

MEETINGS:

October 15, Hardware Clinic.
November 5, Gordon Letwin, Zenix Product Manager for Microsoft, will talk about the new Zenix operating system.
November 14 & 15, 1981 Personal Computer Fair at the Pacific Science Center, Seattle Center.
November 19, Informal meeting with no speaker scheduled.

Northwest Computer News

VOL. 6 NO. 8

A PUBLICATION OF THE NORTHWEST COMPUTER SOCIETY

OCTOBER, 1981

Personal Computer Fair

SHOW US WHAT YOU'RE DOING!
THE 1981 PERSONAL COMPUTER FAIR
NOVEMBER 14 AND 15
PACIFIC SCIENCE CENTER

THE 1981 Personal Computer Fair is happening November 14 and 15 at the Pacific Science Center, Seattle Center. The hours are 10 am to 5 pm both days, and the fair is included in the regular admission to the Science Center; \$2.50 for adults and ??? for children.

This year the fair is bigger and better than ever. The emphasis is on applications and hands-on the machines. Last year we had over 100 computers and terminals available for people to use. This year we'll have even more. We have more booths—all the best stores will be displaying their wares—and more events. This is your chance to see their new equipment, and find out what people are doing with it.

The fair is perhaps the only one in the country oriented towards both hobbyists and the general public. That's right, it doesn't matter if you don't know anything about computers—we'll teach you! Joe Felsenstein will be running his famous 'Learn Basic in 20 Minutes' booth, and with 20 PET computers in one room you'll have plenty of chances to try out your new skill.

Floyd Kirk is organizing the computer chess tournament. This is your chance to watch computers compete under association regulations. Or try your hand against one of the machines, some of them are pretty hot. By the way, if you have a machine or a program you'd like to enter in the tournament, give Floyd a call at 324-0380 days or 789-6192 evenings.

John Marshall is planning something really special, a series of video tapes, films and slide presentations direct from the suppliers themselves. These presentations will be mostly educational shows teaching basic concepts, demonstrating equipment, and will include some ad-

vanced topics as well. John is putting the collection together now, so if you have any ideas, or have any presentations that you can provide, give him a call. He can be reached at 453-8300 during the day.

And if you've been an active club member for the past year, you may be getting a call from Jim Illman. He's got the stack of that famous green form you filled out last year. He'll be asking for your participation in the fair. We'll be handing out more of the forms at the coming meetings. Or if you can't wait to bring your computer down to the fair, give Jim a call at 932-7600 or 932-8771.

**"It's your computers that
make this fair such a
hit..."**

It's your computers that make this fair such a hit. Everyone with a machine is encouraged to sign up for a spot to display it. Whatever it does, play games, demo a business system, show us what it does! Even if it doesn't do anything, bring it down. We need some non-working systems to hang signs on telling what each part does—even if all you can do is run BASIC. We don't care what kind of BASIC. Joe can use your computer (and you) to help out in his teach yourself BASIC booth. We can use all the computers, terminals, hardware and software you can provide. It's club members' systems that make this the best fair in the country.

We'll be seeing lots of participation from other clubs in the area. Northstar, Atari, Apple, Pet, Cromemco, TRS-80, and Heath will all be represented. Show us what you're doing!



Computer Company Investments

Good news comes from the Federal Government and even better news comes to the Data Processing community. All this and more was revealed by Sue Robbins, a stockbroker from Foster and Marshall, Inc. to fifty participants at the September meeting of the Puget Sound Associated Women in Computing (AWC).

"A gift of \$2000 in the form of the tax-free Individual Retirement Account," according to Ms. Robbins, "can be made to grow and still be kept tax exempt." But data processing professionals are even more fortunate in being able to apply their knowledge of the computer industry and the study of trade journals to advantage on the stock market.

Not a roulette wheel or game to play at random, the stock market may be studied carefully as a business, political, social and economic barometer. While reading computer journals, Ms. Robbins recommends keeping in mind the following basic factors about the company:

- 1) history of the industry
- 2) position within the industry
- 3) earning power of company assets over time
- 4) capitol structure of company

- 5) dividend record
- 6) earning power per share over time
- 7) book value per share of stock
- 8) price record of the stock
- 9) caliber and reputation of management.

After reviewing these questions intelligently, you must relate that history to what you can reasonably imagine in the company's future and research further.

Another important consideration pointed to by Ms. Robbins was an individual investor's risk comfort zone. Those looking for safe growth over a long period of time will want an investment. But another option with higher risk is trading, in which stocks are bought with

the object of re-selling at a profit very soon, usually six months.

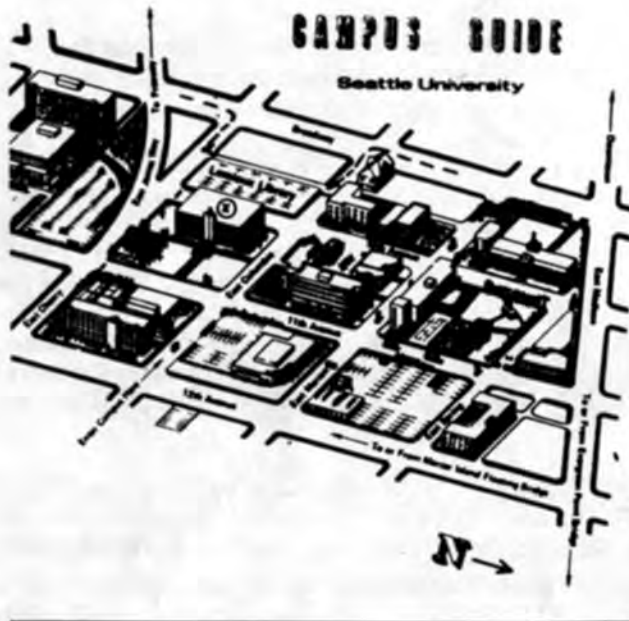
Maybe at this point a roulette wheel sounds like more fun, but for serious financial planning Ms. Robbins gave AWC members material for thoughtful consideration of the stock market potential of data processing companies.

AWC is a national organization with a Puget Sound Chapter, open to everyone. Monthly meetings include networking and speakers. The next meeting will be October 12. For reservations call Eva Peoples at 251-2350.

Northwest Computer Society
P.O. Box 4193
Seattle, WA 98104

192 0982
Holley Michael J

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Permit # 2924



OCTOBER 1981

VOLUME 6, NUMBER 8

RECORDED MESSAGE

527-1852

NORTHWEST AREA COMPUTER STORES

SEATTLE - NORTH

Magnolia Microsystems
2264 15th W
Seattle, WA. 98119
285-7266

Micro Business Systems
6401 Roosevelt Way NE
Seattle, WA. 98115
324-9972

Omega Computers
1032 NE 65th St.
Seattle, WA. 98115
522-0220

Radio Shack
18405 Aurora Ave. N.
Seattle, WA. 98133
542-6184

SEATTLE - CENTRAL

Byte Shop
2605 Second Ave.
Seattle, WA. 98121
622-7196

Pro Audio Seattle
11057 - 8th NE
Seattle, WA.
367-6800

Heathkit Electronics Center
505 - 8th Ave. N.
Seattle, WA. 98109
682-2172

United Products, Inc.
2300-1st
Seattle, WA.
682-5025

Puter Parts
1331-3rd Ave.
Seattle, WA.
625-9556

SEATTLE - SOUTH

Almac / Stroum
5811 - 6th Ave. S.
Seattle, WA. 98108
763-2327

Amateur Radio Supply
6213 - 13th Ave. S.
Seattle, WA. 98108
767-3222

Empire Electronics
616 SW 152nd
Seattle, WA. 98166
244-5200

Heathkit Electronic Center
15439 - 53rd Ave. S.
Tukwila, WA. 98188
246-5357

Radio Shack Computer Center
15425 - 53rd Ave. S.
Tukwila, WA. 98188
248-3710

Computerland
Sunset Plaza Shopping Center
3200 NE Sunset Blvd.
Renton, WA. 98055
271-8585

FEDERAL WAY

Computerland
1500 S. 336 St / Pkwy Ctr
Federal Way, WA. 98003
838-9363

LYNNWOOD

Omega Computers
5421 - 196th Ave. SW
Lynnwood, WA. 98036
775-7585

BELLEVUE

Central Computers
Factoria Square
3836 - 124th Ave. SE
Bellevue, WA. 98006
746-5227

Computerland
14300 NE 20th St.
Bellevue, WA. 98007
746-2070

Omega Computers
839 - 106th Ave. NE
Bellevue, WA. 98004
455-1138

OUTSIDE SEATTLE

Computer Products Div.
10316 Highway 99 S.
Everett, WA. 98204
355-1951, or 743-2295

The Computer Connection
3100 NW Bucklin Hill Road
POB 1194
Silverdale, WA. 98383
692-7753

Yakima Computer Store
1509 Tieton Dr.
Yakima, WA. 98902
453-7378, 248-9040

Computerland
8791 S. Tacoma Way
Tacoma, WA. 98499
581-0388

Micropi
2445 Nugent
Lummi Island, WA. 98262
758-2286

Computers Plus
1415 W. Meeker
Kent, WA. 98031
854-7629

Smart Box Shop
110 N. Tower
Centralia, WA. 98531
(206) 736-4048

If you know of any other Northwest area computer stores, let us know and we will include them in this list in future issues.

Discounts

DISCOUNTS are offered to Northwest Computer Society members at the following computer outlets:

Almac/Stroum
5811 Sixth Ave. South
Seattle, Wa.
763-2300

Discounts offered; 10% off parts or tools, 15% off books and literature, \$30/10 for disks with plastic file box.

N. C. Data
1504 3d Ave. Suite 700
Seattle, Wa.
622-2719 or 622-4220

Discounts offered; 10% to 20% off list price on purchases over \$100 of Radio Shack computer catalogue items. Other product lines discounted as well. Inquire for prices.



How It's Done

THE Northwest Computer News is typeset using a Compugraphic Editwriter 7500 photo-typesetter equipped with an Intelligent Communications Interface (ICI). The ICI allows us to typeset text which has been stored on the Nordata timesharing system and other computer systems.

Our writers use terminals at home or at work to keyboard their articles into Nordata. Our editor can look at those files on her home computer and make needed changes. When the articles are ready, they are transmitted by phone to Compugraphic's Editwriter.

The typeface we are using is English Times. Some copy is received in camera-ready form from other sources so other typefaces may appear occasionally. Advertisements, in particular, are received in camera-ready form.

The Northwest Computer Society expresses its appreciation for the use of Compugraphic's equipment. □

MEETINGS

SEATTLE—The Society meets at Seattle University. Seattle University is on 12th Avenue, between E. Madison St. and E. Cherry St. Meetings are held the first and third Thursdays of each month at 7:30 PM. The first meeting of the month usually features a formal presentation by a speaker or speakers. The second meeting is usually more informal with freewheeling discussion and problem solving.

Meetings are held in the Lemieux Library Auditorium, room 115, on the Seattle University campus.

Thursday, October 15
Informal meeting with no speaker scheduled.

Thursday, November 5
Gordon Letwin, Zenix Product Manager for Microsoft, will talk about the new Zenix operating system.

Saturday & Sunday, November 14 & 15
1981 Personal Computer Fair at the Pacific Science Center, Seattle Center.

Thursday, November 19
Informal meeting with no speaker scheduled.

This schedule has a potential for alteration. We'll try to keep you informed of any changes.

MEMBERSHIP

Membership in The Northwest Computer Society and attendance at meetings are open to anyone interested in personal and small business computers. Subscription to Northwest Computer News is \$10.00 per year. All memberships expire at the end of the year — that means December. All memberships are renewable at the beginning of the year — that means January. In the past we have had an informal policy of pro-rated dues at midyear.

THE NORTHWEST COMPUTER NEWS

This paper is produced monthly by The Northwest Computer Society. It is a benefit of membership in the Society. Other clubs who issue newsletters are encouraged to exchange copy.

THE 1981 NORTHWEST COMPUTER NEWS STAFF:

Editor: Lyle Morgan 447-1663
Associate Editor: Bob Woodbury 271-5593
Circulation: Open
Sales Director: Lyle Morgan 447-1663
Editorial Board: Joe Felsenstein, Ken Berkun, Bill Hunter, Daily McHugher

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ADVERTISING

Relevant commercial advertising is encouraged in NCN. Ads will keep the membership informed of new products, services and opportunities as they appear in the marketplace. Current rates (REVISED AUGUST 1980) are as follows:

DISPLAY ADVERTISING RATES

Size	Cost
Full Page (48")	\$110.00
1/2 Page (32")	90.00
1/3 Page (24")	60.00
1/4 Page (16")	50.00
1/4 Page (12")	35.00
Business Card (NWCS Members only)	20.00 per 6 insertions
Column Inch	12.00
Inserts	150.00 plus printing to post office requirements.

5% discount for 3-5 insertions per year, paid in advance.
10% discount for 6-12 insertions per year, paid in advance.

MECHANICAL REQUIREMENTS

Columns to page: 3.
Column depth: 15.25".
Column width: 3".
Full page image area: 9.75" X 15.5".
Reproduction proof or negative preferred. Camera-ready art acceptable. Minimum space order: 1 column inch. Special requirements: rates on request.

CIRCULATION

Equally by subscription (\$10/yr.) and news stand sales (\$1.00/copy).

CREDIT TERMS

Payment must accompany orders for new advertising. No cash discount is offered.

1981 SOCIETY OFFICERS

President: Joe Felsenstein 365-3829
Vice President: Lyle Morgan 447-1663
Secretary: Rick Powers 328-0591
Treasurer: Tom Philbrick
Program Chairman: Ken Berkun 524-7260
Board Member: Randy Britten 522-1736
Board Member: John Marshall 854-9244

BOARD MEETINGS

Board members—There will be monthly board meetings the third Thursday of each month at 6:00 pm. The next board meeting will be July 16 at Block's Restaurant in Seattle.

EDITOR'S NOTE

WANTED—The Newspaper staff could use a few more volunteers.
(1) A photographer is needed to take pictures at the meetings, special events such as the computer fair and "My Systems" articles. Film will be reimbursed.
(2) Cartoonist/graphics etc. is needed.
(3) And volunteers to enter articles onto Nordata, you must have a crt/printer and a modem.

MEMBERSHIP/SUBSCRIPTION APPLICATION:

NAME _____
STREET _____
CITY _____ STATE _____ ZIP _____
PHONE _____ HAM CALL _____

What computer do you own/use? _____
What operating system/software? _____
What applications do you want to implement? _____
How can we help you? _____
How can you help us? _____

(Membership dues are \$10.00 per year.)

Membership thru Dec. 19_____: \$ _____ New Subscription
Ck/M.O. No. _____ Renewal

Subscription is free to the following organizations subject to acceptance by the NWCS:

Name of Product, Pub. or Newsletter _____
 Club Exchange
 Computer Store in Area
 Major Mfr.
 Supplier
 Publisher

Northwest Computer Society
P.O. Box 4193
Seattle, WA 98104

Calendar

October 1, **Northwest Computer Society**. Norm Larabee of IBM will talk about Data Communications concepts for the 80's. Seattle University Library Auditorium, 7:30 pm. Contact Ken Berkun, 527-1852.

October 1, **Kitsap Apple Users Group**. Regular meeting. 7:00 pm. Computer Connection 3100 NW Bucklin Hill Rd. Silverdale, WA. Contact Darryl Dunmire 692-1080.

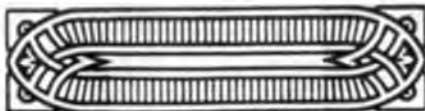
October 3-4, **Second Annual Pacific Coast Computer Fair**. Presented by representatives from all Lower Mainland Computer Groups. Two days of speakers, films, workshops and exhibits. Speakers will include Bob Wallace, Lee Felsenstein, George Gearholt, Barry Pollack, Jim Butterfield, Walter Banks, Lyle Morgan and others. Cost \$3.00 per day or \$5.00 for both. Robeson Square Media Centre, Vancouver, B.C. 10-6 both days.

October 3, **Atari Users Group**. Regular meeting. Contact Oscar Hasten, Byte Shop 622-7196.

October 3, **Software Maintenance Seminar**. Presented by the Puget Sound Association for Computing Machinery. Speakers, Robert L. Glass and Ronald A. Noiseux. Spokane Red Lion Inn, Spokane, WA. \$50 for members, \$55 for non-members, \$15 additional for late registration (after Sept. 19.). Contact Ruth Gustavson, (509)838-5718.

October 5, **Boeing Employees Computing Club**. Regular meeting. Boeing Plant 2 Cafeteria, 14th and E Marginal Way, 7:30 pm. Contact Mark Morris 241-3823.

October 5, **Heath User's Group**. Regular meeting, 6:00pm. Heathkit Store, Seattle. Contact Jan Johnson, 455-3478.



October 6, **68XX Users Group**. Regular meeting, 7:30 pm. Pacific Western Systems, 8454 SE 68th St, Mercer Island, WA. Contact Phil Hughes, 232-4700.

October 6, **Prime Users Group**. Program presented by the Atmospheric Sciences Department of UW. 10 am, site undetermined. Contact Ben Bennett, 872-8500.

October 6-7, **Computers for Small Businesses Seminar**. Presented by the Northwest Center for Professional Education. Speaker, Diane Haelsig of Peopleware, Inc. Cost \$325. Contact Registrar at 746-4173.

October 7, **PSCACM/SIGCUE**. Computers in education discussion, search for resources. Meeting at Andy's Diner, Tukwila, just south of Longacres entrance, 6:00 pm. Contact Perk Bass, 822-7717.

October 7, **Northwest Computer Performance Measurement Group**. Conference on performance and capacity planning. Speakers, Jerry King, Art Maria, Will Garrison and workshops. Sherwood Inn, 400 NE 45th St. 8:30-3:30. Cost \$20, Contact Duane Ness, 345-2797.

October 8, **DPMA**. Regular meeting, topic, Management Services Administration. Quinn's Restaurant, Shilshole Bay Marina, 6:00 pm. Contact Bill Isgrig, 454-5549.

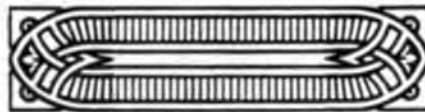
October 8, **Ohio Scientific Users Group**. Regular meeting, Warren Computers, 1819 S. Central, Kent, 7:30 pm. Contact Randy Jones, 852-5400.

October 8, **Kitsap Computer/Personal Calculator Group**. Regular meeting, Olympic College, Rm T-212, 7:00 pm.

October 8, **Techno Directions Seminar**. Presented by Women in Communications, featured speaker, Lou Dobbs of Cable News Network, NY. Workshops on The Electronic Secretary, Demystifying Computers, and others. Trade demonstrations. The Lodge, 222 Mercer St., Seattle 8-4 pm, cost \$60 for members, \$75 for non-members. Contact WICI, 1020 LLOYD Bldg. Seattle, WA 98101.

October 10, **Seattle Genealogical Society Computer Interest Group**. Regular meeting. Jones Building, Third and Union, Room 717, 1:00 pm.

October 12, **Association for Women in Computing**. Regular meeting, topic: Data Processing Degrees, speaker: Darlene Myers of UW Computing Information Center. Sheraton Inn, Renton, 6:00 pm. Contact Eva Peoples, 251-2350.



October 12, **N Kitsap Group**. Regular meeting, Marine Science Center, Poulsbo. Contact David Graham, 779-5105.

October 13, **Small Users Group**. (Small group, not small computers) Regular meeting. Topic, Communications Revolution, presented by Pacific Northwest Bell. Wharf Restaurant, 6-7 pm social, 7:00 dinner and program. Contact Darryl Dunham, 285-3200 for reservations.

October 13, **Northwest Pet/6502 Users Group**. Regular meeting, Academic Computing Center, UW. Contact Richard Ball, 284-9417.

October 14, **TRS-80 Users Group**. Regular meeting, Burien Public Library, 14700 6th Ave S. Contact Steve Smith, 271-5924.

October 14, **DECCUS**. Regular meeting, Puget Power Auditorium, 7:00 pm. Contact Keith Bechard, 454-6363 x2587.

October 14, **Basic Management Seminar**. Presented by Fred Pryor Seminars, Doubletree Inn, 205 Strander Blvd. Tukwila, 9-5 pm. Cost \$135, Contact registrar, 1-800-255-6139.

October 15, **Telecommunication Association of the Northwest**. Regular meeting. Contact Judy Young, 464-4676.

October 15, **Northwest Computer Society**. Board meeting, all are welcome. Blocks Restaurant, 6:00 pm.

October 15, **Northwest Computer Society**. Hardware Clinic, bring hardware questions and answers to the informal meeting at Seattle University Library, 7:30 pm. Contact Ken Berkun, 527-1852.

October 17, **Atari Users Group**. Regular meeting, contact Oscar Hasten, 622-7196.



October 19, **Boeing Employees Computing Club**. Regular meeting, Boeing Plant 2 Cafeteria. Contact Mark Morris, 241-3823.

October 19, **Kitsap Computer Group**. Regular meeting, Computer Connection, 3100 NW Bucklin Hill Rd., Silverdale, 7:00 pm.

October 21, **Northstar Business Club**. Regular meeting, new location. Contact Fred Volking, 362-1728.

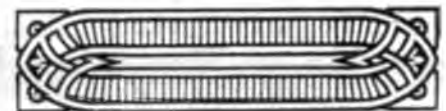
October 22-23, **Word Processing Seminar**. Presented by Pacific Lutheran University. How to plan, implement and manage a word processing system. Speaker, Donald J. Wessels, Hyatt Hotel, 17001 Pacific Highway S., 8:45-4:30 pm. both days. Registration fee, \$505, includes lunch and all meeting materials. For information and registration contact Lynda Hunter, 383-7344, or write to Executive Development, School of Business Administration, Pacific Lutheran University, Tacoma, WA 98447.

October 25-28, **5th Annual SPSS Users and Coordinators Conference**. Preliminary announcement and call for papers. Papers are now being accepted. Please submit a single-spaced abstract to Michael Leavitt, Federal Judicial Center, 1520 H Street NW, Washington, D.C. 20005. The conference is a forum for circulating new developments in SPSS software products, supplying feedback to the providers of SPSS, SCSS, and IDA. Contact Dr. Leavitt, (202) 633-6326.

October 26-27, **Managing Documentation and Documentation Standards**. Seminar presented by Carnegie Press Center for Documentation Resources. Marriott Hotel, 3201 S 176th St. Seattle, WA. Course director, Donald J. Gibbs, CDPA. Cost, \$545, includes materials. For information and registration contact Carnegie Press, 100 Kings Rd. Madison, NJ 07940, (822-1240).

October 26? **Association of Cromemco Users**. Meeting place and date changed from regular. Contact Jim Ilman, 932-8771 for details.

October 28, **PSCACM**. Regular meeting, Mark Boles of Intel will discuss Microcomputer Architecture for the Future. Dinner and meeting place details unavailable at presstime. Contact Clay Jackson, 881-0110.



October 28, **CPM/Pascal Group**. Regular meeting, KOMO-TV Studio G, 7:00 pm. Contact Dick Curtiss, 784-8018.

November 5, **PSCACM**. Earl Joseph of Sperry Univac will speak on Computing Futures. Dinner and meeting place details to be announced. Contact Clay Jackson, 881-0110.

November 7, **Skills Development Seminar for Word Processing**. Presented by the Word Processing Association of the Northwest. Speakers, workshops, career development, trade demonstrations. North Seattle Community College, cost \$25. For information and registration contact Diane at 223-1293.

November 14-15, **Personal Computer Fair**. Presented by the Northwest Computer Society at the Pacific Science Center. Project demonstrations by Society members, workshops, speakers, films, trade demonstrations and more. For information and to participate, call Ken Berkun, 625-6737 or 524-7260.

1981 Personal Computer Fair

November 14 and 15, Pacific Science Center. Plans are being made for this year's Fair that include lots of new and exciting activities. For more information and to participate, call Ken Berkun at 625-6737, days and 524-7260, evs.

We have booth space available for both commercial and non-profit exhibitors. Give Ken a call if you are interested. □

Bulletin Boards:

The following list includes the numbers of local Computer Bulletin Boards. If you know of any others, please contact this paper.

244-5438, 246-8983, 482-5134, 482-5590, 524-2093, 546-6239, 723-3282, 937-0444. □

Tips, Snips & Trivia

Survey

Dear Computer Enthusiasts:

As a member of the Honolulu Apple Users Club, I am interested in surveying the users of the VISICALC program. Thru your help in compiling sample VISICALC user forms, members of all clubs would benefit from such a project.

My proposal is to collate selected VISICALC sample forms and to return a bound copy of the summary of these forms to the participating club as well as a copy to each individual who responds to the survey.

The information requested from each participant is:

- 1) A printout of the form in its particular use.
- 2) A form noting the actual formulas and relationships used between the rows and columns.
- 3) A short summary on the use of the particular form, the field in which it is used (Accounting, Finance, etc.), and its key time-saving features.
- 4) Contributor's name, address, phone, and club.

Materials must be submitted by Oct. 31, 1981, in order to be considered for publication. Your participation in this survey would be greatly appreciated. Please feel free to contact me if there are any questions regarding this project.

Thank you,
Michael K. Ihara
Honolulu, Hawaii 96822

Fully Limited Warranty

Fully Limited Warranty

Clone Software (hereinafter explicitly referenced as "Us") warrants this product against defects in material and workmanship for a period of 1/5 second or 1 disk revolution, whichever occurs first. During the warranty period, we will replace, repair, or ignore (at our option) any defective item provided it has not been subjected to flagrant abuse (such as inserting the disk in a disk drive, reading the instruction manual, etc.) or used in accordance with the directions supplied.

No other warranties are expressed, including the warranties of merchantability, fitness for a particular purpose, or delivery of product ordered. Nothing in this statement shall be construed as a written statement of warranty or guarantee, including (but not limited to) this sentence.

This statement takes away specific legal rights, and you may have other rights taken away which vary from state to state.

Universal Computer Co.

Medflies

Thousands of home computerists are trying to eradicate pesky fly populations with a computer simulation game. The simulation, "Sterl," allows the use of two methods of pest control—pesticides and release of sterile males—either alone or in combination.

The environmentally attractive approach is to release millions of sterile males to mate with females and produce eggs that don't hatch. However, some normal males continue to mate and produce live offspring. Hence, the use of sterile males alone cannot eradicate fly populations.

Non-persistent pesticides such as Malathion kill live flies, but have little or no effect on eggs which may hatch days or weeks later. Thus, even after daily spraying, some flies are likely to survive. Furthermore, pesticides force flies to migrate to other more hospitable areas, as has happened in California since the spraying program started.

Use of the simulation indicates that a combined approach of pesticides plus sterile males is the most economic approach to controlling insect populations, but rarely can an insect population be totally eradicated.

"Sterl" is one of four simulations in the package, "Ecology Simulations I" from Creative Computing Software. Other programs in the package include "Buffalo," a program which simulates the buffalo population in 1850; "Tag," a simulation of the tagging and recovery method of measuring animal populations; and "Pop," a simulation of animal population management.

The games are available for Apple II and Radio Shack TRS-80 from Creative Computing.

Spectral Associates

Spectral contacted the Northwest Computer Society to try to connect with computer professionals on some new projects. The following is an excerpt from the inquiry.

"I am writing to give you a brief description of what I am doing. For the last 8 months I have been writing programs for the TRS-80 Color Computer. Most of these programs are in machine language and they are selling well. I am, however, becoming increasingly bogged down by the business end of this venture. I intend to make Spectral Associates a leading producer of high resolution color graphics software with primary emphasis on the 6809 processor. We currently have the new Hitachi MB6890 Personal Computer and will soon get the Fujitsu Micro-8. Neither have been released on the American market and both use the 6809.

I need capable programmers who want to write good, quality software, on a royalty basis for these machines. I have high level contacts at Tandy, Hitachi and Fujitsu which will prove very useful. I have complete development facilities here in Tacoma for those who wish to avail themselves."

Tom Rosenbaum

Mr. Rosenbaum also said that the Hitachi has Microsoft Basic and a disassembler. It has 32k with 17k video control and overhead, 14k for programs. Interested people should contact him at: Spectral Associates, 141 Harvard Ave., Tacoma, WA 98466, (206) 565-8483.



Flea Market

FLEA Market is a service provided by NCN and is free to non-commercial members. A nominal charge of \$.50 per line is levied on all others. All ads should be sent to: NWCS, POB 4193, Seattle, WA 98104.

FOR SALE OR TRADE:

One Centronics 101S Line Printer (has been contract maintained) \$450. One IBM Selectric Terminal w/Moore Pinfeed. (ASCII or IBM Code) \$450. One Penny Whistle Modem (new kit, almost done) \$95. Contact James Maloney, Box 933 Anacortes, WA 98221, (206)293-4774.

FOR SALE:

IMSAI 8080 mainframe computer, S-100 type Bus structure, includes TDL ZPU CPU board with Z80 microprocessor, Processor Technology 4k RAM PCB board, Tarbell cassette interface—model 100, 17 accessory edge connectors installed, fan accessory, manuals. Hardly used, excellent condition, great beginning mainframe to build up a system. \$550. Contact Steve Sala, 924-6427 eves, 926-6277x49 days. 10612 E 27th Ave, Spokane, WA 99206 K7AWB.

FOR SALE:

Atari 825 80 column printer. New and in original box, under warranty. \$600. Contact Mike Smyth 244-8259 or 655-4212.

FOR SALE:

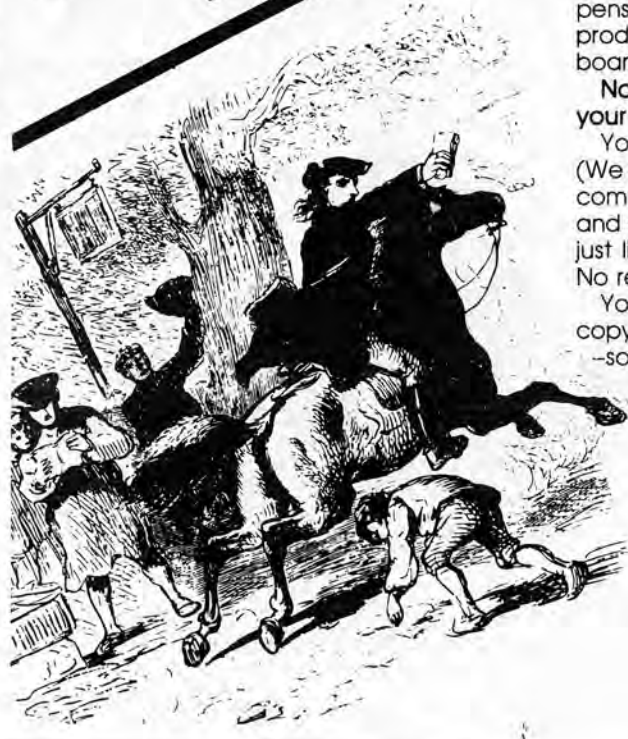
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The club receives a large amount of advertising mail that cannot be accommodated in the paper. Therefore, what does not get printed is brought to the meetings and distributed. There are special interest programs and hardware that may be of interest. You are invited to browse through it. □

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Conputation

by Joe Felsenstein

A CONFIGURABLE TERMINAL PROGRAM

I am a bit of a nut on the subject of terminal programs, mostly because I have such a need for them. I like to do a lot of text entry on my microcomputer, then transmit the result to one of the time-sharing systems I use. An example is this column. When you write a column for this newsletter, the easiest way is to use your favorite editor on your own system, then to transmit the result to NORDATA, to an account whose number and password you can get from the editors. This requires a terminal program that can transmit files, and of course it is very nice if it can receive files as well.

I finally wrote a terminal program I like. This column will take you on a guided tour of my program, which is written in Pascal/MT+. Now I realize that you may not have a Pascal/MT+ compiler, but the object of this exercise is to make the program accessible to you, so you can write your own. I also intend to distribute the compiled code to club members for free, provided that it is legal to do so without paying a license fee to the people who wrote the compiler. There are some compilers on which this is possible (although the matter is totally ambiguous with regard to Pascal/MT+, so I will probably not use it for the distributed version).

Ports—A Necessary Digression

The most interesting aspect of the program is its configurability. A terminal program written for your friend's computer will probably not run on yours, and the guts of the problem is with port numbers and masks. There are two major ways that microcomputers input and output bytes. A few use memory-mapped I/O. This means that whatever comes in or out goes into a memory location, and the program inputs and outputs bytes by simply reading from or writing to those locations. The Apple II and the Osborne-1 use this system.

The more widely-used system, at least for 8080s and Z80s, is to use ports. The hardware which corresponds to a serial port (say the port to which you attach your modem) is accessed by a program by reading and writing bytes to logical ports using the OUT and IN instructions. Usually there are two logical port numbers: one the status port and one the data port. The data port is the one which you read or write the byte from or to. The status port is a port which is read by the program when it needs to find out whether a new byte is ready in the data port, and whether the data port is ready to be sent a new byte.

Usually the status ports have a particular bit which indicates that a new input byte is ready, and another bit which indicates whether it is ready to receive an output byte. For example, suppose that you had my machine (an ancient SOL-20). Its serial status port is port number 248 and its serial data port is number 249. If we want to know whether we can send the serial port a byte, we check the status port by reading a byte from it. The bits in this byte are, by the usual convention, numbered 76543210. In a SOL, Serial Input Ready is indicated by bit 6 being a 1, and Serial Output Ready by bit 7 being a 1.

That means that any terminal program which I write for my system will not work on yours unless you have the same port numbers, the same bits indicating Input Ready and Output Ready, and the same values of those bits (0 or 1) having the same meaning. So my program won't work on your system unless you either have the same kind of system, or unless you have some way of configuring the program for your system.

Configurable Programs

Of course, we can write a program which starts out by asking you to type in the numbers of your ports, plus some indication of which bit is which and what their values are when a port is ready for input or output. Of course, running such a program is pretty tedious: you get tired of typing all this in every time you want to run the terminal program.

One way of getting around that is put all this stuff into a text file whose name is known to the program, and read it in at the beginning of the program. Then the program could be reconfigured for a new machine by simply retyping the text file with the new port numbers and other information.

I have not taken this route, but have been slightly trickier. When the program starts running, it looks at a byte in memory, and checks it to see if there is indication that it (the program) has been configured already. If not, then it starts asking you a bunch of questions about port

numbers and so on. It stores these numbers away in memory locations. It also sets the configuration variable (in our case a Boolean variable called CONFIGGED) to TRUE.

Now this might seem to get you nowhere. Why should we expect all these values to still be the same the next time you run the program? Here's where the trick comes in. CP/M has a function called SAVE, which allows you to write out part of memory into a file. In our case, the terminal program is just over 12K (48,256-byte 'pages') long. If we get to the CP/M operating system after exiting from the configured terminal program, so that the program and all these configured values are still sitting in memory, and type SAVE 49 TERMINAL.COM, our problems are solved.

The SAVE command writes out onto the file a copy of the terminal program, along with the small stretch of memory (immediately following the program) containing the variable CONFIGGED and the port information. Thereafter, if we type TERMINAL, the CP/M operating system will read in the program and this critical data. When the program starts to run, it will see CONFIGGED as being TRUE, and the port numbers


and such all in existence in their proper places in memory.


If you recompile this program under Pascal/MT+, you will have to use the switch '/D:3080' to put the data immediately after the program. Some experimentation with the (hex) value 3080 may be necessary. You should also use DDT to zero out most of memory before running the program for the first time to make sure CONFIGGED starts at FALSE, and you will have to SAVE 49 TERMCFG.COM to make sure that you have an unconfigured version.


The user will thus want to have two versions of the program: an unconfigured one (called, say, TERMCFG.COM) and a configured one, called TERMINAL.COM, which can be regenerated by running TERMCFG and then doing a SAVE 49 TERMINAL.COM.


Configuring


To configure the program to your system, you run TERMCFG.COM. It asks you for the numbers of your serial status and data ports. It also asks you for an integer as a mask to indicate where the Input Ready and Output










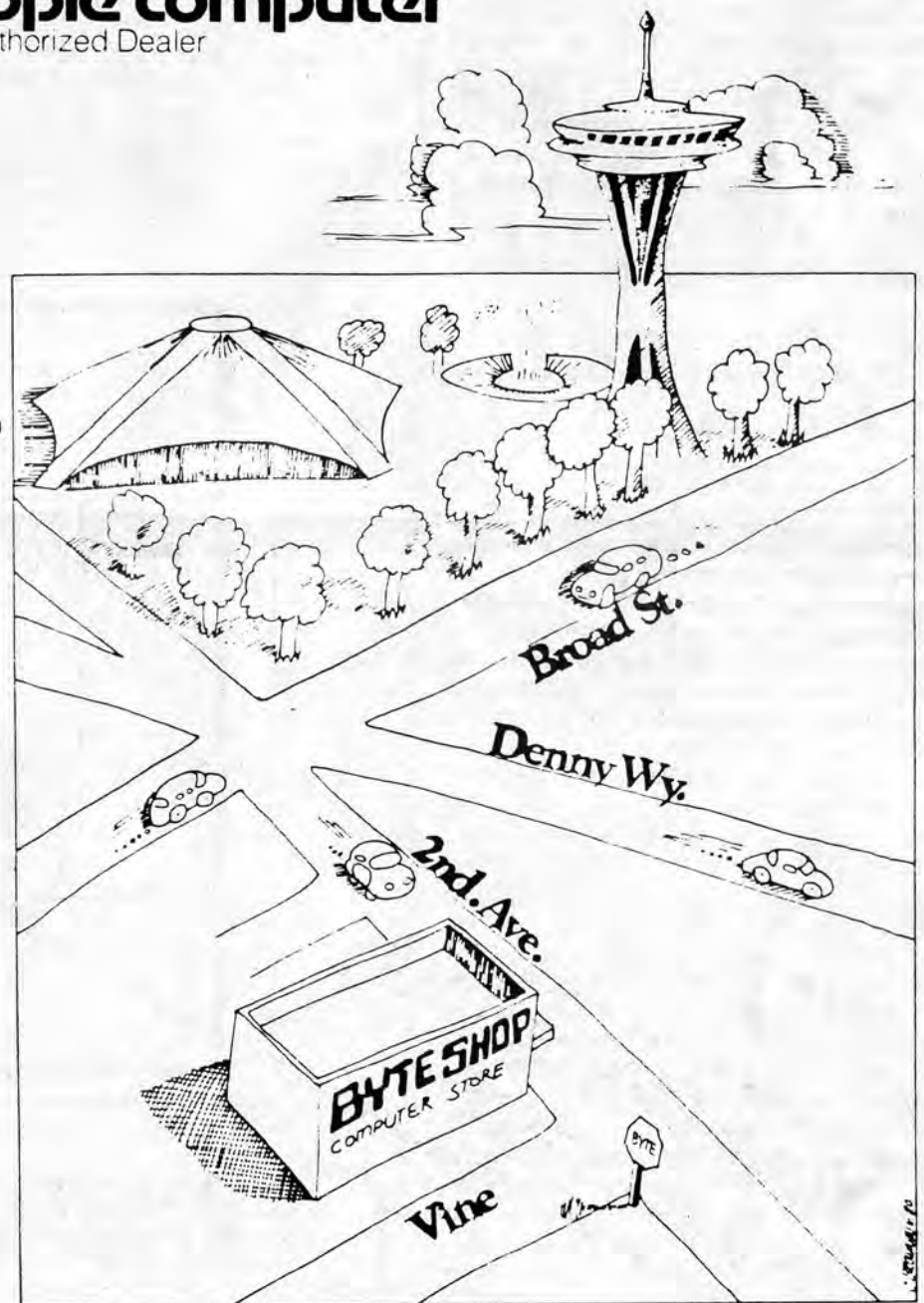













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Personal Computing and the Handicapped

from Chicago Area Computer Hobbyist Exchange.

The Museum of Science and Industry, Chicago, Ill., hosted the Midwest Regional Semifinals of the First Annual Competition for Personal Computing to Aid the Handicapped. This competition was sponsored by the Johns Hopkins University Applied Physics Laboratory.

Over 50 contestants from Minnesota, Wisconsin, Illinois, Indiana, Michigan and Ohio displayed their software and hardware at the Museum of Science and Industry's Computerized Innovations for the Handicapped Fair, August 22 and 23, 1981. Some of the contestants were handicapped; others developed systems for handicapped friends.

Daniel Simkovitz, who is legally blind, displayed a CRT terminal for the partially sighted. A majority of the legally blind have some minimal sight. Braille is not a viable alternative for these people. Simkovitz's terminal could display 8 different type fonts in sizes ranging from 1/2 in. to 3.5 in. on a 19 in. screen and allowed for both horizontal and vertical scrolling.

First prize went to Bob Stepp, who created a Braille word processor. The Braille alphabet, an arrangement of raised dots, consists of 26 upper case letters and many specialized symbols such as music and mathematical notation. The specialized symbols cannot be translated from the printed English, but must be typed in Braille notation. Any mistake would mean that a whole page would have to be re-typed.

The hardware for Stepp's Braille word processor consists of an electro-mechanical Perkin's Brailier

"First prize went to Bob Stepp, who created a Braille word processor..."

modified with solenoids, a driver board to interface the Brailier with an Apple II computer, a customized 2176 character generator ROM with both Braille and standard visual alpha-numeric characters, piggybacked internally to the Apple's normal keyboard, and a customized operating system to allow for use either in Braille or visual alpha-numeric code.

The software that runs the Braille word processor works like most other good word processors; but there are two major differences.

- 1) The Braille raised bumps are represented on the screen by dots in a 2x3 matrix.
- 2) The 'typing' is done by using the "SDFJKL" typewriter keys to encode the Braille characters, using the dots in the 2x3 matrix.

Stepp says that when he finishes his Master's thesis on artificial intelligence and settles into his new teaching job at the University of Illinois, he intends to build a second Braille word processor around the Apple II computer, which he received as first place prize.

Second prize went to University of Illinois professor Peter B. Maggs, who used a Radio Shack TRS-80 and voice synthesizer to demonstrate a program called Talking Computer and Talking Computer Terminal.

With this software, the printed display that appears on the CRT is 'spoken' by the voice synthesizer. If the letters are typed slowly, one at a time, the letter will be displayed on the CRT, and at the same time will be spoken by the word synthesizer. However, if a series of letters forming a word is typed quickly, the whole word will be pronounced by the synthesizer as it appears on the screen.

The computer has to be slowed down during keyboard input, because the user must wait for each letter or word to be spoken. The software is completely transparent to the BASIC interpreter. The same program is available for CP/M systems using the VOTRAX Type-N-Talk and for the Apple using an Echo II Synthesizer.

Several other entries used microcomputer hardware and software to enable quadriplegics or other severely handicapped people to do computing, control electric appliances, and even to dial the telephone.

Thirty contestants will be selected from the 10 semifinalists in each regional area to display their computing aids for the handicapped at the Great Hall of the National Academy of Science, Washington, D.C. This exhibit will be for two days, October 31 and November 1. The top award in the competition is \$10,000 and the award winner will be announced at a banquet.

Leah R. O'Connor

To Clean or Not To Clean

By Gaylen Beardsley

"To clean or not to clean?" is a question that was, and still is, very prominent in the world of computer disc pack memory users.

One of the earlier methods of cleaning disc packs involved wooden tongue depressors, cotton swabs and alcohol. This method, although very basic, had the right idea but proved to have a large potential of damaging the data stored and the packs themselves. Because of this, most manufacturers suggested against using this method of cleaning. After a period of time, there evolved an understanding by the users that they were not to clean their packs at all. However, computer industry history reveals that periodic cleaning of magnetic tape, a sister storage device, has long been recognized as beneficial. The automatic tape cleaner eliminated the cotton swab method and now cleans tape storage with a minimum of human involvement.

Similarly, disc pack cleaning has become far more advanced since being introduced in 1969. Now, with this technology, the same minimum of human involvement is achieved with virtually every bit of contamination removed from the pack and no damage to stored information. This method does away with the need to remove the data on the pack before cleaning.

A dramatic example of the efficiency of disc pack cleaning occurred in the spring of 1972 when Corning Glass Works in New York was flooded. Their disc packs were under eight feet of muddy water close to 48 hours and were totally caked with mud. After recovery, they were cleaned on an automatic cleaner.

This cleaning resulted in the recovery of over 80 percent of the data.

Although the above example is extreme, normal dust, smoke, smog and even pollen in the air, create problems with a pack that is operated in an environment other than a clean room.

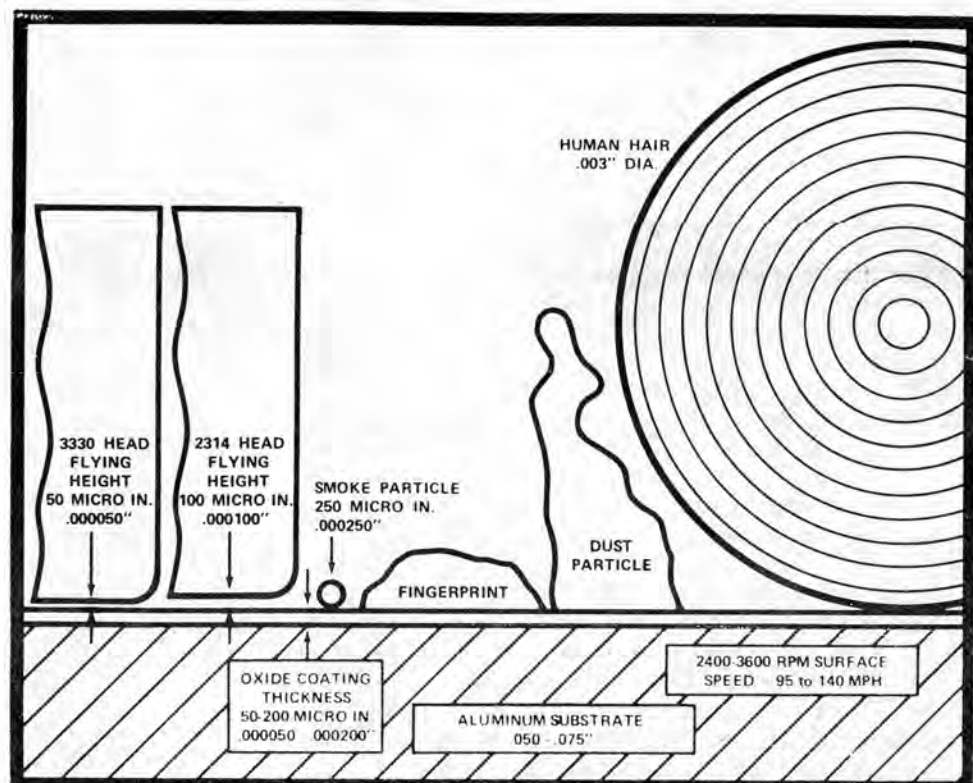
The illustration shows the thicknesses involved of several kinds of contaminants along with the required head flying height required for normal operation.

When these contaminants build up, the distance between the head and disc surface increases. After a period of time, the head is so far away from the disc, that reading of the data stored becomes erratic. Due to uneven buildup of the contaminants, the head begins to float in an erratic height pattern and can crash into the disc, creating headaches only a data processing operator could imagine.

Computer Support Associates has been actively using automated disc cleaning equipment since 1974. Mr. Billye Smith, President, said "We have had instances where customers have shelved packs because of read/write errors, too many bad sectors or alternate track assignments. In nearly every case, these packs were restored to error-free operating condition by the automated cleaning process."

Mr. Smith gave an example; "Seattle City Light had a pack that had seven bad sectors. When they re-initialized, they came up with the same seven bad sectors. After just one cleaning, they re-initialized completely error free."

Computer Support Associates has disc cleaning services in Portland, Olympia, and Seattle providing both cleaning service and used computer brokerage.



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London Computer Fair

London Computer Faire

FOOTMEN in bright red livery, gentlemen politely sipping tea from cup and saucer or beer from glass seemed the major touches of ethnicity to Mike Holley, a Northwest Computer Society member, as he attended the Fourth Annual Personal Computer World Show in London recently. The Fair was held September 10 through 12 and is the largest in the United Kingdom. Much like our West Coast Computer Fair, major manufacturers familiar to us presented their products as well as British, European and Japanese manufacturers with products that are not available in the U.S.

Filling two floors of showspace, the main floor was oriented for home/hobbyists while the upper floor offered products with more appeal to businesses. The main floor seemed to attract the lion's share of interest, it was crowded with lookers. The upper level was not able to attract as many people. By the end of the second day, 8,000 people had attended and they expected a very large crowd for the final day.

“Even with the depressed economy, there is still a demand for high technology consumer items...”

Mike was impressed with the number of British manufacturers. It seems the industry is healthy and active. One company doing well is Acorn which markets a product called Adam. It sells for about 150£ or about \$350, 120£ as a kit. It is a 6502 colour(sic) computer much like the Apple with general purpose software, Microsoft standard BASIC, keyboard and peripherals.

Clive Sinclair's single board computer is very popular, especially with its attractive price, 50£ in kit form. Based on the Z80, it is a bare bones system with just five integrated circuits and very portable.

Nascom ran into cash flow problems and was acquired by Lucas Electronics, a multinational. They produce an interesting Z80 computer, for sale just as a

main board without a bus. They sell modules that can be added. A little box with floppy disks and controller board is available and the CRT sits on top. They sell all the basic kit parts for as little as 125£. Other things like IO boards, disc controllers, memory and software may be purchased and added separately. A smaller company is offering an Ohio Scientific superbboard lookalike. It too comes as a kit.

Data Applications offers a color computer similar to the Apple. It has both hobby and business orientations. It is based on the Z80 with CP/M. Most of the companies are getting CP/M.

Companies more familiar to us like Radio Shack (Tandy), Texas Instruments (Texas), Commodore (Pet), Atari, Apple, NEC, Sharp, and many others showed their latest and greatest. On the first floor, the big booths were Tandy, Apple and Pet. NEC was displaying their business computer upstairs, one they recently introduced to the US.

The systems above and below were very similar, the only differences were in the marketing methods. On the second floor they had three-piece suits and below they were casual.

Commodore's Vic 20 is like the Tandy Color Computer, a keyboard in a box. A reviewer said the basic Vic costs 190£ (\$400) stripped. It has 6502 processor, standard Commodore BASIC, full sized keyboard better than the Tandy, cassette interface, and optional peripheral interfaces. Disk drives are yet to come. It is in the group with the TI99, the Atari 400 and is very nice. A TRS-80 Color Computer has not been introduced to the UK market yet because of the differences with television broadcasting standards, but when available it will sell for about 350£ versus 200£ for the Vic. Commodore is lowballing to attract a major portion of the market before Tandy enters.

The Sharp MZ80K in the UK is different than that sold in the US. It is more like the HP85. A nice little package with a keyboard, small monitor, built in commercial tape drive with automatic rewind and high resolution graphics. The monitor is green phosphor, with 40 characters per line, 320x20 pixels resolution. They also have floppy discs and printers to plug in.

The Radio Shack Model 1 is still available and selling for considerably less than the Model 2. It was dropped in the US because of the FCC rulings. There are no similar rulings in the UK yet. It costs 300£. The Model 3 costs 600£.

Because their television has higher resolution (20 percent better), the color graphics are much better than ours. The Apple requires an adaptor board to convert it. There is a company that sells a Texas Instruments converter, too, but it just lowers the performance to the US level.

Also popular are talking computers but there are complaints about the American accent. Votrax and other companies offer plug in boards. Mike tested the Texas Instruments Speak and Spell but could not tell if it had a British version. UK educators would surely be distressed to have words like colour, theatre, and centre misspelled. Mike did see a help file that had some translations.

“There are complaints about the American accent...”

Software availability is basically the same. Microsoft Basic is just about standard, and other American software companies like Lifeboat are active in the marketplace with the same products they offer here. The major difference is price. Things that cost \$1,000 here cost 1,000£ there, more than double.

One British software company had a big booth and offered a fancy programming language that would take a description of your database and write a program for it. The reviewers say it still has a long way to go. The popular games like Space Invaders and Asteroids have taken over pubs, and high school kids do the same things they do here.

Educational institutions have about the same access to computers for the classroom, mostly limited by the cost. Sharp, Apple and Pet are popular but the Government is backing a British made computer. The schools go ahead and buy what they like best, especially the expensive items.

The United Kingdom is gearing up for a major project that is innovative and exciting—so innovative that it probably is not possible in the US. The computing industry is teaming up with the BBC to develop a small computer that will be used in conjunction with a 10 part television series on using a computer. The BBC Com-

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puter has just been announced; it will sell for 235£ (\$470-500) and will be available around the first of the year. It is a 6502-based machine but was specifically designed to handle other processors. They will have a Z80 processor and another 6502 processor kit available for more capability. They have a kit for networking the things called Econet and an interface to connect several together for data transfer or to share disks and peripherals. It is a reasonably sophisticated machine. It will use Microsoft Basic so other computer owners can follow along with the series. The television series being coordinated by BBC to be broadcast this year is a national event with the Academy of Science. It is an extensive home study course on computing.

Another case where they are ahead of us is with Prestel. Prestel is offered by the telephone company (part of the post office there). It is a large database, several thousand pages of data that you access with a special television and the telephone. You can dial up hotels for reservations, reserve a room, see the Dow Jones averages and get other information. It is an in-

"A major project that is innovative and exciting—so innovative that it probably is not possible in the U.S..."

dexed system so you can get help accessing the directories. The cost is prohibitive. However, the special television is 1,000£. There are companies who are selling little boxes to attach to your regular TV for 170£.

The system is not really tied into computers for timesharing yet but Prestel has made arrangements with *Practical Computing* to give the magazine several thousand pages on the system. The hope is that computerists can make access to the database quicker and better. They plan to allow storage of programs so people who have computers can share information. The 170£ output device has a cassette so you can store and review data. The project hasn't really taken off yet but it looks like it will.

An area where they are behind is with modems. They don't have modems. The British Post Office who runs the Phone Company believes that they are the only ones

smart enough to produce modems. So they have no modems. At the computer Fair, however, there was one modem from Micro Peripheral Corp. of Mercer Island, WA. It was being imported by a company over there and they were dialing up the Source, Telenet and other US databases via satellite. They were advertising access to US databases. The modems aren't quite legal yet but the post office is expected to rule on them within a few months. The modems were selling for 200£.

"By the end of the second day, 8,000 people had attended..."

Even with the depressed economy, there is still a demand for high technology consumer items. Kiosks and magazine racks everywhere may have 20 to 30 magazines about electronics and computing. A lot more information is available to the public.

The industry recognizes that they must keep prices low because people don't earn as much. A typical engineer earns 9000£ as opposed to \$25,000 in the U.S. People tend to buy the cheaper machines. There are thousands of low end and kit machines sold. Pet and Sinclair are popular and there is a lot of software available.

The retail stores are sometimes clustered in neighborhoods and the U.S. companies market differently. Radio Shack, for example, who only offers house-labeled items in the U.S., carries a full line of computers in their stores in England. The shops are small and often have selling space in the basement or loft. One area will be devoted to complete packages and another for kits and parts. The clerks are somewhat more professional.

Overall, Mike's impression of the computing industry in the UK was of remarkable similarity with ours. There are few significant differences. But it is fun to go to a computer fair wherever you are in the world. □



Computertown UK

In the spring of 1980, David Tebbutt of *Personal Computer World Magazine* came to California for the annual West Coast Computer Fair. David, covered with cameras and tape recorders, wandered about the Fair for several days, burning up rolls of film and hundreds of feet of cassette materials.

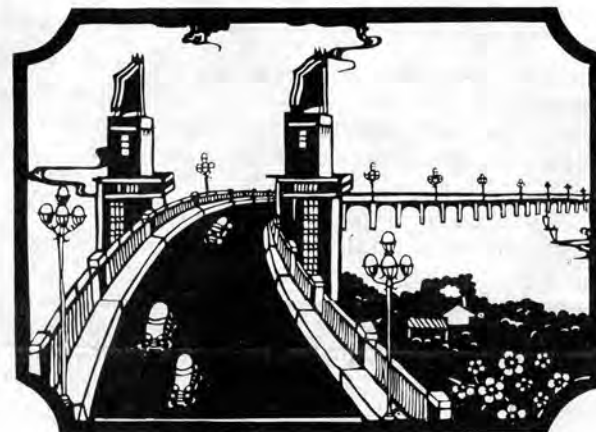
On that trip, he dropped in and visited the fledgling ComputerTown USA site in Menlo Park, California, and spent some time talking with Bob Albrecht, the director.

He returned to England, and, in November of 1980, he initiated ComputerTown UK, a grassroots computer literacy sister project of ComputerTown USA. In six months, David managed to start up 15 ComputerTown sites and affiliate the project with two computer clubs. Today, there are 19 'Towns' in the UK and David is gearing up for his next move.

"CTUK proceeds apace," he writes. "A few weeks ago I had the opportunity to introduce the idea to members of parliament and senior civil servants," he continues. "Since they've declared 1982 to be the Year of Information Technology, I've received a letter expressing their intention to seriously consider a role for CTUK in the jollifications."

When not starting new ComputerTown sites, David is busy drafting guidelines for people contemplating beginning their own ComputerTown ventures. In the draft of the guidelines, the first line reads;

"ComputerTown is a grass roots movement dedicated to spreading awareness of computing among communities around the world."



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Confutation

Continued from Page 5

“There is a bit of funny business involving carriage returns...”

Ready bits are. For example, bit 7 requires a mask of 128 (2 to the 7th power) and bit 6 a mask of 64 (2 to the 6th). It also asks you to indicate for each of these whether the bit is zero or one when ready.

For older CP/M's (before CP/M version 2.0) it is also necessary to supply information on the keyboard port numbers and masks. But if you have CP/M 2.x, there are operating system functions (BDOS calls) which can be used to test and read from the keyboard. If you answer the program's question by saying that you do have CP/M 2.x, then it uses those functions.

Running The Program

The program is designed to transmit and receive text files, not code files (which have all sorts of weird control characters in them). It has five functions:

- (1) To drop out of the terminal program, you type control-E.
- (2) To fill up the memory buffer from one of your files, you type control-F. It will ask you the file name, and as it fills the buffer will display the contents on the screen.
- (3) To dump the memory buffer out the modem port (which we have been calling the serial port), you type control-D.
- (4) The command control-R toggles the filling of the memory buffer from whatever comes in from the modem port. To start filling the memory buffer, you type control-R. To stop filling it, control-R a second time. Typing control-R a third time will start filling it again, but at the beginning, so the previous contents are lost. Whatever comes in when the buffer filling is turned on also, of course, appears on your screen.
- (5) To write the contents of the memory buffer onto a disk file, type control-W. You will be prompted for the file name and the contents of the buffer will also go the screen as they are written into the file. The buffer contents are unaffected, so they can be written (control-W) or dumped (control-D) again.

As will be apparent from this, there is a memory buffer (tentatively 32,000 bytes long) which is an array which is used to store the text which is being moved. Some of you may need to reduce its size to 30,000 bytes to fit it in memory.

To take a file from your disk and send it to another computer (say a timesharing system) you first use the terminal program to log in, and somehow tell the timesharing system you are about to type in a file. On Nordata's PDP-11 RSTS operating system, for example, this is done by typing 'PIP filename=KB:[cr]' where [cr] is a carriage return, and filename is the name the file will have on Nordata (say JUNK.TXT).

Then you type control-F, the filename on your CP/M system, and after the buffer finishes filling you type the command control-D to start dumping it out the modem port. When that is through the terminal program has you back in terminal mode where anything you type goes out to the timesharing system. So (in the case of Nordata) you type a control-Z, which is the signal to Nordata that you have finished typing into the file.

To receive a text file you type a command (on Nordata 'PIP filename[cr]' to have the timesharing system type the file out on your terminal. Just before you hit carriage-return on that command, you type control-R to signal the terminal program to start filling the buffer with whatever comes in. When it is through, or when you feel in danger of overflowing the buffer, type control-R again, then control-W to write out the contents of the buffer on your system. You may want to pause the timesharing system typeout while this is going on, which you could do (on Nordata by typing control-S) just before typing control-R. To resume filling the buffer (from its start) you type control-R again, then resume the typeout by (on Nordata) typing control-Q. And so on. You'll figure it out.

There is a bit of funny business involving carriage returns. When a line of a text file is read from a CP/M file, it will have both a carriage-return (CR) and a linefeed (LF) at its end. When the line is placed into the buffer, however, the LF is removed by the terminal program, because most timesharing systems will put a linefeed back on when they receive a carriage return. If incoming or outgoing files end up without linefeeds, you may have to avail yourself of the services of an editor to put them back in.

How The Program Works

There is not space to go into a detailed description, but the program source code is fairly transparent, I hope. Note the buffer array BUFFER, its current filled length BUFLONG, and the variable STASH which indicates whether (TRUE) or not (FALSE) incoming bytes are to go into BUFFER. The configuration procedure CONFIGURE is very straightforward. The procedures MODEMREAD, MODEMSEND and KEYREAD are also quite straightforward, though they use some non-standard Pascal/MT+ features, which include the predefined INP and OUT arrays for port input and output, the _& operator which does 8-bit masking, and the _@BDOS function which calls the BDOS to read the keyboard in CP/M 2.x systems.

The procedure DOCOMMAND does all the special buffer-filling and buffer-dumping commands (control-D, F, R, and W). It uses a nonstandard feature, a string variable, but only to read the filenames which you type in. Pascal/MT+ procedures ASSIGN and CLOSE are necessary to open and close CP/M files.

The guts of the program is the part at the end:

```
REPEAT
  MODEMREAD (X, SERIRDY);
  IF SERIRDY
  THEN BEGIN
    IF STASH THEN BEGIN
      etc, etc
    END;
    WRITE(X);
    END;
  KEYREAD (X, KEYRDY);
  IF KEYRDY
  THEN BEGIN
    etc, etc
  END;
UNTIL DONE;
```

which will repay careful study. SERIRDY is a Boolean function which is set TRUE by MODEMREAD if a byte is ready to come in from the modem. KEYRDY is similarly set true by KEYREAD if a byte is ready at the keyboard.

I can't expect everyone to be as excited as I am at having a fairly painless terminal program, but you may at least find this useful as an example of a configurable program. □

Electronic Worksheet

Digicalc, an electronic calculating spreadsheet for use on Digital Equipment Corp. computer systems, has just been announced by WHY Systems, Inc., of Redmond, Wa. The program draws a tabular worksheet onto the screen of a VT-100 terminal and the user is able to enter and solve matrix oriented computational tasks and reports. Applications include pro forma financial statements, financial forecasting and modeling, investment and resource management, and job costing.

For people who have an electronic worksheet program on their personal computers and have wished for

one to use on their business computers, Digicalc is the answer. Although similar to Personal Software's Visicalc, WHY Systems' Digicalc demonstrates enhancements one would expect from a later generation program with the greater power of a commercial system. An optimum sized worksheet contains 8,000 elements, and a maximum worksheet can contain 131,000 elements. Maximum dimensions are 500 columns and 600 rows; the number of elements in a worksheet are a product of the number of columns and number of rows it contains. Worksheets may be saved and recalled. Each user has a personal file for saving up to 999 worksheets and access to a group and a world file each also providing up to 999 saved worksheets.

Worksheets may also be consolidated, allowing the user to enter data from several stored worksheets onto one worksheet. Reports from the worksheets can be printed at the terminal printer port or on the system printer. Commands to manipulate and edit the worksheet are executed with the keys of the auxiliary keypad. The keypad can also be used to enter numerical data in a user programmed mode.

Digicalc has been carefully designed to be extremely user friendly. An extensive help section and an automated training procedure are available at the terminal. An inexperienced computer user can sit down at the terminal and learn to use Digicalc in less than an hour.

Currently available on RSTS/E on PDP-11's, WHY Systems is adapting Digicalc to run on RSX-11m and VAX/VMS. WHY Systems is negotiating with a number of vendors for national and international marketing for Digicalc. In the meantime, local sites may obtain additional information and arrange for a demonstration by writing or calling WHY Systems, Inc., 20915 NE 77th, Redmond, WA, (206)881-2331.

Educational Software

Educational Software

We've had the opportunity to see some good educational software lately; until now most of the programs which profess to be educational are merely technical tutorials, or programs which help programmers to use the capabilities of their Atari. Now programs suitable for classroom use for non-technical users are being written for the Atari. The SOFTSWAP program is coordinated by Ann Lathrop of the Microcomputer Center of the San Mateo Co. Office of Education, 333 Main St., Redwood City, CA 94063. Softswap is developing exchange disks of public domain educational programs for each of the four major microcomputer systems, and needs assistance in compiling a disk of good programs for Atari. She is already receiving the assistance of several user groups, notably Clyde Spencer of the Bay Area Group, and from Atari. What she needs now is more programs from others. If you are involved with education, and understand the special needs of programs which assist the educational process, contact her.

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680X User Notes

Dave Baxter

Rochester Area Micro Society (RAMS)

I recently received my copy of 'Utility Disk 1' from the SS-50 Computing folks. Other than the fact I ordered it on July 8th and just got it (Aug. 20), the disk is certainly worth its price of \$15. For those of you who don't know the advertised contents of said disk, there are three programs on it:

BASASM—this program allows you to write BASIC programs with the text editor and 2, 3, or 4 character labels for your gotos and gosubs. Line numbers are not entered at all, and only those destinations of branching need be labeled. People used to writing programs in BASIC09 or Pascal are already used to this format. The program takes the edit file as 'source' code and generates a .BAS file with line numbers for each line and the labels replaced with their appropriate line numbers. This file can then be loaded and run as any normal BASIC program would be.

There are advantages and disadvantages to programming in this mode. The major advantage is that you get to use an editor to build the program and can therefore make global changes, inserts, deletes, etc. a little easier. Another plus is the readability of the program gained by using labels. A 'GOTO EXIT' is perhaps easier to figure out than a 'GOTO 920' when reading. The main disadvantage is the two pass nature of such a process. The program is built by the editor, processed by BASASM, and then loaded and run. If there are any errors in the program, you have two choices: you can

"I'm perfectly satisfied with what I got for my \$15..."

modify the program then and there (faster), or go back to the editor, change the program, reprocess it, and rerun it. If you're used to working with compilers this is *deja vu*.

I tried the program with a simple test program with a few if...then...else's, multiple statements per line, and various length labels with no problems. One situation not covered in the instructions involved multiple statements in one line with labels in each part. Putting a space before and after the ':' allows proper operation. Since the BASASM program allows you to request the starting number and increment of the final .BAS file, a library of common subroutines could be built and either appended together in editor format, or in numbered BASIC form to build a program.

DDISSAM—this program is a simple disassembler. Indeed, it does not generate labels or variable areas and should then not be confused with a 'source generator' which can generate a disassembly that can be edited and re-assembled. All the program does is list the program machine code (1,2, or 3 bytes, depending on the instruction), the ASCII equivalent of those bytes, and the mnemonic. Since it doesn't generate labels, BD A100 comes out as JSR A100. There is no provision for

disk storage of the resulting listing; however, the output can be diverted to a printer with the P command as with any other utility.

The program would be useful for general inspection of shorter programs, or to have as documentation of some longer ones. The ability to disassemble any length program from its disk file in the format somehow is inconsistent with the level of the disassembly (no labels, etc.). It would seem more appropriate as a utility to inspect sections of memory on an ad-hoc basis. If you've never used a source generator, however, this could open new doors of understanding to your purchased software.

SDCOPY—a single disk copy routine. This was my reason for ordering the disk. As luck would have it, the utility as written only writes to drive 0. My 'bigdisk' is number three. Diving into the source code (which is on the disk for all three programs) revealed the problem. The file control block for the write file is hard coded to 0 and only the name and extension of the source file moved over to it. A quick change to the MOVNAM subroutine of the OCB+4 instructions to OCB+3 and the length counter from 11 to 12, allows the drive number of the source file or the working drive number to be the copying drive. Unlike the more general COPY utility supplied with Flex, this routine works only file by file.

In summary, the programs work as described in the three pages of documentation you get with the disk. The publisher, Ken Orme, makes a disclaimer at the end to the point of these programs being written for 'in-house' use and only made available to people as a service of SS-50 Computing and not as a big money maker. Taken in that light, I'm perfectly satisfied with what I got for my \$15. I'll use the single disk copy a lot, the BASIC assembler a little, and disassembler not at all. SS-50 computing, P.O. Box 398, Garland, UT 84312.

Wordstar Hint

Using a Ruler in WordStar.

When you first enter a WordStar document file, the file is already set up with default margins and tabs. For most documents this default status (left margin at 1, right margin at 65, tabs every 5 spaces) is quite satisfactory. Occasionally, though, you will want to set up different margins and tabs for a special document. This is simple enough to do once. But what happens when you are repeatedly editing a document which has an unusual margin or tab set-up? Or if you have a standard format you would like to use in more than one document?

The answer is to use a ruler, discussed in section 8.06 of your WordStar manual. You set a special ruler line by typing into your text a line which looks exactly the way you want your margin and tab line (at the top of your screen) to look (except that you don't type in the L and R). For example, if you wanted a ruler with margins at 5 and 50, normal tabs at 14 and 20, and decimal tabs at 35 and 46, you would type in as a line of your program:

```
-----!---!-----#-----#-----
```

To substitute your ruler for the default ruler, position the cursor on your ruler line and type #OF (or equivalent command)

The ruler line will print as a line when your text prints out. To avoid this, make it part of a dot comment. Use .IG and uparrow P Return to put the ruler on its own line.

If you have a ruler line you want to use in a variety of documents—perhaps the set-up for a monthly financial statement—you can put the ruler line in a file of its own, then read that file into each document as you want to use it.

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```
(*$X*)
PROGRAM TERMPFG;
(* Configurable Terminal Program,
Copyright (c) 1981 by Joe Felsenstein *)
CONST
  BITMASK = 127; (* MASK TO STRIP EIGHTH BIT *)
  BUFLNGTH = 32000; (* LENGTH OF MEMORY BUFFER *)
VAR CONFIGGED, HALFDUPLX, CPMTWO : BOOLEAN;
  KEYST, KEYPT, SERST, SERPT, KEYSK, SERINMSK,
  SEROUTMSK : INTEGER;
  ONEKEY, ONEIN, ONEOUT : BOOLEAN;
  DUMMY : INTEGER;
  X, CTRLD, CTRLC, CTRLF,
  CTRLG, LFCR, CTRLR, CTRLW : CHAR;
  DONE, KEYRDY, SERIRDY, SERORDY, STASH : BOOLEAN;
  BUFFER : ARRAY[1..BUFLNGTH] OF CHAR;
  BUFLONG : INTEGER;
  COMMANDS : SET OF CHAR;

EXTERNAL FUNCTION @BDOS(X : INTEGER;
  Y : INTEGER) : INTEGER;

PROCEDURE CONFIGURE;
VAR C : CHAR;
BEGIN
  WRITELN('The terminal program has not yet
  been configured');
  WRITELN('Are you ready to configure it (Y or N)?');
  READLN(C);
  IF (C='Y') OR (C='y')
  THEN BEGIN
    WRITELN('Is the terminal to be full (F)
    or half (H) duplex?');
    READLN(C);
    IF (C='H') OR (C='h')
    THEN HALFDUPLX := TRUE
    ELSE HALFDUPLX := FALSE;
    WRITELN('Do you have CPM version 2.0
    or beyond? (Y or N)');
    READLN(C);
    IF (C='Y') OR (C='y') THEN CPMTWO := TRUE;
    WRITELN('The port numbers are to be typed
    in decimal');
    IF NOT CPMTWO
    THEN BEGIN
      WRITELN('Keyboard status port:');
      READLN(KEYST);
      WRITELN('Keyboard data port:');
      READLN(KEYPT);
    END;
    WRITELN('Modem status port:');
    READLN(SERST);
    WRITELN('Modem data port:');
    READLN(SERPT);
    WRITELN('Masks are typed in as integers (0-255)');
    IF NOT CPMTWO
    THEN BEGIN
      WRITELN('Mask for keyboard input ready:');
      READLN(KEYMSK);
      WRITELN('Input ready when bit is
      ... (type 1 or 0)');
      READLN(C);
      IF C='0'
      THEN ONEKEY := FALSE
      ELSE ONEKEY := TRUE;
    END;
    WRITELN('Mask for input ready
    on modem status port:');
    READLN(SERINMSK);
    WRITELN('Input ready when bit is
    ... (type 1 or 0)');
    READLN(C);
    IF C='0' THEN ONEIN := FALSE ELSE ONEIN := TRUE;
    WRITELN('Mask for output ready on modem
    status port:');
    READLN(SEROUTMSK);
    WRITELN('Output ready when bit is
    ... (type 1 or 0)');
    READLN(C);
    IF C='0' THEN ONEOUT := FALSE ELSE ONEOUT := TRUE;
    CONFIGGED := TRUE;
    WRITELN('To save configured version,
    type control-E,');
  END;
END;

PROCEDURE MODEMREAD(VAR X : CHAR; VAR SERIRDY : BOOLEAN);
BEGIN
  X := CHR(0);
  SERIRDY := ((INP[SERST] & SERINMSK) <> 0) = ONEIN;
  IF SERIRDY THEN X := CHR(INP[SERPT] & BITMASK);
END; (*MODEMREAD*)

PROCEDURE MODEMSEND(X : CHAR);
VAR I : INTEGER;
BEGIN
  REPEAT
    I := ORD(INP[SERST]);
  UNTIL (((SEROUTMSK & I) <> 0) = ONEOUT);
  OUT[SERPT] := X;
END; (*MODEMSEND*)

PROCEDURE KEYREAD(VAR X : CHAR; VAR KEYRDY : BOOLEAN);
BEGIN
  X := CHR(0);
  IF CPMTWO
  THEN BEGIN
    KEYRDY := @BDOS(1, DUMMY) <> 0;
    IF KEYRDY
    THEN BEGIN
      X := CHR(@BDOS(6, $00FF));
      IF HALFDUPLX THEN WRITE(X);
    END;
  END
  ELSE BEGIN
    KEYRDY := ((INP[KEYST] & KEYSK) <> 0) = ONEKEY;
    IF KEYRDY
    THEN BEGIN
      X := CHR(INP[KEYPT]);
      IF HALFDUPLX THEN WRITE(X);
    END;
  END;
END; (*KEYREAD*)

PROCEDURE DOCOMMAND(X : CHAR);
VAR I : INTEGER;
  S : STRING;
  F : TEXT;
  FINISHED : BOOLEAN;
  CH : CHAR;
BEGIN
  IF X = CTRLD
  THEN FOR I := 1 TO BUFLONG DO BEGIN
    CH := BUFFER[I];
    MODEMSEND(CH);
    IF CH = CR
    THEN WRITELN
    ELSE WRITE(CH);
  END;
  IF X = CTRLF THEN BEGIN
    WRITELN('NAME OF FILE TO READ FROM?');
    READLN(S);
    ASSIGN(F, S);
    RESET(F);
    FINISHED := FALSE;
    I := 1;
    WHILE NOT FINISHED DO BEGIN
      IF EOLN(F) THEN BEGIN
        CH := CR;
        WRITELN;
        READLN(F);
      END;
    ELSE BEGIN
      READ(F, CH);
      WRITE(CH);
    END;
  END;
END;

BUFFER[I] := CH;
I := I + 1;
FINISHED := (I > BUFLNGTH) OR (EOF(F));
END;
BUFLONG := I - 1;
END;
IF X = CTRLR THEN BEGIN
  STASH := NOT STASH;
  IF STASH THEN BUFLONG := 0;
END;
IF X = CTRLW THEN BEGIN
  WRITELN('NAME OF FILE TO WRITE?');
  READLN(S);
  ASSIGN(F, S);
  REWRITE(F);
  FOR I := 1 TO BUFLONG DO BEGIN
    CH := BUFFER[I];
    WRITE(F, CH);
    WRITE(CH);
  END;
  CLOSE(F, 1);
END; (* DOCOMMAND *)

BEGIN
  WRITELN('Configurable Terminal Program');
  WRITELN('(c) 1981 by Joe Felsenstein');
  WRITELN('OK to copy for nonprofit purposes');
  WRITELN;
  IF NOT CONFIGGED THEN CONFIGURE;
  THEN BEGIN
    WRITELN('Commands (these are control characters):');
    WRITELN(' ^R Toggles filling of buffer
    from port');
    WRITELN(' ^W Write buffer to file');
    WRITELN(' ^F Read buffer from file');
    WRITELN(' ^D Dump buffer to port');
    WRITELN('Now you are a terminal (control-E to stop
    being one)...');
    BUFLONG := 0;
    CTRLD := CHR(04);
    CTRLC := CHR(03);
    CTRLF := CHR(06);
    CTRLG := CHR(07);
    LFCR := CHR(10);
    CR := CHR(13);
    CTRLR := CHR(18);
    CTRLW := CHR(23);
    COMMANDS := [CTRLD, CTRLF, CTRLR, CTRLW];
    STASH := FALSE;
    DONE := FALSE;
    REPEAT
      MODEMREAD(X, SERIRDY);
      IF SERIRDY THEN BEGIN
        IF STASH THEN BEGIN
          BUFLONG := BUFLONG + 1;
          IF BUFLONG = BUFLNGTH
          THEN BEGIN
            STASH := FALSE;
            WRITE(CTRLG, CTRLG, CTRLG);
            WRITELN('***BUFFER FULL!***');
            WRITELN('***BUFFER FILLING
            TOGGLED OFF***');
          END;
          ELSE BUFFER[BUFLONG] := X;
        END;
        WRITE(X);
      END;
      KEYREAD(X, KEYRDY);
      IF KEYRDY
      THEN BEGIN
        IF X = CTRLC
        THEN DONE := TRUE
        ELSE IF X IN COMMANDS
        THEN DOCOMMAND(X)
        ELSE MODEMSEND(X);
      END;
    UNTIL DONE;
  END;
END.
```

```
WRITELN('then after the CPM prompt appears type:');
WRITELN('SAVE 49 TERMINAL.COM');
WRITELN('or: SAVE 49 filename.COM');
WRITELN('where filename is a filename different:');
WRITELN('from that of this program');
WRITELN('To use the configured version,
  just type TERMINAL');
WRITELN('or that filename');
WRITELN('Be sure to keep this file too,
  so you can reconfigure!');
END;
END;

PROCEDURE MODEMREAD(VAR X : CHAR; VAR SERIRDY : BOOLEAN);
BEGIN
  X := CHR(0);
  SERIRDY := ((INP[SERST] & SERINMSK) <> 0) = ONEIN;
  IF SERIRDY THEN X := CHR(INP[SERPT] & BITMASK);
END; (*MODEMREAD*)

PROCEDURE MODEMSEND(X : CHAR);
VAR I : INTEGER;
BEGIN
  REPEAT
    I := ORD(INP[SERST]);
  UNTIL (((SEROUTMSK & I) <> 0) = ONEOUT);
  OUT[SERPT] := X;
END; (*MODEMSEND*)

PROCEDURE KEYREAD(VAR X : CHAR; VAR KEYRDY : BOOLEAN);
BEGIN
  X := CHR(0);
  IF CPMTWO
  THEN BEGIN
    KEYRDY := @BDOS(1, DUMMY) <> 0;
    IF KEYRDY
    THEN BEGIN
      X := CHR(@BDOS(6, $00FF));
      IF HALFDUPLX THEN WRITE(X);
    END;
  END
  ELSE BEGIN
    KEYRDY := ((INP[KEYST] & KEYSK) <> 0) = ONEKEY;
    IF KEYRDY
    THEN BEGIN
      X := CHR(INP[KEYPT]);
      IF HALFDUPLX THEN WRITE(X);
    END;
  END;
END; (*KEYREAD*)

PROCEDURE DOCOMMAND(X : CHAR);
VAR I : INTEGER;
  S : STRING;
  F : TEXT;
  FINISHED : BOOLEAN;
  CH : CHAR;
BEGIN
  IF X = CTRLD
  THEN FOR I := 1 TO BUFLONG DO BEGIN
    CH := BUFFER[I];
    MODEMSEND(CH);
    IF CH = CR
    THEN WRITELN
    ELSE WRITE(CH);
  END;
  IF X = CTRLF THEN BEGIN
    WRITELN('NAME OF FILE TO READ FROM?');
    READLN(S);
    ASSIGN(F, S);
    RESET(F);
    FINISHED := FALSE;
    I := 1;
    WHILE NOT FINISHED DO BEGIN
      IF EOLN(F) THEN BEGIN
        CH := CR;
        WRITELN;
        READLN(F);
      END;
    ELSE BEGIN
      READ(F, CH);
      WRITE(CH);
    END;
  END;
END;

BUFFER[I] := CH;
I := I + 1;
FINISHED := (I > BUFLNGTH) OR (EOF(F));
END;
BUFLONG := I - 1;
END;
IF X = CTRLR THEN BEGIN
  STASH := NOT STASH;
  IF STASH THEN BUFLONG := 0;
END;
IF X = CTRLW THEN BEGIN
  WRITELN('NAME OF FILE TO WRITE?');
  READLN(S);
  ASSIGN(F, S);
  REWRITE(F);
  FOR I := 1 TO BUFLONG DO BEGIN
    CH := BUFFER[I];
    WRITE(F, CH);
    WRITE(CH);
  END;
  CLOSE(F, 1);
END; (* DOCOMMAND *)

BEGIN
  WRITELN('Configurable Terminal Program');
  WRITELN('(c) 1981 by Joe Felsenstein');
  WRITELN('OK to copy for nonprofit purposes');
  WRITELN;
  IF NOT CONFIGGED THEN CONFIGURE;
  THEN BEGIN
    WRITELN('Commands (these are control characters):');
    WRITELN(' ^R Toggles filling of buffer
    from port');
    WRITELN(' ^W Write buffer to file');
    WRITELN(' ^F Read buffer from file');
    WRITELN(' ^D Dump buffer to port');
    WRITELN('Now you are a terminal (control-E to stop
    being one)...');
    BUFLONG := 0;
    CTRLD := CHR(04);
    CTRLC := CHR(03);
    CTRLF := CHR(06);
    CTRLG := CHR(07);
    LFCR := CHR(10);
    CR := CHR(13);
    CTRLR := CHR(18);
    CTRLW := CHR(23);
    COMMANDS := [CTRLD, CTRLF, CTRLR, CTRLW];
    STASH := FALSE;
    DONE := FALSE;
    REPEAT
      MODEMREAD(X, SERIRDY);
      IF SERIRDY THEN BEGIN
        IF STASH THEN BEGIN
          BUFLONG := BUFLONG + 1;
          IF BUFLONG = BUFLNGTH
          THEN BEGIN
            STASH := FALSE;
            WRITE(CTRLG, CTRLG, CTRLG);
            WRITELN('***BUFFER FULL!***');
            WRITELN('***BUFFER FILLING
            TOGGLED OFF***');
          END;
          ELSE BUFFER[BUFLONG] := X;
        END;
        WRITE(X);
      END;
      KEYREAD(X, KEYRDY);
      IF KEYRDY
      THEN BEGIN
        IF X = CTRLC
        THEN DONE := TRUE
        ELSE IF X IN COMMANDS
        THEN DOCOMMAND(X)
        ELSE MODEMSEND(X);
      END;
    UNTIL DONE;
  END;
END.
```

```
WRITELN('then after the CPM prompt appears type:');
WRITELN('SAVE 49 TERMINAL.COM');
WRITELN('or: SAVE 49 filename.COM');
WRITELN('where filename is a filename different:');
WRITELN('from that of this program');
WRITELN('To use the configured version,
  just type TERMINAL');
WRITELN('or that filename');
WRITELN('Be sure to keep this file too,
  so you can reconfigure!');
END;
END;

PROCEDURE MODEMREAD(VAR X : CHAR; VAR SERIRDY : BOOLEAN);
BEGIN
  X := CHR(0);
  SERIRDY := ((INP[SERST] & SERINMSK) <> 0) = ONEIN;
  IF SERIRDY THEN X := CHR(INP[SERPT] & BITMASK);
END; (*MODEMREAD*)

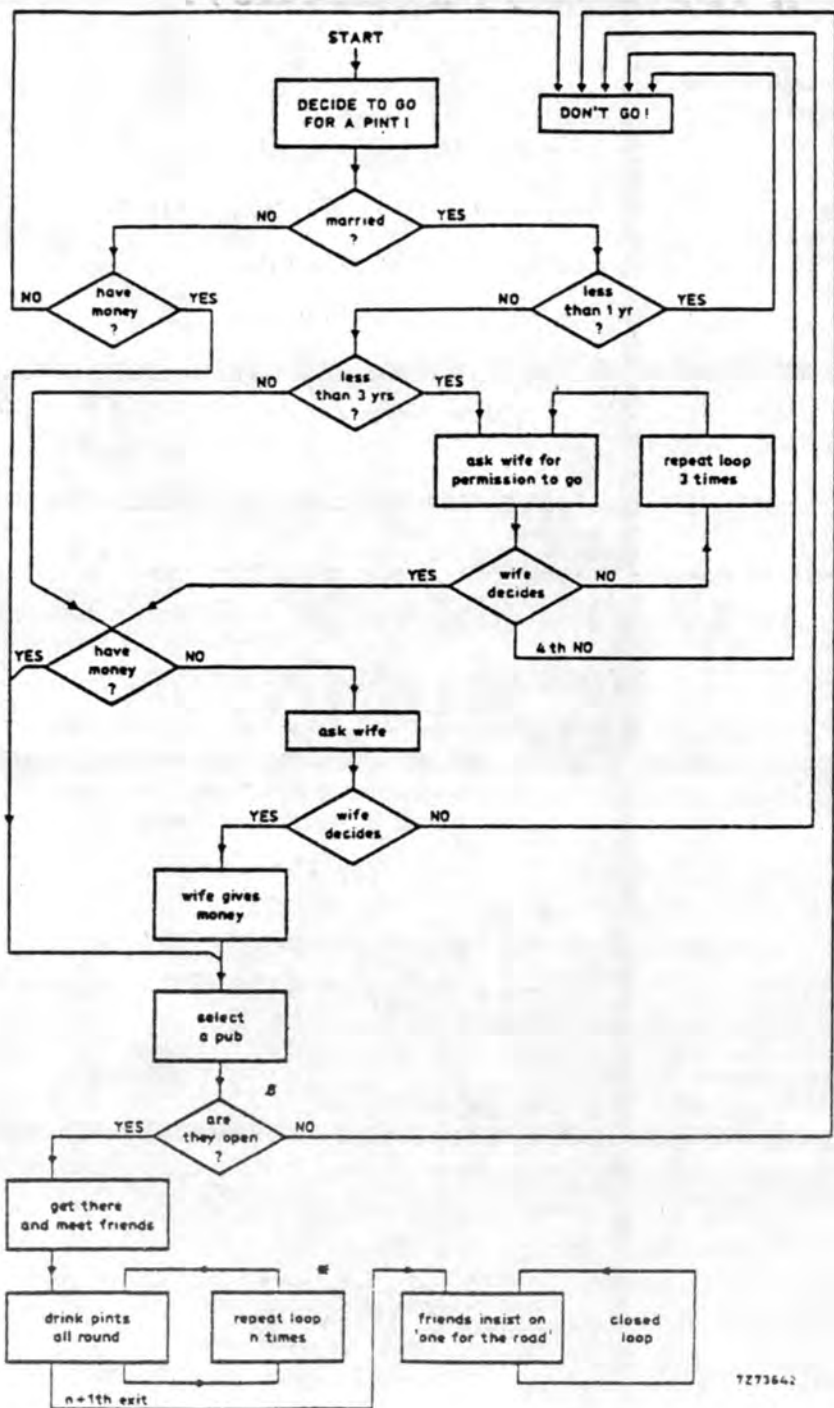
PROCEDURE MODEMSEND(X : CHAR);
VAR I : INTEGER;
BEGIN
  REPEAT
    I := ORD(INP[SERST]);
  UNTIL (((SEROUTMSK & I) <> 0) = ONEOUT);
  OUT[SERPT] := X;
END; (*MODEMSEND*)

PROCEDURE KEYREAD(VAR X : CHAR; VAR KEYRDY : BOOLEAN);
BEGIN
  X := CHR(0);
  IF CPMTWO
  THEN BEGIN
    KEYRDY := @BDOS(1, DUMMY) <> 0;
    IF KEYRDY
    THEN BEGIN
      X := CHR(@BDOS(6, $00FF));
      IF HALFDUPLX THEN WRITE(X);
    END;
  END
  ELSE BEGIN
    KEYRDY := ((INP[KEYST] & KEYSK) <> 0) = ONEKEY;
    IF KEYRDY
    THEN BEGIN
      X := CHR(INP[KEYPT]);
      IF HALFDUPLX THEN WRITE(X);
    END;
  END;
END; (*KEYREAD*)

PROCEDURE DOCOMMAND(X : CHAR);
VAR I : INTEGER;
  S : STRING;
  F : TEXT;
  FINISHED : BOOLEAN;
  CH : CHAR;
BEGIN
  IF X = CTRLD
  THEN FOR I := 1 TO BUFLONG DO BEGIN
    CH := BUFFER[I];
    MODEMSEND(CH);
    IF CH = CR
    THEN WRITELN
    ELSE WRITE(CH);
  END;
  IF X = CTRLF THEN BEGIN
    WRITELN('NAME OF FILE TO READ FROM?');
    READLN(S);
    ASSIGN(F, S);
    RESET(F);
    FINISHED := FALSE;
    I := 1;
    WHILE NOT FINISHED DO BEGIN
      IF EOLN(F) THEN BEGIN
        CH := CR;
        WRITELN;
        READLN(F);
      END;
    ELSE BEGIN
      READ(F, CH);
      WRITE(CH);
    END;
  END;
END;

BUFFER[I] := CH;
I := I + 1;
FINISHED := (I > BUFLNGTH) OR (EOF(F));
END;
BUFLONG := I - 1;
END;
IF X = CTRLR THEN BEGIN
  STASH := NOT STASH;
  IF STASH THEN BUFLONG := 0;
END;
IF X = CTRLW THEN BEGIN
  WRITELN('NAME OF FILE TO WRITE?');
  READLN(S);
  ASSIGN(F, S);
  REWRITE(F);
  FOR I := 1 TO BUFLONG DO BEGIN
    CH := BUFFER[I];
    WRITE(F, CH);
    WRITE(CH);
  END;
  CLOSE(F, 1);
END; (* DOCOMMAND *)

BEGIN
  WRITELN('Configurable Terminal Program');
  WRITELN('(c) 1981 by Joe Felsenstein');
  WRITELN('OK to copy for nonprofit purposes');
  WRITELN;
  IF NOT CONFIGGED THEN CONFIGURE;
  THEN BEGIN
    WRITELN('Commands (these are control characters):');
    WRITELN(' ^R Toggles filling of buffer
    from port');
    WRITELN(' ^W Write buffer to file');
    WRITELN(' ^F Read buffer from file');
    WRITELN(' ^D Dump buffer to port');
    WRITELN('Now you are a terminal (control-E to stop
    being one)...');
    BUFLONG := 0;
    CTRLD := CHR(04);
    CTRLC := CHR(03);
    CTRLF := CHR(06);
    CTRLG := CHR(07);
    LFCR := CHR(10);
    CR := CHR(13);
    CTRLR := CHR(18);
    CTRLW := CHR(23);
    COMMANDS := [CTRLD, CTRLF, CTRLR, CTRLW];
    STASH := FALSE;
    DONE := FALSE;
    REPEAT
      MODEMREAD(X, SERIRDY);
      IF SERIRDY THEN BEGIN
        IF STASH THEN BEGIN
          BUFLONG := BUFLONG + 1;
          IF BUFLONG = BUFLNGTH
          THEN BEGIN
            STASH := FALSE;
            WRITE(CTRLG, CTRLG, CTRLG);
            WRITELN('***BUFFER FULL!***');
            WRITELN('***BUFFER FILLING
            TOGGLED OFF***');
          END;
          ELSE BUFFER[BUFLONG] := X;
        END;
        WRITE(X);
      END;
      KEYREAD(X, KEYRDY);
      IF KEYRDY
      THEN BEGIN
        IF X = CTRLC
        THEN DONE := TRUE
        ELSE IF X IN COMMANDS
        THEN DOCOMMAND(X)
        ELSE MODEMSEND(X);
      END;
    UNTIL DONE;
  END;
END.
```



time taken if, married, may be prohibitive
 # depends upon number of friends and money remaining

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