use single commands to cause either to occur.

Push-Aparts
There's also a "push-apart" command-code. When placed in a line, all white space will be inserted at that point — or those points — rather than being equally distributed between the word-pairs as is normal in justified text. For instance:
Mytype   *a Jim Warren Product*
345 Swett Road   Woodside, CA 94062
(415)851-7075

Temporary Indents, Left & Right
With traditional, fixed-space, fixed-linefeed printers and typewriters, indenting a given width for a given height is easy. Proportional-spaced fonts and incremental vertical spacing changed all that. *MyType* allows temporary indenting on the left and/or on the right by any of three options: *(1)* indent until told to stop indenting (as was done with the first two sentences of this paragraph), *(2)* indent for *n* number of lines, or *(3)* indent for *x* vertical distance.
For instance, this paragraph begins with indentation of one pica on the left and one inch on the right, and continues it for one vertical inch of text. This produces a 1" x 1" square space on the right.
These several kinds of temporary indents allow text such a quotes or supplementary notes to be visually set off from the main body of text, and allow easy creation of these areas known as *run-arounds* — blank space for a graphic, diagram, or photo to be later pasted into the camera-ready type.

Fields Within Lines
It's easy to do tab-fields on fixed-space printers, but it's an entirely different matter with proportional-spaced character fonts and

fine-resolution positioning control. MyType offers several options:
You may specify fields by their widths, or right endpoints, or the lengths of given text-strings. Text in each field may be left- or right-justified, or centered, just like lines.
Here's an example:

MyType 0	pre-production	*now avail.*
MyType I	semiauto. hyphens	*Jul., 1985*
MyType II	auto. hyphenation	*Aug., 1985*
MyType III	speller & dictionary	*Oct., 1985*

Many More Features
Only a few of MyType's features have been presented, here. There are many more — and still others are being added, weekly.

Begin Using MyType NOW!
You can get MyType in its current, pre-production "*Version 0*" form for Alpha Micro/-LasetJet systems — and begin using it immediately. Although this is a limited-apability version, it is sufficiently robust that it produced all editorial content of this *Silicon Gulch Gazette*. The first full-capability production copies — *Version I* — will be available by July, 1985, planned for the Alpha Micro and for the IBM PC.
Have your cake and eat it, too: Purchasers of the pre-production Version 0 — who want to begin using limited MyType immediately — will be upgraded to Version I as soon as it is available, for only the cost of the recording media, shipping, and UPS COD fee.

Or, Wait 'Til Later — It'll Get Better (For Horse Riders, Waiting for Solar Cars)
You can wait another several months and get MyType I. However, pricing may change — for better or worse. And, you won't get to use it in the meantime.
MyType 0 for Alpha Micro computers with H-P LaserJet printers is available from your local Alpha Micro dealer or from the distributor of MyType for Alpha Micros: CA Software, 14 Woodside Way, San Rafael, CA 94901, (415)485-1009, *attn:* Adrien Charron.

please clip and return

- -

I don't have an Alpha Micro computer right now, but I want MyType. Please send a detailed product description and pricing, as soon as it is available for my system:
  computer:
    IBM □PC, □XT, □AT
    Apple □II, □III, □IIc
    other: _____
  operating system:
    IBM/Microsoft □PCDOS, □MSDOS
    DRI □Concurrent CP/M, □MP/M
    other: _____
  memory capacity: _____ kilobytes
name: _____
company: _____
shipping: _____
  address: _____
city: _____ state: ____ ZIP: _____
phone(s) _____
applications: _____

Please return this to:
MYTYPE
345 Swett Road
Woodside, CA 94062

Drafting Output Boosted 40%
(continued from front page)

that eventually I would have to learn how to use one — or else find another profession. Since I didn't relish launching a new career, my aim became a very simple one: find a capable CAD system at a price I could afford.

CAD "Wish List": Pointer Input, Transmittable Drawing Files

At the top of Miller's "wish list" for a CAD system were two key features: the capability to accept input from a light pen pointing at the monitor screen, and the ability to create ASCII-coded drawing files that can be transmitted to other computers.

As an artist, he felt it would be more natural to draw directly on the surface he was looking at; thus he preferred a light pen to a digitizer tablet. And, since he frequently sent drawings to his clients and SCA associates, he wanted a CAD package he could use in an electronic mail scheme.

AutoCAD Met His Needs

At the time Miller was in the market for a CAD package, the AutoCAD software from AutoDesk, Inc., was the only product he encountered that met his particular set of requirements. It is a generic, two-dimensional drafting package for creating and editing drawings, and generating hardcopy output using any of a variety of pen plotters. It enables Miller to euickly draw, move, modify, erase, rotate, duplicate and scale any drawn object.

To create a drawing, Miller works from a rough sketch prepared by a tech writer. Using AutoCAD's multi-layer capabilities, Miller draws construction guidelines on an otherwise unused layer. He then uses these guidelines as an overlay, turning them on and off as he needs them.

Miller finds that using a micro is vastly different from drawing manually — the only similarity is the holding of a pen. For example, when he wants to draw a line with AutoCAD, he selects the LINE command in the menu along the right edge of the screen. He then places the tip of his light pen on the points where he wants the line to start and end, and the line is drawn automatically.

"I can draw a line just as quickly with my old drafting equipment," Miller observes, "but making changes — shortening a line, moving it, or getting rid of it altogether — is much faster on the micro. And because there's no erasing involved, the drawings are much neater."

Block Commands Permit Wholesale Modifications

Besides changing single lines, Miller's CAD system enables him to easily make wholesale modifications to a drawing. Using AutoCAD's block move command, he can move entire sections of a drawing in one fell swoop. And, using the software's block insert command, he can insert previously created drawings and symbols that are stored in external files.

In conjunction with the block insert command, Miller can also utilize "template" drawings, modifying them as necessary — an important capability since up to 20 percent of the drawings in many of his projects are similar.

Moreover, he can readily use a special library of symbols he has created. When drawing a logic array, for example, Miller puts his library of electronic logic symbols on the highest level of overlay. He then calls up the symbols from this invisible layer as he needs them.

"I now have much greater flexibility in laying out a drawing," he says. "Much of an illustrator's skill lies in anticipating how the elements of a drawing will fit together. But it's practically impossible to get a layout perfect on the first shot; there's always some juggling to be done.

"AutoCAD's block commands and multiple layers give me the freedom to try a variety of approaches when doing a layout."

Continuing to Explore

Now that he has progressed beyond the novice stage as a CAD user, Miller is exploring the more sophisticated short-cuts that his system offers. For example, he reserves one of AutoCAD's 126 on-screen layers for an associate to enter call-outs — the text on a finished drawing. That used to be an exacting and time-consuming task on the IBM composer.

Miller also expects to use his communications capability more fully. Increasingly, his clients are requesting that their drawings be delivered in machine-readable form. Until now, he has accommodated those clients by sending them drawings on floppy disks. But he will soon begin transmitting drawings directly by telephone, eliminating the time and expense of a courier or the U.S. Mail — or delivering them himself.

Looking back, Miller says, "Although I was impressed with the first mainframe CAD system I saw [in aerospace, long ago], it really can't compare with my micro-based drafting system for speed and features. For a few thousand dollars, I have drafting facilities that couldn't have been bought at any price at the beginning of my career."

Wideband Portable Recorders Compatible with PC's

Kyowa Dengyo Corporation's 14-channel, seven-speed RTP-650A and four-speed RTP 610A are portable data recorders which offer wideband FM analog recording, pulse code modulation (PCM) digital recording, and GP-IB interfacing to desktop PC's for a computerized data acquisition and processing system.

Both models use Beta-format videocassette tape running at speeds from 15/32 to 30 ips. Standard FM recording bandwidth at high speed is DC to 40 kHz. Optional 300 Kbps PCM recording is available with an add-on amplifier. An analog/digital converter and Kyowa's RG-65A GP-IB interface allow computer control over the recording and processing of data.

The RTP-650A data recorder also includes an electroluminescent (EL) display. The EL display permits menu-driven recorder setup and monitoring of the recording process with waveforms and bar charts.

Direct recording is optional.

For more information, please contact: Thomas Lento, Sardi & Bleecker Advertising and Public Relations, 37 Station Drive, Box 249, Princeton Junction NJ 08550, (609)799-1890.

80+ Programs Listed for Computer-Aided Design and Drafting

The *AutoCAD Applications Catalog* lists over 80 programs which tailor its computer-aided drafting and design facilities to specific application areas. The catalog is a quarterly publication.

AutoCAD software is low-cost and runs on most microcomputers. It provides any professional who draws with most of the capabilities of vastly more expensive mini- and mainframe-based CAD systems.

From Architecture to Theatre Lighting

The *Applications Catalog* is a compendium of software packages that have been developed by AutoCAD users to integrate AutoCAD into their particular CAD application environment. The Catalog lists a wide range of programs in disciplines such as Architecture, Electrical Engineering, Electronic Engineering, Chemical Engineering, Civil Engineering, Mechanical Engineering, Structural Engineering, Construction, Facilities Planning, Graphic Database Translation, General Drafting and Theatrical Lighting.

"We designed AutoCAD to be easily customized from the very beginning," said John Walker, President of Autodesk, Inc., the producer of AutCAD. "We've always felt that this feature is one of the greatest strengths of our program. It allows AutoCAD to serve as the heart of highly customized CAD workstations. The large number and quality of third-party software packages included in our catalog supports this theory."

Programs will be listed in the catalog in one of four categories: Autodesk products; products supported by Autodesk, that are tested, reviewed and distributed by Autodesk; products qualified by Autodesk, that are reviewed by Autodesk for compatibility across machines and can be ordered through the product vendor; and products that vendors state are compatable with AutoCAD, which are available through the product vendor.

Voted Best 1984 Tech Program

With 15,000-20,000 installations, worldwide, AutoCAD was named the "Technical/Scientific Program of the Year-1984" by eight leading computer trade publications in the United States. AutoCAD is a product of Autodesk, Inc., 2320 Marinship Way, Sausalito CA 94965; (415)332-2344.

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dBASE II Multi-User Version Discontinued in U.S.

Ashton-Tate announced recently that it has discontinued shipment in the U.S. and Canada of the multi-user version of dBASE II. Shipment of the product will continue in the international markets.

According to Ashton-Tate multi-user product manager Ron Aarons, the company plans to make a multi-user version of dBASE III available in the future. "The multi-user version of dBASE III will take advantage of newly available hardware. This product will allow corporate users to enjoy the efficiencies that can result from an accessible departmental database," Aarons said.

Aarons added that the multi-user version of dBASE II will continue to be marketed overseas. "The product has enjoyed broader interest overseas," he commented.