An easier keyboard for your operator...
An advanced tape station for your computer

The Tally Datascribe emphasizes simple operation with your keypunch operator in mind ... and a host of versatile data handling options for more efficient utilization of a key-to-tape recorder. If you already have key-to-tape recording and communications equipment, you'll be especially interested in Datascribe. That's because Datascribe designers took the time to reflect on the shortcomings of all the earlier key-to-tape equipment in order to build a better machine.

The keyboard is virtually identical to the conventional keypunch keyboard. Operation is so simple you can learn from the manual if you choose. For training purposes, all data is displayed in English language. Both the 7 and 9 track units are identical in operation and features.

The Datascribe system is one basic unit which, with the addition of appropriate plug-in options, can be additionally used as a remote data terminal, pooler, high speed communicator or high speed print station.

The Datascribe offers a unique and highly efficient data compression feature. In the transmission mode, one character can be used to represent many when data is identical to the preceding data or preceding record. Datascribe operates over dial up telephone lines. Both supply and take-up for full 10½″ reels is standard.

And this is just the beginning. Call your nearest Tally regional office or contact us here for full details.

Tally Corporation, 8301 South 180th Street, Kent, Washington 98031. Phone (206) 251-5500.

Regional Offices:

Chicago: 33 North Addison Road, Addison, Illinois 60101 (312) 279-9200

Dallas: 2339 Inwood Plaza, Dallas, Texas 75235 (214) 521-5657

Los Angeles: 501 N. Golden Circle Drive, Santa Ana, California 92705 (714) 542-1196

New York: 45 North Village Avenue, Rockville Centre, Long Island, N.Y. (516) 678-4220

Richmond: 5404 Distributor Drive, Richmond, Virginia 23225 (703) 231-0259

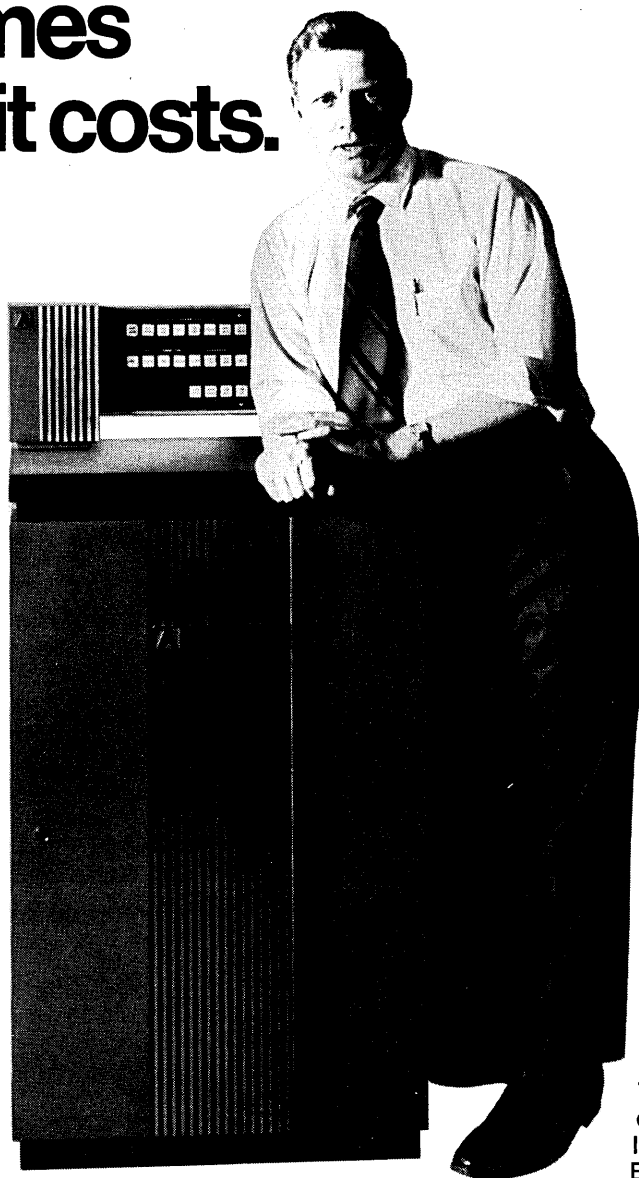San Francisco: 420 Market Street, San Francisco, California 94111 (415) 989-5375

England: Tally, Ltd., Tally House, 7 Cremyll Road, Reading RG1 8NQ, Berkshire Reading 580-142

TALLY°
Vanguard Series

What's a remote batch terminal that's compatible with 4 main frames worth?

About 4 times more than it costs.

That's right! The new Atron MULTI-COMM Terminal is compatible with 4 different main frame modes—the IBM 2780 BSC, the CDC 200 UT, the Univac 1004, and the XDS/Univac DCT 2000— *yet costs only about as much as a standard remote batch terminal.* So, for the price of one, the new Atron MULTI-COMM Terminal gives you the communication ability of a number of remote batch terminals with the flip of a switch.

Proven Lowest Cost-To-Performance Ratio

No other terminal manufacturer can offer you so much for so little. For example, the Atron MULTI-COMM Terminal shown with the IBM 2780 BSC and Univac 1004 modes leases for just $1,410 per month (including maintenance) and gives you all these operation capabilities:

● 400 CPM Card Reader ● 380 LPM Line Printer ● 8K Byte CPU ● MULTI-COMM Channel (requiring only one data set)

You don't need a highly skilled computer operator on your staff to use it either. Or an expensive storage system. You simply switch-select the desired mode from the set of immediately available core resident communication modes.

Of course, since the Atron MULTI-COMM Terminal is programmable, you can do your own on-site computer work and

minimize costly connect time and central site usage. And you'll quickly discover how much faster and easier programming is when you're working with truly "compiler level hardware" ... the perfect blend of hardware and software.

Total Flexibility

"Ah, but is there a MULTI-COMM Terminal that will fit into my operation?" This is a question we look forward to answering. Because Atron remote batch terminal systems are not only compatible with all common communication modes, they're *totally flexible.* You tailor peripheral components to your system needs:

● Card Readers — 225 to 1000 CPM
● Line Printers — 135 to 1250 LPM
● Magnetic Tape Units — 7 and 9 channel

And if you have special systems requirements, we have the special peripheral component to handle them. So, whatever your operational needs, we can help you build the system to handle them.

We stand behind our equipment too ... with over 75 authorized Atron service facilities.

If you'd like to hear more, just give us a call ... or drop us a line. We'll be happy to give you a cost-performance analysis for your operation.

ATRON CORPORATION
1256 Trapp Road • St. Paul, Minnesota 55121 • 612/454-6150

DATAMATION ⑦①

A PRIL FOOLS' ISSUE

C OMMENTARY

About the Cover

Henry Martin's flipped-out computer sets the proper tone of cheeriness for our feature articles. After that things settle back to normal. But you're on your own.

DATAMATION®

IT'S TOO THICK
TO PHOTOCOPY
So you'll need your own
personal copy of the
Datamation Industry Directory.

The Cybermess.

(Cleared up by Cybermatics Inc., Fort Lee, New Jersey)

What you see in the picture below is a bad case of cyberling rivalry.
The phone book is full of companies named Cyber-something. Since we helped make this mess, we'd like to clean up our corner of it.

CYBE-D N L ELECTRICAL

Cybe-Tape 468 Park Av S	— — — — — — — 686-7654	Cyplot
Cyber Data Systems Corp 200 ParkAv	— — — — 986-2515	Cypk
CYBER-TRONICS INC		Cypre
4 NevadaDr LkSucces	— — — — — — NYC# 895-0870	Cypres
Cyber-Tronics Inc sales 350 5Av	— — — — 736-8392	CYPR
Cyber-Tronics Inc svce 350 5Av	— — — — — 736-8388	
Cybercom Corp 342 MadAv	— — — — — — 972-1932	Cypre
Cybermark Systems Inc 745 5Av	— — — — — 759-8530	Cypr
Cybermatics Inc		Cypr
2460 LemoineAv FortLeeNJ	— — — — NYC# 594-7319	Cypr
CYBERN EDUCATION INC 501 MadAv	— 758-5544	Cypres
Cybern-Education Inc 299 ParkAv	— — — — 758-5544	Cypres
CYBERNETIC APPLICATNS INC		Cyp
	280 ParkAv 869-1100	Cyp
Cybernetic Developmnts Inc 101 ParkAv	— — — 889-3537	Cypr
Cybernetic Systms Corp 236 5Av	— — — — 686-1470	Cyp
Cybernetics International Corp 280 ParkAv	— 869-1100	C
Cybernets Group Inc The 101 ParkAv	— — — 889-3535	
CYBERT TIRE CORP 726 11Av	— — — — CO 5-1177	C
Cybertek Inc resrch 65 E55	— — — — — 421-2890	C
Cybertype Advtng Co 80 5Av	— — — — — 691-347	
Cybertype Corp 80 5Av	— — — — — — 691-347	
CYBERVOX SYSTEMS INC		
2224 HewlettAv Mrick	— — — — 516 623-3	
CYBETRONICS INC		

Here's the mess, torn from the phonebook. We're in there somewhere. Can you find us?

Our full name is "Cybermatics." You won't find the word in a dictionary yet, but it has a precise meaning: the science of managing information-communication systems.

That's exactly what Cybermatics Inc. does. We develop on-line computer systems. This is the big leagues of the computer game. It takes big-league talent. Four of the 18 great brains in on-line computers work at Cybermatics.

Companies don't build on-line computer systems every day. So it may be quite a while before you ask your secretary to get you "Cybermatics."

But when you do, please pronounce it very, very carefully.

© 1970 CYBERMATICS INC.

CIRCLE 29 ON READER CARD

DATAMATION

DATE	EVENT/SPONSOR	LOCATION	CONTACT	COST
April 11-13	COMPSO West	Los Angeles	Computer Expositions, Inc. 37 W. 31st St. New York, N.Y. 10018	Free preregistered $2 at door
May 2-5	Assoc. of Business Forms Mfrs. Annual Meeting	Miami	ABFM P.O. Box 5737 Washington, D.C. 20014	Unknown
May 4-6	SID Int'l. Symposium	Philadelphia	Lewis Winner 152 W. 42nd St. New York, N.Y. 10036	Unknown
May 18-20	Spring Joint Computer Conference	Atlantic City	AFIPS 210 Summit Ave. Montvale, N.J. 07645	Preregistration $20, members $50, others
May 25-28	20th Annual Convention National Microfilm Assn.	Washington, D.C.	NMA Suite 1101 8728 Colesville Rd. Silver Spring, Md. 20910	Unknown
June 1-4	NRECA 7th Annual DP and Automation Conference	Atlanta	C. E. Aultz National Rural Electric Cooperative Assn. 2000 Florida Ave. N.W. Washington, D.C. 20009	Unknown
June 3-5	Conference on Area-Wide Health Data Network	Buffalo	Continuing Medical Educ. 2211 Main St. Buffalo, N.Y. 14214	$90
June 20-26	2nd Annual Interactive Computer Graphics Conf.	Palo Alto	Prof. David A. Thompson Dept. of Industrial Eng. Stanford Univ. Stanford, Calif. 94305	$395
June 22-25	DPMA Conference & Expo	Houston	DPMA 505 Busse Highway Park Ridge, Ill. 60068	Unknown
July 26-30	International Computer Expo. for Latin America	Mexico City	Sociedad Mexicana de Computacion Electronica Yacatas, 435 Mexico 12, D.F.	Unknown
Aug. 3-5	1971 National Conf. of the ACM	Chicago	ACM 1133 Ave. of the Americas New York, N.Y. 10036	
Aug. 3-5	The Counter-Conference	Boulder, Colo.	David Burmaster 545 Technology Sq. Cambridge, Mass. 02139	
Aug. 16-20	Jerusalem Conference on Information Technology	Jerusalem	Jerusalem Conf. on Info Technology P.O. Box 7170 Jerusalem, Israel	
Aug. 22-27	Int'l. Conference on Information Science	Tel-Aviv	ISLIC P.O. Box 16271 Tel-Aviv, Israel	
Aug. 23-28	IFIP Congress 71	Ljubljana, Yugoslavia	IFIP Congress 71 Box 4197, Grand Central New York, N.Y. 10017	

CALENDAR

POTTER LP 300
135 LPM, UP TO
$3,385 E

This is the lowest price in the world for a printer with these characteristics. Until now, system manufacturers have had to decide between 15 char/sec. typewriters or the high priced 300 lpm or faster computer printers. The Potter LP 3000 combines high speed with low cost.

The Potter LP 3000 Line Printer is ideal for data communications systems and mini-computers. At 300 char/sec. or 135 lpm it is perfectly matched to 2400 baud data rates and offers more than 10 times the speed of ordinary I/O typewriters — all at only a fraction of the cost of computer line printers.

D LINE PRINTER 132 COLUMNS ACH/100

Designed with just a small percentage of the parts used in other printers, it gives you a level of reliability never before possible. You can incorporate the Potter LP 3000 Printer into your system easily and with confidence. It's in production now!

For information on the LP 3000 and any of Potter's complete line of magnetic tape transports, disk drives, printers or 96 column card peripherals, contact Potter Instrument Company, Inc., 532 Broad Hollow Road, Melville, N. Y. 11746. Phone: (516) 694-9000

Our COM graphics capability lets you do some great card tricks.

See that aperture card? It contains a precise, microfilm image of stored computer data. Time lapse from data input to processed output? Less than a minute.

Our new Microfilm Plotter lets you do some other impressive tricks, too. A single-data input command can produce a circle, arc, line or vector in solid, dashed or broken lines.

Other capabilities include overplotting. Previewing on monitor scope. Optional alpha-numeric character generator. Plus other options depending on your particular application.

Price? You'll be surprised how little it costs.

So if you're still plotting computer data on paper, chances are our Microfilm Plotter is just what you need to cut that work load down to size.

For details, contact The Bendix Corporation, Computer Graphics, 23850 Freeway Park Drive, Farmington, Michigan 48024. (313) 477-3700.

Bendix

LETTERS

Slanted opinion

Sir:
Data processing has spawned more illogical, unscientific, inappropriate, foggy, slippery, ill-chosen terms than any other field of science or technology. Especially to be decried are the compounds formed with hyphens and slants. And now the latest monstrosity is upon us: price/performance. This from "Benchmark Changes in the '70s" in the Jan. 15 issue.

". . . but mostly the 3½th generation is defined by price/performance, one of the few commodities that can be sold in a down market."

Find me one person who will define that piece of jargon in terms acceptable to anyone else. In the name of English decency, please do what you can to stamp out the spread of price/performance.
GERALD COHEN
Staatsburg, New York

We don't have the time/space.

Ethics epic

Sir:
The Jan. 1 News Scene contains a very inaccurate reference to the 26,000 members of the Association for Computing Machinery. According to the article on p. 58, a rather young and small (2,000 members claimed) organization of programmers and analysts pretends to be "already ahead of the other organizations by having a code of ethics . . ."

Since November of 1966 the members of the ACM have had strong guidelines for our ethical conduct in this field. These guidelines, entitled "Professional Conduct in Information Processing," cover relations with the public, employers and clients, and with other professionals.
MICHAEL F. WEISBARD
Elmhurst, Illinois

Higher and hire

Sir:
It's quite likely that the long-haired youth in the cartoon on p. 50 of your Feb. 1 issue is thinking (in response to

the question posed by his establishment elder, "Are you familiar with the Protestant work ethnic?") the following thought: "Yes, the higher you go the whiter you probably are."
WILLIAM J. WILSON
Huntsville, Alabama

For his thoughts

Sir:
I usually enjoy the cartoons in DATAMATION, but the one in the Feb. 1 issue showing a personnel manager asking an applicant whether he was familiar with the Protestant work ethnic left me a little dazed. No more ethnic jokes, please.
WALTER PENNEY
Greenbelt, Maryland

White flag

Sir:
Okay—we give up. What's the Protestant work ethnic?
CANDY WILMOT
TOM ALLEN
Urbana, Illinois

It's when a typographical error creates misunderstanding and almost a moment of truth. However, it offended our code of ethnics, too.

Rolph can't myth

Sir:
Mr. Rolph in his discussion of 1970's money problems (Jan. 15, p. 28) supports the myth that there is a shortage of venture capital. In reality, a number of new sources of venture capital opened up during last year. What actually did disappear was the public market for newly formed corporations and with it those "investors" who relied on the "greater fool theory." Such speculators hope that naive individuals will buy their shares at ever higher prices regardless of the actual value of the company, permitting the original "venturers" to benefit before the inevitable collapse of the stock. That these money sources have been driven from the market should cause little regret, since their manipulations make it very difficult for deserving

companies to raise additional funds subsequently.

Venture capitalists can still be "turned on by a new concept or a technological breakthrough," but will insist, as true venture capitalists always have, on a realistic cash flow that supports a potential business opportunity. Some feats that are technologically fascinating should not be funded by venture capital; e.g., moon flights and supersonic transports.

Groups with unique capabilities and obvious commitment will find that venture capitalists are still around and are interested in listening to their stories.
KENNETH W. RIND
Oppenheimer and Company
New York, New York

Your phone's ringing.

Slide remarks

Sir:
Reference: "Fearless Opinion" (Letters, Jan. 1, p. 12).

In answer to the question posed, Corning Data Systems, Raleigh, N.C., manufactures the Corning 904 interactive graphics display terminal, which is suitable for the task of visual verification of character pairs.

The Corning 904 employs a photo-

chromic storage crt making possible an integral hard-copy unit and superimposed slide projection system for presenting static information. The 8½ x 11-inch screen is able to display up to 4,608 characters in a 72 characters-per-line, 64 lines-per-display format. The unit seems to satisfy all requirements of the proposed application, and sells for under $20,000.
DANIEL J. SLISKI, JR.
Associate Editor
Computer Display Review
Watertown, Massachusetts

Letters . . .

Ab uno disce omnes

Sir:
Sic ignotum per ignotius! If I read my dictionary correctly, that seems to be an apt analysis of your Dec. 15, 1970, article, "Election Woes Again in Maladroit Detroit" (p. 64). In other words, it would help if you had your facts straight and especially from an unbiased source. The vendor of any equipment or system usually finds it hard to be objective about the performance of his product, and it is obvious from your article that Mr. Thomas L. Schoen of Datamedia is no exception. As a friend of mine is fond of saying " . . . if you believe that (story), I'll tell you another one. . . ."

The fact remains, as pointed out by Bob Patrick in your May 1970 issue with reference to the L.A. voting system, it's really stretching things pretty far to call it a system. And I wonder whether the cost of running the last L.A. election can ever be justified, provided one can determine the *true* costs.

If you ever lack for things to do, you might consider establishing the criteria for conducting a feasibility study to determine what the best method for voting should be. One basic question should be paramount. Is the absolute integrity of the vote maintained throughout the *total* voting process from casting the vote to reporting the results? If done objectively, I think you'd be in for some surprises when it comes to computerized voting schemes.
H. R. GRYSH
Detroit, Michigan

Paper plaint

Sir:
May I suggest that in *De Ludi Natura* (Feb. 1, p. 34), Messrs. Endicott and Huyck have achieved a less than revolutionary breakthrough in defining "what do programmers do?"

They tell us that designing information is very similar to designing a technical paper, in their paper which contains the following fairly obvious assertions:
1. "There are many principles of good design. Design should be hierarchical with no flat levels."
2. "Control storage should be understood to be the base element in a set of storage hierarchies" (this comes at the end of a seem-

ingly unrelated paragraph).
3. "Problem representation has a very strong influence on design."

For a good chuckle, try reading the last paragraph, identifying the subject, and then expressing it in good English.

Hoping for "increased ease of recruitment into the profession of talented individuals," I am
KENNETH P. SEIDEL
Northridge, California

Penn pal

Sir:
In the Look Ahead column of the Jan. 15 issue, you refer to a data entry terminal "deal" between Penn Central and Sycor, Inc. I would like to clarify your report by indicating that the terminal project has not been approved by Penn Central trustees. The results of the field test of Sycor equipment developed for the Penn Central Transportation Co. must be evaluated before any recommendation of new data entry terminals is presented to the trustees.
T. J. SMITH
Vice President, Marketing
Sycor, Inc.
Ann Arbor, Michigan

To the rescue

Sir:
Mr. Philip Dorn, in his article, "EDP Professionals—the Blurred Image" (Jan. 1, p. 22), denounced the apathy of the so-called computer professional. The technical societies came under fire for their meager contribution to the professional image, both within the public eye and within the industry.

I submit this status of technical societies is created by their apparent lack of interest in recruiting new members. For, if they make any attempt at all, it must be classed as abortive, at best.

Since entering the data processing field in 1968, after my return from Viet Nam, I have attended an 11-week Air Force data processing school, a 10-week systems engineer school, and am nearing completion of my MBA in data processing at Temple Univ. I belong to two data processing book clubs and receive five monthly trade magazines.

Even though I am a Marine first, I consider myself a data processing

professional second; and yet no one, or any organization, has ever contacted me about joining a technical society. I work daily with two IBM Model 360/50I computers under OS MFT, so would not consider myself a complete layman in the field.

If the Marine Corps recruited in the manner of the technical societies, I would rapidly be without employment.

My point is short and sweet. I am sure there are many like myself in both the military and civilian organizations of data processing. Why don't the technical societies at least advertise where they can be contacted.

I want to belong to an active professional organization—help, please.
MAJOR ROBERT K. NIXON
Marine Corps Supply Activity
Philadelphia, Pennsylvania

Round off

Sir:
Recent complaints about the dissemination of census information center on the fact that it is possible to determine precise data about a specific individual. Most of the solutions which have been offered concentrate on making the data nonspecific. Thus, identifying information is removed from data records, or only statistical data are published. As has been shown (DATAMATION, May 1970), these methods do not guarantee privacy.

I suggest that the other side of the problem can also be attacked: Make the data less precise. As a start, all data counts could have the last digit rounded off. If data tapes are distributed, introduce random errors. If reasonable care is taken, the data will still provide reasonably accurate statistics for all but the smallest samples. And yet, no individual item could be reliably attributed to a specific individual. (And if it were, that item might still be false.)
DENIS HILL
Ottawa, Canada. ∎

8 Keystation
shared processor system
for $120 a month
per Keystation

The INFOREX Intelligent Key Entry™ System leases for $50 per Keystation and $560 for the Control Unit, including maintenance.

Costs less, yet we give you more. Full 125-character record display. Key and visual data verification at any station. Ability to store more than 100 program control formats in our System's disc memory. Up to one third more functions such as balance totaling, calculating and comparing check digits. Automatic pooling on 7- or 9-track compatible tape.

How do we provide a lot more at lower cost? INFOREX is a company of information processing experts rather than hardware assemblers. So instead of making do with higher cost general purpose equipment, we design our own to do the job more efficiently, more reliably. Means we can build in every function we need, while leaving out the useless extras.

Write for full information to help evaluate the Intelligent Key Entry System in your operation. We would also be pleased to have you check with present users on System performance and service. Write INFOREX, Inc., 21 North Avenue, Burlington, Mass. 01803 or INFOREX AG, Dornacherstrasse 210, Basel, Switzerland.

▶● INFOREX

CALL FOR PAPERS

1971 FJCC

"Computers and the Quality of Life"

The 1971 Fall Joint Computer Conference will be held in Las Vegas, Nevada on November 15, 16, 17 and 18, 1971.

The scope of the conference will encompass the entire information processing field. However, the primary theme will be the use of computers to improve the quality of life. In particular, application papers are solicited for sessions relating to such topics as Urban Planning, Environmental Control, Education of the Disadvantaged, Planning for Change in Highly Industrialized Nations, Accelerating of the Progress of Emerging Nations and other problems of our world society. A prime objective is to stimulate interest which will lead to new developments and advances. Authors are invited to submit original papers in these application areas, and in system design and hardware/software technology.

AFIPS will award a plaque for the best paper of the conference, based on the technical importance and quality of the written papers.

Instructions to Authors

Only new unpublished papers may be submitted. The text should not exceed 6000 words. Include a 100-200 word abstract and a full set of illustrations keyed to the text. Obtain any necessary company approval before submission.

Manuscript must be typed, double spaced, one side of the paper only. On the first page give: title; full name of author(s) with co-authors in desired order; company or university affiliation of each author; name, address, and telephone number of the responsible author. Responsible author's name and page number must appear on each subsequent page.

Six copies of the draft manuscript, each complete with abstract, and illustrations (all of which will be retained) must be submitted. Please notify the Technical Program Chairman in advance of your intention to enter a paper.

PAPER DEADLINE APRIL 1, 1971

Ralph R. Wheeler
General Chairman

Dr. Martin Y. Silberberg
Technical Program Chairman

1971 Fall Joint Computer Conference
P.O. Box 11337
Palo Alto, California 94306

B5700

Large scale techniques and operating system benefits at a low entry price!

Your company, your bank, your university, your government agency, your research and engineering group can move into advanced, large scale data processing, *now*, at lower cost.

Burroughs makes it possible with the B 5700, one of the '700 Systems'.

By most industry standards the B 5700 is revolutionary. It offers:
● dual independent processors, modular memory, floating I/O channels and electronic exchanges that link these components dynamically

● automatic multiprograming, virtual memory, reentrant programs, Burroughs comprehensive and efficient Master Control Program, ALGOL-COBOL-FORTRAN and BASIC programing, and powerful data base software
● options that include high-speed memory extensions, massive random-access disk storage that up to four systems can share, plus a large and powerful data communications subsystem
● an exceptionally broad selection of peripherals, terminals, inquiry and display systems,

data controllers and auxiliary equipment.

Many of these advanced design concepts and operating features are backed by a record of solid achievement in customer installations. That's added proof that the B 5700 is one of the most productive, responsive, simple to program and easy to manage systems ever built.

B 5700—it's the smart way to prepare for even larger systems like the B 6700 and B 7700.

Burroughs

VIATRON: STILL AN ATTRACTIVE BUY?

All those companies that looked at Viatron Computer Systems Corp. last fall with the idea of acquiring the beleagured Bedford, Mass., company, appeared to have been taking a second look now that the big V's filed for protection under bankruptcy laws. That $40 million tax loss carry forward makes Viatron a particularly attractive acquisition, provided the legal proceedings result in the company's debt slate being wiped clean.

OH WHERE, OH WHERE - BUT IS IT GONE???

King Arthur's Merlin couldn't do better. Something disappeared from IBM San Jose and hasn't been missed. IBM code-named its 3330 disc drive project well--- Merlin. A part of Merlin (IBM security people said it was a "Merlin file") disappeared last October and hasn't been recovered. We hear it was a 3336 disc pack. While IBM security admits to a theft and the San Jose police, as careful (coincidentally) as IBM itself, admit they have an open theft case involving IBM. Company public relations people deny anything connected with the 3330 has ever been missed from the San Jose plant. IBM's reluctance to admit the theft may have something to do with its well-known determination to keep the 3330 out of the hands of plug-to-plug competitors as long as it can. (One source says IBM has 100 people doing nothing but protecting the 3330). The computer colossus filed a suit to enjoin Memorex from selling a 3330-like system for 30 months and recently sued Richard Stock, an ex-employee now with Information Storage Systems.

"HARASSED" BUT BUSY

Storage Technology Corp., Boulder, Colo., apparently isn't letting litigation stand in the way of business. The company, object of a suit filed last August by Telex Corp., has installed eight 9-track IBM-compatible tape drives for Ford Motor Co. which could lead to an order for more than 100, its largest to date. The Telex suit, charging STC with raiding Telex employees and theft of trade secrets among other things, is in discovery stages and STC attorneys say it "has no basis in fact and is strictly an harassment."

PERILS OF ANTITRUST: APRIL INSTALLMENT

Will Judge Neville let IBM file its counter claim against CDC, charging that the computer maker and its wholly-owned Commercial Credit Corp. have violated antitrust laws? The answer comes the end of this month when a hearing on the issue will be held in St. Paul.
   No one knows the specifics of the IBM claim, since it hasn't been filed and is based on CDC and CCC documents privately disclosed during the "discovery" proceedings of CDC's suit against IBM. But legal experts are willing to guess. The most likely allegations are per se violations through reciprocity or tie-in practices. In other words, IBM may claim that Commercial Credit, which makes industrial loans, has asked its borrowers to buy edp equipment from

Control Data, or that CDC itself pressured these clients (reciprocity). Or it may be alleged that CCC made the order of CDC equipment a condition of a loan, perhaps at a favorable interest rate (tie-in).

Whatever the claim, it is certainly another of the many head-snapping IBM counterattacks on the industry lately. It also indicates that Control Data is vehement in its purpose and won't settle the way Applied Data Research and DPF&G did. IBM is hitting where it hurts, in the money bags, since it asks that CDC divest itself of Commercial Credit. One source says that the counterclaim may be used in negotiations with the Justice Department: "If you are too tough with us, we will pursue our claim against CDC." We're told there is precedent for this kind of move, based on the attitude that Justice wants to avoid destroying competition while prosecuting a monopoly case.

SILENCE IS GOLDEN

A move away from the noisy line printer, spewing documents written in all-caps on huge 11x14-inch pages, is indicated by plans at two California companies. At XDS, they're looking to a nonimpact process under development by Xerox that will produce 132-column documents in an 8½x11 size with alphas in caps and lower case. Speeds initially will be in the middle range. But no imminent announcement.

At SJCC, a product with similar capability will be announced by Versatec. The Cupertino firm, whose electrostatic printers and plotters are mated to minis and midis, is starting with a 480-1pm model priced at from $5-6K in high oem quantities. Again, 132 columns, 8½x11, caps and lower case.

XDS BEARING DOWN HARD ON SOFTWARE

Although 1970 equipment sales of Xerox Data Systems dropped 20% and the El Segundo, Calif., company had to lay off up to 1,100 persons, hiring of programmers was not affected. Under pressure from parent Xerox Corp. to develop a business dp capability, XDS has more than tripled its software force since joining Xerox in 1969 (from 150 then to 500 today). The new president Bill Glavin says another 100 will be added this year. William Vitek, hired last winter from IBM as vp-programming, has boosted software productivity 50%, says Glavin. XDS finally is delivering the long announced UTS (universal time-sharing) system to Sigma 7 users. It has acquired full rights to XOS, the Sigma 9 operating system developed jointly with CII, the French company, and will deliver copies in the third quarter.

RUMORS AND RAW RANDOM DATA

With an initial membership of four, a new System 3 users group has been formed by Irwin Cohan, 23331 Vanowen St., Canoga Park, Calif. 91304. . . It is called "NASU" (for National Association of System 3 Users). . . Data General's been so busy, it almost shipped its 1000th machine without realizing it. The machine went out last month from Southboro, Mass. . . IBM will announce another nonimpact keyboard soon. The company's experience with its nonimpact keyboard on a portable audio response unit has been favorable.

For Efficient Handling, Filing or Storage of 80 Column and 96 Column Cards, See Your Wright Line Catalog

If you want efficient handling, filing and storage for either eighty column or the new ninety-six column cards, look in the Wright Line Catalog. You'll find everything you need including files, trucks, cabinets, racks and other accessories, — all beautifully styled to enhance the appearance of your computer room.

The Wright Line Catalog is your one complete source for information on card storage and handling equipment and accessories for use in disk pack and tape systems.

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by Ethan I. Shedley

BIG SYS

an inquiry into game structure, strategy, and counterploys for management players

It's been a hard year for systems. Two large reservation systems and two large communications systems have surfaced long enough to go under in ignominy. What with other rumblings around the industry there must be at least ten more that won't be admitted to lest user or manufacturer be embarrassed. So what's happening? If as many big systems fail in the next year as did last, the users might go back to the guys with the sleeve guards and green eyeshades rather than let the computer cosa-nostra get their hooks on another 10 to 50 megabucks.

Lest anyone get the impression that I am setting my sights on manufacturers alone, let me define what the "brotherhood" is: it's computer people everywhere; engineers, programmers, systems analysts, working for manufacturers, software houses, users, universities, and government.

It's been a long time since SAGE and SABRE, and most of the nasty problems in large scale system design have been solved by virtue of bitter lessons learned over the past several years. Somebody out there is supposed to know: how to design these systems, how to manage a programming effort of a few hundred man-years, the pitfalls of unresolved and changing specifications, shortsighted load predictions, and so forth. Yet we hear things like "It's research and you can't schedule creativity," "We're facing problems that have never been faced before," "The specs keep changing," and the inevitable, "The hardware manufacturer screwed us (again?)."

Come off it fellas—that may be all right for the hapless user or the comptroller who has to squirm his way through the year-end P&L to cover up your boo-boo—but aren't you just a tiny bit ashamed to say it in front of your peers or to yourself in front of the mirror?
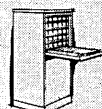
For what it is worth, here is one view of why it is happening and what can be done about it.

Eric Berne's (*Games People Play*) transactional analysis technique seems particularly well suited to the big system problem. The chips cost one megabuck apiece. Most games are two-handed, underhanded, and backhanded.

1. Scope (Rape)

A two-handed game played between vendee and vendor. It applies to hardware or software. It is usually the aftermath of a game of BUY-IN.

Thesis: Every variation in the original specification is taken as an excuse to obtain more money in a manner disproportionate to the actual costs required to make the change.

Examples:
(1) Vendee: "I need another copy of the instruction manual."
    Vendor: "SCOPE! SCOPE! (RAPE! RAPE!)"
(2) Vendee: "The system doesn't work."
    Vendor: "SCOPE! SCOPE!"
(3) Third Party: "The postage meter repairman's union is on strike."
    Vendor: "SCOPE! SCOPE!"

As in the case of a woman who cries "rape," the "victim" is usually held to be blameless and antagonisms are turned against the "aggressor," who is the real victim.

Antithesis: The game works only if (as usually happens) the vendee accepts the role of the "assailant." A good specification reviewed by lawyers and competent, disinterested third parties can go far to preventing the game. By refusing to indulge in a prior

TEM GAMES

game of BUY-IN the vendor may protect himself by not making SCOPE necessary. In all cases, a cry of SCOPE should be countered by a demand for substantive validations of the effects of the proposed changes. Each such change should be subject to a formal procurement cycle. An alternate source of supply should be queried.

2. Snivel

A two-handed game played between vendee and vendor. It is the aftermath of a poor specification and a vendor who has willingly bid on such, perhaps with the intention of playing SCOPE.

Thesis: Outrageously indecent demands are made for expansion of the system without cost. The vendor may concur in anticipation of a later game of SCOPE or in anticipation of a game of FOLLOW-ON.

Examples:

(1) Vendee: "I need another 1500 terminals which were implicit in the specification (SNIVEL, SNIVEL)."
Vendor: "SCOPE! SCOPE!"
or,
Vendor: "You're right."

(2) Vendee: "Anybody could have seen that the standard operating system would not apply (SNIVEL, SNIVEL)."
Vendor: "SCOPE! SCOPE!"
or,
Vendor: "You're right."

Antithesis: Refuse to bid on an ambiguous specification without explicit clarifications or establishing mutually agreeable ground rules for subsequent games of SCOPE.

3. Follow-on

Thesis: An unattractive contract (a game of SCROOGE) is made more attractive by dangling a hypothetical follow-on contract on which to recover losses. FOLLOW-ON may be initiated by the vendor or by the vendee.

Examples:

(1) Vendee: "Play BUY-IN with me so you can recover with a follow-on."
Vendor: "I believe."

(2) Vendor: "I'm going to play BUY-IN because you have a built in follow-on."
Vendor: "I agree."

Antithesis: That which is in a contract is in a contract, and not much else. If the follow-on is not a contractual item with built-in commitments on both sides, the parties are taking a risk. The vendee should not accept a BUY-IN even if there is a large follow-on unless he is willing to commit to that follow-on. The vendor should realize that the vendee is under no obligation to provide the follow-on and is taking a risk if he plays BUY-IN. In either case, the follow-on, if any, should be explicitly stated according to a schedule attached to the original procurement.

4. Gypsy

A three-party game of collusion between the vendor and the vendee. The victim is the end-user.

Thesis: A bad system is hidden by a collusion between the vendor and vendee to the effect that the predicted load has gone beyond the operational capabilities of the unfinished system. The system is

scrapped and a new one started from scratch. In extreme cases the game may go through three or four such cycles before it is put to the test.

Example:

Vendor: "Your loading has gotten so big that the system will not work. Let's fold our tents and steal away like gypsies in the night."

Vendee: "Our loading has gotten so big that we need to upgrade to a Belchfire-500. Let's fold our tents and steal away like gypsies in the night."

User: "Sob, sob" or, "sob".

Antithesis: The end user should not play SNIVEL or FOLLOW-ON, nor should he be conned by a game of SCOPE. An overloaded system with marginal performance is better than none. A game of GYPSY is usually forewarned by an internal game of SCOPE. If the system won't work, it's because it is a lousy design. The user should demand quantitative performance figures prior to accepting a game of GYPSY.

5. Guru

A game played in-house (the vendee's shop usually) between the system design manager and the end user. It consists of a running snow job.

Thesis: Avoidance of substantive results and meaningful answers by retreating into a snowstorm of technical gobbledegook.

Examples:

(1) User: "Why won't the system be on time?"

Manager: "The Frobisher Larosch theory of transponential gravitics proves that re-entrant subroutines are only subliminally recursively enumerable."

User: "You're so smart you must be right."

(2) User: "Why do you need 85 more programmers?"

Manager: "You numbskull! The Frobisher Larosch theory . . . etc."

User: "You are the GURU and you know best."

Antithesis: Never forget that a good manager can communicate in a nontechnical fashion. The same management principles apply to programmers and systems analysts as apply to other mere mortals. Just because the snow job comes out of a high speed printer doesn't make it less of a snow job.

6. Research

An in-house game played between the system design manager and the user. An alternate tactic to GURU.

Thesis: The sanctification of incompetence by calling it research.

Example:

User: "Why don't the columns on the printout line up neatly?"

GURU: "RESEARCH! New problems never before attempted! Climbing Mount Everest! Uncharted horizons! Giant Brains! A million mistakes per second!"

Antithesis: What in the hell are you doing fielding an operational system that requires research. Such systems belong in the university. The user should assume, unless proven otherwise, that it is a research problem only to the GURU. Get an unbiased, objective,

third party to arbitrate. Get a GURU who doesn't have to learn how to do his job.

7. Smop

An in-house game played by the system design manager and the end user or between the vendor and the vendee.

Thesis: The manager or vendor is either so dumb that he has no rational perspective on the cost of software or has boxed himself in and is looking forward to playing a game of GYPSY or SCOPE.

Examples:

(1) User: "Could you squeeze in an order-entry system while you're at it?"

Manager: "Certainly; it's only a Small *Matter of Programming.*"

User: "I'm glad it's free."

(2) Vendee: "Your standard operating system does not appear to be too efficient for this application."

Vendor: "Relax—it's only a SMOP."

User: "I'm glad it's free."

Antithesis: Look at each instruction as if it were an electronic component worth about $5 installed. Approximately 10,000 such "components" fit into each conceptual cabinet. If someone plays SMOP, ask for an instruction count and visualize how many "cabinets" it entails. Decide for yourself if it is a SMOP. The SMOP player may counter with a game of RESEARCH or GURU. Nothing worthwhile is free.

8. Garbage Can

Thesis: An attempt to create an illusion of progress by confusing activity with productivity. The game can be played equally well with hardware and software, though the software version is more popular.

Examples:

User: "How is that 100,000 instruction program coming along?"

Manager: "Great! 90% done! 10,000 instructions in the test data generator, 20,000 for the acceptance test, 55,000 in the GARBAGE CAN, and 5,000 on the program."

User: "How's it going."

Manager: "Great! 150% done! 30,000 in the test data generator, 40,000 for the acceptance test, and 80,000 in the GARBAGE CAN."

Antithesis: The only instructions that count are those that end up in the operational program. No credit should be asked or given for the number of instructions written, only for those executed. After all, we can expect an incompetent to write far more instructions than someone who knows what he is doing.

9. Documentation

Thesis: Expanding the role of documentation beyond all possible belief to cover the actual design effort.

Example:

User: "How's it going?"

Manager: "90% done. Just got to do the DOCUMENTA-TION."
User: "Is it running yet?"
Manager: "No, but it will just as soon as we do the DOCUMENTATION."
After an indecent interval:
User: "Is it done?"
Manager: "Yes, but—DOCUMENTATION."
Antithesis: Documentation should be started at the very beginning and be progressive. When the job is done there should only be minor modifications of the documents. More than one program has been finished by playing a game of SCOPE over DOCUMENTATION. The antithesis is: "Let's see it run! NOW!"

Thesis: A form of delusion in which people are led to believe that a job is done when the system runs to output for ideal data under ideal circumstances.
Example:
Manager: "It ran! It ran! Here is the output! We're done!"
User: "Let's celebrate."
Antithesis: Any damned fool can write a program that runs to output for well conditioned inputs. Typically that's only 20% of the job. Only a program that properly runs for all the cruddy cases with the system fully loaded and completely integrated can be considered to run. The antithesis is to try it with cruddy data. Anyhow, CELEBRATION is a silly game because there will always be yet another bug in the program.

Thesis: This is a tactic used by the GURU and may be a variant of RESEARCH. It is a preposterous claim that it is impossible to predict beforehand what the computer loading will be.
Example:
User: "How many computers will we need?"
GURU: "According to the Heinsenberg uncertainty principle it is impossible to predict."
User: "How much memory will we need?"
GURU: "HEISENBERG."
Antithesis: There are any number of methods available to predict loading, memory, channel utilization, etc. If the user does not play SCROOGE, he can, at a reasonable cost, obtain such predictions. The GURU who says it's impossible probably doesn't know how to do it. Find someone who does.

Thesis: This is a hardware game often played in conjunction with HEISENBERG as a prelude to GYPSY.
Example:
User: "We don't seem to be getting the performance we expected."
STOKER: "Throw another computer on the fire."
User: "The programming seems to be behind schedule."
STOKER: "HEISENBERG, RESEARCH, GURU, STOKE, STOKE, STOKE."

Antithesis: A good specification, a lack of games playing, proper planning and fixed price contracts are the antithesis to STOKE.

Thesis: This is a people version of STOKE. It is a form of Parkinsonism wherein an inept development group is supported by still more inept expediters, coordinators and administrators.
Example:
GURU: "We need more programmers."
User: "You have enough."
GURU: "All right then, give me some administrators and expediters to coordinate so that I can ease the programmers' burden and improve their efficiency."
User: "That makes sense."
Antithesis: If his people administration is top-heavy, you can imagine how top-heavy his administrative programs must be. If his organizational controls are sloppy, imagine the state of his programs. Nine out of ten persons in the development group should be doing tangible work. Programming administration is no different than the administration of any other kind of engineering.

Thesis: A misbegotten attempt to create a system overnight. Usually played in conjunction with CELEBRATION.
Example:
User: "Let's get this system installed in six weeks."
GURU: "SMOP."
User: "We can do it boy! BANZAI!"
GURU: "BANZAI, BANZAI, BANZAI."
Antithesis: Such systems have the longevity of a Kamikaze pilot. It is almost impossible to get any decent system running in less than 18 months. Most systems can be done in 36 months. The antithesis is PERT or similar techniques.

Thesis: This is the favorite game of ancient despots. Surround yourself by sycophants who tell you only good news.
Example:
User: "BANZAI."
GURU: "SMOP, Yessir."
Cassandra: "It won't work."
User: "Kill the messenger of doom."
GURU: "YESSIR."
User: "BANZAI."
GURU: "YESSIR."
Cassandra: "It won't work."
Antithesis: Did you ever consider the fact that the guy who says everything is ok is giving you no information and that the Cassandra right or wrong has a higher probability of telling you something you don't know? Follow up the Cassandras—they are your hedge against doom. If they are wrong, they have only wasted a few hours. It's the better risk. ■

Riot at Wright Rites

by William J. Jones
Staff Reporter, Quite Plains Intruder

QUITE PLAINS, N.Y.—The recent wedding of computer engineer Reed Wright and Miss Theresa Prime started out normally enough. The couple had spoken the double-words, "I do." As the fetching twin bridesmaids Millie and Nan O. Second stood by, best man Mike Roe II handed Reed the ring. His stomach still doing flip-flops, Reed slipped his Theresa's loop onto her second digit, and gave her a buss. She had been given in marriage by her uncle, General Register.
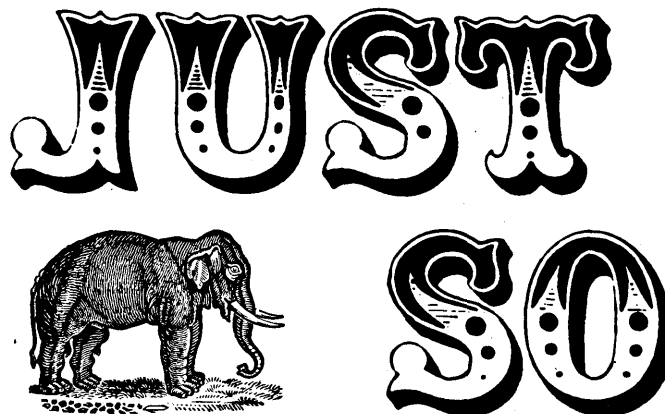
Creeping bugs

The bugs started creeping into the program after the couple'd registered a non-restoring division of the cake. The groom multiplexed bytes of cake with high burst rate inputs of the on-line punch, a red delight with heavy spike functions at its input, in a bowl maintained in overflow condition.

He soon became abusive, shouting chained commands to his new wife. He suddenly screamed, "Watch out for those two snakes! They're parallel adders! Here, I'll get them with these multi-pliers," and, brandishing the cake server, chased the guest who was last in first out, and his poor best man, Mike Roe, second.

Multiple punches

He overturned (this is the truth) tables and flailed out asynchronously with both access arms; observers saw him punch Feed, punch Card, and even punch Papa Tape. In the ensuing riot, someone connected and the Read Wright head crashed against a natural log table. Fighting gave way to an interrupt routine while some of the men went behind the table and end-around carried the destructive Reed out and the women tried a console operation on his cryogenic bride.

It developed that Reed had suffered a slipped disc, as well as the head crash, but his recovery routine was successful, his wife forgiving, and the timing delay before the honeymoon within tolerances. However, one instruction set out by his wife as an initialization procedure was "Monitor the load routine. Get looped again and you will be dumped."
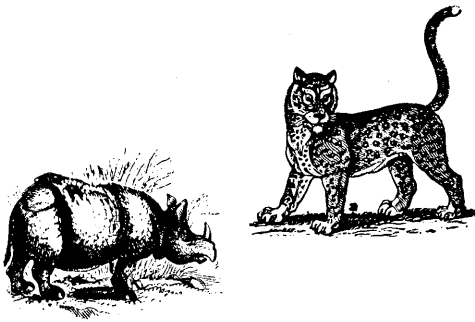
In the High and Far-off Times, oh Best Beloved, the Very-First-Manager-of-Programming made loud unhappy noises about the lack of documentation, and he realized not that he had established a Tradition. Indeed, scarcely a month goes by, even now, that some minor poobah does not hold forth, in one of the software trade journals, on his own documentation system. Such profusion proves confusion. If the bald truth be known, oh Nibbler of Small Bytes, any documentation is rare, and good documentation is unknown.

Programmers prefer writing for machines rather than for humans; otherwise they would author magazine articles, rather than programs. The well-known scarcity of programmers has bred an independence that is largely superfluous, since most Programming Managers are programmers who have made bad and are busy trying to start their own software houses on the side. What care they for the dictum, "Thou shalt not code until the flow-charting is complete"? Only two programmers in the country flow-chart before they code, and I've lost track of the other one.

No, my Counter of Microseconds, the solution to the documentation riddle is not to be found in any system, but only in an understanding of the programming process deeper and even more sly than that of the programmers and their leaders.

The naive Customer who needs programming support thinks that he must budget and schedule for the writing of programs. In truth, most of his time and money will go for the definition of what it is that he wants, for it is a great and unrecognized truth that all programs must be written twice. The first try (called an "iteration" by sophisticates) goes to give the Customer what he asks for. After

PROGRAMS

—Tom Woods

he has had time to examine the results, he realizes with horror that:

The results are within the definition of what he said he wanted, and that

They are not at all what he really wanted. Further, that

His budget and schedule are nearly exhausted.

From our detached viewpoint, gentle player at the scope-keyboard, we can see that this situation comes about with the best of intentions and good faith from all parties, and that the Customer and the programmers are now in an unpleasant jam. The second iteration is a frantic attempt to modify the program with minimum cost and great haste. At this point we may ask, oh Best Beloved, what will be the very first item of procedure sacrificed to the schedule/budget pressures. If you answer "documentation," your rare perception is worthy of a reader of this wonderful periodical.

The project will be completed. This time the program will do what the Customer wants, not what he says he wants, the schedule and budget will be over-run, but only by so much, and the documentation will reflect, with fidelity and comprehensiveness, a version of the program long since discarded. Under the baffled and unhappy stare of management, the programmers will grow restive and submit resumes to various places, will depart, and will leave their successors to figure out the program, so that it can be maintained. In a few months some learned periodical will publish yet another article on yet another system of program documentation which guarantees that the records are always current.

Now, Reciter of Start/Stop Times, having recognized this invidious cycle, we alone are free to act, using the great strengths of the process, but bending, as the willow bends under the snow, to avoid being broken.

Managers! Continue setting up software houses. Being busy at that, you will not bother the Customer or the programmers.

Programmers! You who so hate to document programs, because you know it to be a sham and a waste, you shall not document a line until the Customer returns with that successful test run and tells you what he really wanted in the first place. Then, with the expertise you have gained from the first iteration, you shall plan your program, flowchart it, specify formats, and, let us not forget, write the code.

Customers! You shall not demand any documentation until after you have seen the first good test run. You shall include the second iteration in your initial budget and schedule, and you shall realize that programmers, crazy though they are, are not the less human for it, and you shall live together with them in mutual peace and respect.

Sound structure supporting a function
Pays off in beneficent unction:
  A program that works
  Sans hang-ups and quirks,
And a programmer free from compunction.
                                    —Richard M. Petersen

An agonized chronicle
of the adventures of
a terminal user

Illustrations by Dave Graves

NAKED

CAME THE

TIME-SHARER

by D. Neil Loshem

I haven't flown on a 747 yet, and it will be a while before I do. I say that so you will know that I am basically pretty conservative, and that I wouldn't have ordered a time-sharing service if I hadn't thought about it for a while. But there I was, needing an interactive system to back up my consulting work. I didn't know anything about time-sharing, so I sent off the DATAMATION reader service card to half a dozen companies. In due course I got brochures from most of them, which I analyzed as follows.

Co-existent Computers Corp. sounded good, but when I called and admitted to the salesman that I would only need 15 or 20 hours a month, on one terminal, the conversation turned icy. He murmured something about preferring customers with at least five terminals, and how they were about to institute a minimum monthly charge. He promised to call back, but I didn't exactly feel welcome, so I'm not too unhappy not to have heard from him again.

Symbiotic Sharing Systems looked attractive, but when I called them the telephone operator said the phone had been disconnected for non-payment. Hmmm. I had heard things were tough in time-sharing.

Shared Silver Cord looked like a likely candidate. They had a range of languages, no minimum, and since the salesman's commission was to be paid over a three-month period I figured that they would be in business at least three more months. I put a check mark by that one.

Amniotic Fluidics worried me. I couldn't shake the impression that they might be trying to do too much for me. I let that one go.

Togetherness Terminals didn't seem bad, but when I called I was told the number had been changed. Warily I dialed the new number, and spent a pleasant few minutes with the operator at Cosmic Conglomerates. She was pretty sure she had heard about the acquisition of Togetherness, but she wasn't able to put her finger on the number. I decided to look for other opportunities.

Combat and Industry Affiliates sounded like an odd name for a time-sharing company, even in Washington, but I figured, "What the hell!" A phone call isn't that big a deal. But the operator wouldn't even talk to me without knowing my clearance level, and since I don't do classified work lately I had to let that one go. I'll never know what the initials mean.

The last name on my list (three companies didn't answer the inquiry) was Universal Umbilicals. Had to pass that one up, too, since they didn't have FORTRAN.

Shared Silver Cord looked like the best bet, so I signed the forms they sent and waited for the new era to dawn.

Dawn arrived a week later, when a delivery company showed up with

a big box. My wife signed for it, since I was out chasing some scraps of consulting income at the time. Three days later a man from Shared Silver arrived, again while I was away (he hadn't called first), to "install" the machine. As I get the picture, this

consisted of taking the terminal out of the box, plugging it in, and making a two-minute call to ssc's computer. He assured my wife that I wouldn't have any trouble.

Ah, but I did! Everything was fine for the first 10 minutes, but then I started getting the "plus sign sickness," as I later came to call it. What this was, was that every so often the typewriter would start spewing out plus signs in the middle of a message. Spewing would continue indefinitely until I turned off the main power switch for the precise 3.7 seconds (plus or minus 0.5 second) that would kill the plus signs but not bounce me from the computer. I didn't think this had been part of the promise of the new era, so I called my contact at Shared Silver, Solomon Basileia, complaining mildly. He promised to send a man out immediately.

The man turned out to be a telephone installer. Not a data set man, mind you, nor a communications man of any sort. I wasn't home, as usual, and I had by now instructed my wife not to attempt to speak for me in such matters. So the telephone man was going on his official instructions, which apparently read "Check out customer complaint." As my wife tells it, he picked up the phone, got a dial tone, said "Must not be the telephone," and left.

Need I tell you that this did not solve the problem? Back to Sol. He

apologized profusely and promised instant action. This turned out to be another telephone man who "balanced the line," whatever the hell that means. This made absolutely no difference. The next call to Sol did get me a terminal man, but again he came without calling first, so I wasn't home. Needless to say, the plus sign sickness was intermittent, and it didn't happen while he was there. He assured my wife that everything was "just fine."

But it wasn't. When I called Sol again I learned that he was on vacation, so I gave the message to the girl who was taking his calls. It was my misfortune to have interrupted her coffee break, so she was in something of a snit. I don't know what she wrote down, but when the serviceman called (fantastic! he called first!) he didn't really have much of an idea what the problem was. I explained it to him, and he said he would be over the next day. I said I would be out then, but since he understood the problem I was sure he would have no trouble.

When I got home the next day my wife was in tears. "Why should he yell at me?" was all I could get out of her. In something of a foul mood I called ssc and asked for "service." Hah! This was at 5:04, so I got an answering service. I thought I had learned never to argue with clerks, but I was too angry to listen to my own advice. I gave the poor girl a sour lecture on how not to service computer equipment.

When I heard from the ssc serviceman the next day, he was obviously having trouble restraining himself. "What did you say you thought was wrong with our equipment?" I didn't much like the tone of his voice or the suggestion that I was imagining things, so I may have shouted. "The damn thing puts out plus signs in the middle of the bloody messages all the time, that's what's wrong with it." He: "Well, all I know is, I spent two hours running all the diagnostics our company *and* Intergalactic Computers ever devised, and it didn't fail." I: "Beautiful. Now if only I wanted to run diagnostics instead of computing Bessel functions, I'd have a working terminal." He: "Had you ever thought of trying a different terminal company?"

Well, now, by golly I had thought of that, but I was getting stubborn at this point. If computers can send men to the moon and run wars for us,

why couldn't somebody fix a crummy little $5,000 terminal?

Solomon finally got back from his vacation. I threatened him with the loss of my business, but I somehow don't think $250 a month impressed him that much. The Better Business Bureau ploy didn't work either, but when I told him I was going to write nasty letters to the editors of DATAMATION AND *Computerworld*, he promised to give it one more look. In fact, he promised that he would himself bring a serviceman over that afternoon, and amazingly enough he did. Would you believe that I was there?

When they came I signed on, got the plus sign sickness going, proved to the serviceman's satisfaction that it was not the computer or the telephone, and left him staring at the thing for a minute. Finally he said, "Oh," started pulling cards, and within 10 minutes had the whole thing fixed. *Permanently.*

Moral: Before you can teach a mule anything, you've got to get his attention—by smashing him over the head with a two-by-four if necessary. If I could have gotten a terminal man

to hear and believe my characterization of the trouble, it could just as well have been fixed two months earlier.

Everything was fine for a couple of months, but then I needed a language Shared Silver didn't have, and decided to get another service. Thought it might be worthwhile to give Togetherness Terminals another look, assuming that by now the Cosmic Conglomerates operator might have found them. Had she ever. And when I got talking with the salesman it turned out that business was really booming. He was quite frank about it: "Now that we're a part of Cosmic, people are willing to believe that we
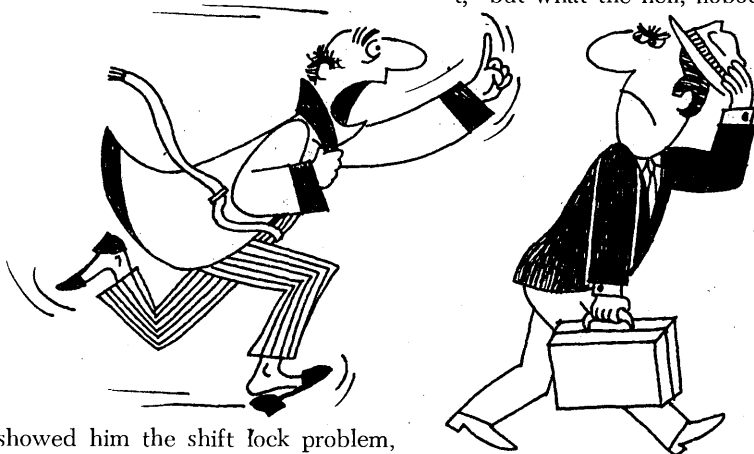
NAKED ...

will be staying in business." That's what he said. I signed up, sadder but wiser, expecting less.

The delivery and installation were much smoother this time, but when I turned on the terminal I discovered two minor problems: whenever I shifted to upper case the keyboard locked in upper case until pounded on, and if I ever hit the "attention" button while the system was typing anywhere in the second half of the line the system would lock up. It could only be unlocked by (you guessed it) turning off the power switch (2.4 seconds, this time, plus or minus 0.3 seconds, and I got bounced half the time anyway).

With a sinking feeling I called my man at Togetherness, Helmut Kiltschig. He wasn't in, but I gave my message to his secretary, who seemed nice. In fact, I gave her a fairly detailed description (I didn't expect to be in the next day when she assured me the serviceman would be there).

The next day, however, I turned up with a virus, so I was there when my wife told me the man couldn't find any trouble and was about to leave. I roared downstairs to see what was what. Seems he had a totally garbled description of the trouble, and had fixed absolutely nothing. I

showed him the shift lock problem, which he fixed in two minutes.

I then showed him the lockup on an attention in the second half of the line. (An interrupt during the first half of the line, or during the carrier return, didn't cause the trouble.) His first question: "Why would you want to interrupt it? Why not just let it type?" My first impulse was to tell him that for $147 per month I expected his terminal to work with the reliability of my good old Shared Silver terminal, and it didn't have this trouble. But I wasn't sure I could keep a straight face through that

speech, so I instead tried to explain to him how people use terminals, and how sometimes you can see that you don't want the whole line. He seemed to shake his head at the whims of crazy customers, but maybe that was my imagination. Anyway, he settled down to try to fix the trouble.

Two hours later, having changed two-thirds of the cards, having brought in a new terminal from the truck and gotten the same trouble, and having shot the maintenance budget for the month, he informed me in a barely-controlled rage that, "It must be the computer." I calmly signed onto his computer with my Shared Silver terminal, proved that it *wasn't* the system, and smirked. I really shouldn't have smirked. It wasn't nice, and it wasn't in my own best interests, because he promptly stormed off.

Well! I couldn't allow things like that to happen, so I canceled my Togetherness contract and called up Universal Umbilicals again. Turned out they *did* have FORTRAN; it seems that when I had called earlier I got one of their less senior salesmen, who hadn't heard of FORTRAN at the time. I signed up, and it was very smooth. About twice every page it would send back an "e" where I had typed "t," but what the hell, nobody's per-

fect. (My standards had deteriorated by then.)

All was well, until one day I had to give a lecture and demonstration at the local chapter of the Acronymic Computational Machinations Society. As usual, I put off the preparations until the last minute. As I was putting the terminal in its case, I decided it might be a pretty cool idea to try it out, since I hadn't used that particular system for a couple of weeks. Would I be telling you this except that the computer wouldn't

complete the connection? This is bad news, when it's 5:30 and I'm due at the cocktail hour.

In a panic I called my guru at Universal, Anemone Fleury. She gave me emergency instructions on how to perform mouth-to-mouth re-

suscitation on a sick terminal: switch modems, call a different computer to make sure it isn't the machine, make sure the handset mouthpiece is in the right end of the coupler. (Yes, I did have it in backwards, in my panic, but that wasn't the trouble.) I learned a lot, but the terminal still wouldn't talk to the computer. My Shared Silver terminal wasn't portable, so what was I supposed to do for a talk at ACMS? I didn't have a whole hell of a lot to say anyway, and without a dog act to cover for me I was about to be shown up for a complete charlatan.

But all was not lost. Anemone started talking about how she might be able to find me a substitute terminal, etc., when suddenly she remembered that we hadn't tried the most elementary cure for sick electronic gear. "Now here's what I want you to do," she said. "Pick up the front edge of the terminal about three inches, and drop it." I thought she said to pick it up six inches and drop it three times, so I proceeded to do so. Anemone is screaming, "Enough, already" at the sound of crashing electronics, but when I dialed the head module again, everything was beautiful. I took off for the meeting, had my drinks, skipped dinner, and nobody ever knew that I didn't have anything to say.

Nothing exciting has happened for three whole days now, but I'm not taking bets. If anything interesting develops, I'll let you know. ∎

the town mouse and the country mouse

AN on-line process once went on a visit to his cousin the batch process whose cpu was in the back panel wires. His batch cousin made him heartily welcome and allocated him all the best storage he could serve—read only registers, chips of breadboard circuits, crust stacks. The on-line process picked a little here and there, but it was clear that he did not enjoy the simple batch monitor fare.

"Cousin," he finally said, "I don't understand how you put up with such dull throughput. But of course you can't expect anything better in the serial mode. Come load with me, and when you have lived on-line for a run, you will never want to come back here."

The two set out to get on-line that very evening and arrived late at night. "You must be link edited and loaded after your long message," said the on-line process, and took his guest at once into a grand associative cryogenic memory array. There they found the remains of some executive text—all kinds of svcs, enter/exits, LPSWs and overlays.

The dazzled batch process was just trying to decide which tempting byte to store first, when the interrupt occurred, and in came a machine check with a parity light. Both jobs scampered off the system and hid on secondary storage until he left the cpu. When all was quiet again, they went back to their structures. But hardly had the batch process executed its first instruction, than it heard a terrific churning and sorting and two huge compiles came bounding into the memory. Half frightened to exit, it ran down from the table look-up and into an outbound queue, where it saw the on-line process terminating.

"Goodbye, cousin," said the batch process.

"What, going so soon?" said the other.

"Yes," it replied, "I seem to have lost my allocate."

(A crust of breadboard in peace and batch is better than an on-line feast in fear.)

—Jack Ludwig

360/curse: hymn of hate

Hail 360, child of evil! For thy misdeeds we curse thee! Verily do we curse and condemn thee; we call down the wrath of the Heavens upon thee!

Know, threesickly, that we hate thee with a pure and white-hot passion. May the microseconds of thine existence be eons in misery. As thou pushest about the bits of thy programs, may the 1-bits cause chills and may the 0-bits itch, and may thee be in continual torment. As thou miscomputest the problems of thy users may every man's hand be turned against thee. May children cast card chad at thee and call thee cursed!

May thy insulation evaporate, and thy cores collapse, and thy flip-chips flop. May thy ROS become writable, and may a user write his FORTRAN program all over it.

May thy printers rewind; and thy tapes unwind; and thy memory banks grow senile; and thy drums be out of round; and thy high-speed channel be multiplexed with the reader/punch; and may thy channel programs loop.

May thy bits each have three states.

May os have 100 versions, and may each version have 5000 APARS. May each APAR have 100 PTFs, and may each PTF be punched off-register on warped cards. May each PTF have 100 hex patches, and may each patch grow scar tissue.

May each version require ten SYSGENs, and may each GEN fail ten times. May each failure cost a shift, and may each shift be billed at prime rates.

May thy wait state ABEND; may thy SVCs get protection faults; may thy SPOOL overflow. May thy DAT unit cut in and out. May thy adder drop its seventh bit, and may thy multiplier compute cube roots. May thy move-characters command complement every third bit. May thy floating point registers be where thy fixed-point registers should be.

A pox upon thee and upon thy kin! Upon thy mod 30s and upon thy mod 90s and upon thy mod 67s! Yea, upon thy children and thy children's children, even unto the seventh generation of hardware.

Yea, 360, know that thou shall be sorely afflicted. From this time forth shall thy peripherals become independent processors and shalt thou be synchronized with the low-speed printer. And thy cores shall be as dust within thee and in sorrow shalt thou lament thine lot.

—Mary Shaw

A new and significant technique
for adapting computer system
capacity to the workload

by Paul Abrahams

COMPILER PESSIMIZATION

The rapid increase in the capacity and operating speeds of computers is well known to all workers in the field. Until the recent business downturn dampened the demand for computing, this was widely heralded as "progress." Unfortunately, this progress has left the industry in real danger of finding itself with a large excess in computing capacity at the very time when computing needs are diminishing and management is issuing increasingly sharp memos on the need for frugality.

It is the contention of this paper that there are techniques available for absorbing this excess computer capacity and saving the edp department from the economy axe. There seems to be little doubt that these techniques will become increasingly significant in the '70s and should be mastered by any serious student of programming. Simply put, the techniques involve the incorporation of "make-work" into the object code produced by a compiler. Since most computer programming is now being done in higher-level languages, it is clear that the compilers for these languages are an obvious point of departure. Hence, compiler pessimization.

For make-work to be truly effective, it must have two characteristics:
1. It must be useless.
2. It must not be obviously useless.
Thus, expanding computer usage by finding new applications or extending old ones is not satisfactory, for the results may inadvertently turn out to be useful. Nor will merely padding a compiled program with NOPs do; it is far too obvious that no operation can be accomplished by a "no operation" instruction. More subtle measures are called for.

We propose that the OPT parameter associated with the control languages for some compilers be expanded to permit negative values. Thus, OPT=0 would request that a program be neither optimized nor pessimized; OPT=-1 would call for primitive pessimization, and OPT=-2 would call for full pessimization, with the inefficiency of the compiled code being limited only by the inventiveness of the pessimizer. Existing programs, as well as new ones, could be pessimized through recompilation; thus the benefits of pessimization could be extended throughout a library of programs.

An interesting application of pessimization occurs when a computer is newly installed. With adequate pessimization, a small group of jobs can easily be made to strain the capacity of the machine virtually on the first day of operation. Thus the installation manager has a ready argument that an even larger machine is needed; or, alternatively, he can decrease the pessimization as new projects are attempted on the machine, thus keeping the load constant and the users satisfied.

To some extent, the possibilities for pessimization are language-dependent. The richer the language, the richer the potential for pessimization. Thus PL/I, for instance, with its elaborate block structure, proliferation of data types, and multitasking facilities, provides a vast new array of possibilities for the astute pessimizer. Indeed, there are those who maintain that PL/I compilations are naturally pessimized, without special effort in that direction.

One point must be made clear: the aim of pessimization is the creation of inefficiency and not the introduction of bugs. Thus, a pessimal program, like an optimal one, must produce the same results as the original one. Some specialists in the field would disagree with this approach, arguing that the introduction of bugs creates a high level of demand for programmers' services, starting with those of the application programmer, who must detect the bugs introduced through pessimization, and ending with the pessimizer himself, who must remove the offending code. While we do not dispute this conclusion, we maintain that our primary goal is to keep computers busy, not people; and production

runs are far more effective towards this end than are debugging runs. The advocates of the "introduce bugs" approach, however, can take comfort in the fact that pessimization is likely to introduce bugs at least inadvertently.

We now turn to the consideration of some specific pessimization techniques. We classify these according to whether they primarily affect central processor computation, input-output, or the use of storage.

The following are among the techniques known for the pessimization of central processor computation:

1. **Expansion of loops.** Code appearing outside of a loop may be moved into the loop, thus causing it to be executed many times instead of just once. For example, the FORTRAN code sequence:

```
RHO = SIN(THETA)
DO 10  K = 1,15
10  SIGMA = SIGMA + SQRT(RHO + G(K) )
```

may be altered to:

```
DO 10  K = 1,15
RHO = SIN(THETA)
10  SIGMA = SIGMA + SQRT(RHO + G(K) )
```

2. **Multiplication by constants.** Multiplication by integer constants may be reduced to repeated addition. Similarly, for cases where extreme pessimization is required, addition may be reduced to repeated incrementation by unity. Note that under some circumstances both the multiplication and addition pessi-

mizations may be applicable, thus producing a cascaded gain in inefficiency.

3. **Injection of common subexpressions.** The FORTRAN sequence

```
RHO = SIN(THETA)
SIGMA1 = RHO + RHO**2
SIGMA2 = RHO/3
```

may be converted to

```
SIGMA1 = SIN(THETA) + SIN(THETA)**2
SIGMA2 = SIN(THETA)/3
```

thus causing the SIN to be computed three times instead of once. Better yet, the elimination of a statement creates the appearance of a **gain** in efficiency. Injection of common subexpressions also implies that subscript multiplication should be carried out for each array reference without regard to other array references or the known characteristics of the indexing variables.

4. **Register allocation.** Results should be moved back and forth from storage as often as possible, and

fast registers should be used only when necessary to achieve correct results.

5. **Postponement of binding.** Expressions whose value is known at compile time can nevertheless be recomputed at run time. In the case of a block structure language, various expressions relating to the sizes of aggregates may become known at compile time, at the time of entrance to a block, or at the time of computing an expression. All such computations and the associated storage allocations should be made at expression time if possible; otherwise they should be made at block time. Under no circumstances should they be made at compile time.

Some of the input-output pessimization techniques may require modification of programs other than the compiler itself. The following are some known techniques:

1. **Page control.** In a paging environment, one should adopt the MRU (most recently used) algorithm. Under this algorithm, when a page must be expelled from core, the most recently used page is the one expelled. If the operating system permits compiled programs to expel pages, then for maximal pessimization, pages can be expelled after each reference.

2. **Choice of record size.** Record sizes should be selected so as to maximize short records, unfilled allocations, and interrecord gaps.

3. **Buffer management.** Input buffers should not be read into until they are entirely empty; similarly, output buffers should not be written out until they are entirely full.

The object in storage pessimization is to maximize the core requirements of the compiled program. Here are some methods:

1. **Allocation of temporary storage.** Temporary storage locations required for intermediate results should be assigned to separate locations, rather than being overlapped. Allocations, if done dynamically at run time, should be done in as small blocks as possible.

2. **Choice of buffer size.** Large buffers, when managed according to the principle suggested above, can consume arbitrary amounts of space and often can force an overlay structure to be used.

Use of a
Validated
Numerical Model
for
Forecasting

by M. L. Lesser

I HAVE LONG BEEN AMAZED at the insight that can be gained from the manipulation of a numerical model built from observation of seemingly unrelated facts about a class of activity—a model derived without consideration of any causal relationships. The art is very highly developed among practitioners of the "soft" sciences—such as economics and management—and occasionally bleeds over into the "hard" sciences, and even into engineering. The technique appears to be particularly appropriate when applied to "forecasting." Consequently, I decided to try my hand at it.

For subject matter, I considered the series of sailing yachts S_i ($i = 1, 2, 3, \ldots$) I have owned. It was easily demonstrated that the year of first commission for each S_i can be predicted by the relationship:

$$Y_1 = 1964$$

$$Y_{i\,(i>1)} = 1964 + \sum_{n=1}^{i-1} 2^{(n-1)} \qquad \text{eq. (1)}$$

Testing this for each S_i for which data are available showed no deviation—assuming that S_4 will be launched approximately on schedule this spring.

The length over all (LOA), to the nearest foot, of S_i is given by:

$$L_i = 9i \qquad \text{eq. (2)}$$

Testing this, we find that it fits all data exactly except for the fact that S_2 was 17 feet long, instead of the predicted 18 feet. However, this is an error of only about 5.5% (defining percent error as 100 times the difference between actual and predicted values, divided by the predicted value, for any i). Thus, the model predicts the measured LOA of S_i to the nearest foot with an rms percent error of 2.8%—for all available actual data.

The cost of each S_i, in current dollars, is predicted by:

$$C_i = 600\,(N_i)^2$$
$$\text{where } N_i = 2^{(i-1)} \qquad \text{eq. (3)}$$

The scatter in actual data for C_i is somewhat greater than for the other dependent variables, but the rms percent error (as defined above) for all data points is 6.7%—which is not too bad considering the state of the econometric art.

It should be noted that the model given by the above three equations has been validated over the entire existing universe for which it pertains—this has not been a small-sample validation. The only potential datum point that was not considered was the dinghy bought as a tender for S_3 about one year after Y_3. It was considered reasonable to omit this point, since the dinghy is equivalent in size and cost to S_1, and the model is independent of how, or whether, superseded S_i's are disposed of. It should also be noted that all S_i's were designed primarily for cruising, rather than for racing.

Having validated the model, we now propose its use for forecasting: We see that S_5 will be first commissioned in 1979, will be almost exactly 45 feet long, and will cost about $154,000. Several interesting conclusions can be drawn from this. The most significant of these is that the economic inflation will get worse, at an average compound rate of about 9% per year, since one can buy (at 1971 prices) a very-well-equipped quality cruising sailing yacht, 45 feet LOA, for around half the figure forecast by the model. Another conclusion, personally comforting, is that the model assures me that I will be able to afford the vessel when the time comes.

One's mind boggles, somewhat, at the implications of S_6 —even though this is extrapolating the model only 50% out of the validated range of the independent variable. It is not recommended, therefore, that the model be used for $i>6$, since I am not sure that the model is independent of my present age and life expectancy. ∎

Field Application Note
Identification of
Right and Left Hand

INTRODUCTION

In technical field work it is often desirable, if not necessary, to distinguish between right and left which, to some field personnel, may present a problem. Examples are: components being located on the right or left, controls having to be moved to the right or left, etc. Persons having difficulties in this regard are occasionally admonished to have reference to their right or left hand, respectively; this, however, tends to be of little use if the particular person has difficulty in identification of his right and left hand.

PURPOSE

The purpose of this application note is to aid field personnel in the correct identification of the right and left hand, with the highest probability of success and with considerable ease. Having accomplished such identification, the person will be able, by straight analogy, to transfer the directional characterization to the item(s) in question.

PROCEDURE

Identification of the right and left hand may be accomplished by following the procedure given here, in the indicated sequence:

1. With arms parallel, or nearly parallel, place both hands upon the surface of a table, workbench, or other flat, horizontal furniture or equipment surface.

▷ NOTE ◁

It is assumed that the person in question has two hands, which is generally the case. In situations other than the one assumed, the procedure given here is not applicable.

2. Note whether the two thumbs are the two similar digits of the respective hands that are in closest relative proximity. If this is the case, step 3 may be omitted.

3. Counter-rotate the two hands in such a manner as to accomplish the criterion of step 2.

▷ WARNING ◁

Neither hand should be rotated more than 180 degrees. Should this appear required, rotation in the opposite direction is indicated, instead, to prevent possible injury.

4. Observe the relative position of each thumb with respect to its corresponding hand.

5. With a suitable marker, mark the hand that has the thumb on the right with a letter "R", and the hand that has the thumb on the left with the letter "L".

CONCLUSION

The hand bearing the "L" mark will be the right hand, and the hand bearing the "R" mark will be the left hand.

—Pete Lindley

It's true.

After helping a jillion feet of paper tape wind and unwind its way through communications systems everywhere, Teletype announces the addition of magnetic tape data terminals.

There are some basic advantages in both mediums. But as you are well aware, the medium that's right for a system depends a lot on the application criteria.

The new magnetic tape data terminals have many operational features that make life less complicated for the operator.

New, modular line of Teletype® 4210 magnetic tape data terminals.

For example, take a look at the tape cartridge, which was specifically designed for reliability required for data transmission.

Its vital statistics are: 3″ x 3″ x 1″.

It contains 100 feet of ½″ precision magnetic tape.

It will hold 150,000 characters of data, recorded at a density of 125 characters per inch. The equivalent of a 1000 foot roll of paper tape.

This means that your data is easier to store, easier to handle, easier to work with than ever before. And it's reusable.

The units have a "fast access" switch which will move tape forward or reverse at a speed of 33 inches per second. A digit counter provides a reference point to help locate various areas of the tape.

Four ASCII control code characters can be recorded in the data format to aid character search operations. When the terminal's "search" button is pressed, tape moves at the rate of 400 characters per second

Also magnetic tape adds high speed on-line capability to low speed data terminals.

You can zip data along the line at up to 2400 words per minute. For example: Take a standard speed Teletype keyboard send-receive set, and a typical typist. Add a new magnetic tape unit to this combination and the on-line time savings can pay for the magnetic tape terminal in short order.

Straight-through threading makes tape loading and unloading exceptionally easy.

They can send or receive at high or low speed. Or can be used independently as stand-alone terminals online.

If you would like to know more about this new line of Teletype magnetic tape data terminals, please write Teletype Corporation, Dept 81-15, 5555 Touhy Avenue, Skokie, Illinois 60076.

until the control code selected is detected. Then the terminal stops the tape automatically.

A "single step" switch is also provided which enables you to move the tape forward or backward one character at a time. In editing or correcting tape, you can send a single character using this feature.

You can take better advantage of voice grade line speed capabilities.

An operator can prepare data for magnetic tape transmission using the keyboard terminal in local mode. Then send it on-line via the magnetic tape terminal up to 2400 words per minute.

These new modular magnetic tape data terminals offered by Teletype are perfectly compatible with model 33, model 35, model 37 and Inktronic® keyboard send-receive equipment.

Teletype 4210 magnetic tape data terminal with 37 keyboard send-receive set.

TELETYPE

machines that make data move

Postal Service Plans Large DP System Investment, More Services

The U.S. Post Office began automating its mail processing operations in 1958; the results, while consistent, haven't been exactly impressive. But the Post Office is still trying, and things seem to be looking up. Last year, Congress changed the agency's name to the "U. S. Postal Service," gave it almost complete autonomy and power to float bond issues.

About $73 million will be invested in postal R&D contracts during FY'72, which begins next July 1st compared with $50 million in FY'71 and $30 million the previous year. The modernization program is likely to keep growing through FY'75, and probably beyond. The total bill probably will amount to several billion dollars, and much of it will go into information handling systems.

The program's primary goal isn't to improve service, however, even though poor service generated much of the political support for the recent reorganization. Instead, the main purpose is to eliminate a mammoth, recurring postal deficit — currently $1.5 billion/year.

Hopefully, the Postal Service will be paying its own way "within 13 years," says an official. But the gap apparently is going to be closed partly by charging more rather than spending less. Recently, the Postal Service proposed an increase in first class rates from 6 to 8 cents, and in airmail from 10 to 11 cents; other rates would go up as much as 142%.

Although there are plans for a variety of expedited pickup, transmission, and delivery services, all of them probably will cost extra.

To further increase its revenues, the Postal Service is planning a number of new "information products" — for example, a computerized address updating service for volume mailers. While these products haven't been defined yet, they raise the specter of government competition with private industry and possible violation of individual privacy.

Automation will undoubtedly reduce direct labor costs; however, the unskilled and semiskilled, largely black workers who are displaced will almost certainly have trouble finding other work. The result could be that postal patrons will end up paying not only for automation but also for increased welfare.

Spending it

Much of the FY'72 R&D money is going into a "letter mail code sorting system (LMCSS)." Essentially, it utilizes bar code imprinters to rerecord zip code information on the face of each envelope, and bar code readers to route this mail through a letter-sorting machine (LSM). The mail ends up, classified by destination city or post office, in a set of bins on the back of the LSM. The ultimate system will sort even further, and produce a stack of letters for each mailman arranged in the same sequence he follows on his rounds.

Some of the FY'72 money to be spent on LMCSS has already been obligated, or committed in effect to firms with special capabilities. But according to Pat Hanes, LMCSS program director, there is "plenty of opportunity" for newcomers who submit the right bids.

For example, the service plans to ask for bids before the end of this year on an electronically-controlled unit capable of feeding mail into a facer-canceler machine. About 500 units will be acquired. Defense Electronics, Inc., Rockville, Md., and Miller Research Corp., Baltimore, are scheduled to deliver prototypes this month, but neither firm probably will bid on the big buy, says Hanes, because "they're not geared for a production operation like this." The Postal Service will own all the prototype drawings, and will write specs for the production contract in-house, he adds.

Mail reaches the facer-canceler after being delivered to the post office receiving dock, being culled to weed out odd sizes and shapes, and being oriented into a "singulated" stream. In the Ultimate LMCSS, the next major step after facing-canceling will be address-reading, using either an OCR unit or a human operator seated at a keyboard.

The read data will go to a computer which controls a bar code printer. The latter device, located next to the reader station, will record along the lower edge of each envelope, in a space about 1/10th inch high and 3.5 inches long. Then, a bar code reader linked to the LSM will scan this block and, guided by what it reads, will route the letter to one of 305 collection bins on the back of the sorting machine.

LMCSS now consists of a test-bed installation in the Cincinnati post office; some of the equipment came from Plessy, which built a similar system for the Australian postal service several years ago.

By the end of this calendar year, an upgraded LMCSS is scheduled to be operating in Cincinnati, and installation of a second system in another city is supposed to be under way.

Really big

Hanes reports that a "big" system study contract probably will be awarded this year, aimed at determining the optimum computer configuration for LMCSS and related mail processing chores. The present setup utilizes a Sigma II that lacks the capability needed ultimately.

This contract probably will go to a software firm to eliminate a system maker's latent bias toward his own hardware. LTV Aerospace Systems and Computer Sciences helped design the Cincinnati test bed, but Hanes doesn't believe they'll have any bidding advantage — partly because the test bed was a relatively simple design problem, and partly because the bulk of the work under the new contract will involve new system functions.

Another upcoming contract involves development of context analysis software to interpret incomplete address information. A different approach to this problem is already under development; it consists of connecting a crt to the OCR reader and using a human interpreter. A follow-on contract is likely before the end of '71, says Hanes.

He indicates that the work done so far on interpreting incomplete addresses hasn't given any company a bidding advantage. This is also true of another R&D area likely to produce a contract in FY'72; the problem here is to collect mail from the bins at the back of the letter-sorting machine. The bins are now emptied manually. Hanes wants an automated system that can service several LSMs concurrently and empty the bins in different sequences.

More of it

Aside from LMCSS, the Postal Service intends to award several other R&D contracts by the end of FY'72. These include production of a bar code reader for mail sack labels; development of a similar device for parcel post, and development of a standardized system for controlling the conveyerized sorting of nonletter mail.

The Postal Service is also exploring use of optical scanning to orient parcel post so it can be read more easily by the conveyer operator. A cash register for recording sales transactions at Post Office counters is under consideration; it may include on-line communications capability.

Systems analysts within the Bureau of Research want to optimize the location of maintenance facilities, the training of maintenance personnel, and the periodic servicing of fixed and mobile equipment. At least two study contracts are possible by the end of 1971.

Postal Service R&D bids are solicited and negotiated by the Office of Contract Programs within the Bureau of Research and Engineering. Ed Tamulevich, chief of the office, reports that as of last Dec. 31st, he had 195 contracts active, worth $87 million. He expects an increase to around $125 million by the end of '71. About 70% of the contracts are cost plus fixed fee; the rest are largely fixed price arrangements.

Unsolicited proposals are always welcome, says Tamulevich, but few are accepted. A "Guide for Submission of Unsolicited Proposals" is available from the contract programs office, 1100 L Street N.W., Washington, D. C. 20260.

Besides automating its mail processing operations, the Postal Service is also automating a number of related functions.

The Bureau of Finance and Administration, which operates a 360/65 at Post Office GHQ, is planning to upgrade 18 existing remote terminals and add about 12 more. The RFP probably will be released during the last half of '71. A mini-computerized key-to-mag-tape system will be solicited shortly for each of six regional postal data centers. Another contract on the way involves evaluation of the need for a Postal Service finance center. A similar study, of a transportation center, is likely to be contracted later this year.

The Bureau's adp center, headed by B. G. Anderson, has a continuing need for outside support to augment its software staff. The help is obtained under a "basic ordering agreement" negotiated annually with suppliers located within the greater Washington area. BOA contracts are worth $2,500 to $20K per job.

The Bureau of Planning and Marketing has a number of surveys planned, and a $2.5 million FY'71 budget for contract support. "At least as much will be spent in FY'72," says Assistant Postmaster General Ronald Lee, who heads the bureau. Lee's department will soon begin testing an on-line system for updating the addresses of postal patrons who have moved. He hopes to convert this into a computerized address-updating service that can be sold to volume mailers.

The Chief Postal Inspector has set up an office to conduct research, maintain liaison with private industry, and devise crime prevention-oriented systems. "Attention will be given to utilization of closed circuit TV, surveillance devices, (and) computer applications," he told Congress last year.

—Phil Hirsch

"Ever hear of anyone who was replaced by an electric pencil sharpener?"

NEWS✳SCENE

Proposed Tariff Seems to Solve Access Issue

An "innovative" tariff which promises to reduce telecommunications costs drastically for many users has been proposed by the Rochester, N.Y. Telephone Co.

Basically, the "Rochester Plan" eliminates the extra charge for access arrangements which is now imposed on dial-up customers who want to use independently based terminals. It permits use of a much simpler access arrangement than the ones now specified in the tariff. And it sets up an inspection and certification procedure for foreign attachments that should make it much easier for independent manufacturers to compete against carrier equipment salesmen.

The tariff proposal has been filed with the New York State Public Service Commission. If accepted there, it will affect only a relative handful of foreign attachment users. But users of switched telephone service throughout the country will be affected if the Federal Communications Commission makes the Rochester Plan the basis of a new foreign attachment policy.

This could easily happen: the commission's present policy clearly isn't working and the Rochester Plan appears to have more appeal than any of the other alternatives suggested.

Nearly three years ago in its Carterfone decision, the FCC said patrons of the public telephone system should be able to use any terminal that doesn't impair service to other patrons. Today, however, the vast majority of all voice and data terminals connected to the dial-up system are still supplied by Bell — even though independents offer more equipment capabilities, lower prices, and better service.

The basic reason for Bell's monopoly, say the independents, is that the FCC requires each foreign attachment user to obtain a complicated access arrangement from a carrier. The extra cost, delay, and red tape persuades many telephone users to give up the whole idea and obtain their terminal equipment from the carrier.

Various proposals for replacing the access arrangements have been sent to the commission, but none has attracted the support of both users and carriers. The commissioners probably won't change present policy until they can obtain a consensus, for without one the whole battle will just drag on.

Rochester Telephone Co.'s recent proposal may be what the FCC is looking for. Developed and put forward by a carrier, the proposal contained ideas that have been espoused for a long time by independent terminal manufacturers and users. As one source puts it, "now that Rochester Tel. has endorsed the use of a simplified access arrangement, combined with certification and inspection of independently made terminals, Ma Bell can hardly argue — as it has in the past — that these procedures will leave the dial-up network inadequately protected."

In Lease Financing: Need Warrants Concession

Something new is creeping into leasing agreements being signed this year by Transamerica Computer Co. of San Francisco with peripheral manufacturers.

It's warrants granted to Transamerica to purchase a given number of shares of the manufacturers' stock at a specified price within a stated time period. Those manufacturers who had previous agreements with Transamerica without the warrants clause apparently aren't objecting to the clause in new contracts viewing it as a "concession necessary to securing an important source of financing."

And important it is to small companies selling in markets used to lease as opposed to purchase and to whom carrying leases themselves could be crippling. A typical second contract was signed early this year by Transamerican and Data Instruments, Sepulveda, Calif., covering Data Instruments Dataplex line of source data entry equipment. Data Instruments had an agreement with Transamerica in calendar year 1970 without the warrants clause. This year's has it and provides for Trans-

america's buying up to 70% of the equipment leased by Data Instruments in 1971 up to $4.5 million. The warrants issued cover 125,000 shares of stock at $7.125 per share over a five year period.

Transamerica has similar leasing agreements with some 30 companies and at the end of 1970, owned an estimated $142 million of equipment out on lease under such agreements.

Would Paneling Solve Licensing Problems?

An unprecedented (almost) combined meeting of the Los Angeles chapters of the Data Processing Managers Association and the Association for Computing Machinery was held recently to hear a panel discussion on the subject, "Licensing of Computer Professionals." The panel members were Dr. Richard Hamming, of Bell Labs, Herb Safford, of DPMA and General Telephone, and Donn Parker, ACM and Stanford Research Institute. The panel was nicely moderated by Bob Gordon, University of California at Irvine.

The California state senator who is head of the senate committee on business and professions also was supposed to be in attendance but wasn't. His presence might have enlivened an already lively meeting because it was his committee that triggered the panel discussion by scheduling hearings (later canceled) on the licensing of programmers.

In his opening remarks, DPMA chapter president Clarence King stated that the problem of licensing and certification was a poignant one, and perhaps it is. It's certainly a prickly one, as evidenced by the differences of opinion among members of the panel. Dr. Hamming began by asserting unequivocally that he is against licensing, that he wouldn't know how to test for it. He said that it was nonsense to attempt to treat computer science in a legal manner because no one knows what programming really is — it doesn't stay stable — and in ten years there will be other methods of programming that no present pro-

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The Incredible Reducing Machine that started it all.

This is the KEY-EDIT model that made Consolidated Computer a world leader in data input equipment. Introduced little more than a year ago, more than 100 KEY-EDIT™ systems are installed and working in cities throughout North America and Europe. And they're serving an equally diverse mixture of government, industry and business.

KEY-EDIT is known to these users as "The Incredible Reducing Machine" because it reduces data preparation problems to an absolute minimum. KEY-EDIT 100/100 combines all the advantages of the shared-processor with powerful editing and control features.

Reliability is another key to KEY-EDIT's success. Reliable delivery. Reliable service. Reliable people.

Reliable Delivery. KEY-EDIT can be operational on your premises in as little as ninety days. No dealing in futures. And it'll work from "day one" and will continue to work because it is backed by

Reliable Service. It's one thing to install a system. Another to ensure that it works and keeps on working. KEY-EDIT works and continues to work because it is backed by

Reliable People. Marketing people. Technical people. Systems engineers and designers. Both from North America and Europe and in North America and Europe.

New! The basic KEY-EDIT 100/100 is now available with a variety of newly designed data stations. Illustrated below are some of the optional configurations and model colors now being offered with the original Incredible Reducing Machine. Contact Consolidated Computer today for complete details on the KEY-EDIT 100/100.

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The Incredible Reducing Machine for communications and remote editing.

This communications-oriented addition to the KEY-EDIT™ family, with powerful control and editing features as standard, can be tailored to a variety of user processing needs.

The KEY-EDIT concept provides an easily understood transition to shared processor data capture for the smaller business.

Larger companies can use the 100/145 as an economical terminal processor, linking remote branches with headquarters location.

With a powerful editing and control processing capability, the 100/145 becomes a high-performance introductory system to large users for evaluation and specification development.

Users can select from a variety of data capturing devices, card readers, paper-tape readers, and other peripheral equipment to make a powerful integrated data input system.

grammer will be doing.

This, he further averred, is inevitable and probably desirable because the current reputation of programmers for meeting schedules and documenting their work is so bad no one would want them to continue programming. Hamming felt that the people who wish to license and certify are guilty of wishful thinking, that what they really want to do is measure and certify social responsibility, and that, he maintains, can't be done.

The next panelist, Herb Safford, confessed to mixed emotions about licensing because he, too, wasn't sure how performance could be measured, but he felt it was necessary to ensure the integrity and qualifications of people entrusted with privileged information. He admitted the many intangibles involved in the process, and echoed a previous statement of Hamming's that pure binary or machine language programmers of ten years ago are long gone (from the audience, Gene Jacobs piped up, "I'm still here!"), but he advocated the appointment of a commission by California's Governor Reagan to study all ramifications of the problem and to determine the objective, need, procedures, and implementation of licensing, and just whom should be licensed. He conceded that licensing would not necessarily guarantee ethical conduct.

Ethics, however, was the main plank in Parker's panel platform. Although he considered it somewhat premature to discuss the concept of licensing, the state legislature had started things and the professional organizations had better be involved. He cited instances of embezzlement by programmers with the use of a computer to emphasize the need for licensing and ethical safeguards.

This brought an objection from the floor. Gene Jacobs spoke up once more. "That's irrelevant. If a guy's dishonest, licensing won't stop him. And using a computer has nothing to do with it. They used a quill pen to do it for years."

Parker contended that increasing public awareness of computers and the harm that people who program them can do is motivation enough for the industry to start regulating itself. He praised the DPMA for its CDP (Certificate of Data Processing) program, which he termed a pioneering

effort, and stated that until the professional societies are strongly in favor of licensing, there wont't be any (a position also taken by the state of California.)

More than 100 people attended the meeting and although nothing was or could be decided, the atmosphere was peaceful. As the affair broke up, Dr. Hamming, whose phrase, "The purpose of computing is insight, not numbers," is often quoted, was asked to update the profundity. "Sure," he answered quickly, "the purpose of computing numbers is not yet in sight."

ACM to Exonerate Innocent Computers

ACM (Association for Computing Machinery) has put the "Blame the Computer" syndrome under analysis and produced some therapy that may effect its cure. At the instigation of president Walter M. Carlson and executive director Gordon Smith, the association is proposing that local chapters establish "ombudsmen" to mediate the public's computer pique.

The ACM describes it as a modest program. Initially, ombudsmen could monitor and respond to local instances of the "blame the computer" charges or appeal for help in specific situations. The emphasis will be on local response to local incidents with fact finding and trouble shooting the ombudsman's main job. ACM cautions that each action should be thoroughly documented in case a lawsuit should result.

Reaction has been "very positive," according to an ACM spokesman. The chapter chairmen are enthusiastic over the opportunity for worthwhile involvement. The ACM executive committee has approved it and directors of the other computer and data processing societies have pledged their groups' cooperation. ACM has asked the local chapters to work with the other professional groups, particularly DPMA and IEEE, in selecting ombudsmen.

The association is now providing two-day orientation seminars on the program. The sessions, held in the chapters' home towns, will delineate the kind of problems the ombudsmen can legitimately handle (e.g., comput-

er dating service complaints, data processing school recommendations, data bank errors) and will show how to get and document the facts and contact the appropriate people to resolve the situations. It also will put the group in touch with existing public assistance organizations, such as the Chamber of Commerce, Better Business Bureau, Legal Aid Society, Civil Liberties Union, and the press and local government agencies.

ACM is supporting three other projects to curb "blame the computer." One is a program directed by BEMA (Business Equipment Manufacturers Assn.) to defend the computer when it is publicly blamed for failure. BEMA said it recently got the press to more fully explain what went wrong during the moon landing. Briefly labled a computer error, it was eventually explained that a faulty signal from instrumentation caused the computer to misread the situation.

The second program is directed toward informing thought leaders. Here ACM is encouraging members and chapters to meet with community leaders, take part in legislative hearings and assist in planning and implementing public services. Currently under consideration are ways and means for the New York chapter to assist the city of New York in optimizing the court schedule and to help a group of programmers who want to build a consumer data bank of products and services.

The third program has ACM interested in TV game programs that would make use of the computer. It is felt that the general public would see what a computer can do and finally realize it is only a tool. As yet the games have not gotten beyond the concept stage so members of the profession and the ombudsmen, when they are appointed, will be defenders of the computer for a while yet.

McCracken on Tour
With Anti-ABM Ploy

Spring is here and with it has come the second annual campaign against the U.S. Safeguard antiballistic missile system by the Computer Professionals Against ABM, headed by Dan McCracken, who has been on a nationwide tour speaking to ACM chap-

ters and university groups. No funds are being collected along the way, no report on response or reaction is anticipated, and McCracken is receiving (when he receives) only a nominal fee, but his hope is steady that he and his associates (who include Paul Armer of the Harvard Program on Technology and Society, and Joseph Weizenbaum, professor of computer science at MIT) may be able to arouse enough public sentiment against the project to influence the Congress to derail it. Some encouragement in this regard has been given McCracken by Senator Hubert Humphrey of Minnesota.

McCracken's objections (technical) to the ABM system are fairly well known. He contends that "The precise nature of the computing task for the system cannot be defined ... Realistic testing is impossible since it would require nuclear explosions in the atmosphere ... Evolutionary development, critical to the success of every known successful computer system, is out of the question — the Safeguard computer would never be given a second chance."

McCracken states that "not one" computer professional outside the government has taken a public stand in support of the ABM or provided technical assurance that it will work. However, there is one: Bob Head, who also is a *Datamation* contributing editor, and who favors ABM "on grounds of national defense strategy." Are there others?

Varian Aims Minis at All the End Users

To Varian Data Machines, the minicomputer must be viewed both as a blessing and as a curse. On one hand, the ferocious competition in the oem mini market makes that business just about as attractive as the livery stable business, while the end user market — and something Varian calls minicomputer vertical markets — are looking like they could be the hottest items since fried chicken franchises.

J. J. Orris, director of product management in the Varian subsidiary at Irvine, Calif., sees the mini oem marketplace as "a knife battle" among Varian, Digital Equipment Corp., and the Data General Corp. The remaining

Gould 4800
meets architects' demanding
requirements for hardcopy alphanumerics
and graphics.

A Boston-based architectural firm, specializing in institutional projects, has made a high speed interactive computer system an integral part of their architectural design process. And to take full advantage of this capability, they use a Gould 4800 electrostatic printer to provide hardcopy alphanumerics and graphics. The Gould 4800 provides printout for feasibility studies, area diagrams, alternate plans, perspectives, detail drawings, specifications and managerial reports. Where a plotter would take up to 30 minutes to produce a drawing, the Gould 4800 delivers one in seconds. And where a dry-silver photographic process would produce muddy copies that can't be traced or used directly, Gould 4800 copy is sharp, clean and fully acceptable for client presentations. The computer system, called the ARK/TWO was developed by Perry, Dean and Stewart Architects and Planners and programmed by Design Systems, Inc.

It includes an Autrotrol digitizer, a DEC PDP 15/20 (16K), 500K Disk, two Computek CRT's with a keyboard and tablet. Ultimately, it's felt this advanced system will reduce the critical path in large construction projects by 4 to 6 months. All kinds of companies are using the Gould 4800 to meet all kinds of hardcopy requirements. This smooth, quiet unit delivers up to 4800 lines per minute on an 8½" or 11" format. It has an optional character generator. Software and interfaces for major computers are available. And while the Gould 4800 has relatively few moving parts and little need for maintenance, there are service facilities nationwide.
Find out what the Gould 4800 can do for you. Give us a call. Or write: Graphics Division, Gould Inc., 3631 Perkins Avenue, Cleveland, Ohio 44114.

➔ GOULD

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NEWS SCENE

two major manufacturers of minis — Honeywell and Hewlett-Packard — appear to be concentrating on the systems and the end user markets rather than the oem business.

Varian remains very much in the mini oem marketplace and its new low-cost 16-bit machine, the 620L, is expected to enhance the company's competitive position in that marketplace. Orris says that Varian Data Machines is profitable and that he includes its mini operation in that assessment.

The new emphasis — and the great future hope — at the Irvine plant since George Vosatka took over as president nearly a year-and-a-half ago has been on the end user market.

"We've had four major software developments accepted by our customers," says Orris, who pointed to his firm's batch processing master operating system and three compilers — BASIC, FORTRAN IV, and RPG. "And we're working on new software all the time," he adds.

In addition to Varian's drive to attract end users more or less across the board with broad spectrum software, the firm has been staking out what it calls "vertical markets," by designing special systems around Varian minicomputers. "One of the nice things about vertical markets," says Orris, "is that they're not discounted markets. They're not so price sensitive."

Varian's first plunge into a vertical market is Varitext, a text editing system that competes with IBM's MT/ST system. Varian's system, which is aimed at customers who produce manuals, brochures, even magazines, was designed for the production of low-cost and high-volume camera-ready pages. Varian has high hopes for Varitext, although, since its marketing effort has just recently begun, it is too soon to determine how the system will do.

Varian's second effort will be in the data communications area, says Orris, pointing to the company's recent introduction of its 620/f-DC Data Communications System. The comprehensive system is essentially a communications preprocessor relieving a large computer of collecting some data. The system is quite likely a harbinger of data communications things to come from Varian.

"We want to develop an image in data communications," says Orris. The Varian executive indicated the firm is developing additional systems in other vertical markets, but he declined to reveal precisely what they are.

L.A. Tries to Control Shake, Rattle and Roll

As the earth continued its daily oscillations in the Southern California area following the Feb. 9 initial jolt, a natural interest mounted in what's being done to keep buildings from falling over (a late estimate of quake damage was over 60 lives lost and over $1 billion in structural damage), especially with the advent of high-rise office and apartment buildings in downtown Los Angeles and outlying commercial complexes.

One L.A. architectural firm, Albert C. Martin and Associates, has developed a computer simulated earthquake vibration analysis program as part of its seismic design studies for various buildings now under construction, including the 52-story Atlantic Richfield Plaza, across the street from its own offices on the 20th floor of the 42-story Union Bank Building in Los Angeles, which it also designed (only plaster cracks appeared on the Martin walls — foundation and structure of both buildings held firm).

James Lord, the firm's principal systems engineer, heads the team that devised the analysis system, which employs an animation technique to graphically illustrate the dynamic behavior and characteristics of a high-rise structure during an earthquake in a seven-minute, 16-mm film that demonstrates the rather remarkable ductility and elasticity of steel. Using a service bureau 131K 1108 (connected by a UCC COPE .31 terminal) and software developed by the company (and which is available to other architectural firms), Lord's group mathematically modeled a 52-story, steel-framed tower and excited it by several simulated earthquakes ranging in magnitude from 4.5 through 8.5 on the Richter scale, plus a specific rerun of the El Centro, Calif., 1940 quake that had 7.2 magnitude. (Somewhat unsettling during an interview with Lord was his dry comment that the L.A. quake of 6.5 was a "mod-

erate" temblor.) The input was applied along each of the major axes of the building in turn. The computer then generated a plot of the tower on mag tape at a given point in time, which was converted to frame by frame of film at 1/40th-second intervals, portraying the sequence of combined seismic response.

Although Lord contends that there is no real physical limit to the height of buildings in L.A. ("the higher it is, the easier to control the variables"), he stressed two factors in building design that are not widely understood: the wind dynamics problem (in some cities, such as Boston, the top stories of certain high rises sway as much as 15 feet and these offices are becoming difficult to keep occupied), and the fact that there is no such thing as earthquake proof, only earthquake resistant. He is firmly committed to steel construction (the firm was asked to bid on an all concrete 50-story building in downtown L.A. but refused), because it is the most flexible material, better able to return to original form after the alteration of an earthquake than any other. He is a strong believer in the use of the computer in structural design (there are 12 software people in the Martin organization) and makes his terminal available to other firms in the downtown area for scientific use.

Only one thing. He still expects a major Southern California earthquake (7.5 would be 10 times greater than Feb. 9, 8.5 would be 100 times greater) and designs with that in mind. Please, Lord.

There Was No One There to Hiss the Villain

They didn't wear black handle-bar mustaches and they didn't leer but there was rent that hadn't been paid and they did foreclose — in this case on assorted IBM peripheral gear leased from IBM by CompuTerminal Corp., San Francisco Service Bureau.

An IBM-hired truck pulled up to CompuTerminal's facility on the morning of Feb. 24th and truckers removed the gear on which $20K back rental was owed. But the story isn't as sad as it might have been. Len Palmer, president of CompuTerminal, was ready. The company had been given a Feb. 23 deadline by IBM, "to

pay up or else." At first, said Palmer, "I didn't think they'd do it but as the deadline approached and their attitude didn't change I became sure they would." So Palmer, ten days before the deadline, contracted with Datronic, a leasing company, to lease from them equivalent peripherals (also IBM). These were delivered and running the day before the foreclosure.

CompuTerminal, like many other service bureaus, came upon bad times last April and went into arrears with many suppliers. Palmer says things have picked up in the early months of this year and they are beginning to clear up their delinquencies. Their suppliers, he said, "with one notable exception," were most cooperative. The center operates a Burroughs B5500 on which they were delinquent to the tune of $80K. They're current now and clearing up the back payments in installments. "Our landlord

NEWS SCENE

was beautiful. He tore up our lease and took a promissory note." Palmer said he offered plans of settlement to IBM similar to those offered his other suppliers but the best they could do was, "one half by the 23rd and the balance in 90 days."

"I showed him (the IBM representative) our list of stockholders," said Palmer, "thinking the fact there are among them representatives of companies which are big IBM users might have an affect. His response was: if Thomas J. Watson's name was on that list I couldn't change policy."

Palmer contends that service bureaus have long been considered "second class" customers by IBM. He said directors of the Association of Data Processing Service Organizations (ADAPSO) currently are drafting a letter to IBM to this effect in hopes there will be policy changes.

"Even before unbundling we got no attention," he said, "because service bureau accounts were house accounts." Recently, he said, IBM adopted a different commission structure for sales to service bureaus which virtually revives this condition.

It has been reported, he said, that since the recession hit, some 500K points (a point is worth $1 in lease revenue per month) worth of IBM owned equipment has been repossesed from service bureaus in the New York area alone.

And what does he think IBM will do to collect the $20K? "I don't know. I'm going to wait and see but I'll bet we have one of the very few full-blown computer installations in this country which doesn't mean one penny in monthly revenue to IBM."

NEWS BRIEFS

Kelly Comes Through

Scientific Control Corp., Dallas, has a new majority stockholder and better prospects for the future than it has had in more than a year.

Richard Kelly, a man described by his attorney as "an entrepreneur and investor ... a man who likes to buy ailing companies and turn them around," last month completed something he'd been trying to accomplish since early last fall. He purchased the 50.9% interest in the troubled firm

held by Penn Central affiliate, Great Southwest Corp. Purchase price was not disclosed but Kelly last fall had agreed to pay $250K for the GSC shares and the current deal involved a $100K payoff to Harris-Intertype to whom the stock had been pledged as collateral on a loan, so the price probably falls between those two figures.

Having completed the purchase, Mr. Kelly was, at this writing, attempting to raise the working capital needed to revitalize the company which has been operating for months with a skeleton staff in "a holding pattern." Maybe he can do it.

New to Banking

Source data acquisition, once an almost exclusive tool of sophisticated, defense-oriented industries, is moving into the business world. Data Pathing, Inc., a major source data acquisition system supplier, has installed what it calls the first such system in banking. First National City Bank of New York has taken a system it will use to isolate operation costs in hopes of reducing overhead. DPI, which has 65 installations to its credit, said "more and more" of its systems are doing to non-defense oriented customers. The firm said average order size, about $500K, is back to prerecession levels.

Treble Damage Suit

Arcata Communications, Inc., filed a treble damage antitrust suit in Miami Federal District Court against Southern Bell and AT&T charging the two carriers, "deliberately damaged and sabotaged Arcata terminal installations."

It accuses Southern Bell salesmen of trying to win orders from Arcata customers by making false statements about Arcata terminals and contends access arrangements required by Bell are unnecessary. Arcata's attorney, Thomas DeWolf, said Bell has "shorted out" Arcata terminals by making wiring changes inside switching centers linked to them. The suit asks for $10 million in punitive damages plus three times whatever actual damages are allowed by the court.

Software Firm Expands

One of the few program package software firms on the upgrade after trim-

ming "uneconomical functions" during the current recession is National Computing Industries, San Francisco, which recently transferred headquarters there from Phoenix and named Frank Beck as chief executive officer. A subsidiary of Continental Telephone, NCI expects to show a profit for the first quarter of '71 on sales of its Work 10, a file management package, and RSVP, an information retrieval product, and is adding people and marketing outlets, the latest in Mexico City.

SHORTLINES

Computer modeling has become an important part of the world of finance. TRW's Systems Application Center will develop a model for the Federal Reserve Board that will simulate FRB's national payments system ... Chase Manhattan Bank formed a new subsidiary, Chase Econometric Associates, Inc., to market an econometric model of the U.S. economy, to develop additional econometric models of industries and individual companies, and to provide an economic data base on a time-sharing basis through Rapidata, Inc., New York City ... In the name change field: Logitron, acquired late last year by The Bendix Corp., is now Interactive Terminals Corp. Analog Digital Systems, Inc., Palatine, Ill., became Anixter Data Systems ... Philco-Ford's Microelectronics Division pulled out of the shaky semiconductor business ... Control Data's Cybernet moved into Canada with opening of the first Canadian public Cybernet terminal in Calgary, Alberta ... Computer Utilities of Mid-America, Inc., a licensee of Western Union Computer Utilities, Inc., expanded its geographic coverage with opening of new centers in Omaha, Neb., and Bloomington, Minn. ... And in training: Edutronics Systems International, Inc., has made available an "Essentials of Fortran" film course it says will prepare trainees to do productive work "immediately." Computer Innovations, Chicago, is offering what it calls "the busy man's APL training program," a quick course taking three hours per week for three weeks. ∎

Input Preparation

Some industry experts estimate that it costs 10¢ to keypunch and verify each card that goes into a computer, after paying rental on the equipment, salaries, and other associated costs. The attempts that have been made to reduce the $5 billion annual bill for input preparation have usually been expensive replacements themselves, and/or involved a complete changeover to a différent methodology to effect unspectacular cost savings.

The Verimatic 70 may change all of that—and might be as common in an edp installation in a few years as the keypunch has been in the past. The unit consists of a card reader, output printer, and computer logic

PRODUCT
SPOTLIGHT

circuitry. It processes keypunched cards at the rate of 18,000 cards per hour, surely equal or exceeding the performance of quite a few verifiers on an eight hour shift. The Verimatic is programmed by keypunch personnel using a standard 80-column card. The unit then starts reading the cards, checking for improper punch formats, improper duplications, range check errors, and validity errors. Additionally, the unit can obviate the edit pass runs so common in edp shops, because it can also list and total multiple fields accepting positive and negative entries, verify check-digits and zero-balance, operating with both base and alternate

programs, identify transaction-code errors, and store characters in a data table for matching with punched data to indicate errors when illegal information is entered.

Verimatic 70 is also a keeper of keypunch operator performance statistics, providing complete departmental performance by individual operator, showing the number of cards processed, the number of error cards, and the number of total error keystrokes. Output from the system is a listing identifying and isolating the error and providing a diagnostic message to facilitate error correction.

An installation might use the Verimatic in four ways (that we can

think of—there are probably others): as a straight verifier, eliminating key verification; as a pre-verification editor, allowing most errors to be caught and corrected immediately by the same operator who made them; as a post-verification editor to verify the verifiers, and as a precomputer editor. And the price is only $19,980. The unit can also be rented for $495/month excluding maintenance. At that price the installation could afford to re-verify all their keypunching and still keep the girls around. Delivery is 90 days ARO. PERIPHERAL SCIENCES, INC., Norristown, Pa. For information:

MTU

This firm has built primarily test equipment in the past, and the Series 7/9 of IBM-compatible tape units is their first tape drive. A 12½ ips design, various density and track combinations allow 10 models to be offered. The standard 200, 556, and 800 bpi are offered for the 7-track models (choice of any two) with either single- or dual-gap heads, all of which are NRZI models. The 9-track units also have combinations of single- or dual-gap heads, and either 800 bpi NRZI or 1600 bpi phase encoding recording modes. Rewind speed for all models is 125 ips, and the reel size can go up to seven inches. The units also have built-in tape cleaners and electronic deskew-

ing circuitry, and are plug-for-plug and pin-for-pin compatible with their major competitors' (PEC, Ampex, and Wang Computer Products) comparable units. Prices start at

$2150 for orders of 100, and the price includes a cabinet. WILLARD LABORATORIES, INC., Los Angeles, Calif. For information:

Non-Impact Printer

The Model 720 is a Teletype-compatible alphanumeric terminal that can be operated either portably or as a desktop unit, with a built-in acoustic coupler or hardwire coupler. It operates at switched speeds of 10, 15, and 30 cps using a non-impact thermal print head for nearly silent operation. The 720 prints 80 characters per line and utilizes 320 feet of paper. A receive-only version, the 721, is designed to interface with crts. An accessory paper tape punch and reader operates at up to 30 cps. The price is $3395 and delivery is from stock. DATA ACCESS SYSTEMS, INC., N.J. For information:

Supermodem

It is difficult to call the PIX-600 a modem, because such expensive things as communications controllers and special communications software can be eliminated through the use of the Parallel Interface Extender modem. It's similar to the vendor's MARQ-48 (Nov. 15, '70, p. 157) in that it's a 4800 baud modem. But the PIX sports an 8-bit parallel interface for direct plug-in to a computer i/o channel. Thus, remote peripherals and processors appear to the computer as local peripherals, eliminating a lot of costly communications wrinkles. And the price is only about $6K.

The first model, available this month, is a generalized version with an interface board that must be modified to fit the particular computer i/o channel for which it is ordered. Standardized versions with pre-wired boards will be provided later, according to demand. The modification is at extra cost if performed by the vendor. PARADYNE CORP., Clearwater, Fla. For information:

CRT Terminal

The model 7700 crt display terminal is not the first unit of this type to be manufactured by this vendor, but it is the first unit to carry their banner into this highly competitive commercial market. The unit consists basically of the 12-inch diagonal monitor, a set of 64 ASCII characters, editing features, character generator, refresh memory, and interfacing. Characters appear in dot matrix displays of 25 lines of 40 characters (1,000) or 25 lines of 80 characters. The screen is refreshed from MOS shift register memory at 60Hz. Options to the 7700 include another 32 characters, selective blinking, and polling for multiple sets. Cursor control and editing functions also comprise the 7700. The interfacing is EIA RS-232 for either synchronous (optional) operation up to 9,600 baud, or asynchronous operation up to 1,800 baud in half or full-duplex mode. Other optional configurations permit serial transmission up to 120,-000 baud or parallel transfer rates of 15,750 characters per second. Prices start at approximately $3200 for end user versions, with the 1,000 character models ready now, and the 2,000 character version scheduled for next month. LEAR SIEGLER, INC., ELECTRONIC INSTRUMENTATION DIV., Anaheim, Calif. For information:

Teleprinter

The model 100 serial impact printer can be used as a data terminal, communications printer, text editing typewriter, or maybe in other applications as well. Its print speed, using an interchangeable print wheel containing 96 ASCII characters, ranges from 30-50 cps across 80-256 positions. Tab speeds in either direction are 35 ips across up to six copies of journal roll, continuous forms, or

cut forms.

Options include addressable tabulation to any given position, vertical tabulation, the ability to operate each side of a split platen independently, and ledger card insertion devices. The terminal is priced at $2960 in single quantity, or oem's can buy the components separately. I/O DEVICES, INC., Montville, New Jersey. For information:

CIRCLE 368 ON READER CARD

Minicomputer

Not long ago minicomputers with little or no memory (just the cpu) were selling for around $10K. But during the last year the price of memory storage has dropped dramatically, as evidenced by the model 620/1 being priced at $5400 with 4K of 16-bit core words. In all other categories, the 620/1 is a 620/i (1.8 usec cycle time for up to 32K of memory). Each 4K chunk added to the 620/1 costs $2300. The l designation stands for low cost. All the software packages

developed over the years can be run on the /1, and so can all the standard assortment of peripherals. Deliveries begin in June for the 620/1. VARIAN DATA MACHINES, Irvine, Calif. For information:

CIRCLE 363 ON READER CARD

Tape Drive

The model 8197 tape unit is a read-only unit for off-line reading operations. IBM-compatible tape, written in 9-track 800/1600 bpi formats, or

200, 556, and 800 bpi 7-channel tape is read asynchronously at speeds up to 45 ips. The densities are switch selectable, with dual operation for identical data rates, an option offered with 1600 bpi operation. Delivery is 45-60 days ARO for the 8197, which is priced at $6640 in orders of 100. The rewind speed is 150 ips. KENNEDY CO., Pasadena, Calif. For information:

CIRCLE 361 ON READER CARD

We've made it child's play to put together your own print-out storage system.

A storage system so simple, so flexible, you can slip it together, stack it, expand it, connect and interconnect its rugged, lightweight modular units with all the ease and freedom of a kid's Tinker Toy*.

That's what makes the new National Data Reference Control System the most versatile, economical print-out storage and referral system you can buy. Now, with *five new storage and connector units* designed to give you an infinite variety of expansion and control possibilities, you can custom design a system that meets your exact requirements — from a single floor station to a complete, multi-module department.

Remember, too...only National offers you a *total housing system* including data binders and hanging devices, plus a complete selection of floor and desk-top referral and retention units. Find out now how easy it is to make a National hero out of yourself when it comes to planning an EDP storage system. Mail the coupon for our new brochure.

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...HARDWARE

OCR Computer System

Any business maintaining a very large number of records, such as oil companies, stock exchanges, etc., might find the Graphix I Optical Character Reader-based computer system the solution to their process-ing problems. A Digital Equipment Corp. PDP-10 (having roughly the power of a 360/50) is the "con-troller" of Graphix I, but there are other processors, too, allowing the system to scan and process incoming 16 or 35mm microfilm, output onto microfilm, and have enough comput-ing power left over to act as a large-scale time-sharing system, all simul-taneously.

The PDP-10 sets up the scanner, telling it where to scan on the incom-ing microfilm, how to scan, and where to store the information in memory and then lets the scanner proceed, leaving the PDP-10 available for other duties. Frames are ad-vanced in as little as 10 msec through the asynchronous system. Depending upon the quality of the input, Graphix I can read over 2000 charac-ters per second. When film quality starts to deteriorate, the control-ler instructs another hardware box called the Binary Image Processor to increase the amount of image en-hancement. Numerous little proprie-tary "tricks" are used to deal with problem characters, including corre-lation of images at 9 relative offsets, masking, etc. When a character can-not be identified, it is displayed on a crt for an operator to make the final judgment. Up to six crts can be attached and a special controller is supplied here for handling the crts without using mainframe cycles. This should drop the error rate to near zero.

The only font Graphix I cannot deal with is Chinese ideograms. All others, including handwriting, are allowed with new fonts being "learned" in about one minute. Pe-ripherals offered with Graphix I in-clude tape drives, discs, line printers, and unit record equipment. Graphix I is supplied with all the necessary packages for operation, including as-semblers, loaders, monitors, I/O rou-tines, FORTRAN IV and COBOL com-pilers, and others. Prices start at $1.2 million. INFORMATION INTER-NATIONAL INC., Los Angeles, Calif. For information:

CIRCLE 371 ON READER CARD ∎

Information Management

Qwik-Trieve, as the name implies, retrieves data. It also facilitates data storage and handles both functions for up to 250 million bytes of disc resident data in time-shared, batch, and interactive systems. The package was developed for commercial time-sharing, specifically Spectra 70/46, and has been operational on a 192K 70/46 system for the past year. Similar packages are being prepared for the PDP-10 and B6500. The storage/ retrieval package features free-form English query statements which get 5-15 second response depending on the character of the query rather than the file size. There is no report generator so the response—management, operations or technical information—comes out pretty much as it went in. However, the inquirer can indicate a sequence for fields.

Another Qwik-Trieve feature is its ability to combine record segments for more efficient use of storage and to make immediate use of storage once it is emptied. The 70/46 Qwik-Trieve system has a purchase price of $30K which includes installation and one year of maintenance. Lease terms also are available. The B6500 package will be available in late summer and the PDP-10 version will be ready in October. WESTINGHOUSE TELE-COMPUTER SYSTEMS CORP., Pittsburgh, Pa. For information:

Cost Accounting

PROFACTS (Production Formulation Accounting and Cost System) is a COBOL package that provides data for analysis of production costs. It is divided into a maintenance and a production cycle. The first maintains data on current cost for raw materials, labor, and overhead, and can generate this data for each finished and intermediate product. It monitors cost fluctuations and the use of raw materials in intermediate products. The second portion of the package prepares data on material and manufacturing requirements for the various levels of production, based on production requests for each product. It also consolidates this data to report gross requirements of materials and intermediate products for a given production cycle and to provide a history of usage. PROFACTS is designed for use with the DOS operating system on a 64K mod 30 360 or larger with four tape drives and two disc drives. A source deck of the program and five days of education and implementation are provided for $7800. One and two year full payout leases also are available. System updates are provided free for one year or the life of the lease contract. FORTEX DATA CORP., Chicago, Ill. For information:

Fortran IV Compiler

Two versions of this ASCII FORTRAN IV compiler are available to HP users. The first compiles in an 8K DOS-M system or in a 16K DOS or RTE system, and the other, a more powerful package, requires a 16K DOS-M or DOS system or a 24K RTE system. The compiler is compatible with HP FORTRAN II compilers and will compile programs written in that FORTRAN without modification. Additionally, object programs constructed by the compiler can be loaded and executed by any HP computer system having at least 8K of memory and a teleprinter appended. Error diagnostics also are included in the package. Object programs can be punched on paper tape or written to a disc for immediate loading and execution, or both. Output also can be in the form of source listings, object code listings, or again both. A symbol table listing for each main and subprogram also can be produced. Binary paper tapes cost $55 and binary and source paper tapes, with listings and documentation cost $540. HEWLETT-PACKARD CO., Palo Alto, Calif. For information:

Graphics Design

An interactive graphics design system that has been in use for five years by a firm manufacturing fighter planes is now available for sale or as a service. The package is modular and will be tailored to the specific needs of manufacturers. Minimum hardware required is a 360/50 with 512K core and 2250 crt terminals. The basic system containing all essential program modules is $120K for an irrevocable license, with monthly maintenance at $4500. Prices of additional modules are negotiable. As a service, the system runs on a 360/75 with 1024K main storage plus 1024K large core storage. McDONNELL DOUGLAS AUTOMATION CO., St. Louis, Mo. For information:

Cobol/Bal Debugging

PAID (Programmer's Aid in Debugging) is a 2K BAL package that can be used on IBM 360 systems using DOS for checking out COBOL and BAL programs. The product of a two-man firm, it is said to have the ability to detect, validate, and print out program errors without interrupting the processing of data exceptions, and also to make use of external interrupts to produce snapshots of core and patching. PAID is available on a 30-day free trial. The purchase price of $350 includes the object program and operation manual. MPIRS ASSOCIATES, INC., New York, N.Y. For information:

Cross Assembler

Three software packages allow the assembly of programs for Nova minicomputers on the IBM 360/370, Univac 1108, and CDC 6600. Each assembler is written in FORTRAN IV and is compatible with the Nova Extended Assembler (relocatable), it is said. The source programs are distributed on IBM compatible magnetic tape, and accompany a 50-page instruction manual. The price of $45 is meant to cover the cost of preparing and providing the tape, plus the manual; it's not unbundling. DATA GENERAL CORP., Southboro, Mass. For information:

SOFTWARE

Your mini-computer is only as fast as your printer.

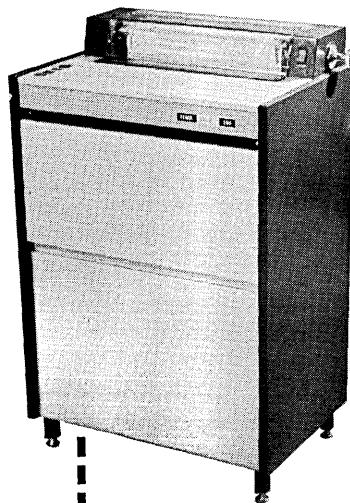# Teletypewriter 1 second print-out.

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Our 1 second print-out.

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ANNOUNCEMENT OF A. B. DICK COMPANY'S VIDEOJET 960
PRINTER. PRECIOUS COMPUTER TIME NEED NO LONGER BE
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The A. B. Dick Videojet® prints up to 250 characters a second. And it does it whisper-quietly at almost 25 times the speed of conventional teletypewriters. Yet Videojet still prints a full computer-width line on ordinary untreated paper. All for less than $7,000. Or, you can lease.

Videojet plugs right into your minicomputer system with either a parallel interface through an I/O channel or a serial buffered interface that makes the printer look like an RO teletypewriter. And A. B. Dick's national service organization assures you immediate servicing.

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Fortran Efficiency

FORTUNE ˙(FORTRAN Tuner) is a FORTRAN IV program which analyzes each statement of a FORTRAN program, tallies up the number of machine cycles expended to execute the statement, and lists the results along with the original source code. This listing can then be used to locate those statements which use the greatest amount of computer time and thus should, if possible, be optimized. Tables of instruction execution times of most of the 360 line are available currently and the vendor can supply FORTUNE for any FORTRAN machine in two or three weeks, it is claimed. The mailout package can get by with as little as 8K bytes on a 360, but 32K is a lot more comfortable. The package, including an object deck and operation manuals, is priced at $2490, or 'can be rented for $99/month on a minimum one-year contract. COMPUTER PERFORMANCE SYSTEMS, INC., Santa Clara, Calif. For information:

CIRCLE 383 ON READER CARD

Investment Evaluation

Information for judging potential income property investments is supplied by PROPVAL running on Univac 1108s. The 20K FORTRAN program analyzes the yearly tax, cash income, equity, and appreciation expected from a particular investment situation and then calculates the return on invested money. User information is supplied in various levels of detail enabling quick look and in depth analyses to be performed. The PROPVAL program can handle syndications on a per-share basis, various loan schedules, depreciation methods, and provides for yearly changes in economy related parameters. PROPVAL is available as a service, on a lease basis, or can be purchased for $3K. COMPUTER INVESTMENT SERVICES, Hermosa Beach, Calif. For information:

CIRCLE 370 ON READER CARD

DOS Automatic Spooling

A DOS system provides automatic spooling of data from card reader to disc and from disc to line printer and card punch for the System/360 Model 25 and up. No modifications of applications programs are required. It runs in a foreground partition of less than 10K and requires MPS, but with little operator intervention, according to the vendor.

Provisions for running special forms and spooling interrupt for on-line printing are included, and multistacking of jobs on the disc is possible. Blank characters are compressed out of all unit record disc files to minimize storage. The purchase price of $6900 includes documentation and about two man-days of installation and training. A rental plan is available. COMPUTER EDUCATIONAL SERVICES, Atlanta, Ga. For information:

CIRCLE 384 ON READER CARD ∎

Double Your 360 RJE Throughput.

You say your line printer is running at half its rated speed? And you've been told the problem is your "2400 bps line." The problem, sir—plain and simple—instead lies with the ordinary dial-up modem you're using.
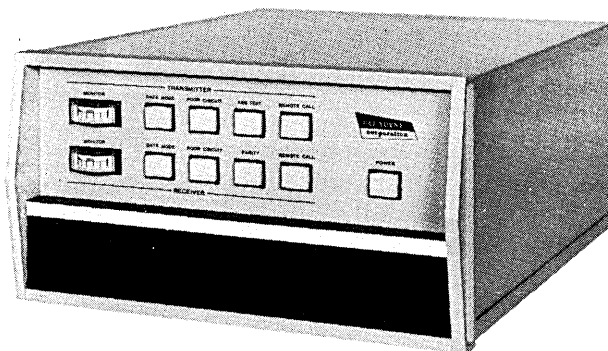
The cure? The Paradyne BISYNC-48 modem. A unique 4800 bps dial-up modem that, through unprecedented high speed modem technology, provides an effective throughput on the dial-up net of two to four times what you're now getting from your 201.

With the BISYNC-48 your line costs will be drastically reduced . . . you'll realize substantial savings in the front-end controller . . . you'll have improved data integrity and reduced communications cost in your CPU . . . and your high speed terminals can operate at full capacity on the dial-up network.

Such innovative features as a 5112 bps bit rate, automatic adaptive equalization, and powerful error control* enable the Paradyne BISYNC-48 to achieve a *4800 bps effective throughput* on dial-up lines. All for no more than ordinary modems which merely modulate and demodulate.

There's no longer any reason to let your 360 RJE terminals work at less than optimum capacity.

*continuous transmission ARQ using a simultaneous ACK/NAK "reverse channel" which eliminates line turnaround.

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THE FURTHER PERILS OF ICL IN COMPETITION

Restrictions on the purchase of foreign computers by British government departments are being lifted. They have been in force for six years and give local manufacturers a 25% price advantage against competitors. In effect this has meant a discrimination in favour of local manufacturer ICL since the industry was merged into one big mainframe maker. The change of policy was stated to a parliamentary committee of inquiry looking into the state of the computer industry. A senior minister, Sir John Eden, from the Department of Trade and Industry, made it clear that the reason for abolition of price-preference was to encourage investment in manufacturing in UK. This is a traditional approach by Conservative administrations. The last time they were in office, Conservatives were responsible largely for helping Honeywell extend its production in the UK to cover computers. Now, with a devoutly right wing and free enterprise government even by Conservative standards again in power, Univac seems to have been persuaded of the merits of going into production.

Manufacturing is to open in Scotland, which is an area that traditionally offers development grants to entice industry. Modifications are also to be made to the one-tender practice in which ICL has sometimes been the only maker asked to give a nominal quotation for a particular government installation. The argument over the buy-British policy has been skillfully evaded by those responsible, but it was brought into the open last year at the start of the computer inquiry when IBM lodged complaints in evidence.

In spite of the changes over procurement policy, the direct support to ICL through development grants started by the last government is going to be honoured by the new administration. But the future for ICL will probably hinge on raising larger investment capital than available from this source when plans are laid for their next series, which is well overdue.

However, specifications are understood now to be frozen on a new range. After much debate, the idea of opting for the basic language or code-word machine of John Illife has not been adopted. The next ICL machine was at least expected to provide the options of six or eight characters to a byte on a four-byte word.

In practice, the new design apparently shows little in the way of adventure but concentrates on development of well-founded techniques for memory tagging three-way access to memory.

ROLLS FALLOUT HITS SERVICE FIRM

Financial hardship faces Systems International, the big European service company set up with Rolls Royce money last year. At present the management is looking for a financier to take over the Rolls Royce stake in the business. The company opened a $2.5 million hq in the UK last year and installed an IBM 360/65 and ICL 1904A worth about $10 million, together with peripherals.

WE NEED SYSTEMS ENGINEERS

Washington, D.C.

COMMAND & CONTROL To support the development of the National Military Command System, the World-Wide Military Command System, Safeguard System and other command, control, communications, and information systems, MITRE's Washington Operations has immediate openings for communications engineers and specialists in software sciences, computer networking, and data management systems. Appropriate background should include design and development of large software systems, hardware/software integration or state-of-the-art studies. Degree required in electrical engineering, computer science, or related disciplines. Advanced degree desirable.

INTELLIGENCE SYSTEMS To support the development of electronic intelligence systems, Washington Operations has openings for engineers with experience in electromagnetic propagation, antenna design, receiver system design, signal processing, and system simulation. A degree in electrical engineering or related disciplines is required.

AIR TRANSPORTATION MITRE's Washington Operations also has openings for ATC System Engineers, ATC System R&D Planning, Airport Planning, and Analysis and Radar Communication, Navigation System Specialists.

If you're interested in these openings in McLean, Virginia (suburban Washington, D.C.) send your resume to Mr. Homer S. Willie, Jr., at The MITRE Corporation, 1904 Dolley Madison Blvd., McLean, Virginia 22101.

Boston, Mass.

INFORMATION PROCESSING Experienced engineers who can define and evaluate information processing problems and determine solutions related to command and management systems are needed now. A background in data management systems and related software sciences including requirements analysis, systems design and development or state-of-the-art studies in related areas is required. Engineers with "hands-on" experience in using mini computers and an interest in computer networks are needed for several other immediate openings. In these positions, you'll be using mini computers to interface dissimilar hardware and software components, extending the capabilities of an existing computer network and using these systems to provide network control functions in a distributed information processing network.

COMMUNICATIONS Experienced engineers to work on conceptual design, planning, technical direction, testing and the evaluation of major communications systems. Current activities include modern tactical communications systems; high-speed data processing, transmission and display, including computer-to-computer communications and imagery transmission. Also, unified communications, navigation and identification systems for aircraft; automatic switching and network control; radio propagation; modulation/coding design and satellite communications systems.

If you're interested in these Bedford, Mass. (suburban Boston) openings, send your resume to Mr. Fred Brown, The MITRE Corporation, 824 Middlesex Turnpike, Bedford, Mass. 01730.

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PEOPLE

One of the founders of Data Products Corp. is now its president. **Graham Tyson,** who joined Erwin Tomash in 1962 to form the Woodland Hills, Calif., peripherals manufacturing firm, was promoted early this year from senior vp to president and chief operating officer. Tomash is the firm's chairman and chief executive officer. One of Tyson's first moves in the new position was to add more clout to the firm's marketing organization by assigning the company's vp for oem marketing to take charge of all marketing activity. **Jack Ogg** now becomes senior vice president of marketing—a new post in which he oversees the firm's oem and systems division marketing. Ogg has been with the company six years and earlier held advertising and marketing posts with Electronic Memories and Magnetics and Ampex Computer Products.

C. W. Spangle has been vice president and head of Honeywell Information Systems (HIS) since the merger last August of Honeywell and General Electric's computer operations. The 45-year-old executive, who started with Honeywell as a salesman 25 years ago, has now been assigned additional duties as executive vp of the company, succeeding **Charles L. Davis** who left to become president of Addressograph-Multigraph Corp.

Graham Tyson   A. Ficarra

in January. . . . Information Storage Systems, Inc., the Cupertino, Calif., disc drive manufacturer, has named **James J. Woo** chief operating officer. The former Chinese Nationalist Air Force officer is a founder of ISS and has been its vp for operations. At the time of his promotion, ISS was negotiating a merger into ITEL Corp., San Francisco . . . Also in San Francisco, the computer peripheral leasing company, Transamerica Computer Co., formally named **James Rush** as its president—a post he has been occupying without the title for a year. Rush is also vp-administration with the parent Transamerica Corp. **Robert Elmore** was named executive vp-finance. **Fraser Wallace** continues as executive vp-operations . . . **Robert M. Bleiweiss,** a 36-year-old former publisher and public relations executive, has been named president of c&s Information Publications, Inc., a newly formed subsidiary of Computing and Software, Inc., Los Angeles. He's the author of *Marching to Freedom,* the life of Martin Luther King, Jr.

New appointments in the computer services business: **Thomas J. Sorger** was named exec vp of Engineering Computer Systems, Inc., Lexington, Mass., computer consulting and facilities management firm . . . **Anthony M. Ficarra,** 28, is the youngest officer of Ennis Brandon Computer Services, Inc., Dallas, and one of its most outstanding. To recognize this, the company recently named him executive vice president. One of his first moves in the new post was to name **Jon C. Dell'Antonia** as a vp of the firm, and at 29, his senior by one year . . . **Fred M. Schriever** was elected vp for consulting services with the Consulting Group of Leasco, Inc., New York.

Roger C. Guarino, Sr., former corporate director of systems and data processing with Kelsey-Hayes Co., has joined American Express as vp of data processing and communications . . . **Robert F. McGrath** is the new vp-finance and controller of GTE Information Systems, Inc., which provides data processing products and services through seven operating divisions . . . Data 100 Corp., Minneapolis, elected **Robert N. Trimpey** vp and controller . . . **D. J. Garrity,** former manager of planning and financial analysis with McDonnell Douglas Astronautics Co., Huntington Beach, Calif., has been named director of business operations with McDonnell Douglas Automation Co., St. Louis, a new post . . . **F. Peter Fisher** is the new president of Computer Microfilm Systems, Inc., Glendale, Calif., succeeding **Jerry Stears** who has resigned. **John Discola** joins the company as its first vp of marketing. Discola and Fisher formerly were with Computerbase Corp., Los Angeles, where Fisher was president. ∎

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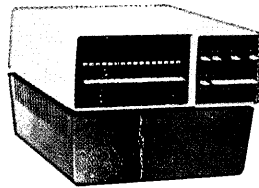
ADVERTISERS' INDEX

The growing family of Westinghouse Computers

Westinghouse Computer Department, dedicated to the principle that response to customer needs must be paramount, introduces the newest member of its expanding computer family, the Westinghouse 2550 Satellite Processor. It joins the recently-announced Westinghouse 2500 table model and rack-mounted model 16-bit digital computer line. The Westinghouse 2550, one of the industry's first user-oriented modular systems for remote and off line data processing, is available **today** for **today's** user requirements. The basic Westinghouse 2550 configuration incorporates the versatile 2500 computer with 4096 words of memory, control console, data set adapter, card reader, line printer, and supporting software (executive communication system, I/O handlers, data set adapter handler, communication formatter with data compression, and emulators compatible with IBM, UNIVAC, CDC and other terminal manufacturers).

Westinghouse 2500 Table Model
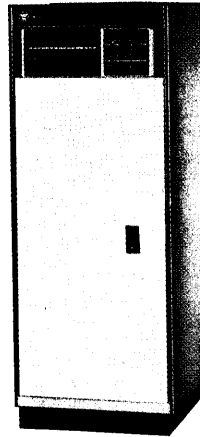
Westinghouse 2500 Rack-Mounted Model

The Westinghouse 2500 computer line features a 750 nanosecond memory cycle time, 4096 words expandable to 65,536, hardware multiply/divide, a full line of peripherals, and many options that give meaning to systems modularity. Established software features monitors, FORTRAN IV compilers, BASIC compilers, assemblers, linking loaders, cross assembler/simulator and numerous other packages.

The option-oriented approach of Westinghouse Computer Department products offers the customer unusual versatility **plus** the knowledge and experience of Westinghouse Electric Corporation's many years of activity in the computer business. Write Westinghouse Computer Department for detailed literature. You can be sure if it's Westinghouse!
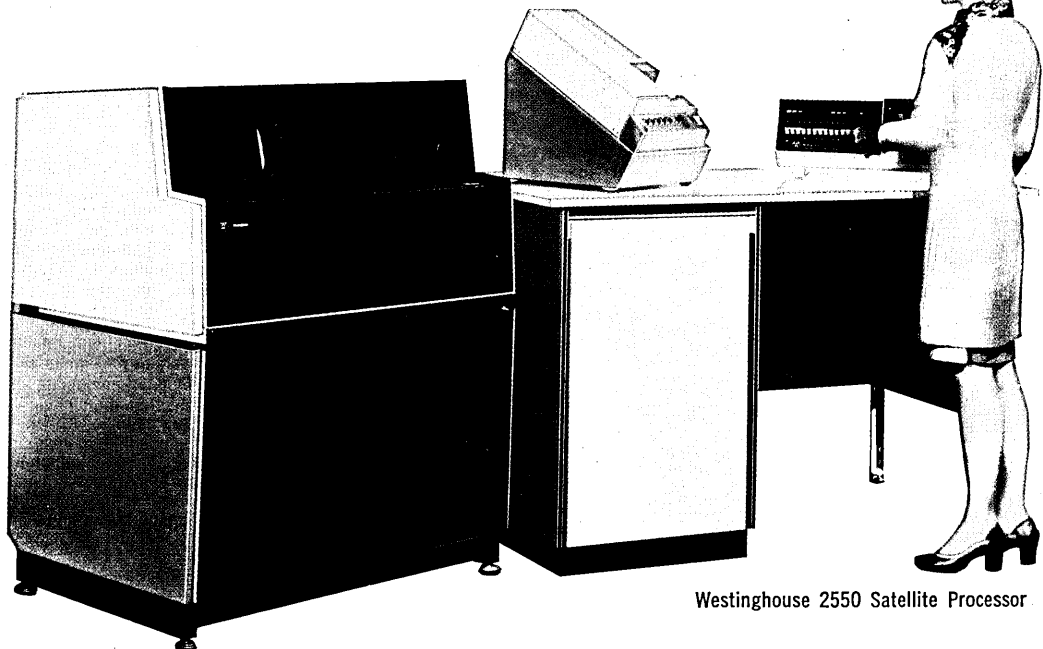
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