

Enthusiast'99[®]

NOVEMBER 1983

Vol. 1, Number 4

20 CHRISTMAS GIVING
SUGGESTIONS

ELECTRONIC SOFTWARE
DISTRIBUTION

MORE GATB[®] PROGRAMMING

TI'S NEW LETTER QUALITY PRINTER



The new TI Professional Computer. It makes you the one with the answers.

To help today's professional and small business executive come up with answers and alternatives, we offer the Texas Instruments Professional Computer. The one with the power, the expandability, the easiest-to-use keyboard, extremely high resolution graphics, and a broad array of software.

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rely on the new 850 Series printers, made by TI especially for the new TI Professional Computer.

The TI Professional Computer.

SPECIFICATIONS

System Unit.
16-bit, 8088 microprocessor, 64K byte RAM, expandable to 256K bytes, 4K byte graphics display memory, 5-slot expansion bus.

Keyboard.
Specially designed low profile. Popular typewriter layout. 97 keys, including 12 function keys. Separate numeric keypad and cursor control clusters. Tactile response, for quick positive entry. "Upper- and lowercase" letters.

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Printers.
150-cps TI 850 Series for most applications.

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**TEXAS
INSTRUMENTS**

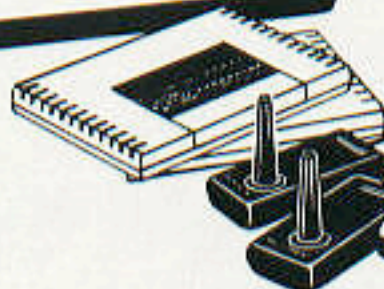
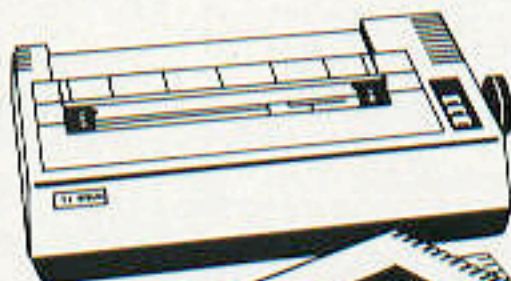
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 PHM3036 Zero Zap
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PHM3039 Yahtzee
 PHM3041D Adventure (Pirate Disk)
 PHM3041T Adventure (Pirate Tape)
 PHM3042D Tunnels of Doom (Disk)
 PHM3042T Tunnels of Doom (Tape)
 PHM3052 Tombstone City
 PHM3053 Invaders

PHM3054 Car Wars
 PHM3056 Alpiner
 PHM3057 Munch Man
 PHM3110 Chisholm Trail
 PHM3112 Parsec

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TI'S NEW LETTER QUALITY PRINTER

This issue's cover by Joseph Mills illustrates the perfect Christmas gift — software and accessories for your home computer. As you prepare for the holiday season, you might find the "20 Christmas Gift-Giving Ideas" story on page 20 helpful. One exciting gift idea is a new release from the Master 99 series — an action game called "D-STATION" written in super-fast Assembly language.

LOOK FOR THESE SYMBOLS

They will "clue you in" on articles and stories of particular interest to readers in the areas of Home Computing, Professional Computing and Portable Computing.

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Computing








Professional
Computing



Portable
Computing



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Publisher/President Charles La Fara □ **Managing Editor** Dana Nichols □ **Senior Staff Editor** Guy S. Romano □ **Senior Technical Editor** Bill Gronos
□ **Staff Technical Editors** Jack Carrel, Terry Heim □ **Contributing Editor** Regena □ **Advertising** Dana Nichols □ **Design and Production** Brian Tinker □
Typography 959th Tactical Graphic Production Squadron □ **Accounting** Virginia La Fara □ **Office Manager** Dorothy Armstead □ **Clerical** Linda Cooley □
Program Operations Mary Tilley □ **Fulfillment** Chad La Fara, Cos Bowlin, Sandy Oliver, Christine Gibbs □ **Photography** Joseph Mills □ **Printing**
Mercury Press, Oklahoma City, OK □ **Legal Counsel** Steve Mains/Roper, Lief and Mains/Attys. at Law/1507 Pine St./Boulder, CO 80302.



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LIBRARY CORNER

By Guy S. Romano

The Fear of Filing — Part I

IUG software librarian Guy S. Romano expands his LIBRARY CORNER to help you overcome the "Fear of Filing", making vast new vistas available to you and your computer.

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ComputerCraft, Inc.

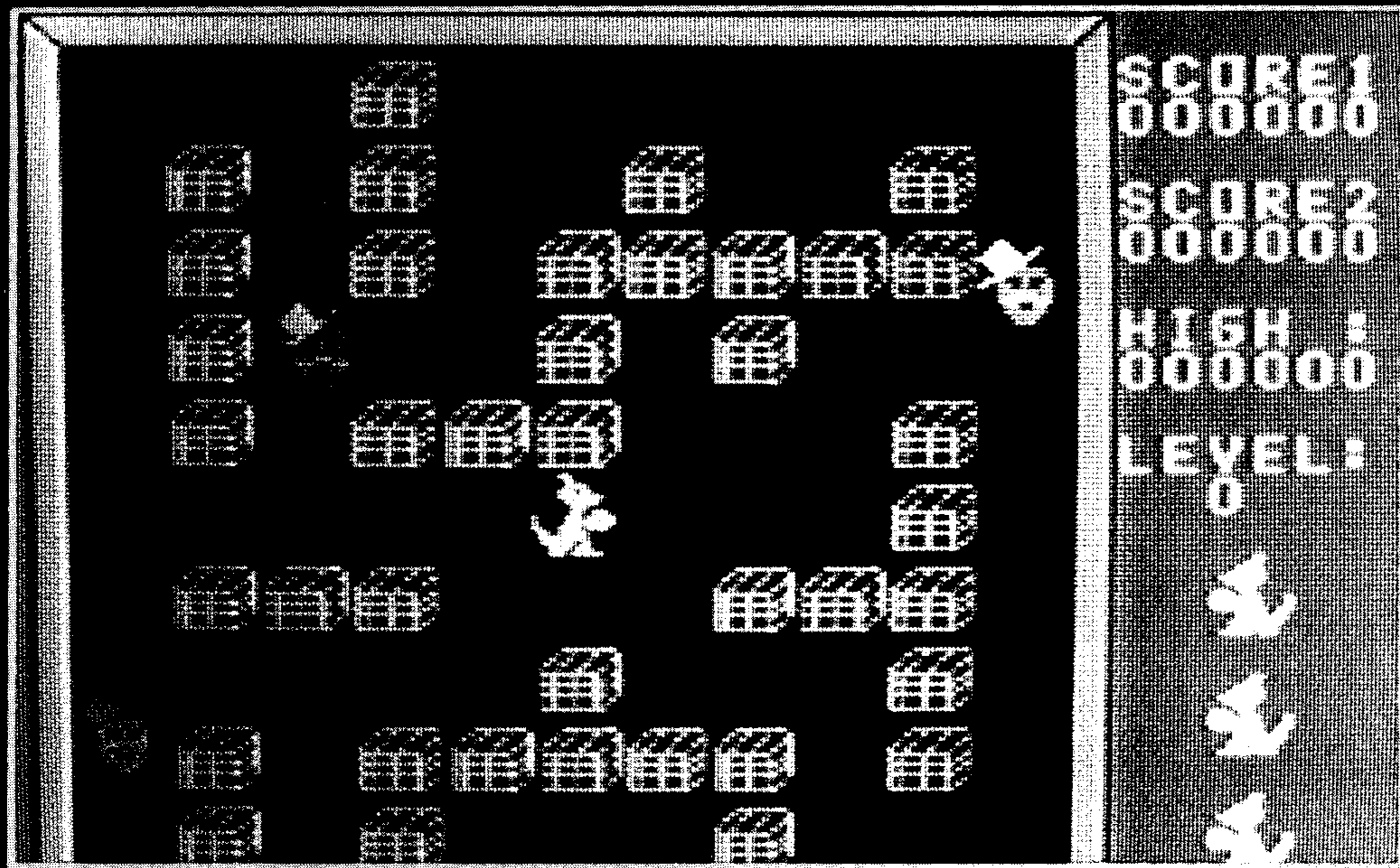
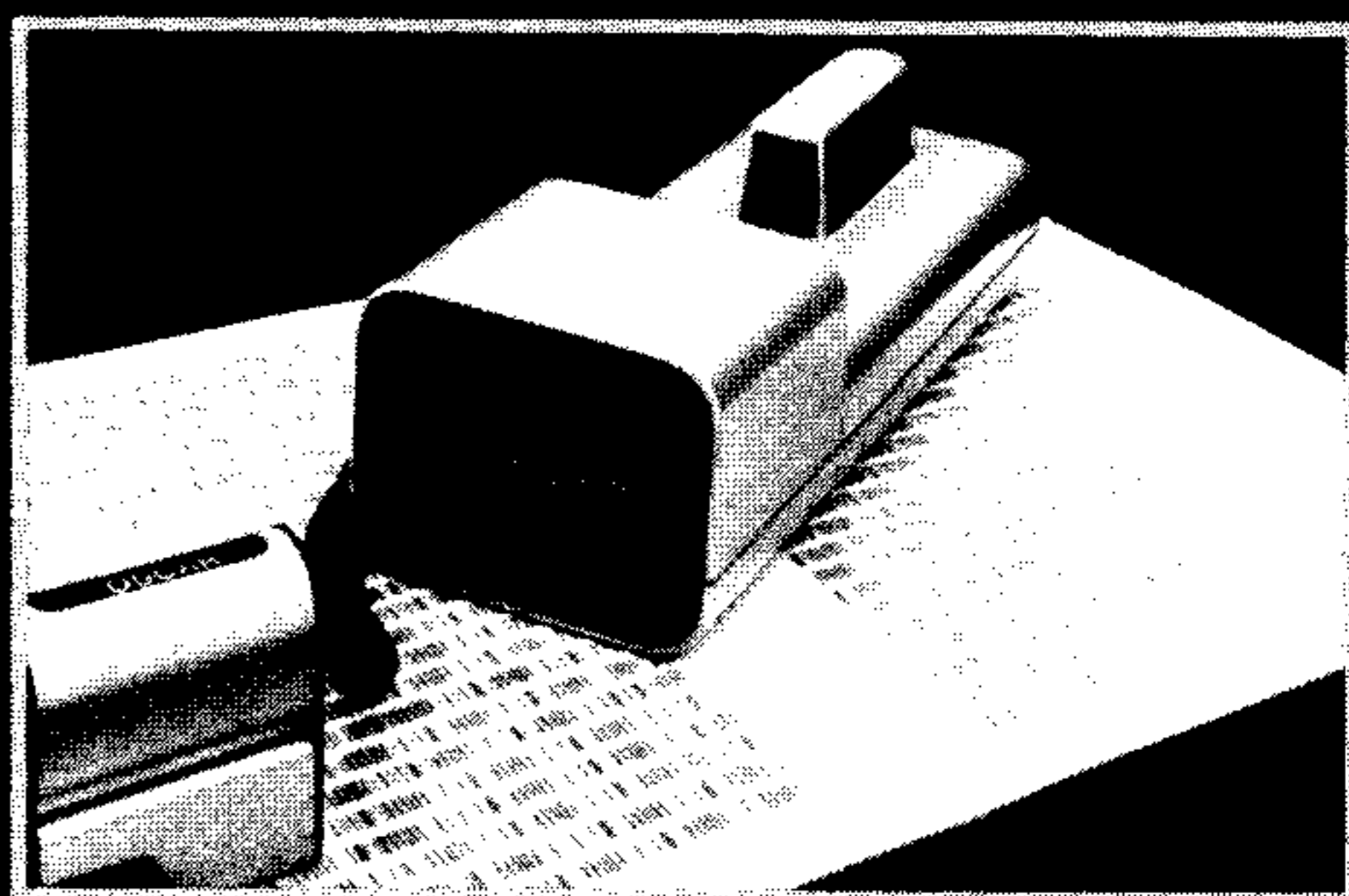
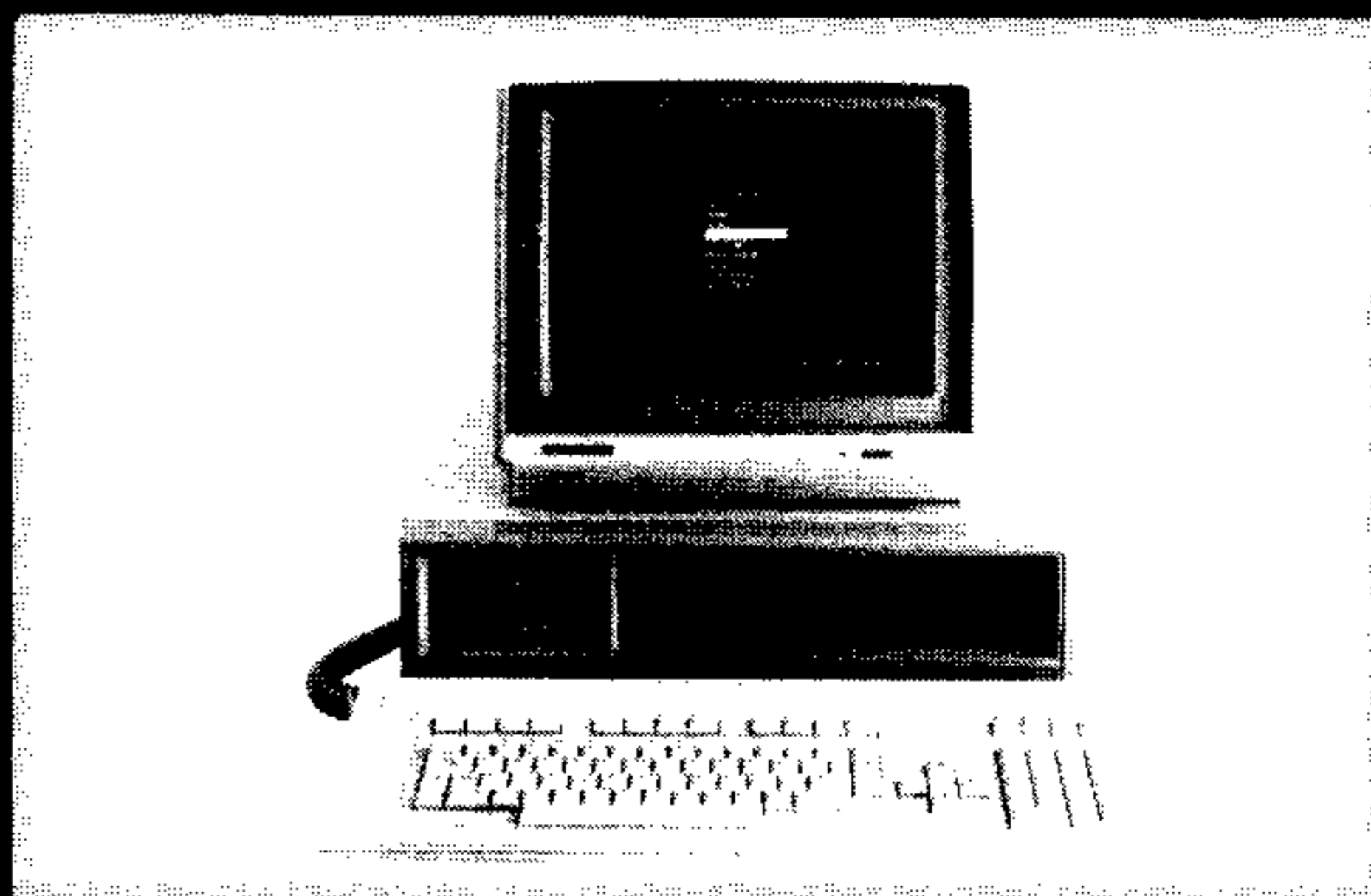
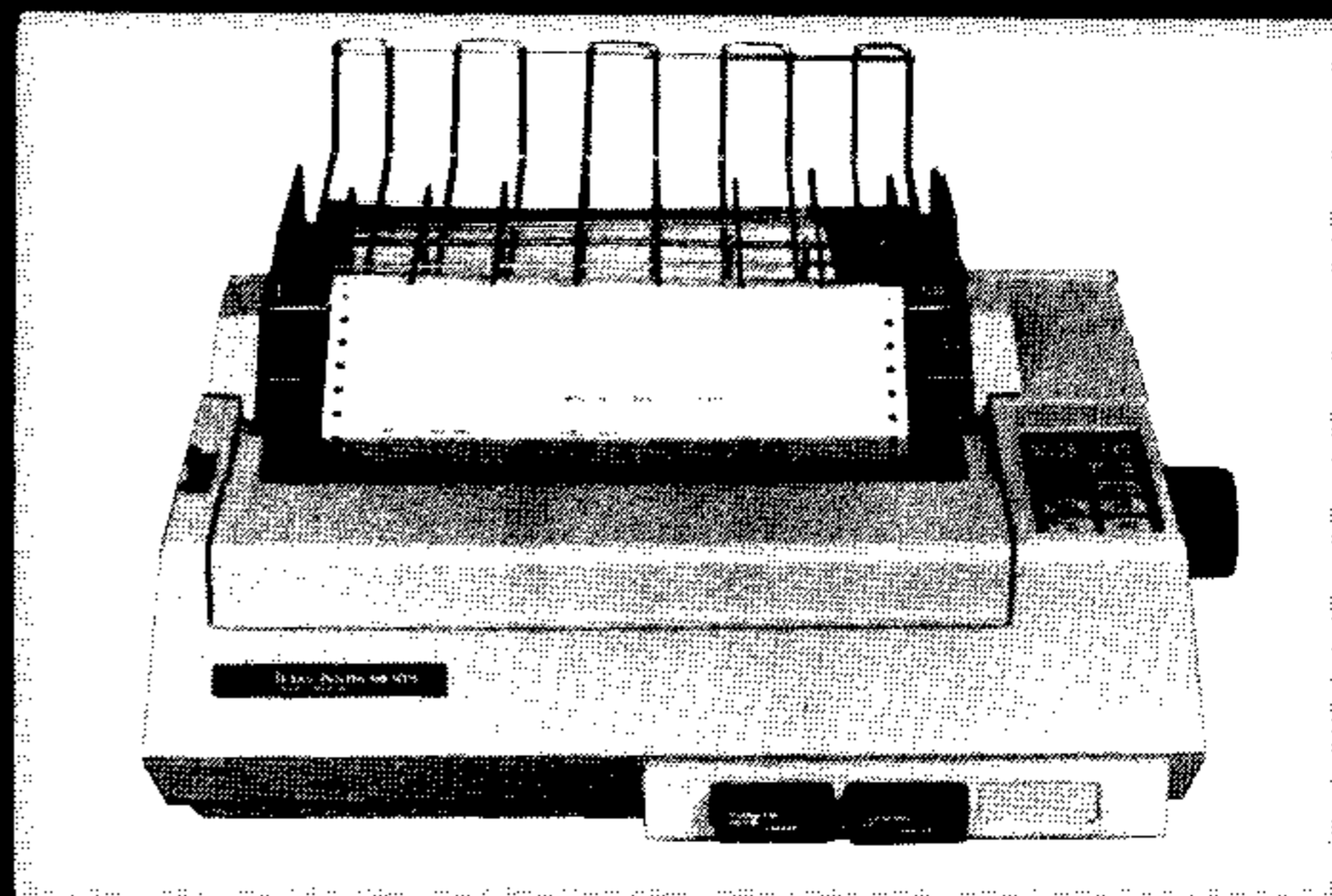
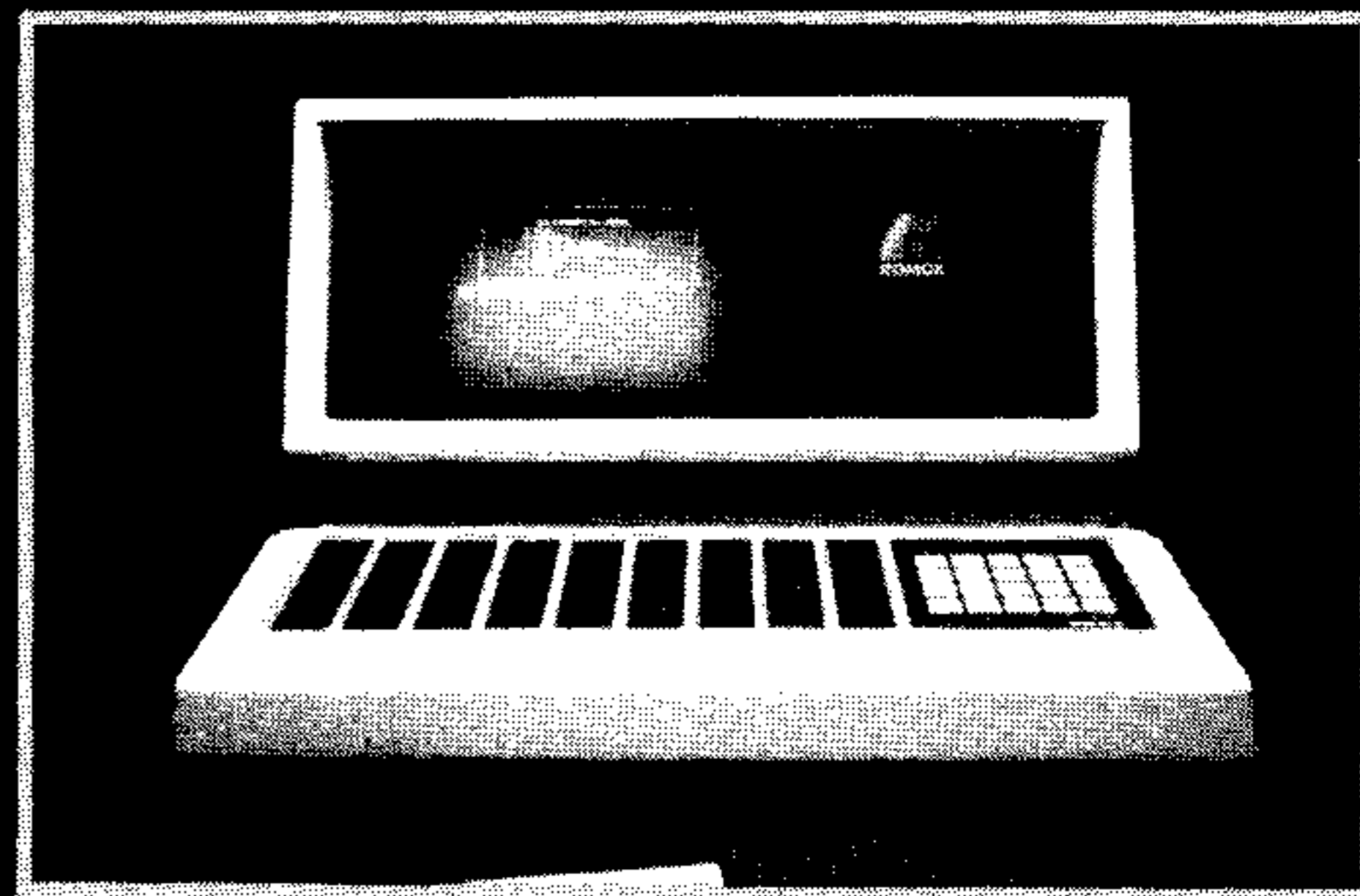
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CHARLIE'S PAGE

By Charles La Fara

An interesting at-a-glance look at the proliferation of YOUR Users-Group—the IUG!

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MORE

FUN FOR THE

T199/4A™

Funware™

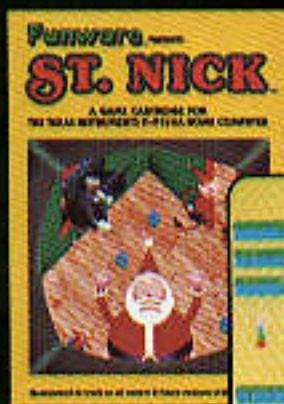


W

icked witches, banished from Halloween, have swooped down on poor old St. Nick for Christmas. And cranky, as they usually are, they've cast their evil spell on the elves, who are scattering toys everywhere with wild abandon. Christmas itself is in dire jeopardy! Help St. Nick ward off the witches and get his workshop back in order. If this sounds like jolly good fun, just try the challenge of 42 screen levels!

(CAUTION: Don't smile while playing. The elves may scatter your teeth!)

ST. NICK.™



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RABBIT TRAIL.

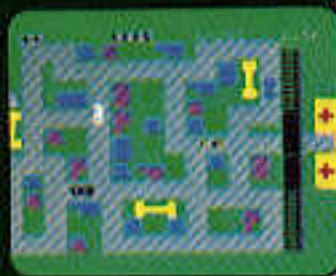
All you want is a few carrots to nibble on... and the whole world's trying to stop you. Run through a maze of rabbit holes as you dodge weasels, hawks, traps and cars. Seven different screens provide an unending challenge that'll leave you hopping mad!



RABBIT TRAIL

AMBULANCE.

Helpless citizens are dropping like flies... somehow you've got to get them all to the hospital before they expire! Speed through city streets dodging runaway cars, trains, and traffic in a fast-paced strategic adventure guaranteed to get your pulse racing!



AMBULANCE

PIPES.

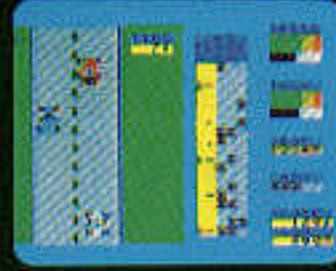
A simple problem becomes an incredibly complex strategic challenge: Help Arlo, the Absent-Minded Plumber, create a water-supply system for the whole neighborhood. Select the right pipes from the factory, plan your delivery system, hook up the joints and pray that poor Arlo hasn't left the valves open!



PIPES

DRIVING DEMON.

Arcade-style auto racing for the TI 99/4A, in a desperate race against the clock and the competition. Weave through the cars, skid through the oil slicks, then floor it down the straight-away. Your long-range scanner warns you of obstacle cars in your path, but you'll need lightning reflexes to react in time. Mile-a-minute thrills!



DRIVING DEMON

S O F T W A R E



VIEWS

Enthusiast '99™

OFFICIAL PUBLICATION OF THE INTERNATIONAL 99/4 USERS GROUP

Into each life a little rain must fall.

It was difficult hearing the news on October 28 that Texas Instruments, Incorporated had made the decision to stop production of the 99/4A. Fur flew and foreheads became moist with perspiration.

But then the dust cleared and we realized that things weren't really so bad. No one's 99/4A self-destructed or ceased to function and the world kept right on turning.

It's unfortunate that future computer enthusiasts will be unable to enjoy the 99/4A, and our second generation will never see TI's second generation computer. However, the time is now, and the IUG will continue to keep its doors open for a long time to come.

In fact, you are the reason the IUG is still going strong. Now more than ever, all 99/4A computer owners must join together to prolong any obsolescence of the 99/4A. Our Software Exchange Library must continue to grow, and third party products must flourish in the market.

The initial response I have received from our advertisers of third party products is that they plan to continue production. At this time, the January issue of Enthusiast '99 is in a holding pattern, waiting until the dust clears and a logical decision can be made as to its future. Now more than ever, both our advertisers and Enthusiast '99 depend upon you to help keep the 99/4A market going strong.

Our initial step at this time is to stay calm and stay together.

Dana

QUESTIONS & ANSWERS

Q Early in August I placed an order with the International 99/4 Users-Group for a telephone modem and RS-232 Card. Although the products were promptly shipped (I received them on August 19) I was very disgruntled when I found out that Texas Instruments had lowered the price on these two products on August 15th. I was told by the Users-Group that although I had received the product after the promotion began I still was not entitled to the lower price. I don't think this is very fair.

A On August 15 we received from Texas Instruments a price reduction for several items in their hardware line. Although our inventory was price protected as of that date, anything that we had invoiced and shipped prior to August 15 was not covered. This means that we had no other choice than to bill our customers at the old price until August 15, 1983. Generally, information on promotions of this type are leaked to retailers in advance of the actual effective date, thus giving the dealer an opportunity to advise would-be buyers. However, this was a well-kept secret until the actual date the promotion went into effect.

We certainly can understand how you feel knowing that if you would have waited to place your order you could have saved over \$200. The International Users-Group and other dealers, however, are at the mercy of Texas Instruments and we have no control over their pricing and promotional policies. Although we do everything in our power to provide our members with the best possible services, we are sometimes caught in the middle. With ever-decreasing prices in this hi-tech industry, all we can say is that we are sorry and assure you that you were not alone when it came to being caught in this decreasing price situation.

Q Although I've had my 99/4A for several months now, I'm anxious to find more applications than playing games on it. What are some of the more common uses for the 99/4A?

A Currently the trend seems to be toward word processing and educational training, followed by home entertainment, business accounting, personal finance, graphics, and scientific work. Additionally, computer time-sharing with information databases has shown a sharp increase in the past several months.

Still, the most common use reported among our members is game playing. The reason for this is that until recently there was a lack of quality software in the educational and home usage area. Now, however, we are beginning to see more and more non-entertainment software becoming available from Texas Instruments as well as third party producers.

Home use of computer time sharing, such as services provided by Source Telecomputing, Dow Jones, and CompuServe, are increasing rapidly as these companies offer more and more consumer related services, and as peripheral devices to access time sharing systems decrease in price.

Q Most of the cassette and diskette software packages that I have purchased contain statements saying that I cannot return them for refund. This, however, is not the case with hardware. Why the difference?

A Because of the inability of software producers to produce unbreakable codes software piracy has become rampant in this industry. (See September Enthusiast '99) The only way that software manufacturers can protect themselves against this piracy is by insisting on strict return policies. If the manufacturers offered lenient return policies, customers could purchase software, copy the programs, and then return the package for a full refund.

If this problem were not controlled it could get out of hand, and it would not make sense for manufacturers to produce software. Until some type of precise protection scheme is devised, you will continue to see no real way to obtain refunds on software packages.

Most manufacturers of software will, however, allow the return of software for updates and fixes as needed.

Q I've been thinking about buying another computer, but it seems there are always newer and better models coming out all the time. Should I buy now, or wait in anticipation of a better model and a cheaper price? How can anyone know how quickly the computer they purchased will become obsolete?

A This is a very difficult question, one I'm not sure we're qualified to answer. One of the first things you should consider is just exactly what chores you

want your computer to handle. Consider all existing software packages and any modifications that would have to be made to them. Then weigh the price of this system against the cost of systems which you feel will become obsolete and systems which you feel have a long range future and capability to expand.

Only you can make the decision to purchase the right computer for your needs.

Q I currently own a TI 99/4A, and feel that I need to move up to the TI Professional; however, the cost of the Professional is beyond my current means. Does Texas Instruments or someone else offer financing plans?

A There are several financing arrangements offered by most computer dealers who handle the TI Professional. Most offer to the consumer the ability to purchase both hardware and software using major credit cards which offer extended payment terms to card holders. Some stores have their own financing department, and will arrange either direct or indirect financing after a minimum 20-30 per cent downpayment. In checking with local banks and lending institutions in the Oklahoma City area, loan officers advised us that many individuals choose to use their type of service for financing of computer hardware and software.

The best way to purchase a computer, however, is with cash in hand. Most dealers will offer some type of discount on purchase "if you bring the green".

Q I see a lot of advertisements in the computer magazines for power-surge protectors and suppressors for personal computers. Do I really need one for my computer?

A I'm sure that there is some validity in using this type of product. We certainly use one on our mainframe computer, the TI Business System 672, here at the IUG office. For our TI Professionals and 99/4As, however, we have not seen the need to install these devices.

Located in the midwest tornado alley, we are always subject to spring and fall thunderstorms and lightning displays that would rival a July 4th fireworks frenzy. Whether it's simply luck, or our equipment is exceptional, we have never lost the first bit of information nor have we experienced hardware damage due to electrical problems.

The only time we would recommend use of this type of equipment is if you live in a home that is subject to brown outs or power surges that occur when a large electrical drain, such as air conditioning, is put on your electrical system.

Q I recently saw a new type of display monitor at an IBM trade exhibit, which was filled with gas. The demonstration showed some amazing graphic abilities, and was quite comfortable on the eye. Will this type of monitor ever become available for the home computer?

A We also saw this monitor displayed at the National Computer Conference held in Los Angeles, CA, and were extremely impressed with its resolution and overall quality. It is a gas plasma monitor, and it contains a grid made up of tiny wires running between two flat glass plates. The plates are filled with neon and argon gases, and are then sealed.

In the demonstration at the NCC, the monitor was divided into four separate sections, and performed four simultaneous functions while hooked to one of IBM's main frame computers. It offered a sharp orange display, which is readable from almost any angle.

When we questioned an IBM representative as to whether this product would ever be available for their IBM-PC, or other professional or personal computers, the representative said that with its current cost of over \$7,000 it may be some time before it's made available to the home and professional computer owner.

Q I am an absolute game freak who has become bored with my current library of game software. As you normally are able to take a look at new packages before they hit the market, can you please tell me some new games that will challenge my obsession?

A During the fourth quarter of this year and the first quarter of 1984, game packages will become available that are both challenging and should have a non-boring effect on their owner. As for what is currently available, we suggest any of the Extended BASIC games offered by Moonbeam Software, Northampton, MA, we especially like Zero Zone and Robot Runner.

If you're fortunate to own an Editor/Assembler, disk system and an additional 32K RAM, you might wish to consider two new arcade products from Softmachine: Barrage and Spotshot. Both

of these products were designed by the same programmers who did Munch Man and Parsec. Arthropod, a Centipede-type game, offers many hours of enjoyment and uses the same peripheral configuration. If your budget only allows for a Mini Memory module and cassette player, try CUBIT, from Artios Software in Oklahoma City.

- **Sea Warrior**—You command a nuclear sub. Seek and destroy enemy ships. Beware of enemy destroyers. Strategy game for 1 player \$19.95
 - **Black gold**—See if you can become an oil tycoon. Drill wells, buy land, play stock market. 1-4 players \$19.95
 - **Rat Race**—Arcade action. Get your rat to the other side of freeway and home. Joysticks/Keyboard: EXT-BASIC only \$17.95
 - **Blackjack**—Old time favorite. Graphics, and sound. 1-4 Players \$10.95
- Available in EXT. or TI BASiC, specify which you need. Cassette only.

Check or money order:

Charles S. Henderson

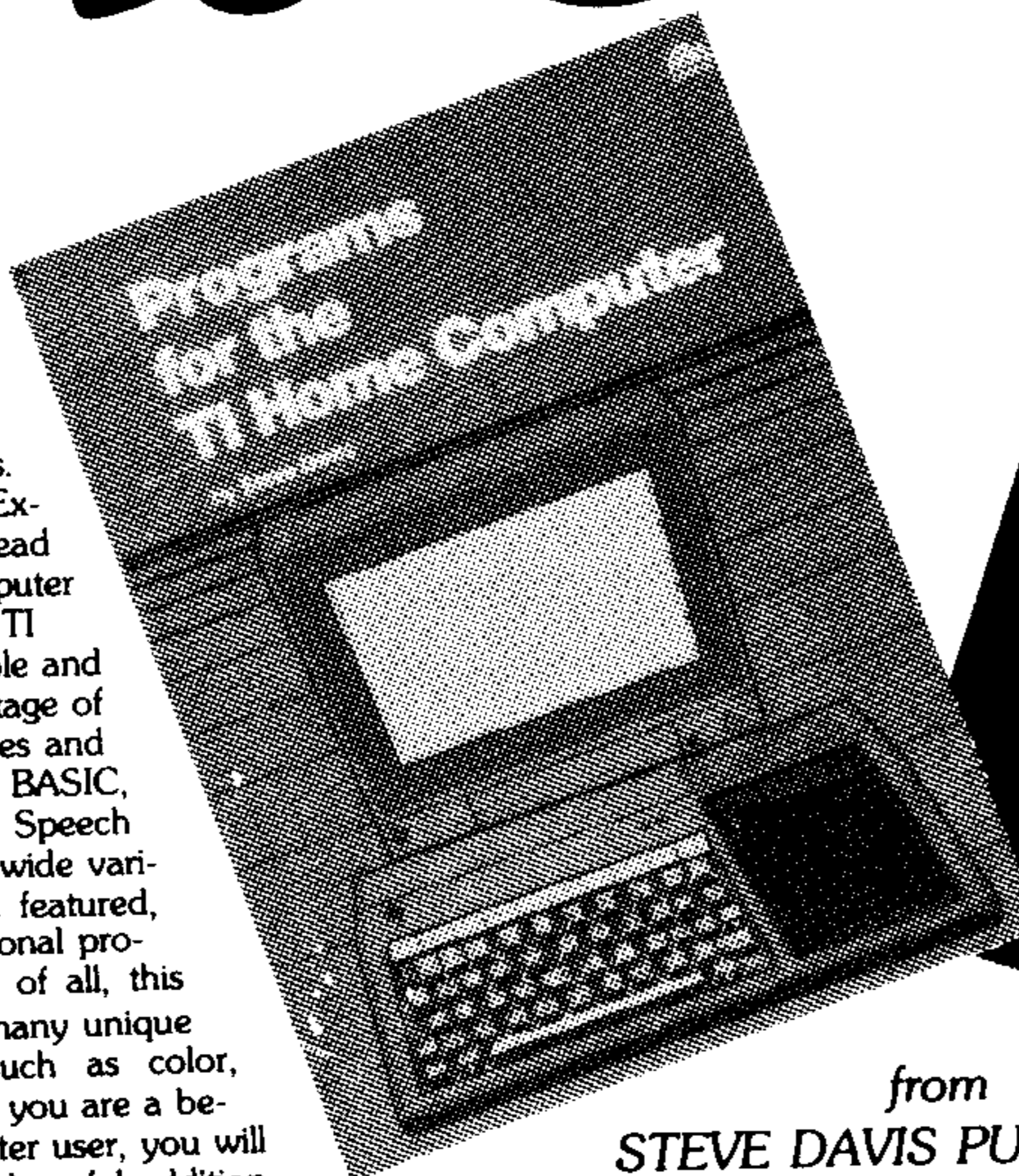
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Dealer Inquiries Invited

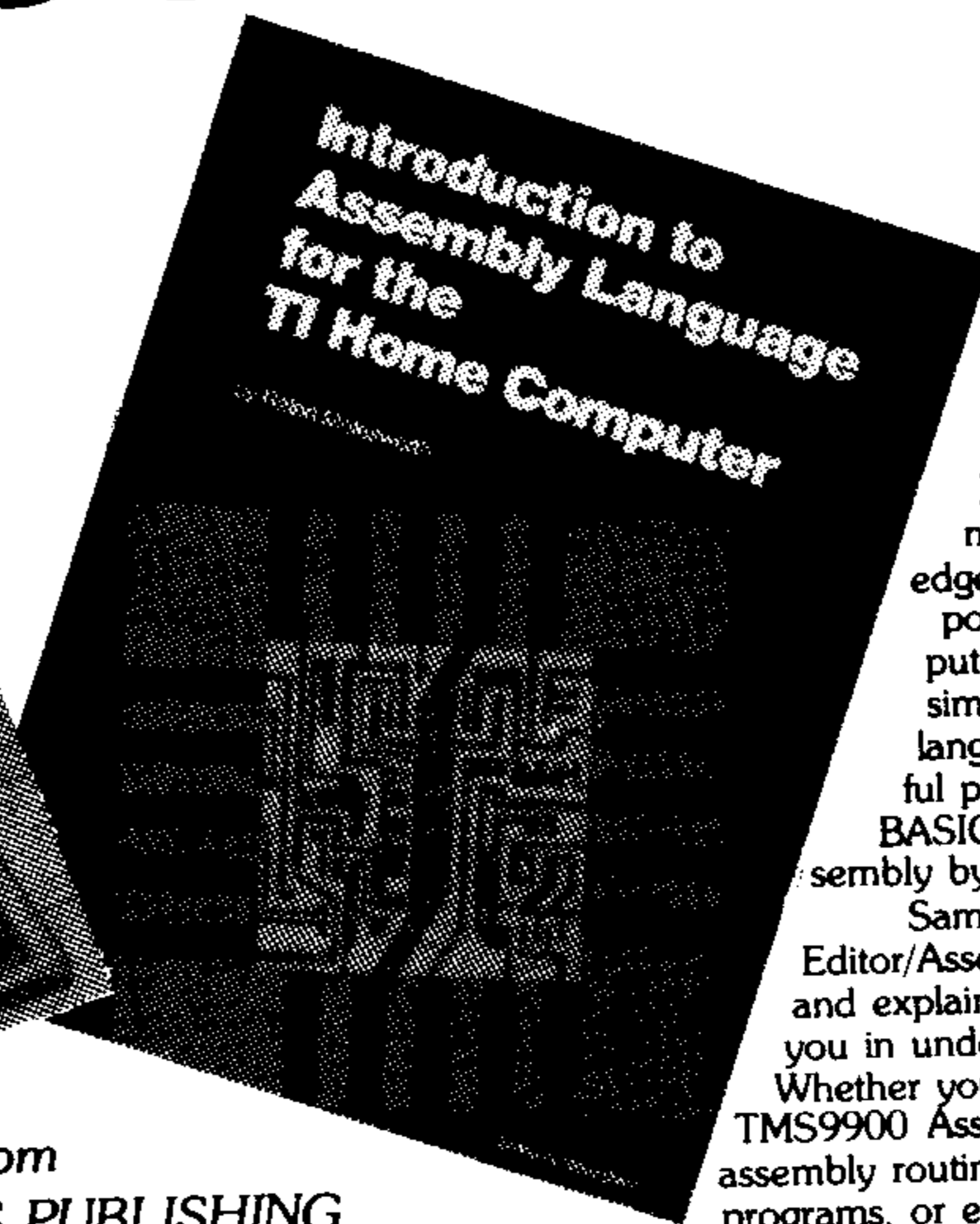
Two to Grow On

Programs for the TI Home Computer by Steve Davis

At last, here is a book of programs written especially for users of the popular Texas Instruments 99/4 and 99/4A home Computers. Fifty unique programs in TI BASIC and TI Extended BASIC are presented in an easy-to-read format, ready for you to type into your computer and use. Most of the programs are listed in TI BASIC and may be used with just the console and a cassette recorder, while others take advantage of the special capabilities of optional TI modules and peripheral equipment, such as TI Extended BASIC, Mini-Memory, Terminal Emulator II, the TI Speech Synthesizer, a printer or the disk system. A wide variety of programs for home applications are featured, including games and entertainment, educational programs, programming aids and more. Best of all, this volume offers programs that highlight the many unique features of the TI Home Computer, such as color, graphics, music, sound or speech. Whether you are a beginner or an experienced TI Home Computer user, you will find this collection to be an entertaining and useful addition to your program library. 8½x11, 128 pages, soft cover.



\$14.95



from
STEVE DAVIS PUBLISHING

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Introduction to Assembly Language for the TI Home Computer by Ralph Molesworth

This introductory text offers step-by-step instruction in getting started with the powerful TMS9900 Assembly Language for the Texas Instruments Home Computer. It is written to meet the needs of the beginner with a knowledge of TI BASIC who wishes to unlock the vast potential and speed of this popular 16-bit computer. This is an easy-to-read tutorial presenting simple-to-follow progressive steps from assembly language basics to the design and coding of useful programs and subroutines. Comparisons to TI BASIC statements help to teach you TMS9900 Assembly by building on your BASIC programming skills. Sample programs that can be entered with the TI Editor/Assembler or Mini-Memory modules are included and explained in detail. Charts, tables and diagrams aid you in understanding and are useful for future reference. Whether you wish to learn to write complete programs in TMS9900 Assembly Language, if you want to incorporate assembly routines into your TI BASIC and Extended BASIC programs, or even if you just wish to acquire a better understanding of how your TI Home Computer works, this book will help you.

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NEWS BYTES

ATTENTION PRESIDENT'S CLUB MEMBERS

Due to unforeseen announcements by Texas Instruments regarding the abandonment of their Home Computer business, we have found it necessary to rush our current edition of Enthusiast '99 to all our members. For this reason we were unable to print and mail your "Free Tape Offer" along with this magazine. We have made the decision to back up the free tape offer for a one-month period and you will receive your free tape offer card with our December President's Letter.

We're extremely sorry for any inconvenience this has caused and please rest assured that each PC member will receive a total of six free tape offer cards during their annual membership period.

TI SOFTWARE MAY CONTINUE

Although no firm decision has been made at this time, Texas Instruments in a prepared statement released October 31 stated that plans are being considered to continue some software support for owners of the Texas Instruments 99/4A Home Computer. No further details were available to the IUG as of presstime. Selected Solid State Software modules have already been reduced in price to deplete current inventory levels and more information on this price reduction can be found on the inside back mailing cover of this publication.

IUG ANNOUNCES FIRST REPROGRAMMABLE CARTRIDGE FOR MASTER 99 SERIES PROGRAMS

The International 99/4 Users-Group is happy to announce a new software concept to its members. Utilizing the ROMOX Edge Connector Programmable Cartridge (ECPC-TM) the IUG will be offering Assembly language programs to its members for the first time in a cartridge format. The IUG is currently creating an entire program library which will be offered utilizing this new technology. What this means to our members is that no longer will your software cartridges be obsolete once you tire of them. IUG members will have the ability to mail back their reprogrammable cartridge and for a small fee have it reprogrammed with completely new contents.

Our first reprogrammable cartridge is D-Station. It is a wonderful space-age shoot-'em-up entertainment package designed by John Phillips, one of Texas Instruments' own top programmers. D-Station is currently available to all IUG members on reprogrammable cartridge for \$24.95 (reprogrammable cartridges will not work on the 99/4; only on the 99/4A). Our second entertainment package is nearing completion and it is our hope that we will have as many as 50 reprogrammable packages available to our members by April 15, 1984.

Charles La Fara, IUG president, says "this is an exciting new venture for us and also for our members. It eliminates obsolescence of cartridge packages and offers value-added software at a time when it's most needed."

Although the cost for reprogramming cartridges has not been established yet, Mr. La Fara feels it will be in the \$10-\$12 price range. For additional information concerning D-Station or the reprogrammable cartridge concept, contact the IUG at (405) 948-1023.

STOCK TRADING AT HOME

The firm of C. D. Anderson & Co., a small discount brokerage firm located in San Francisco, CA, has set up the nation's first home-brokerage system. Individuals can now buy and sell stock by entering orders from their own personal computer without ever having to talk to a sales representative.

Several other brokerage houses, including Charles Schwab & Co., E. F. Hutton, Inc., and Dean Witter Reynolds, Inc., also plan to provide their customers with securities services using home and personal computers.

With clearances from the Securities and Exchange Divisions, the Anderson system developed a rational data base which clients can access for a one time fee of \$300. Additional system usage fees range from 10 to 40 cents per minute. Anderson, who runs his brokerage with his wife Patricia, said that they see the personal computer as the best way for them to grow. The firm currently has about 17,000 customers and feels that investors who do not require consultation from individual analysts will benefit most from his new service.

COLECO SUED BY SHAREHOLDER

A Pennsylvania shareholder of Coleco Industries, Inc. filed suit in Federal Court against the company and three of its top executives charging them with "misleading" the public about Coleco's ADAM Home Computer system.

The suit alleges that Arnold Greenberg, president and CEO of Coleco, and several other officers violated Securities and Exchange Commission rules by concealing adverse information from the public at a time when they sold at least

183,000 Coleco shares at prices as high as \$60.13. The suit further stated that Coleco has had problems perfecting the ADAM, and the company does not have the financial capabilities to meet shipping deadlines which should have begun in early September.

Additionally, it is alleged that Greenberg sold 125,000 shares of his own stock between June 13 and 16, at prices averaging \$56, well above Coleco's current market price.

IMAGIC EXPECTED TO CEASE MANUFACTURING

According to Bruce Davis, corporate vice president for Imagic in Los Gatos, CA, Imagic is "Having trouble getting distribution for their new products and cannot afford to advertise or produce in high volume. Therefore, we are going to cut down our current number of employees consistent with realistic sales figures and projections for the next six months to a year."

On September 16, Imagic laid off 40 employees in its sales and marketing division including 25 retail merchandising specialists from across the country.

Releases have slowed considerably since the beginning of the year when Imagic shelved its plans to go public and secure a new round of venture capital. New titles released since the beginning of the

year did not fare well in a saturated game market and failed to reach the long run success of Demon Attack, Imagic's biggest 1982 hit. Our sources in California's Silicon Valley tell us that Imagic will stop all manufacturing by the end of the year. Although no distributors have been given any notice by Imagic as to provisions for return of existing stock, distributors that we have contacted feel very uneasy at this point due to the large amount of dumping that they have had to do with Imagic products that are not selling.

A TI spokesman has said that the layoffs at Imagic should not impair the contractual agreements that Imagic and TI have made to deliver several new titles for the 99/4A by the end of this year.

COMPUTER CREDIT CARD

Apple Computer and Computerland have both recently announced a separate credit card for purchases of computer equipment. The Apple card, a revolving credit program designed for Apple by General Electric Credit Corporation, will be available to end users who are willing to finance at least \$825 of their hardware and software purchases and will be honored at over 1400 Apple retail outlets in the United States and Canada. The Computerland credit card is almost identical and will be implemented in its 330 franchise stores across the United States. The major drawback of the Computerland card is that the customer's purchase must be at least \$1500. The new Computerland card will be issued by New York-based Citibank and carry the names of both Computerland and Citibank. Card users will be charged competitive rates with no membership or transaction fees.

MONEY MAGAZINE SPOTLIGHTS IUG

When Money magazine decided to publish their 1984 edition of Money's Guide to Personal Computers, researchers were asked to consider all aspects of personal computing so a comprehensive consumer publication could be produced with the utmost credibility.

In the section titled "After You Buy Your Computer" Money chose to mention both affiliated and unaffiliated users organizations. Although several hundred Users Groups throughout the country were contacted by Money, they chose to highlight the IUG as the premiere Users Group for the TI line of personal computers.

In the unaffiliated category, the 8400-member Boston Computer Society was listed as one of the many groups computer owners can contact to add more enjoyment to their personal computing.

FCC CERTIFIES COLECO'S ADAM

The long-awaited release of Coleco's new ADAM computer (bundled system which includes computer, word processing system and letter quality printer) may be one step closer to reality as the FCC has certified that the AAMS electronic components meet all FCC standards. Although Coleco officials have not revised their original projections of producing and selling 500,000 units by year's end, a copyrighted story in the October 4 edition of The Wall Street Journal cast doubts on whether production and sell-through could be accomplished. ADAM was originally to ship in late August and has seen at least three postponements in shipping due to hardware and software failures.

FREE SPEECH OFFER STILL AVAILABLE

Although Texas Instruments cancelled their current \$50 Rebate program and Free Course Offer to new owners of the 99/4A Home Computer on October 31, 1983, they will continue to offer until January 31, 1984 their Free Speech Synthesizer Offer. This promotion provides that if six Texas Instruments Solid State Command Modules are purchased prior to January 1, 1984 the end flaps can be returned along with a special coupon for the redemption of a free Speech Synthesizer. Additional details are available from most TI dealers and coupons can be obtained from the IUG or by calling Texas Instruments at 1-800-TICARES.

ALPEX BIT MAP LICENSE BASE PRICE SET

A recent agreement has been reached between Alpex Computers and Atari for a paid up non exclusive license on Alpex-patented Bit Mapping technology. The agreement states that Alpex will not grant any company a paid up license for less than \$400,000. Atari agreed to pay them in an out of court settlement.

There are no such restrictions, however, on royalty bearing licenses according to Alpex's New York law firm, Darby and Darby. The paid up license fee can be greater than \$400,000 if other companies using our technology choose not to settle with us in the short term and we have to take them to court. In this case we will sue for substantially greater sums, said Alpex President Sam Hales.

Alpex is reportedly negotiating with Mattel, Coleco and other manufacturers including TI, who they feel have violated their patent rights. Contacted by the Users-Group staff member, Texas Instruments failed to comment as to whether or not they have made any agreement with Alpex at this time.

MEMBER SPOTLIGHT



GIUSEPPE GALANTI

This issue's Member Spotlight comes to us from a member located thousands of miles from our IUG office; as a matter of fact, for most of our members to get to this month's Spotlitged individual would require the use of either a plane or a large boat.

Our member spotlight individual is Giuseppe Galanti. He lives in the town of Padova, nestled in a rural community in northern Italy, north of Venice and in the shadow of the Italian Alps, and not really a place where one would expect to find a 99/4A Home Computer. Dr. Galanti is Chief of Urology in the Hospital of Monselice, a town located some 15 miles south of Padua.

Dr. Galanti's love of computers began some three years ago when he bought a Sinclair ZX/81 in hopes of gaining some computer literacy which he could apply to his work as a physician. After writing several programs to collect

and maintain data about his surgical activities, Dr. Galanti found that the ZX/81 was interesting, but not much more.

He was limited by the Sinclair's inability to provide him with additional memory and peripheral equipment which was required as his computing activities increased. Due to this reason last spring he decided to purchase a 99/4A.

Not unlike TI owners in America, Dr. Galanti found it difficult to find software for the 99/4 in Italy and also found a lack of support by European retailers and the Texas Instruments Consumer Product Division in Italy. Dr. Galanti says, "a major reason for purchasing the 99/4A was for its speech capabilities, advanced graphics, and expandability potential.

"The solution to several of my software needs was realized when I found the International 99/4 Users-Group," he went on to say. "I have been able to adapt several of the programs in the Software Exchange Library into my native language and find them most useful not only in my medical practice but also as entertainment when I'm not dressed in surgical garb."

This past summer Dr. Galanti had the opportunity to visit the IUG offices while on a tour of the United States. While here, he was able to pick up several items, including a peripheral expansion box, 32K memory expansion and disk memory system. Many of these items are not readily available in Italy, especially in a rural area such as Padova.

The addition of a Seikoska GP-250X dot matrix printer and a simple modification of one of his programs allows Dr. Galanti to correspond with the IUG and other friends throughout the world.

Most of the computing time at the Galanti household is done by Galanti himself; however, his 26 year old son and 19 year old daughter also enjoy the occasional use of the 99/4A. Dr. Galanti reports that although Sinclair, Commodore and Atari computers are currently outselling the 99/4A in Europe, its popularity is steadily increasing among students and professionals.

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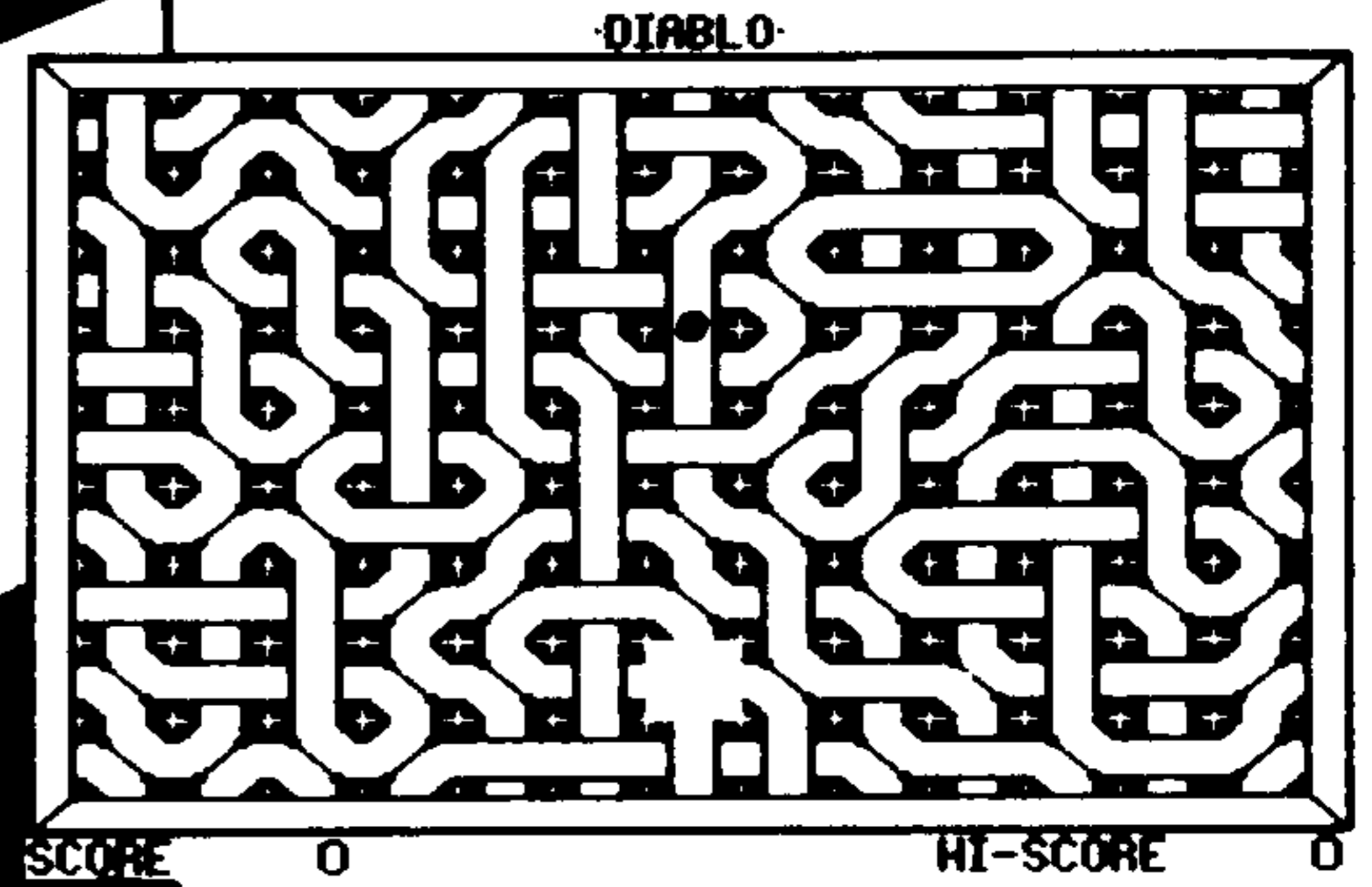
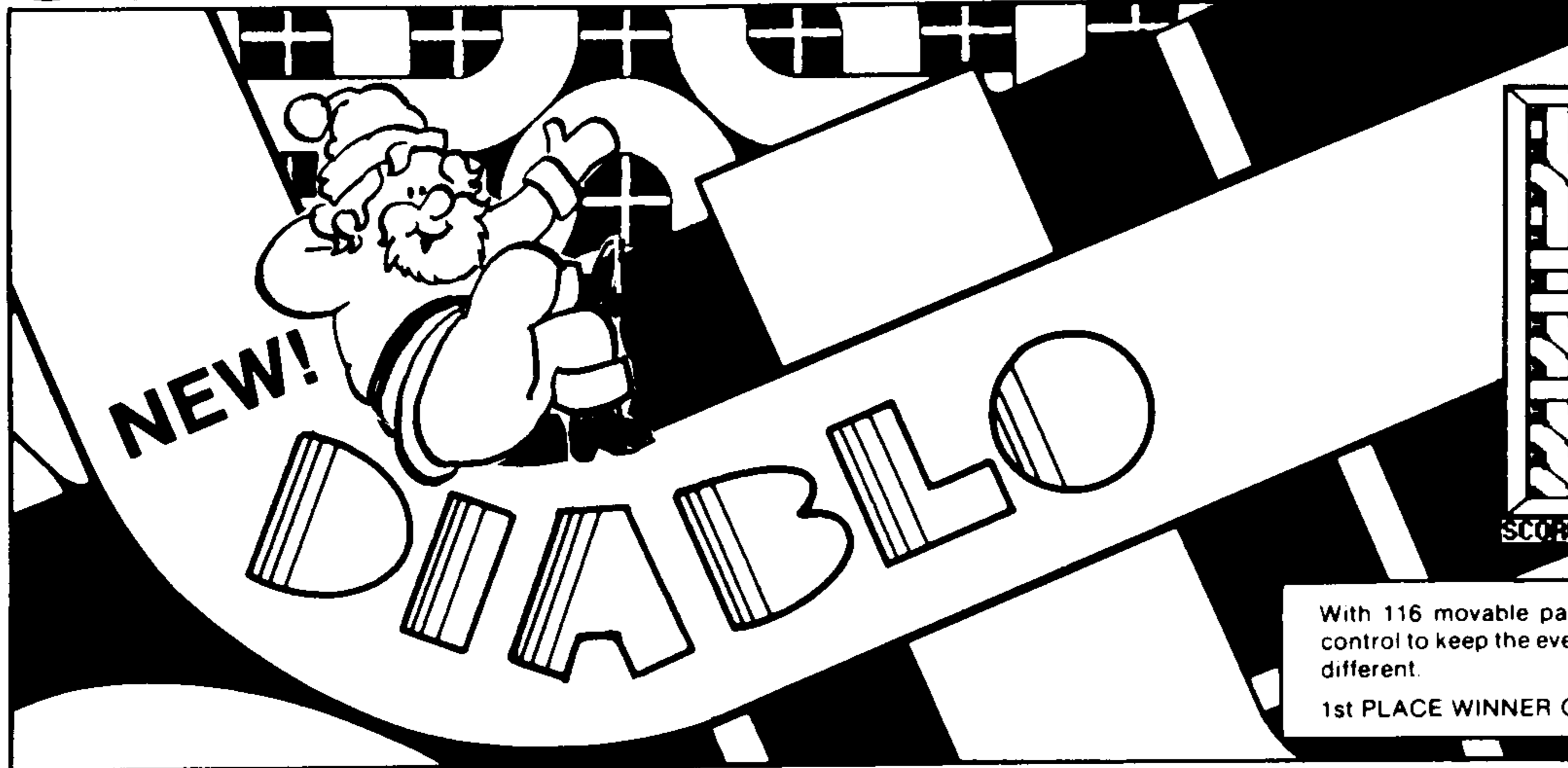
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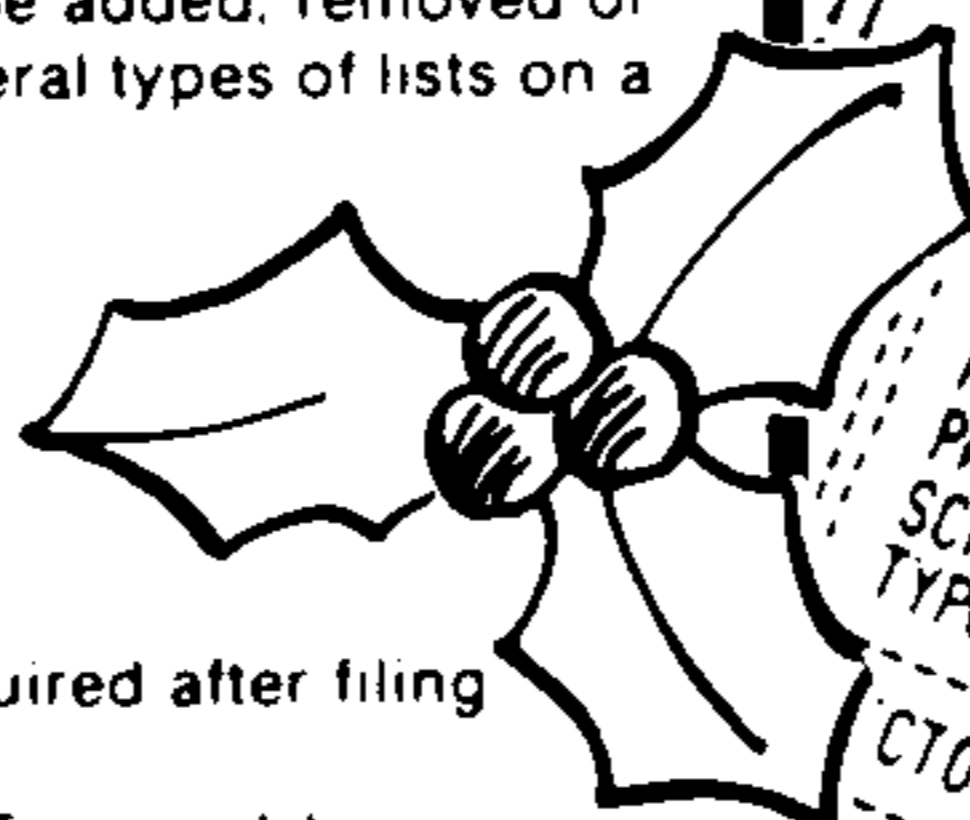
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A WOMAN'S VIEW



By Regena

P.O. Box 1502
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Are you busily making Christmas preparations? Your TI-99/4A can help you with many of the details. Anything that is repetitious can be done efficiently with a computer. A computer can also sort or keep track of things.

A number of Christmas list and mailing label programs have been published. You need to enter all the people in your address file with perhaps a few code numbers. With a touch of a key you can then print all the address labels — or only those matching a certain code. For example, you may choose to print only those labels for people with a zip code within a certain range, or perhaps only for people who sent you a card last year.

Have you got a schedule full of Christmas parties and school programs? Use a type of calendar program to print out a calendar with the scheduled events. Perhaps the program will allow you to select a date, then tell you all the activities for the day.

Many families draw names for Christmas presents. Enter all the names then let the computer randomly match each giver with a receiver.

The computer can keep track of your holiday recipes. If you wish, you can adapt the Cookie File program (from the May issue of *Enthusiast '99*) for your own Christmas goodies. You may even use the computer to generate your grocery list.

You can use an inventory type program to keep track of your Christmas gift shopping. Record the people, the gifts, and the amount of money spent. A budget program or checkbook program can keep track of your money spent for the holiday season.

If your children are too young to help before a Christmas party, let the computer entertain them with a few games. Or center a young people's party around computer games competition. Christmas caroling can be modernized by having your TI-99/4A play the accompaniment.

If you add a printer to your computer there are even more tasks your computer can perform. Your standard Christmas brag letter can be computerized. You may choose certain paragraphs to be in one letter and other paragraphs in another letter. Merge your letter with your mailing list to be a little more personal in the letter salutation.

I have received quite a few requests to write columns on how to use peripherals — especially since the prices have dropped quite drastically and more TI-99/4A users are now purchasing peripherals. In general my programs will not require any extra hardware because I want all TI-99/4A owners to be able to run the programs. However, this month these programs will illustrate the use of a printer.

For those of you who do not have a printer, you may use the general idea to create pictures on the screen. Use PRINT statements and regular symbols and spaces to draw a design.

To use a printer with your TI-99/4A, you will need a printer plus the RS-232 Interface and a cable that connects the RS-232 to the printer. Many brands of printers will work with the TI, and printers range in price from about \$200 to thousands of dollars. Thermal printers are less expensive, and the TI thermal printer does not require the RS-232 Interface. However, special paper is required.

Your standard Christmas brag letter can be computerized...Merge your letter with your mailing list to be a little more personal in the letter salutation.

The RS-232 Interface may be either the "old-style" RS-232 Interface box that attaches to the side of the computer (after the speech synthesizer) or the RS-232 Interface Card that goes in the Peripheral Expansion Box. The "old-style" box may also be used with the Peripheral Expansion Box by putting the RS-232 next to the computer then the Peripheral Expansion Box flex cable from the RS-232 to the Flex Cable Interface.

The RS-232 has two ports that support standard 25-pin plugs. You may use either one for the printer. Look at your manual to see which plug will be designated as RS232/2.

The TI requires a serial printer (as opposed to parallel printer). If you have several computers, usually the one printer can be used by the other computers. Refer to your printer manual for various options that are available. Some printers have "dip" switches that can be manually set. The RS-232 has software switch options so you can match the computer and RS-232 to the printer set-up. These options are BAUD rate, data bits, parity,

stop bits, nulls, check parity, echo off, carriage return, and line feed. The RS-232 manual describes the necessary commands for the various options.

The RS-232 assumes several default values for the options. If your printer requires a change, then you will have to specify those options whenever you use RS-232 commands. For example, if you have a program in your computer and want a listing, here are some sample commands.

```
LIST "RS232.BA=110"  
LIST "RS232.BA=600"
```

The first command has a baud rate of 110, and the second command has a baud rate of 600.

If you are printing within a program, the OPEN command is used to alert the printer. The general form is OPEN #1:"RS232" where you can use any number after the number sign for the file number. If your printer requires some of the option values to be specified, put them in the OPEN statement and you will not need to worry about them later. For example,

```
100 OPEN #1:"RS232.BA=110"  
100 OPEN #3:"RS232.BA=600"  
100 OPEN #5:"RS232.BA=960  
      0.DA=8"  
100 OPEN #6:"RS232.TW.BA=110"
```

Later whenever you want something printed on the screen, use PRINT; but if you want it printed on the printer use PRINT #1 or the appropriate number.

The following program illustrates how you can use a printer to print Christmas letterhead. Regular symbols are used to create a design. This program uses standard 10 characters per inch and six lines per inch. If you're not an artist, use an old listing or previously printed report and trace a Christmas stencil on it. This will give you an idea of where to print symbols and where to leave spaces.

You may also use cross-stitch or needlepoint patterns of Christmas designs and print different symbols for the different colors. Another idea is to use graph paper and color in the squares for a design (or have your children design your letterhead). Then row by row convert the graph paper to PRINT statements.

Line 110 is the OPEN statement that specifies the printer options. If you wish to try this program, be sure to adapt this

line for your printer configuration. Lines 120 through 360 are simply print statements sending the printing to the printer. Some of the lines use the TAB function rather than using quotes and spacing over many blank spaces.

Line 370 is to print CHR\$(12) which corresponds to a form feed or new page. Since this is letterhead, start the printing at the top of the page where you want the printing to start (leave a little margin). After the design is printed, the printer will go to a new page.

Line 380 is a CLOSE statement to tell the RS-232 that you are finished printing. The program then ends. If you want to print several pages, you can put the whole program in a FOR-NEXT loop for the number of Christmas cards you want. For example, add the following lines.

```
115 FOR C=1 TO 10
375 NEXT C
```

```
100 REM CHRISTMAS CARD
110 OPEN #1:"RS232.BA=600"
120 PRINT #1:TAB(23);"#####"
130 PRINT #1:TAB(21);"#####"
140 PRINT #1:TAB(20);"#####"
150 PRINT #1:TAB(19);"#####"
160 PRINT #1:TAB(18);"#####"
170 PRINT #1:"#####"
180 PRINT #1:"#####"
190 PRINT #1:"#####"
200 PRINT #1:"#####"
210 PRINT #1:"#####"
220 PRINT #1:"#####"
230 PRINT #1:"#####"
240 PRINT #1:"#####"
250 PRINT #1:"#####"
260 PRINT #1:"#####"
270 PRINT #1:"#####"
280 PRINT #1:"#####"
290 PRINT #1:"#####"
300 PRINT #1:"#####"
310 PRINT #1:"#####"
320 PRINT #1:TAB(16);"#####"
330 PRINT #1:"#####"
340 PRINT #1:"#####"
350 PRINT #1:"#####"
360 PRINT #1:"#####"
370 PRINT #1:CHR$(12)
380 CLOSE #1
390 END
```

Many printers allow different fonts or different sizes of print. Your printer may also allow graphics. Spend a little time experimenting with what is available with your printer to create a Christmas design.

The next program was written using the TI 825 printer. It illustrates controlling

the printing from the computer. Commands will be different for different printers — consult your printer's manual.

Line 110 is the OPEN statement. VARIABLE 132 allows for a longer print line — 132 characters on one line. Line 120 defines ESC\$ to be CHR\$(27), which corresponds to ESCape. This command is

used in changing the characters per inch on this particular printer. Lines 140, 150, and 160 define compressed print, standard print, and expanded print (16.5 characters per inch, 10 characters per inch, and 5 characters per inch). Change these lines for your particular printer.

Line 170 sets the printer for compressed print. Line 180 sets the printing to 8 lines per inch (rather than the standard 6 lines per inch), and L8\$ is defined in Line 130.

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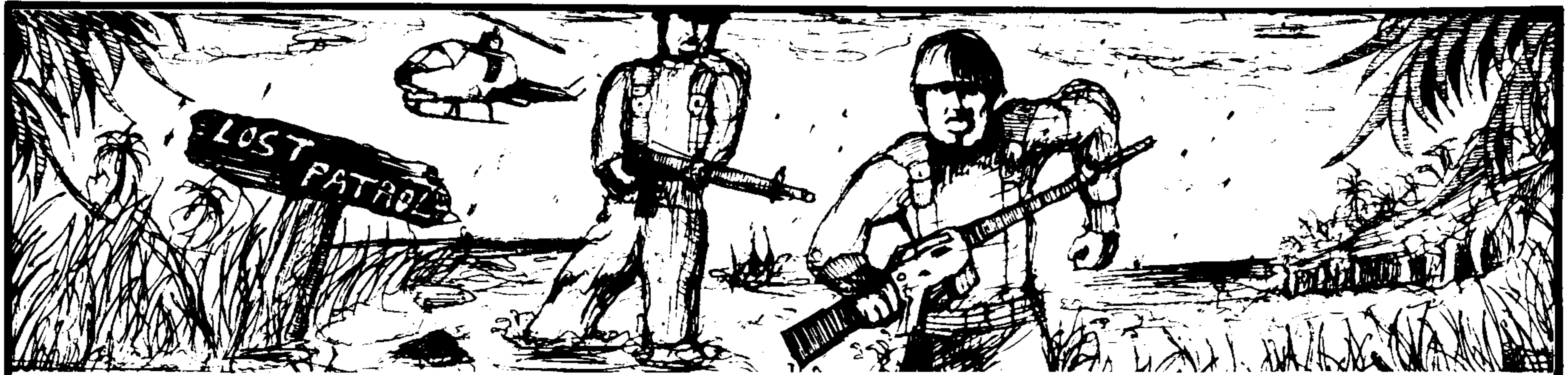
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TOTAL ENCLOSED: _____

Lines 190-360 print the design using various standard symbols. The printing will be closer together for a denser design than the previous program generated.

Line 370 sets the printer to expanded print, or 5 characters per inch. Line 380 prints a message in the expanded print. Line 390 sets the printer back to standard print, which is 10 characters per inch. Line 400 prints the date in standard print.

Line 410 is the command for a form feed, or moving to a new page. Line 420 CLOSEs the RS-232, and Line 430 ends the program.

Enthusiast '99

is published for you!

To make this magazine the most helpful to our members, your articles and suggestions are invaluable. If you wish to submit an article or program we would be happy to review them for possible use. See page 38 for more information.

```

100 REM LETTERHEAD
110 OPEN #1:"RS232.BA=600",VARIABLE 132
120 ESC$=CHR$(27)
130 L8$=ESC$&"P"&"H"&ESC$&"\"
140 C$=ESC$&"P"&"D"&ESC$&"\"
150 S$=ESC$&"P"&"C"&ESC$&"\"
160 E$=ESC$&"P"&"I"&ESC$&"\"
170 PRINT #1:C$
180 PRINT #1:L8$
190 PRINT #1:TAB(62);"!"
200 PRINT #1:TAB(61);"!!"
210 PRINT #1
220 FOR C=1 TO 5
230 PRINT #1:TAB(60);"IIII"
240 NEXT C
250 PRINT #1:TAB(60);"IIII";TAB(79);"      "
260 PRINT #1:TAB(60);"IIII";TAB(78);"#####"
270 PRINT #1:TAB(39);"#####";TAB(60);"IIII";TAB(75);"#####"
280 PRINT #1:TAB(30);"#####"      "      IIII
290 PRINT #1:TAB(37);"#####"      IIII  #####
300 PRINT #1:TAB(39);"#####IIII  ";TAB(80)
310 PRINT #1:TAB(40);"      "      IIII      "
320 PRINT #1:TAB(36);"      "      #####III  #####
330 PRINT #1:TAB(34);"#####"      III#####
340 PRINT #1:TAB(30);"#####"      #####
350 PRINT #1:TAB(27);"#####"      #####"
360 PRINT #1:TAB(30);"#####"
370 PRINT #1:;E$
380 PRINT #1:"      SEASON'S GREETINGS FROM REGENA"
390 PRINT #1:;S$
400 PRINT #1:TAB(33);"DECEMBER 1983"
410 PRINT #1:CHR$(12)
420 CLOSE #1
430 END

```

FAST FULL-SCREEN DATA PROCESSING WITHOUT DISK OR EXPANSION WITH THE MINI EDITOR!

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America's information utility offers personal computer owners access to hundreds of informative consumer databases on a wide range of subjects, including electronic mail, bulletin board classifieds, news and information services, business services, consumer services and entertainment. 99/4 owners will also enjoy Texnet which is designed especially for them and includes the IUG Software Exchange Library. For more information, contact either the IUG or Source Telecomputing, McLean, VA 703-734-7500.

PROBE

Soon to be available from Scott, Foresman and Company, Probe is a series of workbooks and cassettes/diskettes offering Beginning BASIC programming activities. Probe combines workbook activities with hands on experience in a motivating and interesting format. Each Probe package contains a student workbook, instructor's workbook, wall charts and pad of screen grids. It is to be presented in four grade/age levels: primary, intermediate, junior high and senior high/adult. For more information on Probe, contact Scott, Foresman and Company, 1900 East Lake Avenue, Glenview, IL 60025.

MOONBEAM SOFTWARE

For those of you who want action packed games without the expense of additional peripheral equipment, Moonbeam Software offers several exciting Extended BASIC packages, both on cassette and diskette. Creativity of Mr. Moon and his staff's programming efforts are reflected in his two current hits, Zero Zone and Robot Runner. Our favorite Moonbeam package is Cavern Quest. For additional information contact Moonbeam Software at 2 Bridge Street, Northampton, MA 01060, or call (413)-586-6290.

THE WIDGIT

A versatile piece of hardware from Navarone Industries allows the owner of the 99/4A quick access to up to three separate modules, utilizing its patented cartridge expander slots. IUG tested and proven, use of the Navarone WIDGIT prolongs the life of your console's cartridge slot. For more information on Navarone's Cartridge Expander Board, contact Navarone Industries, 510 Lawrence Expressway, #800, Sunnyvale, CA 94086, or the IUG.

DONKEY KONG

Soon to be released from ATARISOFT in solid state cartridge, Donkey Kong offers its owners plenty of excitement. A great conversion job from the original arcade game, Donkey Kong requires Mario to rescue the sweet maiden from the clutches of the world's second best known gorilla. For further information on Donkey Kong and other soon-to-be-released cartridges, contact Atari, Inc., at P.O. Box 2943, So. San Francisco, CA 94080.

IUG 4000 SYSTEM

With Texas Instruments' price decrease on many items in their peripheral line, the IUG 4000 System allows our members to bring their 99/4As to their full potential. The system includes the PHP 1200 Peripheral Expansion Box, PHP 1240 Disk Controller Card, PHP 1250 Single Sided Disk Drive, PHP 1260 32K Expansion Card and your choice of a LOGO II, TI-Writer or Multiplan software packages priced at \$419 for Regular and President's Club members.

MODEL 855 PRINTER

Texas Instruments' newest printer offers both letter quality and data quality printing style and eliminates the need to purchase a dot matrix and separate letter quality printer. (See article, this issue) For information contact Texas Instruments at 1-800-527-3500.

TI PROFESSIONAL

Whether you're currently considering your first computer or wanting to upgrade from your 99/4A, the TI Professional Computer makes an ideal Christmas giving idea. With 64K RAM expandable to 256K bytes, the TI Professional is able to handle almost any task with relative ease. New software packages for the TI Professional include such popular items as Lotus 1-2-3, Dbase-II and Easy Writer. For more information on your nearest TI Professional dealer, call toll free 1-800-527-3500.

CUBIT

This new Assembly language game package written by Jack Carrel and Bill Gronos offers its owners arcade-style action and is fun for the entire family. Available on cassette for the Mini Memory and on disk for those who have either an Extended BASIC or Editor/Assembler and 32K Memory Expansion, CUBIT is bound to be one of the top software titles for 1984. For more information on CUBIT contact either the IUG or Artios Software 3211 NW 26th St., Oklahoma City, OK 73107.

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SLYMOIDS

This new action packed command module from Texas Instruments, which will be available during the fourth quarter of 1983 makes an excellent gift-giving idea. Charged with destroying the Slymoids, you will enjoy screen after screen of action packed excitement. Suggested retail price for Slymoids is \$39.95. For additional information contact either the IUG or call TI at 1-800-TICARES.

ST. NICK

Featured on this issue's front cover is a wonderful new module from Funware called St. Nick. It features the jolly old man himself in a maze filled with toys strewn by renegade elves. Santa must collect all his toys prior to his midnight flight; however, impetuous Halloween witches try to impede his progress. For additional information on all Funware modules write Funware at 405 N. Bowser, Bldg. A., Richardson, TX 75081, or contact the IUG.

LOTUS 1-2-3

America's hottest selling new software package is now available for the TI Professional Computer. This integrated package offers its owner much more than just a run-of-the-mill spreadsheet program. For additional information on LOTUS 1-2-3 for the TI Professional contact TI at 1-800-527-3500.

SMART PROGRAMMING GUIDE FOR SPRITES

An easy to understand book from Millers Graphics, this text gives you a professional programmer's secrets and programming ability dealing with sprites.

Its clarity and additional inclusion of blank note pages make Millers Graphics' Smart Programming Guide for Sprites a must for the serious programmer. For more information about the Guide, write Millers Graphics, 1475 W. Cypress Ave., San Dimas, CA 91773, or call (714)-599-1431.

MBX EXPANSION SYSTEM

This three-unit Expansion System from Milton Bradley includes a headset microphone to transmit your spoken commands to the computer, a triple-axis analog joystick with comfortable pistol grip and 360-degree object rotation for total maneuverability, and a console with a 64-position action-input keypad for quick and flexible response to screen movement. Bring Voice Expansion capabilities into your home this Christmas with the MBX Expansion System. For more information, contact the IUG.

PROSTICK II

The ultimate joystick which was described in our September issue of *Enthusiast '99* makes an ideal Christmas gift for the game players in your family. With many new releases from Texas Instruments and third party suppliers, Prostick II will allow you to achieve better scores and higher levels of difficulty. For more information, contact Newport Controls, Route 2, Box 8 Dixon Lane, Bishop, CA 93514, or contact the IUG.

COMPANION

A lightning-fast, writer-oriented word processor from Intelpro, Companion is written in Assembly language and is recommended highly here at the IUG. Lengthy documents are finished in a flash when using Companion, and its accompanying 80-page manual is easy to understand. For more information concerning Companion, contact Intelpro at 5825 Baillargeon St., Brossard, Quebec, Canada J4Z 1T1 or call the Users-Group.

D-STATION

Our latest entry into the IUG Master Series, D-Station, is an exciting Assembly Language game available on cassette for the Mini-Memory module and on disk for members who have Extended BASIC-Editor/Assembler and 32K RAM card. D-Station is also available on Reprogrammable Cartridge form which requires no additional hardware or software devices. This exciting shoot-em-up game makes an ideal Christmas gift.

LOGO II

Just released from TI, LOGO II offers several enhancements which make it much more attractive to the serious LOGO user. Its sound and music features, along with enlarged sprites, make this programming language delightful for both young and old. The new instruction manual which accompanies LOGO II is more comprehensive and easy to follow and when used in conjunction with Scott, Foresman and Company's LOGO Flip Chart, anyone can learn to be a LOGO expert. For more information on LOGO II, contact Texas Instruments, Inc., at 1-800-TICARES.

MINI-MEMORY MODULE

Who says you need expensive additional peripheral equipment to run Assembly language programs? Many of the new arcade style games and other Assembly language products are being designed for use with TI's Mini Memory module. Probably Texas Instruments' most powerful Solid State Command Module cartridge, the Mini-Memory is a must for serious programmers. For more information, contact Texas Instruments at 1-800-TICARES.

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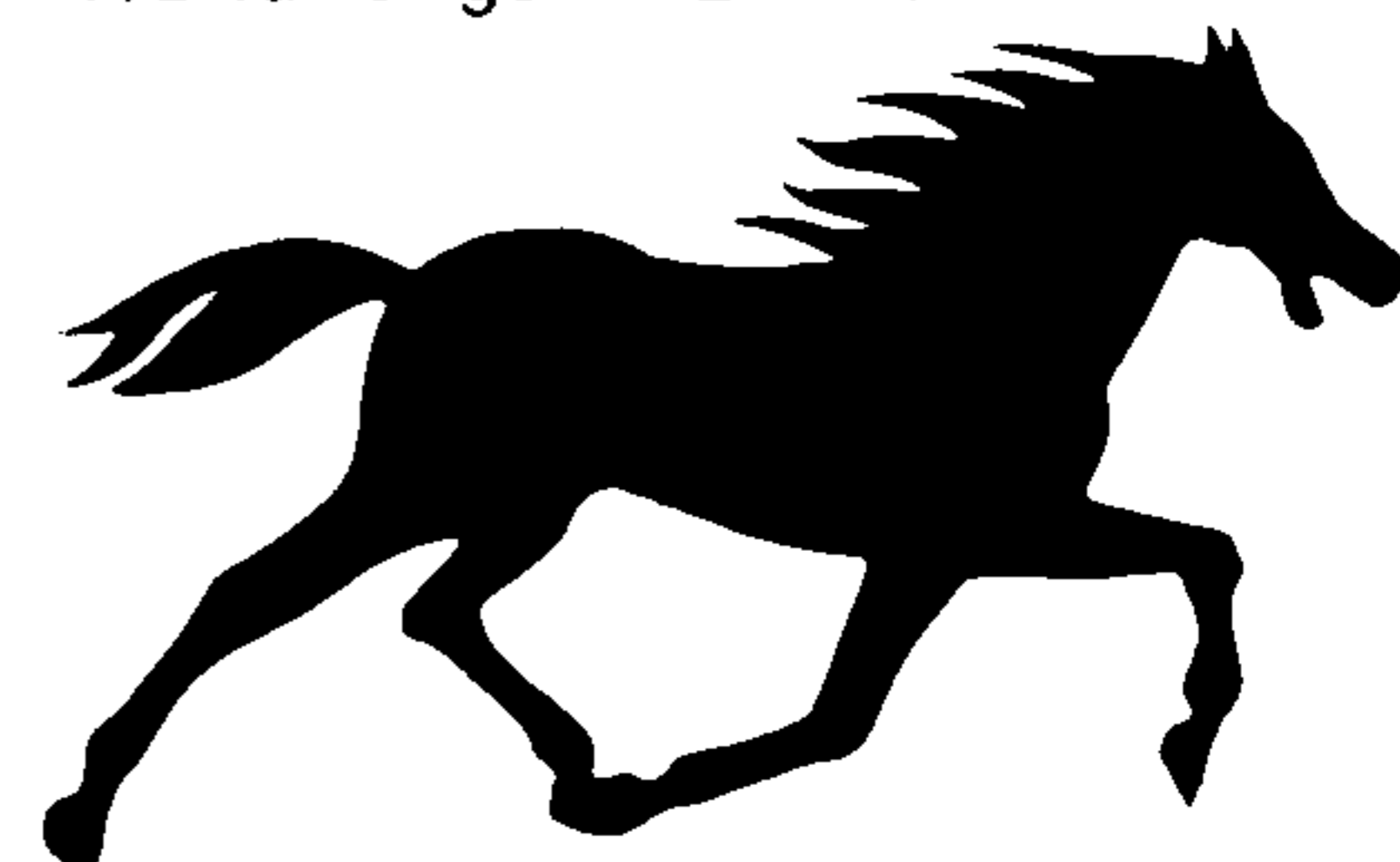
Write for complete list of available software

AN IUG MEMBERSHIP

One of the best Christmas giving ideas would be a new or renewed membership in the International 99/4 Users-Group. As membership benefits continue to increase, it's a gift that will last the entire year. No batteries required.

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SOFTWARE

LOST PATROL: A SURVIVAL ADVENTURE

By Dana Nichols
Managing Editor



You're surrounded by the enemy and have only four others with you. Treacherous obstacles block your path to safety. Can you successfully dodge the acid rain? How is your jumping ability in the mine field? Are you afraid of fish — with teeth? Can you outrun gas clouds and the enemy simultaneously?

All of these obstacles must be overcome to see your army of five to safety. New from Data/Ware Development, Inc., *Lost Patrol* is a new adventure in video game survival.

Available on cassette or disk, *Lost Patrol* requires Extended BASIC, and movement is controlled by either keyboard or joystick. I personally found the keyboard easier to control, but with some practice, using the joystick may become easier to use.

If loading on cassette only a cassette recorder and cable is needed. When loading on diskette, a disk drive and 32K Memory Expansion is needed.

The object of *Lost Patrol* is simple:

get your army of five men through the four dangerous fields ALIVE. The fields are Acid Rain, the Mine Field, Pirahna-infested waters, and the Gas Field.

The game continues until all men meet an ugly and painful death, or any of your men successfully complete the four-field torture trek.

Accumulation of points takes place when any or all of your men reach the other side of each board, or field. An option available to you at the end of the fourth field is to trade in 1000 points for an extra man.

Five keys are needed to play *Lost Patrol*. They are: E = Up, S = Left, D = Right, X = Down, and ENTER = Jump. Speed and direction varies with each of the four boards and obstacles presented.

There are initially seven levels of play and successful patrollers will find themselves playing at even more advanced levels. The player may choose to play at the next higher level after completion of the fourth board.

Before beginning the mission, you and the troops can boost that fighting

spirit while listening to the Marine's Hymn. Then, the fight for survival begins.

While crossing the first field, deadly acid rain pours from the sky. One by one, each man tries his skill at maneuvering through the fatal drops. Each man can move slowly, speed up, slow down, or reverse his steps. After successfully moving through the raindrops, points are awarded and a tone is heard to notify the next man of his chance to join his successful partner.

Should this man come into contact with even a single fatal drop, he disintegrates into oblivion and no points are awarded. Play continues in this field until all five men have tried their luck in the Acid Rain field.

If no players survive the Acid Rain field, above your score the screen will read "Game Over." At this point, you should hit the ENTER key to bring up the Play Again menu.

If any or all of your men successfully cross the field, your score is displayed at the top of the screen. Press ENTER to take your points and your men to the next field.

How are your men at jumping? The mine field tests your sense of timing by strategically placing mines throughout the field. One by one your men must cross the field by jumping over the mines. Should one of your men touch a mine, it will explode, eliminating itself and your man. (Sacrificing one man for the good of the remaining men could become a strategic move in later fields.)

After completing this board, your cumulative score is again displayed at the top of the screen. Press ENTER to continue to the next board.

Your men suddenly find themselves at the edge of a pier overlooking pirahna-infested waters. Again, one by one your men must jump into the water, avoid the pirahna, swim to the other side and jump to the sand above. Oxygen tanks are provided so your men are able to remain underwater for any length of time. Your man will bounce off the black, rubbery bottom as well as the side of the screen. Should your man prove to be a poor swimmer, the hungry pirahna makes

IT'S HERE!

Companion 2.0

By far the fastest, most flexible, and most natural word processor for the 99/4A, COMPANION now offers a wide range of additional Assembly Language features:

- String search: find, search and replace (selective or global), and count.
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- Superb single sheet operation. Reverse paragraphing. Underlining. Tabs saved to diskette.
- User customization

A joy to use, COMPANION is still the only 99/4A word processor which provides a complete screen update between keystrokes (30 times per second), a 40 column screen with fully formed lower case letters, and continuous control of printer mode and text format. Requires 99/4A, Extended Basic, Memory Expansion, Disk Drive & Controller, RS232 or PIO.

Diskette \$79.95

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short work of him and lies in waiting for the next potential victim.

Upon pressing ENTER to bring up the final board, your men will encounter the Gas Field. A green gas cloud moves vertically and claims your man should he venture too near, and a white gas cloud will kill your enemy in this field; the green humanoid, or, as he is more affectionately known, the greenie.

The Lost Patrollers should beware, however, that colors correspond in this field: your man is the good guy and therefore the white cloud will not harm him. On the other hand, trying to guide the pursuing greenie into the green cloud will have no effect, and your man will continue to be the object of the chase.

The object of the Gas Field is to try to trick the greenies (of which there are an unlimited number) into running into the white gas cloud. Another trick to help your man outsmart the greenie is available, however. Gas Field provides an up/down wraparound screen that can be utilized to trick the greenie. When your man runs below the screen, the greenie is momentarily confused; he is alone, and your man is at the top of the screen. He must either utilize the wraparound screen or run to the top and try to apprehend his quarry.

Should you successfully trick the greenie into running through a white cloud, he will disappear and a tone will sound. But watch out! Another greenie is on your trail in a second. Once your man gets across, another tone is sounded to notify your remaining men it's time for another try.

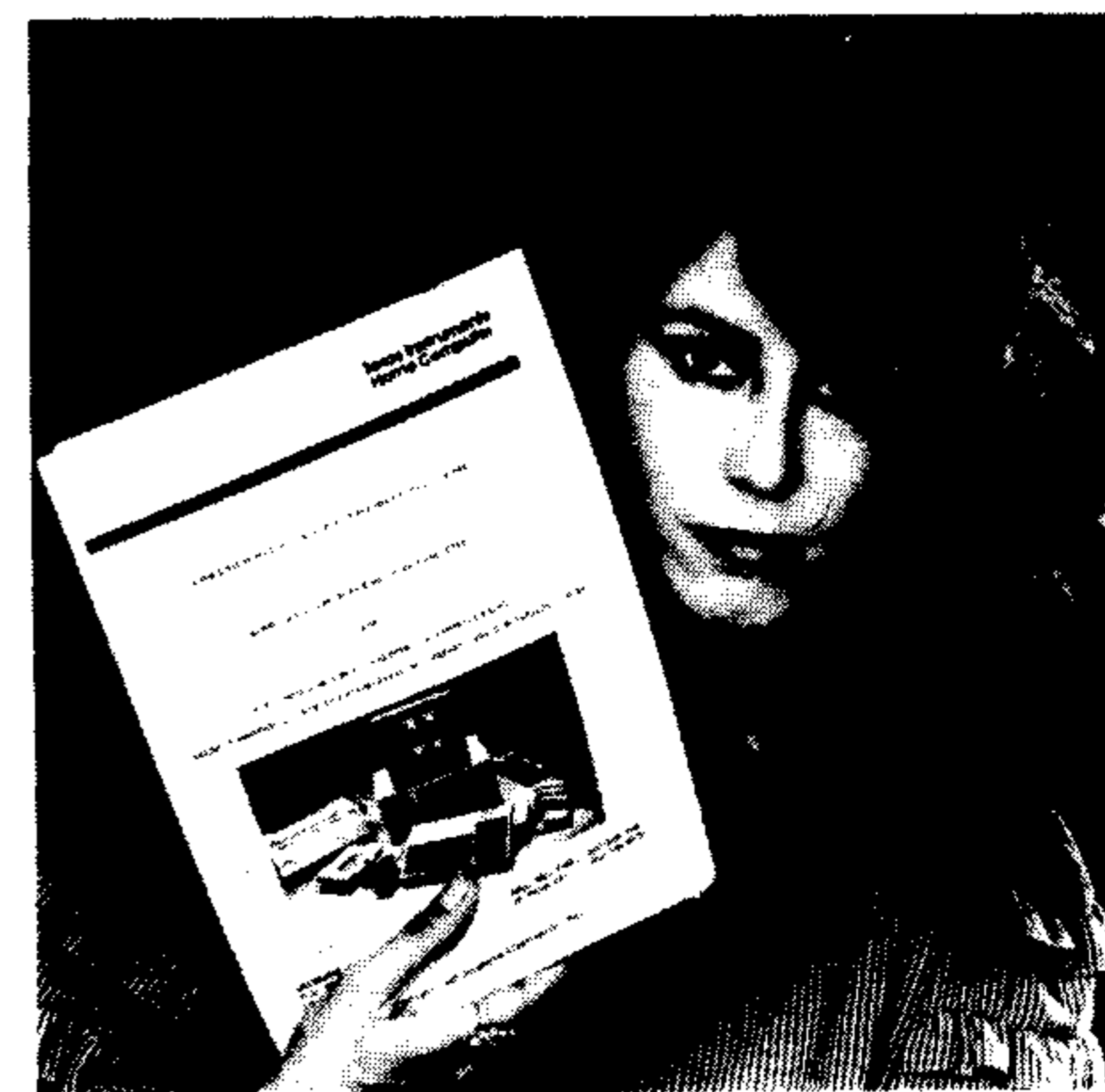
When all remaining men have tried their skill at crossing the Gas Field, that level of the game is over. At this point if you have lost all of your men, the game is over and you may play again. If one or more of your men successfully made the trek, a screen is displayed showing your "Survivors" and your accumulated score. You are then asked if you would like to play again. If you have more than 1000 points and less than five men, you may trade in 1000 points for an extra man. The game then continues at the next higher level of difficulty.

Included in the instruction booklet are some helpful strategies that may be used to aid your men during their journey. The color graphics are quite good, and the overall excitement of the game is appealing. Teens and adults will find Lost Patrol absorbing; a minimum of seven levels of difficulty will keep you busy for months. Available for \$13.95, cassette, or \$15.95, diskette, from Data/Ware Development, Inc., 4204 Sorrento Valley Blvd., San Diego, CA 92121, Lost Patrol is an adventure in survival you won't want to miss.

UNISOURCE

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1 Encyclopedia/Catalog— Hot off the press! All TI software. All TI peripherals. Hundreds of third party software packages and accessories. You can order virtually anything you need for your TI-99/4A using the *TI Home Computer Encyclopedia/Catalog* from Unisource Electronics. Only \$3, refundable with your first order. And, you'll automatically get future updates. Order it today . . . from Unisource.



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4 Availability—Unisource Electronics is located only 3 miles from the TI warehouse in Lubbock, Texas. That's important in today's environment of limited supply on hot new products.

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MASTER 99 SERIES EXPANDED

Listed below are several new additions to the International 99/4 Users-Group Master 99 Series of programs. Master 99 is a series of programs dedicated to specific individual purposes for the serious owner of the Texas Instruments 99/4(A0 Home Computer).

All programs have been thoroughly tested and documented for reliability and ease of use in their specific applications. All Master 99 Series programs are supplied on disk unless otherwise specified in an unprotected format to enable all users to customize their programs.

Our first two Master 99 Series programs, Database 500 and Database 300, released in July, have been heralded by our members as excellent in quality and content. Listed below are several new entries into the series which we hope our members will enjoy. All programs are \$14.95 unless otherwise stipulated.

For more specific details on any program, you may write or call IUG Library Services, 166 Carl Street, San Francisco, CA 94117, (415) 753-1194.

M9-120 Accounts Receivable System — a complete A-R system for dual-sided disk drives, it holds 100 separate accounts

and 2000 transactions per file. Fully featured for easy record keeping. Maintains current status of accounts and allows report printout or individual screen copy. Requires Extended BASIC, printer and disk drive.

M9-130 Accounts Receivable — like M9-120, but for single sided disk drives. Requires Extended BASIC, printer and disk drive.

M9-140 Statistics Package — a collection of seven programs for the statistics field. Provides printed reports of data. Requires Extended Memory, Extended BASIC, printer and disk drive.

M9-150 Book-Keep — a fully featured, integrated bookkeeping system for a small business. Requires Extended BASIC, printer and two disk drives.

M9-160 Point of Sale Data Recorder — for the small retail business. Keeps track of sales and inventory changes daily and updates records. Uses two tape recorders. Requires Extended BASIC, two cassette recorders and printer.

M9-170 La Boutique — a complete accounting system for the small business. Creates and maintains all necessary records and files to keep your business up

to date. Requires Extended Memory, Extended BASIC, printer and disk drive.

M9-180 Infocenter — a complete record-keeping package for owners of service businesses with clients. Devised mainly for the doctor, dentist, etc., it can also be used by accountants, lawyers, and others. Maintains records about clients, updates billing and payment records and schedules and keeps track of appointments. Requires Extended BASIC, Extended Memory and disk drive.

M9-190 Food Management — For use primarily with a small restaurant, this program maintains all records on food costs and budgeting. Records are maintained on a yearly basis so that costs are clearly tracked and evaluated. Requires Extended BASIC, printer and disk drive.

M9-200 Departmental Budgeting — can create a complete budget program for a department or be used for a small business. It prints reports by summary, final reports of files by vendor. You may review other departments also. Requires Extended BASIC, printer and disk drive.

M9-210 Tax Depreciation Package — establishes full files for tax depreciation records and maintains yearly updates

CHALLENGER

CHALLENGER SOFTWARE INTERNATIONAL

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Arcade Action by Mark Sumner and Ken Dibble

SPY'S

DEMISE



You were quietly sipping a double vodka martini (stirred, not shaken) with a twist of Persian Lime peel in the lobby of the Bangkok Hilton when you overheard two KGB employees discussing an encoded message which was giving fits to their superiors. The message was the key to a fortune in valuable computer data, but so far all the cryptologists in the

Ukraine couldn't put the puzzle together again. Slavic security being what it is, each component of the message was kept on a separate floor of the diplomatic mission in Pyongyang.

It didn't take long to figure that the person who could assemble the parts of the puzzle and then solve it would not have to work another day in his or her life. And you, of course, had been getting progressively more bored with the life of spy-for-hire. Perhaps retirement awaited ...

A little research proved fruitful. Each floor contains bits of the puzzle stored in dossiers, tapes, microfilms, and other tools of the trade. All you have to do is gather these and crack the code. What the research didn't turn up was the schedule of rounds made by the embassy guards, and the embassy is crawling with guards. But, you decide to go ahead with the mission. No one said making a fortune would be easy ...

Spy's Demise is a nine screen game in which your score is determined by how quickly you move from one level to the next. But, there is a second game to be played. Each time you move up one of the floors on each screen, part of a secret encoded message will be revealed. Only after all parts of the cryptogram are known can the code be broken. The secret message may not save the world, but it may win you some free software.

Spy's Demise will be available for the TI on both cassette and disk, in Extended BASIC and Assembly Language, and for just about any system configuration.

On Cassette: (\$17.95) Each cassette comes with two versions of the program. Side 1 is in Extended BASIC. Side 2 is in Assembly Language for use with the Mini Memory.

On Disk: (\$21.95) Each Spy's Demise disk comes with three versions of the Assembly Language program on it. If you have 32K Memory Expansion you can run the program with either the Extended BASIC, Mini Memory, or Editor/Assembly modules. The programs are designed to let your computer automatically adjust to the module you have inserted.

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with a printout of reports on status at any time. Tax tables are adjustable from year to year. Requires Extended Memory, Extended BASIC, printer and disk drive.

M9-220 Production Cost Allocation — for any sort of manufacturing business or any business involved with the production of a product. You may enter all costs contributing to the make-up of a product including labor and then project costs. Can be a valuable tool for any production business. Requires Extended Memory, Extended BASIC and disk drive.

M9-230 The Bowler's Recorder — a totally complete and integrated package

to process all the records for a ten-team mixed league. Program and set up to print on standard league report forms. Sorts can be done on all records based on four categories. Also prints the "recap" forms for the next session. Nine programs in all. Requires Extended BASIC, disk drive and printer.

M9-240 D-Station — an exciting new arcade style space "shoot-'em-up" which is enjoyable for all family members. Fast game action requires keen hand-eye coordination on the part of the player. D-Station offers two levels of difficulty and is written in 9900 Assembly code.

Available in three versions: M9-240 is on cassette and can be used with the Mini Memory command module only.

M9-241 D-Station — the same great game available on disk only and requires use of the Extended BASIC command module and 32K Expansion.

M9-242 D-Station — this disk version requires use of the Editor/Assembler and 32K Memory Expansion.

If you bought DB300 or DB 500, please contact IUG Library Services, 116 Carl St., San Francisco, CA. 94117

STAR MAZE A REVIEW

When it comes to Mathematics Action Games, Scott, Foresman and Company can be depended upon to provide your children with an effective learning tool in the form of a fun and exciting maze game. Star Maze is designed to help your child learn basic math division skills.

The game revolves around THID, a friendly, antennaed creature who has become lost in space. The object of the game is twofold: get as many points as possible while simultaneously helping THID find his way to MATHID, his home. Only one can play, and your child has two things working against him: the clock and the BADDID stars.

In order to enable THID to move, your child must correctly answer a division problem. Upon completion, he will earn points and be able to help THID along his way.

THID will move from star to star, with each star having a different point value. To move THID, the arrow keys, E, S, D or X will be used. THID will move in the direction the arrow points.

Your child will get two attempts at the correct answer. Should he miss both times, he may not move until he correctly answers another problem.

It is at this point the clock becomes a crucial factor. Precious seconds tick away while THID waits for your child to correctly answer the question. Should time run out, your child will be notified that he did not get THID home in the allotted time and the game is over.

The screen is set up as follows: a crossword type maze of stars appears with THID appearing amid the stars, and his home planet, MATHID, below. The game's time limit is shown, along with the total amount of points. When the problem is displayed, the child simply enters the correct answer.

As I mentioned before, there are BADDID stars hidden in the maze. However, there is also a GOODID star within the maze. Should THID land on this star, your child will win 20 points. In addition, the screen will turn white, and for 15 seconds your child will double his points when he lands on more stars.

When THID lands on a BADDID star, he will bounce to another star farther from MATHID. When your child successfully finishes the game, THID will be displayed on his home planet and the screen will show "You got THID back home!"

There are three levels of play in Star Maze; standard, advanced and master. In addition, your child can choose how long he will have to get THID to MATHID: two, three or four minutes.

I found Star Maze to be quite enjoyable and in the master stage, a little difficult. During the first level, standard, division problems can be solved with one digit, such as $63/9=7$. The advanced level poses more difficult problems and all require a remainder, such as $63/8=7, w/R=7$. The most difficult level, master, requires your child to solve a three-digit dividend; for example, $416/8=52$, and $520/6=86, w/R=4$.

Star Maze is fun to play and will entertain your child while helping him sharpen his division skills. The time factor not only serves to make the game more exciting, but also encourages your child to think carefully before entering his answer, because a wrong answer results in the loss of valuable time.

A leader in educational software for children and older students, Scott, Foresman and Company have made learning math easier and more enjoyable with Star Maze.

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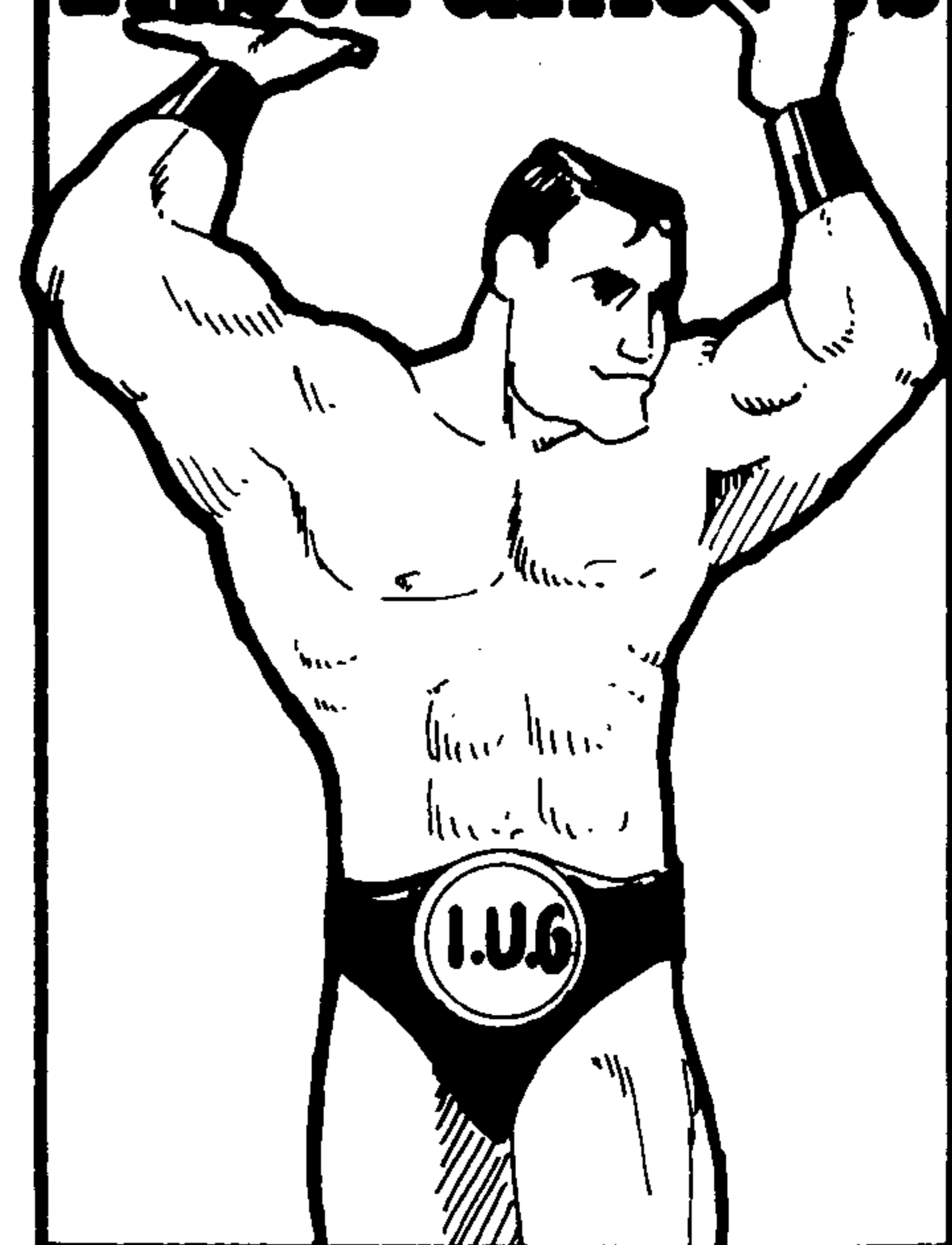
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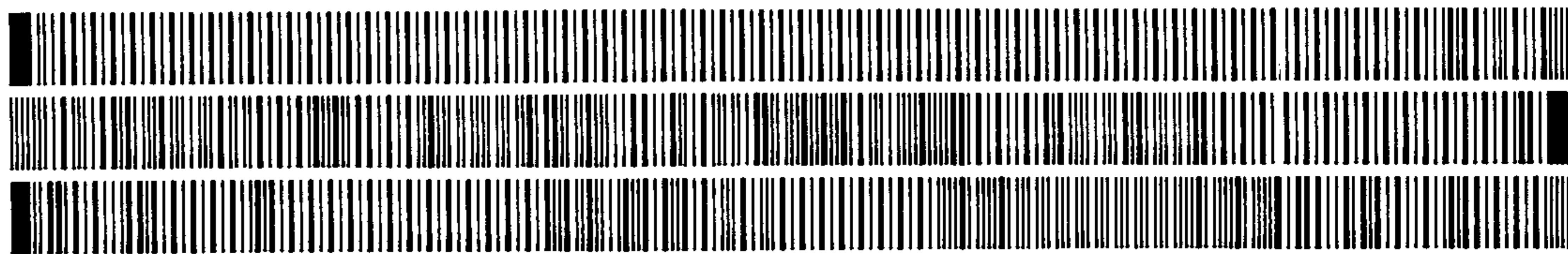
FUNWARE

Texas Instruments



OSCAR

By Dana Nichols
Managing Editor



Beginning in January, the number of software titles for your Texas Instruments 99/4(A) Home Computer will see a huge increase, while the cost of that software will take a precipitous plunge. The innovation making this possible is known as optical bar code scanning, most recently used in the form of Universal Product Codes of grocery store products. The product is OSCAR, new from Databar Corporation, Minneapolis, MN.

Software for OSCAR (Optical Scanning Reader) will be printed directly onto pages of a general interest magazine published by Databar, and officials are discussing plans for additional books and special interest magazines to include pages of bar code software.

Databar is in the process of putting the finishing touches on a wide range of hardware and software programs, set for January introduction.

Existing software will be offered in Databar's monthly magazine and in separate retail packages. An introductory

issue of the magazine is included at no charge upon purchase of OSCAR, and includes sample software programs from the eight family-interest topics ranging from games to money management.

Each magazine includes eight programs in addition to articles and other useful information, and is priced at \$10 (or, \$1.25 per program.)

These eight programs and up to 36 separate program titles (called stand-alone software) will be available in early 1984 at a suggested retail price of \$9.95 each. The stand-alone library will increase at a rate of about 12 titles per month.

WHAT IS OSCAR (AND BAR CODE SCANNING)?

OSCAR is a battery-operated device that plugs into the cassette jack of your 99/4A. Place the plastic template over a page containing up to 31 seven-inch long lines of bar codes. Grooves in the template guide the tip of OSCAR's "wand," a

palm-sized box attached via a cord to OSCAR. Simply slide the tip across one bar code line, left to right; move the tip down to the next groove, and slide the wand back across, right to left. The scanning system in the device "reads" narrow and wide black bars separated by white space and picks up the digitally-encoded information in the bars in machine-readable form.

What's the significance of bar code scanning for home computers? Databar President Leslie Arnold says, "Optical bar code scanning is a true breakthrough for two industries; magazine publishing and software publishing, and the home computer user is the ultimate winner. We're bringing the two together in a merger that boosts the strengths of both and overcomes their weaknesses. Like other magazines, Databar magazine will provide information and entertainment at a reasonable price. And like all software, bar code programs give you the instant personal data you need or want, which is something an article can't do."

Each program in bar code form will require two to three minutes' scanning time, and will be about four pages long. Arnold says work is underway to develop ways to include more information on each page, thereby increasing software sophistication.


WHAT IS DATABAR CORPORATION?

Databar was formed in spring, 1983, when several businessmen decided bar coding of software was an idea whose time had come. Minneapolis venture capitalist Ed Orenstein, the driving force behind several new high-tech companies, founded the company with the backing of a group of investors. Arnold was named President and CEO based on his experience as President of several companies, including AnSCO, Keystone, and others in the printing and computing fields.

Recently, Databar has acquired a manufacturing facility in the small town of Montevideo, MN for production of OSCAR, and Arnold has assembled a group of contributing editors, specialists in their fields, to produce the articles and software concepts. A staff of 40 programmers and support personnel are now developing the initial library of software and readying the magazine for publication. (continued on page 29)

WIZARD'S DOMINION

99/4 A Fantasy Adventure 99/4A



The Voritka Ogres are on the prowl. Only the Wizard's Apprentice, the Evil Wizard, the Hero and the Evil Prince have enough courage to defeat them and rule Wavoria. Inside the caverns of The Wizard's Dominion lay gold, adventure and magical powers.

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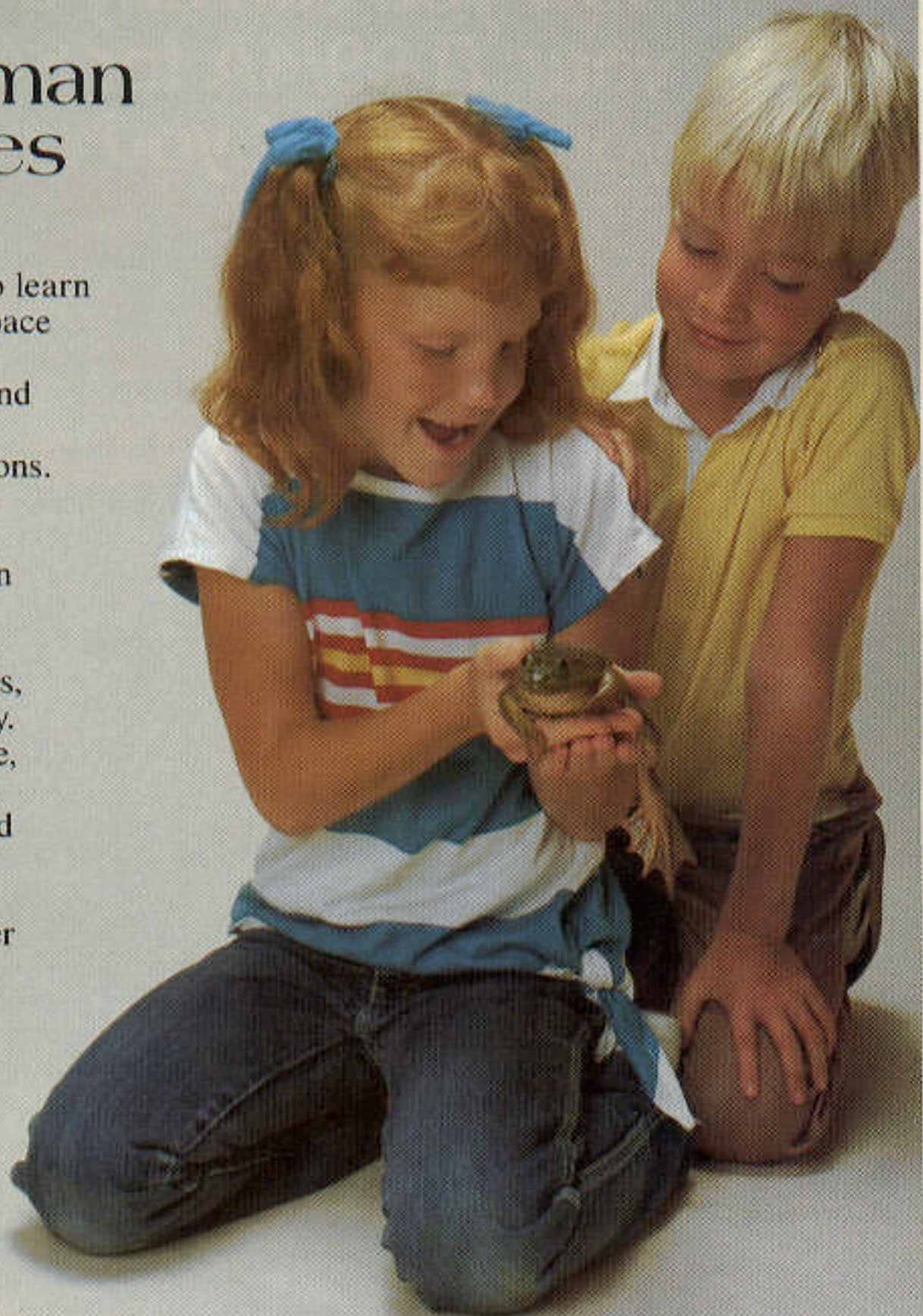
Math Action Games get youngsters deeply involved in the excitement of discovering and mastering fundamental mathematics. Children have fun and learn at the same time.

There's a **Math Action Game** for every age group. Exciting formats challenge participants, moving them through three levels of difficulty. Games can be competitive or non-competitive, so children play them again and again. Each game uses color, music, animation, and sound effects to trigger quick thinking and accurate response.

Math Action Games can give your youngster the incentives and the satisfaction he needs to master math. It's an ideal supplement to any school mathematics program. Games are available for most popular microcomputers.

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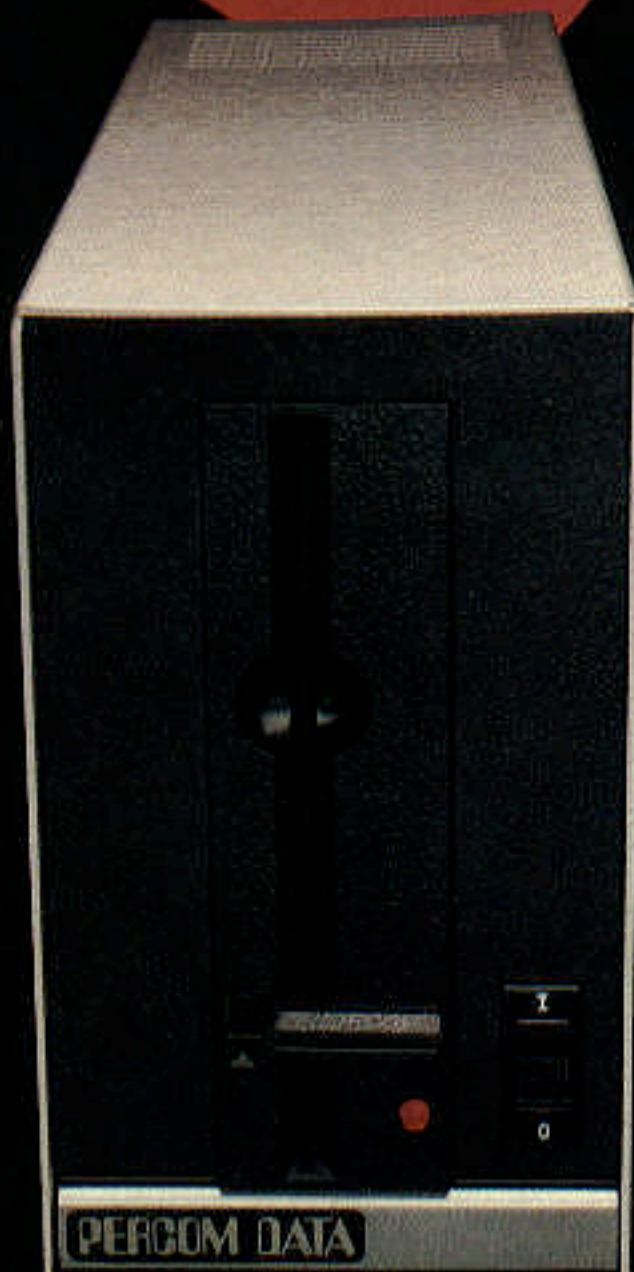


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Putting a disk drive on your TI-99/4A[®] can be an expensive proposition . . . unless you add a Percom Data TX-99[™] for a mere \$449. A similar TI-supplied disk configuration requires that you purchase a Peripheral Expansion Box, a Controller Card and, of course, the Drive itself. The tab on that little package is a hefty \$899!

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WIDE RANGE SOFTWARE PLANS

Software topics from Databar include: games, family health, legal matters, education, money management, math and science for hobbies and home improvement, writing and reading skills, and general interest. Learning BASIC programming is the major focus of the general interest titles to be included in the first magazine.

Each topic in Databar magazine is presented in a manner that incorporates the topic of its previous issue. The magazine is designed for both informational purposes and as a software module. Readers may remove programs from the magazine for easier scanning and store the programs in a three-ring binder mailed to subscribers. At the end of each year, subscribers will have a complete series of 12, eight-program sections, and additional useful reference material.

Arnold explains the series concept: "We want all family members of subscriber households to get some computing time every month; that's the best way to ease into getting the full potential out of the home computer. With only short sessions on interesting topics each month, readers will find they've covered

all bases to the topics at the end of the year, and they haven't had to put in hours at a stretch with voluminous manuals and incredibly detailed software. And going back to find just the section of a program you want to review is easy."

The 100-page, monthly magazine also will include feature articles on the topics of the software. For example, one issue will contain software enabling you to figure what you can afford for a new home mortgage, and the feature article will delve into the in's and out's of obtaining a first mortgage. News concerning the Databar Club, which every subscriber belongs to, and other useful feature articles will round out each issue. The Databar Club plans to run a contest wherein readers will submit their own programs; winners will receive a \$500 prize and see their programs published in Databar magazine. Club members may also contribute articles to the magazine.

SOFTWARE SERIES DETAILS

Following is a capsule description of each Databar software concept and its principal editor.

Classware™, the home education series, is authored by Kerry Mark Joels. He

and additional educators across the country are developing and testing programs across the country to help overcome the limited exposure school-age children currently receive concerning computers. Classware articles will help parents plan a comprehensive computer education program for their children, and the software will provide the student with valuable assistance in not only basic computer skills, but in all learning areas.

Joels is a well-known consultant, author and lecturer concerning the uses of home and personal computers. He has also written several books, including the national best-seller, The Space Shuttle Operator's Manual.

Funware™, the game series, is being created by game experts at Databar. Games currently available or in various stages of production include card-type games such as OSCAR's Match (similar to Concentration), board games such as Checkers, and adventure, mystery, pencil and action graphic games.

Funware games are non-violent, and some are cooperative, rather than competitive.

"The Funware series is obviously the one with the most universal appeal," Arnold said. "That's why we've designed (continued on page 32.)

Requires Extended BASIC, both keyboard and joystick versions included. Available on cassette or diskette.

For the Texas Instruments 99/4(A) Home Computer

The Organized Robot Terrorist Society Against Civilization (ORTSAC) is determined to conquer the world with its army of robots! Yet, your forces have discovered the heavily-guarded ORTSAC headquarters! Can you infiltrate your Android past the Irate 004 security forces? Will you be able to guide him through the labyrinth of dangers that lie ahead so that he may reach the inner chamber where he must confront and terminate the leaders of ORTSAC?

Seven screens of exciting, fast-paced adventure in the year 2600!

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Requires Extended BASIC, both keyboard and joystick versions included. Available on cassette or diskette.

For the Texas Instruments 99/4(A) Home Computer

The enemy is preparing to launch a nuclear warhead that will devastate and annihilate your civilization! They have sent in a squadron of bomber and fighter planes to strip Ground Zero of all defenses and leave it vulnerable to imminent disaster... Commanding two turret guns, you defend the skies against your enemy! Will they destroy your ammo-dump? Will they launch their warhead? Can you defend your civilization from total destruction? The ultimate in super-fast action, arcade-style games with explosive, dazzling graphics!

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ASM22

DEFENDER
FROM ATARISOFT

the games for all ages; so the whole family can jump right into bar code scanning and computing."

(NOTE: The Funware series should not be confused with the Richardson, TX, -based manufacturer of solid state modules.)

Homeware™, the money management series, is being written by James Polzin, president of a financial planning and investment management firm and editor for a monthly newsletter on personal finances.

"I've designed Homeware to get everyone painlessly involved in financial planning by cutting through all the complicated considerations to get to the specific ones an individual should look at," Polzin said. "OSCAR and Homeware software do the sorting out brilliantly."

The Homeware series begins by determining the reader's state of household finances, then moves into the numerous aspects of saving, spending, and investing money. Individual software programs and accompanying articles will cover IRA's, Social Security, personal investing, insurance, budgeting, taxes and other topics.

Scienceware™ is a series of programs designed to help readers use math and science for hobbies, home improvement projects, and other household tasks. Software and articles will allow the reader to calculate materials needed for all home remodeling projects and figure the paycheck periods for energy-saving tasks and purchases. Another topic in the Scienceware series deals with amateur photography.

The principal author of the Scienceware series is Arthur Winter, a faculty member of the UCLA Engineering Department and inventor in the consumer products and electronics fields.

Healthware™ covers all facets of family health and welfare from nutrition and exercise to family communications and cohesiveness. Dr. Patrick Carnes, author of the Healthware series, says: "Healthware is unique in medical publishing for a couple of reasons. First, users will have instant access to the reusable programs on nutrition, health planning, first aid, communications and other so they can go back to use these programs when needed. What are the current options to this approach? You can go back to books on each of these topics to try and hunt out the vital information or you can consult a professional.

"Second, Healthware programs that inform you of personal health facts also are easily accessible to other family members who may want to absorb the same data later on."

Carnes is director of the Family Renewal Center of the Fairview-Southdale

hospital in Minneapolis, which has a staff of 70 personnel who counsel over 600 families annually. In addition, Carnes has written 13 books.

Legalware is a comprehensive program series designed to help "demystify" the law and increase understanding for both students and adults. Joseph Daly, professor of law and chairman of the Center for Community Legal Education at Hamline University, has designed Legalware to put legal information on topics of employment, housing, consumer protection, taxes and other issues at readers' fingertips.

Daly has written several books and contributes a column to the American Bar Association publication on law-related education. He says, "The law frightens many people because they think it's too difficult to understand. But Legalware is designed to alleviate those fears. For instance, one issue will have an article on using small claims court and the software will lead you through preparing your case to take into small claims court."

Genware™, the general interest category of Databar magazine, will cover BASIC programming in the first year of publication. Courseware Applications, an Illinois-based computer skills training company, has designed the software. The focus will be on learning programming in brief, monthly sessions with as little key-boarding as possible required.

Terri Carnes, a family counselor and freelance writer, is the author of Wordware™. The articles and software in the Wordware series range from basic reading and writing skills to learning how to write an irresistible love letter. Titles of planned software include Resume Writing, Vocabulary Teaser, Weeding out the Passive Voice, and Learning Word Processing.

Ms. Carnes is also vice-president of Workshop Design Associates, Inc., a national consulting group on health and education issues.

STAND-ALONE SOFTWARE

The publication's software will be sold in separate packages in retail stores along with an extensive list of other titles. Some of these stand-alone titles, which will be released in January, are: OSCAR's Speller, Speed Reading, Sentence Structure, Word Etymology and Topic Sentences, Analysis of Net Worth, Inflation-Breaking Even, Investment and Money Market Opportunities, States and Capitols, Solar System, Runners Log and Eating Habits, Amulet, Four-in-a-Row, Code Master, Star Count, Balloon Darts, Alphabet House and Caterpillar Hop. Approximately 12 new stand-alone software titles will be introduced each month.

WHERE CAN YOU FIND OSCAR?


OSCAR will be available in most large department, discount, and consumer electronics stores. In addition, bookstores and computer and software stores have agreed to carry OSCAR and its stand-alone software packages. OSCAR will also be found in several national catalogs in early 1984 and in mail order promotions in the January issue of *Enthusiast '89*.

OSCAR'S MECHANICS

OSCAR operates using four "D" batteries, is activated when the wand is removed from the cradle and shuts off when the wand is returned. A "time out" feature shuts power off if the wand is not returned or is left unused for 60 seconds. Various audible sounds help the user scan bar code by signalling when: a) a line of code is read correctly, b) a line of code is read incorrectly, c) contents of the memory are transferred to the computer, d) the unit is failing its self-test, e) battery voltage is low, and f) the unit is about to "time-out."

The overall size of the unit is 4" x 3" and weighs 18 ounces. The Texas Instruments version of OSCAR contains the proper cord and adapter and includes a sample magazine issue with the bar code for the 99/4A.

Although OSCAR's availability is still a few months away, information is available by writing Databar Corporation, Customer Service Department, 10202 Crosstown Circle, Eden Prairie, MN. OSCAR will soon be available through the IUG.

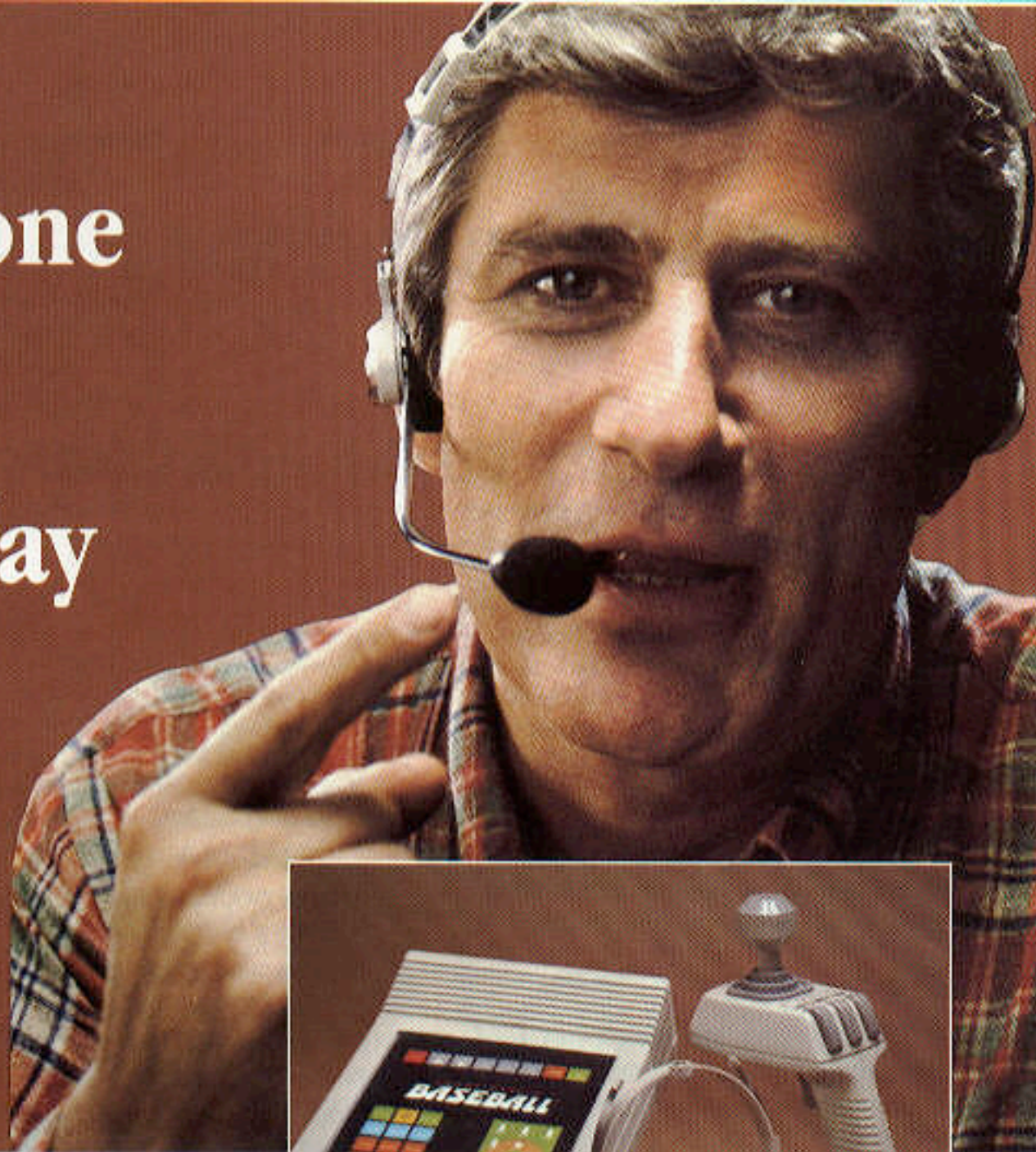

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THIS KEYPAD has 64 positions with overlays which enable you to interact with the video screen. The MBX Expander unit also gives you outstanding speech synthesis. The computer speaks to you in a realistic, well modulated voice. You talk to the computer, and the computer talks to you.



THIS JOYSTICK is a precision engineered pistol-grip, analog control that allows 360° rotation plus front-to-back and left-to-right proportional movements. The result is total maneuverability of screen graphics. It's amazing!
The MBX Joystick was designed in a unique pistol-grip configuration to ensure comfort and eliminate joystick fatigue. It also features auxiliary control buttons and a quick-action trigger button to enhance fast play capability.



Incredible new software, too!

Here are just three of the specially designed cartridges for the MBX System.



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As Morning Star reviews CP/M packages, we will continue to update our software selection. The programs we offer are the products which demonstrate outstanding values. They have met our criteria of being extremely user friendly, comprehensive in content, plus make the best use of the CP/M card's capabilities. They also represent the tasks most needed to be covered by a business computer.

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MORNING STAR SOFTWARE

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Peripheral Requirements: Peripheral Expansion System, disk, disk controller 32K RAM card.

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LOTUS 1-2-3 INTEGRATED BUSINESS SOFTWARE FOR THE "PROFESSIONAL"

By Terry Heim
Staff Technical Editor



In the July issue of ENTHUSIAST '99, many of you read with great interest the comparison of the Texas Instruments Professional Computer to the IBM Personal Computer. In that article, IUG President Charles La Fara did his best to show you the superior capabilities and design of the TI-PC as well as the extras that really make the TI-PC stand out. In this article, we will attempt to show you some of these same things in a slightly different environment.

As most of you know, a computer without software is as useless as a car without gas, and one of the most important software packages ever to be introduced for the personal or professional computer is the Electronic Spreadsheet. These spreadsheets have proven to be invaluable for every kind of business use from general ledger to five year projections. This kind of software has even been made

available to smaller computers such as the 99/4A through the development of Microsoft Multiplan. Some of the most popular spreadsheets on the market include VisiCalc, Multiplan and Lotus 1-2-3.

Of these three, only one integrates spreadsheet processing, data base management and graphing capabilities all into one package. Lotus 1-2-3 was designed to be a complete business package that is easy enough for a first time computer user to pick up, yet complex enough for the experienced professional or computer programmer to use and grow with as his needs increase.

The minimum hardware required to run Lotus on the TI-PC is 192K of memory and either two 320K disk drives or one 320K drive and a hard disk. Version 1.25 of MS-DOS is also required. Extras that would come in handy might include a color monitor, more memory and a compatible printer.

The Lotus system consists of three program diskettes, a rather large and very complete reference manual and a tutorial diskette. The tutorial, although by no means comprehensive, provides a terrific introduction to the concepts and precepts used throughout the Lotus package. The tutorial gives an excellent overview of each part of the system and then takes the user through some guided 'hands on' experience. After getting through the tutorial and by making good use of the built-in help features, it is possible to become fairly proficient at Lotus without spending too much time in the manual.

The help features can be invoked by pressing a single key anytime in the program. There are help screens for every command which consist of a brief description, a list of related topics and the associated pages in the manual.

The manual is intended as a reference tool and therefore is not written in a tutorial format; however information is

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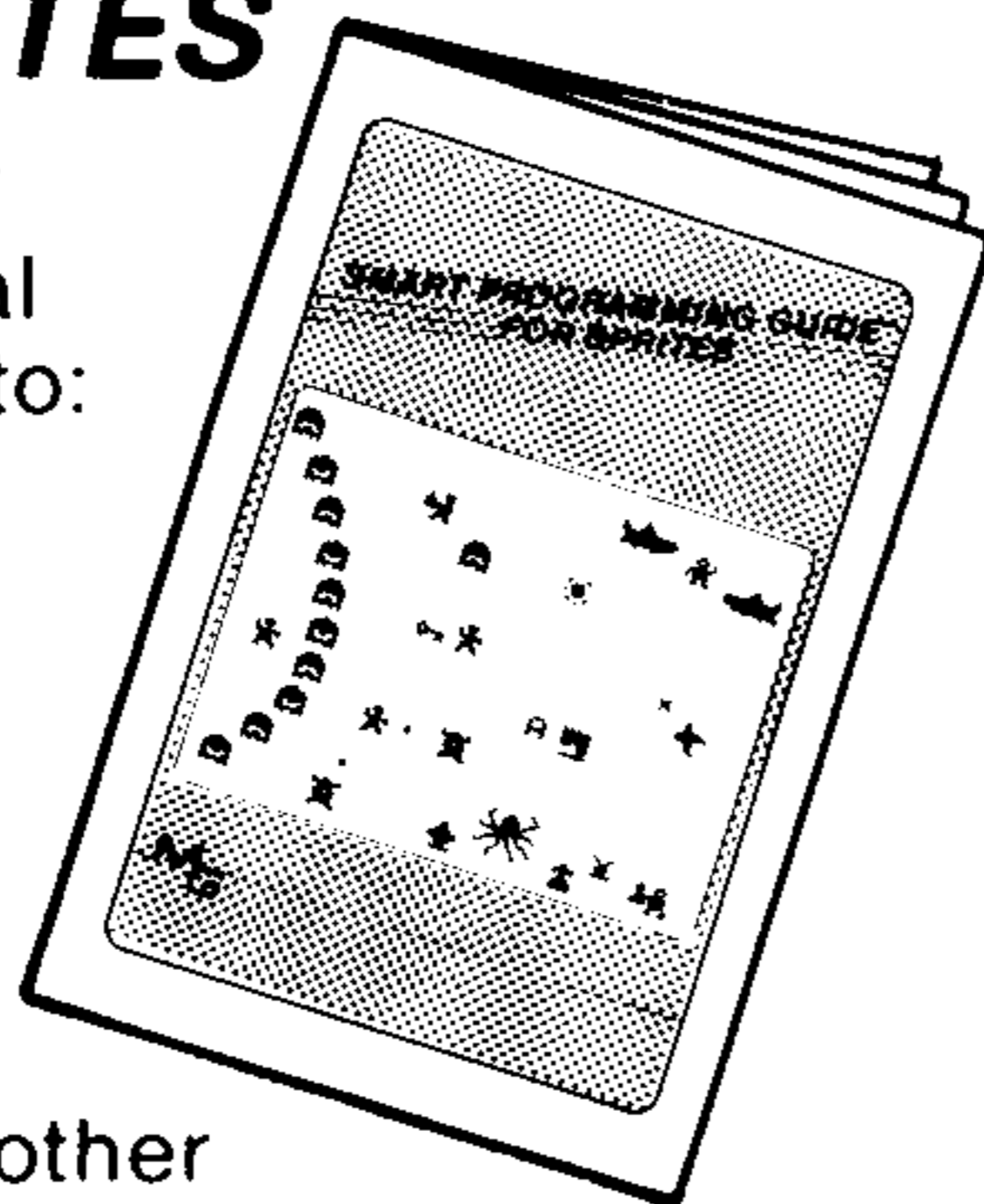
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E-2

presented in a clear and precise manner and the manual provides command descriptions, useful appendices, functional and alphabetical indexes and a quick reference booklet. The Lotus manual is on the same level as the Multiplan manual that we are familiar with for the 99/4, and Microsoft is famous for some of the best manuals in the computer industry.

THE SPREADSHEET

At the heart of Lotus 1-2-3 is the worksheet. This is probably the most familiar part of the package. The worksheet consists of up to 256 columns and 2048 rows (compared to 63 columns and 255 rows on the version of Multiplan available for the 99/4A). The "cells" where the rows and columns intersect can be used to store numeric values and formulas, character strings (labels) or macros (series of keystrokes to be performed at the touch of a letter).

Lotus handles all of the standard spreadsheet functions and formulas with great ease and incredible speed. Rows are addressed by number and columns are addressed by letter (i.e. A1 is the upper left hand corner of the worksheet). Like Multiplan, the command mode is com-

pletely menu driven and the on-line help feature is always waiting to be used.

One of the characteristics of 1-2-3 that really shines is its speed. Lotus recalculates the entire worksheet each time a cell is changed or a command is executed. On some spreadsheets (especially on Multiplan on the 99/4A) this would be a very noticeable nuisance, but Lotus doesn't even slow down. The reason for 1-2-3's speed is simple: It is written in Assembly language.

There is also a wide range of "/@ functions" (built in formulas that perform particular calculations) that can do anything from the normally time-consuming task of adding an entire column of numbers to the always agonizing chore of calculating the internal rate of return for a series of cash flows. There are more than 50 of these functions that can be used as values, in formulas or in macros.

For the advanced programmer, we have briefly mentioned macros that are really "mini-programs" inside Lotus. Using all of 1-2-3's capabilities, it is possible to write interactive macros with programming conventions such as IF-THEN, GOTO and GOSUB statements and accomplish such tasks as setting up menus or validating keyboard input.

Overall, the Lotus spreadsheet can handle anything that any other spreadsheet can do, but 1-2-3 is much faster and more powerful. Several comments have already been made with reference to the version of Microsoft Multiplan currently in use by thousands of 99/4A owners. Please note that these comments have been made only for clarity. More readers of this magazine are familiar with this version of Multiplan than any other spreadsheet type program. The truth of the matter is putting the 99/4A Multiplan in front of a job suitable for Lotus 1-2-3 on the TI Professional would be like harnessing a sled dog to a freight train.

THE DATA BASE

When Lotus is used as a data base management program, the rows are transformed into 'records' and the columns into 'fields'. For example, in a mail list data base, the first record might contain information about John Doe. The first four fields of this record might be his last name, first name, street address and zip code, respectively. Invoking 1-2-3's /Data command and setting up a data table such as this opens up a whole new world of record management.

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Those of you who are more familiar with spreadsheet programs may be wondering "So What?. After all Multiplan can do all of this — all we've done is redefine rows as records and columns as fields." So far you are right. However, Lotus offers a whole range of functions and commands that deal with records as a whole and fields as a part of a record.

One example of this is the /Data Sort. This command can be used to sort all records alphabetically or numerically, in ascending or descending order by any field in the record. In the mail list example, 1-2-3 can sort the list by name or zip code. It can even sort by zip code and then sort every record with the same zip code alphabetically.

A second example is the /Data Query command. The query command allows you to locate, copy or delete records based on simple or complex criteria. A simple application of this would be to tell Lotus to print a list of all of the people who have the zip code 91710. Again, the nice thing about the data base is that it keeps the records together.

1-2-3's GRAPHIC CAPABILITIES


So far we have looked at the "meat and potatoes" of Lotus 1-2-3, the spreadsheet and the data base; now for the gravy.

The graph generating ability of Lotus will allow the numeric information calculated through the data base to be displayed, printed and saved.

There are five types of graphs available: bar graphs, pie charts, line graphs, stacked bar graphs and XY graphs. The use of a color monitor provides six different colors to choose from while the black and white monitor displays shades of grey. The graphs can be printed on a full sheet of paper, on a half sheet, sideways on a full sheet, and various other combinations. With the exception of the XY graph, all are one-dimensional. The XY graph is two-dimensional.

CONCLUSIONS

Usually when a company announces an "integrated software package" that claims to do the same job as several existing programs, the first question that comes to mind is: "What are the trade-offs?". After all, you always get what you pay for and you never get something for nothing. But Lotus seems to break that record as 1-2-3 will compete with any spreadsheet, data base or business graphics program and still look good. The hardware requirements are pretty steep but at a suggested retail price of \$495, Lotus 1-2-3 should prove to be a great investment.



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ELECTRONIC SOFTWARE DISTRIBUTION

By Charles La Fara
President, IUG

Have you ever shopped for a software title for your computer only to find that it's unavailable at retail outlets in your area? Well, this is a problem that will become ever-increasing as more and more software packages become available.

Retail stores are becoming very reluctant to stock many titles unless they think it will be a smash hit — and who can blame them? Inventory costs of software products continue to increase as new titles become available and the retailer must control inventories in software as he does on all other products in his store. Knowing which products to keep and which products to order is a never ending battle the retail store buyer must face. Actually, most software titles have a very short life span; less than one year. And even smash hits for the 99/4A such as Parsec will eventually fade into obscurity. As hit products fade retailers are normally faced with drastically reducing their prices just to deplete current inventories. This sours most retailers and a solution to the problem must be found.

One solution to this problem could be the distribution of software titles electronically. Innovative manufacturers are currently studying various methods of electronic distribution of software both at retail stores and directly into the home. Recently I had the opportunity to visit with one of the premiere companies specializing in electronic software distribution, ROMOX.

Formed in 1982 by a management team of pioneers in the computer and semiconductor industries, ROMOX is a privately held corporation headquartered in Campbell, CA, with the manufacturing facility in the Philippines. ROMOX is currently marketing a product line of 19 recreational and educational software titles for various home computers.

ROMOX President Paul Terrell is a well-known entrepreneur and personal computer marketer. He was the founder and CEO of Byte, Incorporated, the parent company of the Byte Shop Computer Store chain. He was also founder and Chairman of Software Emporium Incorporated, franchiser of the Software Emporium chain of software stores.

ROMOX's entry into the field of electronic software distribution revolves around their introduction of the first pro-

grammable cartridge — the Edge Connector Programmable Cartridge (ECPC™) and the ROMOX programming terminal.

Here's how the ROMOX programming terminal works: the video-computer game retailers lease the terminal from ROMOX. New releases are distributed from a central "library computer" in Santa Clara, CA via a message forwarding network using high speed 1200 baud lines to the retailer's terminal. The terminal displays a menu of up to 500 game titles from various participating software manufacturers. The customer then has the ability to make his or her choice of the software package they desire and inserts a blank ROMOX cartridge (about \$15-\$25) or an old ECPC game cartridge that has been erased.

The terminal first checks to see if the cartridge is a valid ECPC cartridge. Then from a menu selection the consumer tells the programming terminal which program is to be down loaded to the cartridge. Then in less than one minute the electronic transfer from the store's terminal to the cartridge is complete and the customer walks off with a brand new software package. Cost per transaction will range from 99 cents to \$20. The customer pays the local retailer and the transaction is complete.

Everybody wins, says Terrell. "The retailer has no shelves cluttered with unsold merchandise and no inventory headaches, since he has no title inventory except for a stock of blank cartridges supplied by ROMOX. The consumer is never disappointed because the software package is out of stock. And the retailers' cash flow is greatly improved because the customer pays for software on delivery."

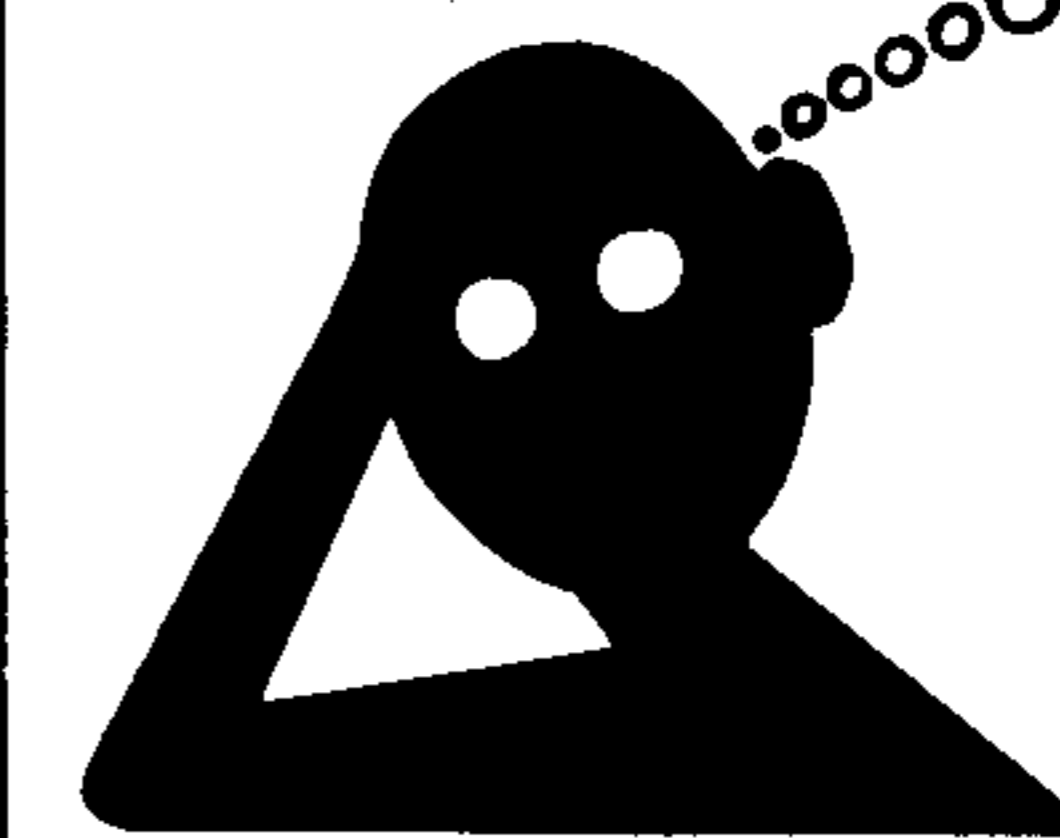
The ability to place software packages in solid state cartridge form using the ROMOX programming terminal also gives smaller software publishers the ability to distribute their software on a much larger scale than ever before. While visiting the ROMOX facility in Campbell, CA we were able to enter several Assembly language programs into their library computer and down load them immediately without error to ROMOX cartridges.

ROMOX is currently test marketing its new distribution concept in 23 locations in northern California. These locations include drug and department stores, convenience food outlets as well as the more traditional software retail outlets.

Electronic software distribution is still in its infancy and other new and innovative ideas for software distribution will be brought to the marketplace in the years to come. Down loading of software directly from a large database such as the International 99/4 Users-Group Software Exchange Library, located on Source/Texnet computers has already shown that Electronic Software Distribution is quite feasible. Other methods of Electronic Software Distribution which are currently in various stages of development include FM broadcasting of software using current radio frequencies and direct cable access feeds from local cable television distributors. Additionally, satellite transmission ASCII code is today a reality and may find its way into the home market within the next few years.

Electronic Software Distribution certainly seems to hold the answer for many of the current problems facing manufacturers, retailers and consumers.

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THE FEAR OF FILING — PART I!

By Guy S. Romano
Senior Staff Editor
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A new computer owner usually is most enthusiastic about running programs, mostly games, that require little but for plugging in a cartridge or loading the program from cassette or disk. After a while, however, the new computerist wants to go beyond this and tries to learn a bit about programming. Now is the time he or she passes through the mystical portals into that wonder world called the User's Manual. One is at first a bit overwhelmed by this new material presented in what one perceives as a new language. Instead of panic at this moment, it is important to put oneself in **STOP** or **IDLE** and take a look around at this world of wonderment. The TI manual seems incomprehensible and filled with gibberish.

The manual is, in fact, an extremely well-written document. It only seems difficult to understand because we, the readers, have forgotten something very important. When we enter the world of computers we must become again as the child and learn to stop **interpreting** what we read and start to take things quite literally again. Perhaps the ideal way to deal with the comprehension of the contents of the manual would be to have a 5-year-old read it and then explain it to us in his own words. Little children are very much like computers in that they both take everything **literally**. Like computers the little ones live in an absolute world of YES/NO, BLACK/WHITE, ON/OFF, 1/0. Tell a little one that he may not lie and he gets very confused when he hears Mommy tell Mrs. Jones that she looks simply gorgeous in the purple and orange dress trimmed with red sequins and yellow maribou. Even the child knows that she looks like a walking jelly bean factory. Little by little, the child begins to learn the adult world of maybe, perhaps, sometimes and gray. If you can imagine, this is the first time the child **learns** insecurity and that things are not absolute and simple.

Perhaps the most important underlying factor in the child's natural affinity for

"playing" with the computer is that IT "thinks" like HIM. It only understands YES/NO, ON/OFF, 1/0. That makes a child very secure because he knows the exact parameters and limits of its actions. Security comes from this interaction. In one word, it is called discipline.

We adults can apply that same discipline to ourselves and still retain the freedom of creativity. Too many "modern" people erroneously believe that "discipline" is bad, that it stifles creativity and robs one of personal freedom. I attribute that tripe to the "modern" child psychologists and "educators". Discipline tells us to walk a line. It does **NOT** tell us **how** to walk that line. And **THAT** is the difference between discipline and subjugation! A ballet dancer follows a rigid discipline of movement and yet, **how** that movement is performed is up to the individual dancer; freedom of decision is what sorts out the Dora Fluffanova's from the Gelsey Kirkland's of the world.

OK, the above preamble is just to set up for a clean approach to understanding a computer manual. Relearn that discipline of taking things **literally** and you will be on your way to better understanding.

After you have conquered the first part of the manual, sooner or later you come to the dreaded door marked "FILE PROCESSING". It is here that most shrink away in fear and confusion, never to return. It seems that this last section in the manual is the most intimidating of all. Mostly, I guess, because it is written in a very literal form with very specific meanings attributed to words we **seem** to recognize and take the meaning of for granted.

Another contributing element to the fear and confusion is the tremendous variety of file handling possibilities that TI has given us with the 99/4(A). It can be, and often is, totally overwhelming. The purpose of these articles will be to "unwhelm" you so you can feel comfortable with the multiplicity of file manipulation capabilities and techniques in your computer.

First we must agree on the exact meanings of words we are using in discussing computer files and their attributes. Once this obstacle is overcome things will be at least translucent. We probably should start with that word "file" since I've already mentioned it. It

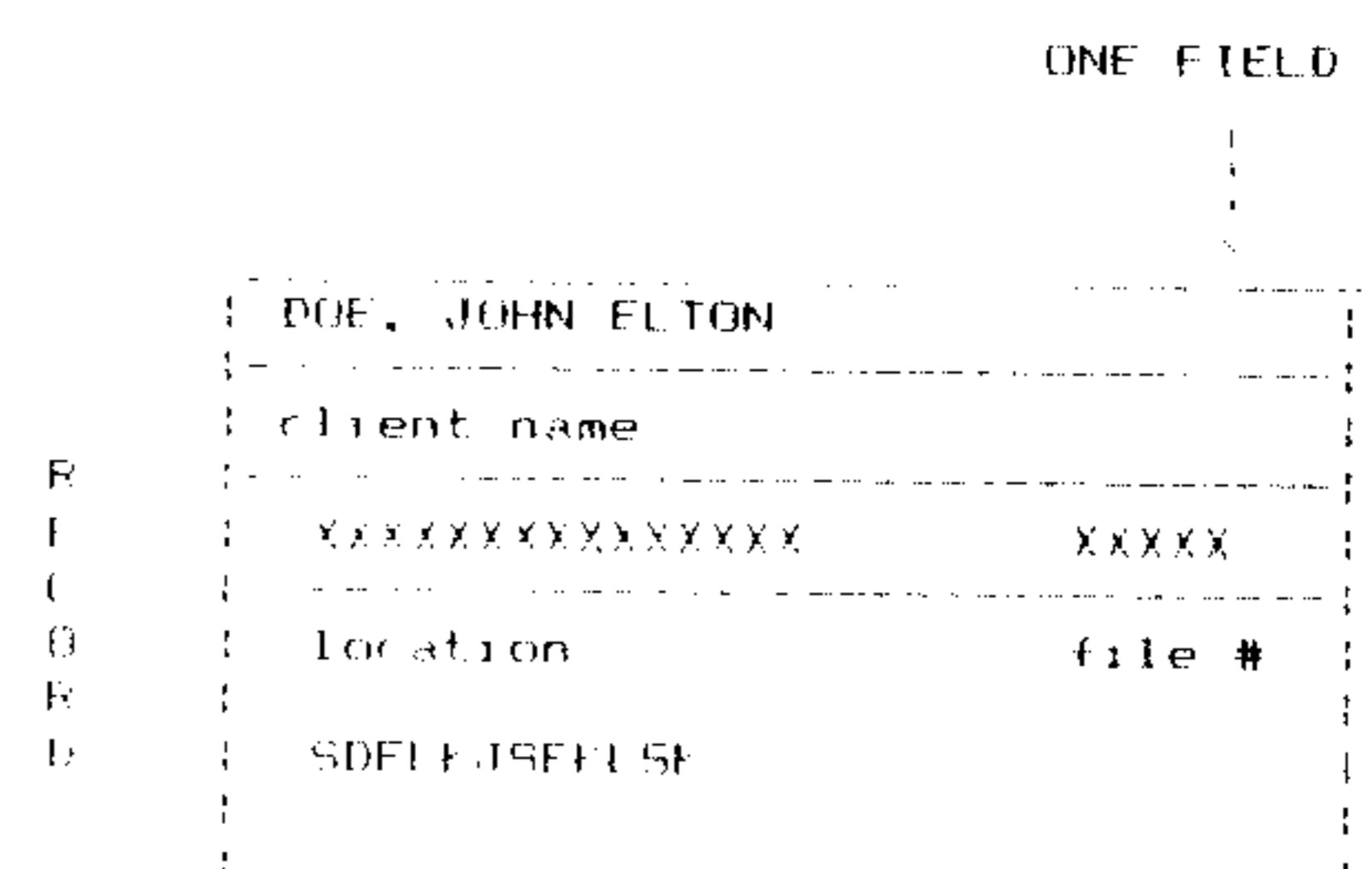
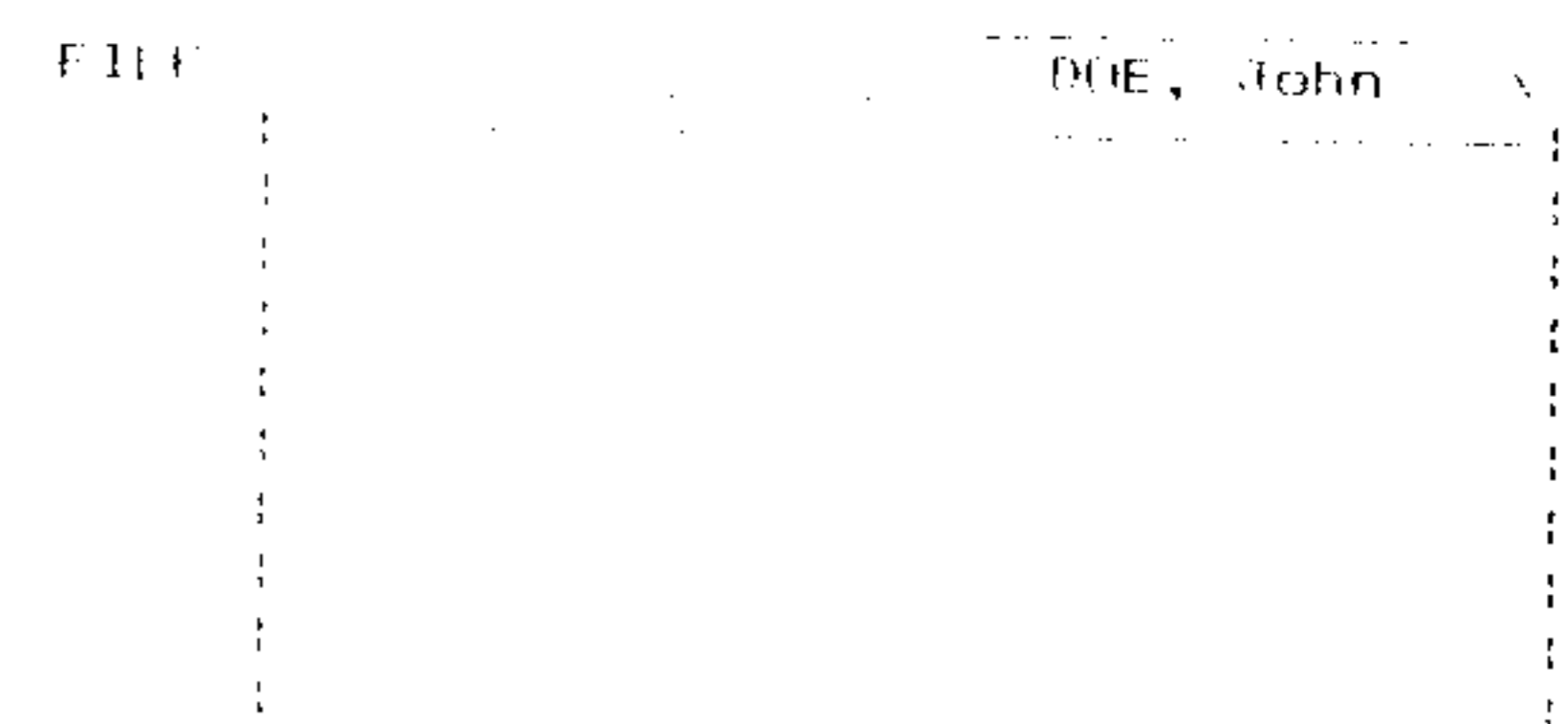
can be confusing because it is used with **two** specific meanings in computer jargon. In a program we can **OPEN** a "file" which does not seem to be a file at all, as in opening a file to a printer. That is because in this instance, "opening a file" simply means "opening a line of communication with" something outside the computer itself. We can open a line of communication with a file on a tape or disk so that the program statement:

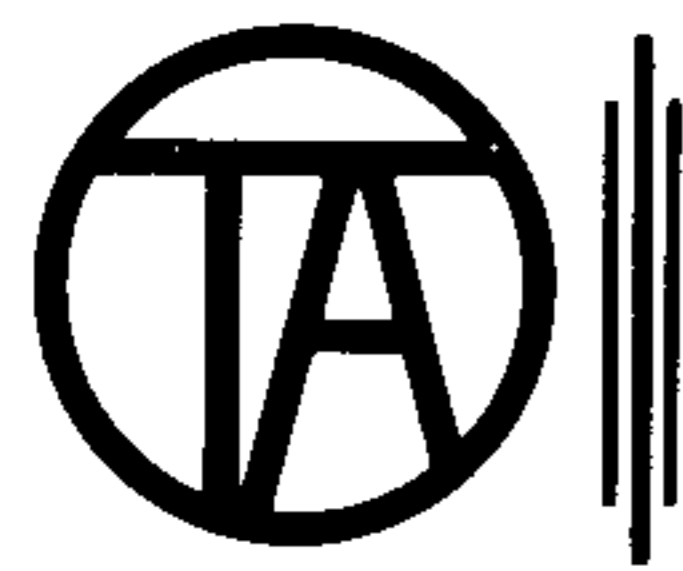
```
OPEN #1:"DSK1.DATA"
```

is understood by the computer as "I want to do something with the set of records with the name "DATA" on disk 1. Please establish a line of communication with it."

So the "file" is either a device connected to the computer or it is a collection of records of data stored somewhere. In "THE DATA GAME" I discussed the words file, record and field. I'll repeat with a bit of oversimplification.

COMPUTER TALK	PLAIN ENGLISH
File	Manila file folder
Record	A form in that folder
Field	A section of that form which contains a specific bit of information.





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So we can create a FILE of our friends containing a collection of records, one for each friend and in each record we will have one field each for name, address and birthday. In computer talk it looks like this (I'm using reference to a disk file here for clarity):

one RECORD each for:
RECORD #0: John Doe
RECORD #1: Mary Doe
RECORD #2: Suzie Smith
RECORD #3: Bill Smith
each record has 3 FIELDS:
1. JOHN DOE
2. 123 OAK ST. USA
3. 25 DEC 1921

In ridiculous oversimplification I could save this information on the disk (or cassette) rather simply with this:

```
10 OPEN #1:"DSK1.FRIE
NDS" (OR "CS1")
20 PRINT #1:"JOHN DO
E","123 OAK ST. U
SA","25 DEC 1921"
30 PRINT #1:"MARY DO
E","123 OAK ST. U
SA","1 APR 1930"
```

etc. etc.

There is an easier way. But this works! To have a truly usable file, however, we must describe the file AND its attributes to the computer (remember, it likes discipline and order).

This is perhaps where the mind boggles a bit in reading the manual because of the number of choices. To complicate this, "default" values are discussed. So, what is a **default** value? Simply put, what the computer was told to choose if not given an instruction to do otherwise. Let's discuss some of the choices and what they mean and do.

First we'll look at the **arrangement** of files we can have. Files can be either SEQUENTIAL or RELATIVE; for cassettes, ONLY sequential. Sequential is the default value here, so if you want a sequential type file, you don't have to type it in since that is what the computer is automatically set to choose. What's the difference?

SEQUENTIAL files have the individual records read one after the other starting at the beginning of the file. They cannot jump around in a random fashion.

RELATIVE files can have records created or looked for in a **random** fashion (RELATIVE really means RANDOM) so you can jump around and go directly to a specific record without going through the file by starting at the beginning each time. In comparison with a file drawer in a filing cabinet it looks like this. If in that drawer you have 20 manila file folders

with nothing written on the tab to describe them and you want to find Mary Doe, you start at the first folder in the drawer and look inside each one until you find Mary's records.

If you had had the *discipline* and order to write a reference on the file folder tab before you put everything away, you could jump in random fashion directly to the folder with "DOE, MARY" on it. Thus, you can see that relative files can be great time savers in looking things up with a computer file. This difference is referred to as the **organization** of a file.

With the TI system we can also specify a file **type**. The choices are DISPLAY or INTERNAL. Since the default is DISPLAY you never have to type that in. A display type stores the data just about like you see it on the screen. It stores every character by a code number. With an internal type the computer does its own magic and compresses the data saving space on the disk or tape.

Because it takes up less physical space it also takes less time to read or write the data from or to the disk. There are some certain specific applications where display type files **must** be used but generally, your choice of internal type will save space and time.

To make file handling more flexible and *safer* there are several **modes** of file opening you may specify in the "OPEN" statement. Choices are INPUT, OUTPUT, UPDATE, or APPEND, with update being the default choice here. Specifying UPDATE means that anyone using your program can **both** read what is in a file as well as write on a record in that file. Consequently, any unauthorized person, in a business, for example, could alter computer records at any time. Choosing INPUT means that a user can only **read** data in the file but cannot change it. OUTPUT, conversely, means that a user can only change or add records to a file but cannot see the contents. APPEND only allows the addition of **new records to the END** of a file. These different modes are not fixed. In other words, if when you first create a file you used output mode, at some time in a different program you could OPEN the file and specify "input" just to read records. That's why, although various modes can be used to protect your data in a program, you cannot protect it completely if another person can get into your **PROGRAM** and change the mode.

Last, for our discussion you may specify whether the record type is FIXED or VARIABLE. RELATIVE files may only be specified as being FIXED. The computer cannot jump around in random fashion looking for records if they are not all the same length. If you type in just the word "FIXED" the record can be a **maximum** of

80 characters long (the number is different for cassettes; see the manual!!).

You may give a definite length specification (up to 255) by using FIXED 100, for example. Just follow the word "fixed" with the number you want. If a record is shorter than the specified length the computer will automatically fill out the difference with blank spaces so that everything is the same length. The default choice in this category is variable so you need not type it in unless you want a length different from 80. Then, just like with the fixed records you add the number to the word "variable" (up to 254). Variable length records have the advantage of space saving because they store the data in its exact length without adding any blanks. But remember that variable length records can only be used in a sequential file. So there is a tradeoff between space saving and flexibility.

Let's take another look at our sample program up there and "gussy" it up a bit. First off, it's silly to write (PRINT) the data on the file the way I did. It's just too primitive. Let's redo it a bit so that we can make it more useful. If you type this in to play with it, please keep in mind that in Part II of this article we will expand on it and make it more flexible by using RELATIVE files.

```

10 CALL CLEAR
20 INPUT "IS THIS FILE FOR D/isk OR C/assette?":A$
30 IF (A$<>"D")*(A$<>"C") THEN 20
40 IF A$="D" THEN 90
50 A$="CS1"
60 A=192
70 GOTO 130
80 A$="DSK1."
90 INPUT "WHAT IS THE NAME OF THIS FILE? ":B$
100 B$=SEG$(B$,1,10)
110 A$=A$&B$
120 A=254
130 PRINT ::::
140 INPUT "HOW MANY RECORDS WILL YOU ENTER? ":B
150 PRINT ::::
160 OPEN #1:A$,VARIABLE A
170 FOR C=1 TO B
180 INPUT "Name? ":A$
190 INPUT "Street, City/Zip? ":B$
200 INPUT "Birthday or comment? ":C$

```

```

210 PRINT #1: A$,B$,C$
220 NEXT C
230 CLOSE #1
240 END

```

Look at line 210. You see the commas there. They are your way to tell the computer where the different **fields** begin and end. In this program we have records with only three fields each. Each of the fields is a **string** (has alphabetic and/or numbers in it) as opposed to a numeric variable (A\$ as opposed to A). More variables may be added of either type. Note that the records are specified to be VARIABLE and maximum length (192 for cassette and 254 for disk).

To be able to use this program for both reading AND writing data in your file, you may add the following lines:

```

162 INPUT "DO YOU WANT TO R/EAD OR W/RITE RECORDS? ":B$
163 IF (B$<>"R")*(B$<>"W") THEN 162
164 IF B$="R" THEN 250

```

and

```

250 FOR C=1 TO B
260 INPUT #1: A$,B$,C$
270 PRINT:"NAME: ";A$:"ADDRESS: ";B$:"BIRTHDAY: ";C$:::
280 FOR A=1 TO 500
290 NEXT A
300 NEXT C
310 CLOSE #1
320 END

```

I suggest that you attempt to play with this program and create some variations to "get your feet wet". In the next article we shall look at some of the more sophisticated file handling techniques. In the meantime, read this article while you have the File Processing section of the Users' Manual at hand. That way you can read it and use this as a guide in "translating" what may seem difficult to understand.

As always, please remember that I.U.G. Library Services is there to help you Monday through Saturday, 8 AM to 4 PM (Pacific Time).

PERIPHERAL MEMORY DEVICES

By Jack Carrel
Staff Technical Editor

There are many possible reasons why you finally purchased a home computer, and specifically, the Texas Instruments home computer. Perhaps you wanted to begin to enjoy the world of video game entertainment within the comfort of your own home. Maybe you wanted to use the newest technological aid in educating your children.

Possibly you got your computer for the express purpose of helping you to manage the household bookkeeping and records management. Or maybe you got your computer because you wanted to learn about computer programming.

For whatever the reason, after you have had your computer for awhile, inevitably, you will notice that some literature came with your computer; BEGINNER'S BASIC and the USER'S REFERENCE GUIDE. And as you begin to peruse these books, you will almost assuredly type in at least one of the example programs. Once you have played with the program for awhile, and have assured yourself that you have toyed with your program long enough, you will probably turn off the computer and go on to something else.

But when you return later to try your hand at more programming, you will notice what thousands of others like you have come to realize. The program has to be typed in in its entirety into the machine each time you want to work with it. That is, unless you noticed the information imbedded in the General Information section of the USER'S REFERENCE GUIDE which discusses accessories available for your computer. It is several peripheral devices that I would like to discuss with you.

You see, memory that is in your computer consists of only two types. First of all, there is random access memory, RAM, in your computer. This is the memory where your program is stored while you are working on it in your computer. The information in this memory can be changed easily. Information contained in this section of your computer can be added, deleted or changed. The other type of memory in your computer is read only memory, ROM. This memory cannot

be altered by your computer. But whereas the RAM memory cannot retain information after the computer is turned off, the ROM memory retains its information whether the computer is on or off. Computer memory that cannot retain data once power is removed from the device is referred to as volatile memory. Memory that has the ability to retain the data even without the power being applied is called nonvolatile. The ROM contains information that is required by the computer to operate, such as the information the computer needs to perform all of the functions it performs in console BASIC.

With these being the only two types of memory in your computer, something else is needed to give you the capability of storing your programs while you are not using them in your computer. This is where the peripheral memory devices come into the picture. There are many choices, but usually your first choice was or is the cassette tape player. This is a very inexpensive method of storing program data. The information you want to keep on the cassette is stored on the cassette tape in the form of tones. A combination of high and low tones are placed on the tape so that a later time the computer can read the tape and retrieve the information.

While the computer is reading the tape, it needs some way of telling if the information it is reading is in fact the correct information. The TI99/4 checks the integrity of the information being read by redundancy. That is, when the computer was recording the information on the tape, it duplicated every piece of data. Therefore, the time and tape space needed to store a particular piece of information is actually twice that required by the information. With this complete redundancy, the computer can check each piece of data it receives, and if the tape player is not playing the information properly into the computer, then the computer can catch this problem and terminate the tape loading, and tell you that a problem exists. The cassette tape method of storing information does have

its drawbacks. It is extremely slow when you are storing large blocks of information. It requires you to perform several functions each time you want to work with the cassette player, i.e. press record, rewind etc.

Also, the only type of files you can store on the tape is sequential files. The cassette tape definitely is not a random access memory peripheral.

Also with cassette tape storage, it is your responsibility to keep track of the storage location of each program you store. You have a choice of either storing each program on its own tape, which can be a costly and cumbersome adventure. Or you can keep track of the reading on the tape counter of your tape player each time you put a new program on the tape. In each case, you are required to do the work and it is supposed to be the responsibility of your computer to be a help and not a hindrance. If you have a lot of data that you are continually manipulating you should look into another form of peripheral memory.

The next choice most people will make is the floppy disk. For the TI99/4, the floppy disk looks like a 5¼ inch square card with a hole in the middle of it. The square part of the floppy disk is actually the cover for the part of the disk that actually has the information stored on it. Like the cassette tape, the floppy disk stores information in the form of magnetic images. But where the cassette player was actually made to play and record audio information, and the information in the computer must be transformed into the audio tones I spoke of earlier, the floppy disk stores the information in a much closer form to that of the way the computer needs it. The transforming of the information to and from the floppy disk is several hundred times faster than that of the cassette player.

Another big advantage of the floppy disk method of data storage is that the computer does most of the work for you. Not only does the computer perform all of the control functions by way of the disk drive controller, but it also keeps track of how much space you have on the diskette

and where on the diskette each program is stored. All you have to do is to remember which programs are on which diskettes.

The information is stored on the disk in a format that makes it possible for the computer to keep track of the location of the data on the diskette. The surface of the diskette is formatted in circular tracks which are divided into sectors. Before a new diskette can be used by your computer for data storage, it must be initialized. It is during this function that the computer maps out the diskette by dividing it into tracks and sectors. Also during the initialization the computer sets up a place on the diskette for it to perform the book-keeping functions such as space available, size of files and names of files. This brings us to another point of difference between tape and diskette storage. With the floppy disk storage method, the blocks of data you store on the diskette are stored in the form of files, whether they be programs or data. These files are given a name when you store them on the diskette. Each time you want to access that file, you may refer to it by the file name that YOU gave it. By storing files in this manner you can know what is in a file by the type of name that you gave it. This makes the task of keeping track of what is on each diskette that much easier for you since you can assign

file names that represent the information in that particular file.

The floppy disk drive works in conjunction with the disk drive controller to interface the computer with the diskette. The disk drive consists of a motor which spins the diskette and a motor that controls the magnetic head that does the actual reading and writing of data on the diskette. It is the disk drive controller that actually tells the disk drive where to go on the disk and what to do once the location is reached.

The analogy of the tape system to the disk system would have you being the controller in the cassette tape system like the disk drive controller is the controller in the disk drive system. The cassette tape player in the cassette tape system is like the disk drive in the disk drive system. And the cassette tape in the cassette tape system is like the diskette in the disk drive system. Since the computer handles the disk functions to include the location and the task to be performed, the computer can access the diskette in whatever sequence you would prefer. In fact, you can access several files at once, and can be reading on one file and writing on another file. In fact, you can set up a file so that you can read and write to the same file within the same program operation. Although there are several rules that you must follow in order to access files on the diskette, you can readily see the advantage the disk drive system has over the cassette tape system of file storage.

The disk memory system is the next best thing to the RAM memory that is in your computer. Because the disk drive is external to your computer memory in both the physical and electrical sense, you can not get the same speed from accessing the disk drive as you can from the RAM. There is another alternative to the disk drive system; the MINIMEMORY module. Besides being a great way to program in Assembly without the overhead costs of the Editor/Assembler system, the MINIMEMORY also can provide you with additional memory for storage that not only is randomly accessible, but is nonvolatile.

I am including the MINIMEMORY in this discussion of peripheral memory devices because although it does in fact add to the CPU memory, when you are using console BASIC, you can treat it as just another peripheral. Although the MINIMEMORY provides you with only 4K of program storage and the disk drive system can provide you with more than 100K of data storage, the MINIMEMORY once again wins out in the cost overhead department. All you have to do is plug the MINIMEMORY into your console, turn it on, and begin using the additional memory that has been added to your

computer. Since the MINIMEMORY does, in fact, add to the CPU memory, it is much faster to access than the disk drive system. You can imagine what the time saving is between the cassette tape system and the MINIMEMORY. So if you are working on a file that isn't too long, let's say less than 250 lines, you can quickly store the program in the MINIMEMORY, before you turn off your console for a break. And when you are ready to return to your computer you can continue working on your program right where you left off without having to go through an involved procedure of loading a tape program.

A fourth type of peripheral memory device has not been officially released to the market by Texas Instruments. This device is called the wafertape storage device. It is an attempt to offer a compromise between the cost investment required by the disk memory system and the lack of speed of the cassette tape system. Although it will not compare in speed with the disk memory system, it will have the ability to act as a random access device, relieving you of the toil involved in using the cassette tape loading system. And since this device is made especially to work with your computer, you will not have the same problems with loading that are inherent with the cassette loading system. Also files will be loaded on the tape in much the same manner as with the disk memory system, but file searches will take longer and the data transfer rate, the rate at which data is read from and written to the storage device, is much longer in the wafertape. This tape is constructed like an eight track stereo tape, that is with an endless tape that is contained within a cartridge. I cannot tell you any more than this about this device at this time because I have not seen one. I have only heard the promises of TI, be that as it may.

Since we have delved into the area of the possible, I thought I would take this time to present to you what I believe will be a future step in the field of home computer peripheral memory devices. I believe that the video disc player has the potential of becoming the great peripheral. Since data is already stored on these disks, perhaps in the future you will be able to purchase video disks for the purpose of storing data from your home computer on them. Heck, maybe you will be able to go to the store and purchase a video disk of your favorite movie and receive on the same disk a computer game related to the movie that you can play on your home computer.

Why let things like reality get in our way? Where would we be today if some "fool" hadn't thought that every home might have a computer in it. That wasn't so long ago, was it?

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GRONOS' ASSEMBLY TRANSLATED BASIC, LESSON TWO,

BUT FIRST A FEW THOUGHTS ABOUT THE IMPACT OF EXPANSION SYSTEM PRICE CUTS

By Bill Gronos
Senior Technical Editor
9505½ S.E. 15th #B
Midwest City, OK 73130

Since writing my last article, a significant event has occurred in the home computer market: Texas Instruments has dramatically slashed the cost of owning a full blown 99/4A system. For around \$400 dollars, you can add a peripheral expansion box, disk drive, memory expansion and your choice of several major software packages. The American free enterprise system has once again proven its value to the consumer, ensuring he receives the best product at the lowest price.

This is not going to be a lesson in market economics, nor is it a financial analysis of the personal computer industry; it is a lesson in Assembly language programming. However, I do see a connection between Assembly programming and the drastic price cuts in peripherals.

I believe the shakeout in the hardware market is going to extend into software. Just as competition has increased the quality of home computers while decreasing their cost, software will shortly follow suit. Just as TI has lowered the price of many of its modules, third party software companies will have to follow suit or be forced to close up shop.

The awareness level of the home computer owner is increasing rapidly. He is starting to understand the principals involved within the heart of his home computer. At one time he may have thought machine language referred to the speech synthesizer, but now he knows it is the fundamental code which directs all the activities that must transpire when a program is running. Although he may understand the concept of machine language, he may not fully appreciate how it relates to the programs he buys. This is where the connection between the

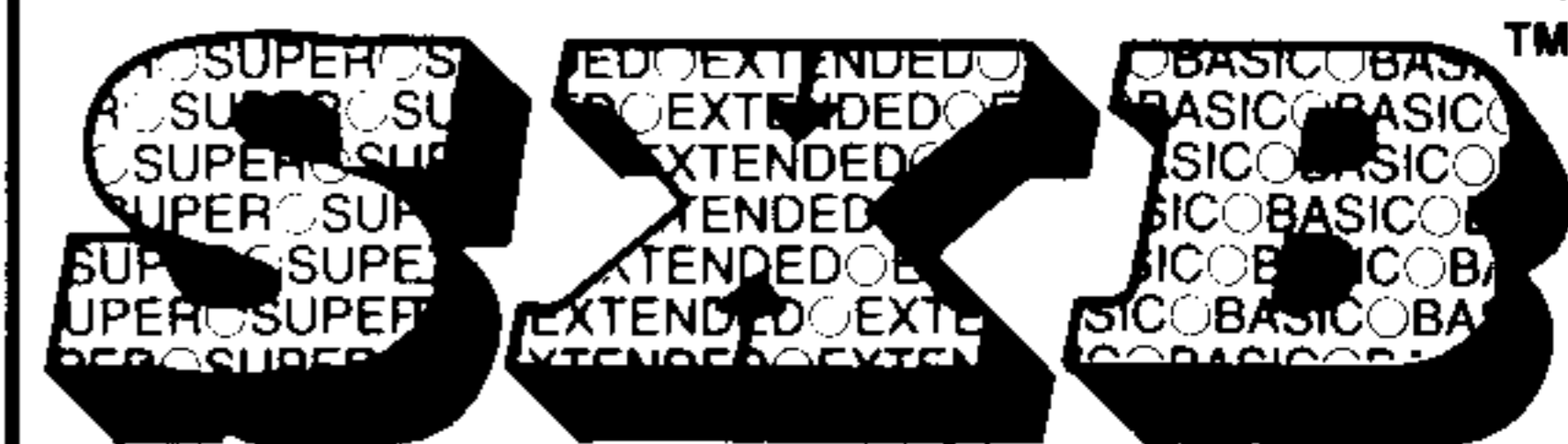
recent price cuts and Assembly language programming comes in.

All of a sudden, disk drives and memory expansions have come within the reach of many more wallets and purses. Many people I work with who used to own only consoles and cassette recorders rushed out to buy the system bargain within a week after the price drop and many more will purchase it in the near future. If they really want to expand the power of their system, they should make one more purchase: the Editor/Assembler system! At around \$40, the Editor/Assembler costs only ten percent of what they paid for the peripheral system, yet it would be the best module they could buy. The Editor/Assembler will open fully the Assembly language door; a door that leads to the most powerful and exciting areas of the 99/4A Home Computer.

The first Assembly language program the new Editor/Assembler owner will probably load and run is the "Tombstone City" game that comes with it; When he does, he's going to be hooked because Assembly language programs are to BASIC programs what prime rib is to baloney sandwiches. And if he thinks Tombstone City is a good game, wait until he sees some of the other third party Assembly language games that are available on disk.

As the number of disk drive/memory expansion system owners increases, the demand for Assembly language games and application programs will also rise. The savvy software buyer will soon realize the superiority of Assembly language programs and will choose these rather than programs that have been written in BASIC. Third party software companies that are unable to make the switch from BASIC to assembly language will lose a growing portion of the market as buyers wisely look for the label that says: "100% Assembly language coding".

Believe it or not, disk based Assembly language programs can be superior to Command Modules! Why do you think that all of TI's major software packages such as TI Writer, Multiplan, etc., all include one or more disks? The main reason is memory space: a single sided, single density disk can hold 92160 bytes of unformatted data. If you maxed out the memory that can be crammed into a Command Module, you would only come up with 38912 bytes (5 GROMs at 6K each and 8K of ROM) and not many modules will have even that much. Of course, these are TI modules I'm referring to. Since only one company has been licensed by TI to use GROMs in their modules (which is why Funware can safely claim that their modules will work on any future models of the 99/4A), most third party module makers have to restrict



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their programs to the 8K of ROM that can be accessed on the module port. Besides memory space, disk based software has another advantage over Command Modules.

TI Command Modules contain memory devices called GROMs. GROM stands for Graphics Read Only Memory and is an acronym you won't find in the Commodore, TRS 80, or Apple technical manuals, or any other non-TI computer manuals. TI invented the GROM chip, supposedly, as a low cost memory device that is easy to interface. Like normal Read Only Memories (ROMs), a byte of information stored on a GROM can be read by telling the memory chip the address of the byte you wish to "see". Unlike the ROM, the GROM automatically increments its internal address counter and has the very next byte of info ready and waiting just in case you would like to see it too, and the next after that, and the next after that, etc. All the GROM requires is that you give it the address of the first byte you wish to access and it will automatically do the bookkeeping so long as you want the next byte. If not, you must specify a new initial address and the automatic incrementing will begin anew.

There is another breed of memory within your 99/4A console that is self incrementing also. This patch of memory is referred to as Video Display Processor Random Access Memory (VDP RAM), or VRAM for short. Although, like GROM, VRAM does its own bookkeeping, it is NOT GROM. The VDP memory consists of a bank of vanilla-flavored static RAM chips which are controlled by the video display processor chip, which provides the auto-incrementing function. With these memory types in mind, let's return to the disk versus module comparison.

Module GROMs are not directly accessible to the 99/4A processor, i.e. they are memory mapped. Program coding contained in GROMs must first be read into CPU RAM byte by byte before it can be executed. Thus, GROMs are really little more than very fast disk sectors. Needless to say, this need to read GROM data rather than act on it directly can considerably impair the execution speed of module programs. When a program segment requires the maximum speed afforded by the CPU, it must either be restricted to the 8K of ROM that can be put into a module or else it must be downloaded into the memory expansion and then executed. The E/A loader is treated in this manner and is transferred from GROM into the low area of the memory expansion. If modules are inferior to disks, why are they used at all?

Obviously, if you want to use disk based software you have to have a disk drive. Even with the big price cut, disk

systems aren't exactly cheap. Also, even if you do have a disk drive, modules are convenient and load faster than disks. The big advantage of GROM based modules, however, is the protection they afford against software pirating. Disks can be copied, and ROM-based third party modules can be copied fairly easily onto EPROMS. Not so with GROMs. You can hike down to Radio Shack and buy EPROMS by the sackful, but you're not bloody likely going to find any EGROMS.

THE ONLY GUARANTEE OF PROGRAMMING QUALITY YOU GET FROM BUYING A MODULE IS THAT SOMEONE THOUGHT ENOUGH OF A PROGRAM TO RISK THE COSTS INVOLVED IN "BURNING" 10,000 PROMS.

The point I want to make is this: don't think you're getting a second rate product when you buy software that doesn't come on a Command Module. I've heard disk based games referred to as "module quality" as if module programming were the ultimate pinnacle that, like absolute zero, could only be approached, but never equalled and certainly not surpassed. The only guarantee of programming quality you get from buying a module is that someone thought enough of a program to risk the costs involved in "burning" 10,000 PROMs: folks, let me warn you, I've seen a couple of modules that are losers.

So if you are one of the recent buyers of the expansion system special, dig down a little further into your pocket and come up with the 40 bucks you need to add the Editor/Assembler package to your system. And after you marvel at the power of Assembly language programming you'll learn to write your own machine language coding. The remainder of this article is intended to help you do just that.

GRONOS' ASSEMBLY TRANSLATED BASIC, LESSON TWO: SPRITES AND THE USE OF INTERRUPTS

The concept of Gronos' Assembly Translated BASIC(GATB)[™] was first presented in the July issue of Enthusiast '99, along with the program coding for duplicating some BASIC functions with Assembly language subroutines. In this lesson I will lay the groundwork for adding Sprite capability to GATB, hoping to duplicate the Sprite commands available in Extended BASIC as closely as possible.

GATB generated many letters filled with "I'd like to see . . ." requests; I appreciate reader feedback very much,

though I'm awfully sorry that volume prohibits me from sending many replies. Those who write are casting votes for what they would like to see covered in my articles. Even before GATB, many of you wrote and asked to have the Assembly language use of Sprites explained, so now you'll get your wish. I'm besieged with so many requests for specialized subjects that I won't run short of material for many years. Of course, the negative side of this is that a lot of you are going to have to wait quite some time before your particular area of interest gets into print.

Bit Map Mode is certainly in the top ten of requested subjects; I already have the coding worked out for initialization, plot point, draw line and several other utilities and they require only a brief explanation in order to run them. "If that is the case", you may be asking, "why doesn't he just give them to us and get on with what ever he wants to bore us with this month, with the possible exception of any more counter routines?" Since I am somewhat of a strange type of individual, I'll give you one of my typical strange answers: Adam Smith's "invisible hand".

In Smith's book, "The Wealth of Nations", he talks about an "invisible hand" that guides the consumer marketplace, deciding what products and services are available to the population. The greatest single factor of this is the price

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people are willing to pay for a product. In this case, the product is these articles and the population is the Enthusiast '99 management.

Enthusiast '99 pays its writers well. Few restrictions are placed on the content of my articles, and so long as I don't land the editors in the libel courts, they will let me ramble right along.

Just as Smith theorized, the "invisible hand" writes just enough malarky in these articles to put a little hair on the paychecks and keep me from wondering what the blazes I'm doing slaving over my console, trying to meet a deadline that came a month early, when I could be terrorizing the highways on my Honda 200 on what will probably be the last pleasant weekend of the season.

I think I just broke my promise not to give you an economics lesson, so I'd better get back to Assembly language. Sprites are the topic of this lesson because they are accessible through BASIC; bit map mode can not be conjured up by 99/4 BASIC (though it will be on the 99/8), so it will have to be left on the back burner.

TACKLING THE MANY TASKS THAT MUST BE HANDLED BY THE ASSEMBLY PROGRAMMER

Those of you who have played around with Assembly programming quickly learned just how many functions that the BASIC interpreter was happy to take care of for you, with nary a whimper. BASIC acted as your foreman. All you needed to do was give it a set of blueprints and it would instruct the various crews such as floating point conversions, video display handling and peripheral access control to do what you wanted them to do. And all this crew supervision was invisible to you. But foremen have to be payed and BASIC is no exception. The currency of the payment is milliseconds; the bigger the job, the more you are going to have to fork over.

If a contractor wanted to save money, he could lay off his foremen and take over the direct supervision of the workers himself. Of course, he must have the knowledge required to do this, or the project will end up a shambles. This, in effect, is what you do when you program in Assembly language; you fire the foreman and pocket his paycheck. However, many of you quickly realized that the foreman really was earning his exorbitant pay. Taking care of all that supervision is hard work because your crew of workers is a bunch of idiots who have to be told exactly what to do, down to the very last detail.

Before we can fully understand the use of Sprites in Assembly language, we have to understand the mechanics of one

of those myriad jobs that the foreman used to do for you: interrupt control.

WHAT ARE INTERRUPTS AND HOW DO THEY WORK?

If your childhood was anything like mine, you were probably at one time or another chided with the phrase: "don't you know it's not polite to interrupt!?". While interrupting a conversation may be rude, computer interrupts are a powerful and vitally necessary tool.

Basically, interrupts work like this: the computer processor is busy working on a job when all of a sudden it is called away to perform some other job. It makes a note of where it is on the first job, sort of like using a bookmark, and then begins work on the new job. When the calling job is completed, it then returns to the old job and continues where it left off.

The call to break off what is presently being done in order to tackle a new job is called an interrupt request (IR). IRs are metaphorical flares that the computer processor is constantly searching the sky for. These sky-borne flares do not mark where the new job to be done is at; they all are shot off at the same place. However, the processor knows where to get the job location address from, because that has been agreed on in advance.

Let's make this metaphor just a tad more concrete by comparing the computer processor to a pizza deliverer. At the start of his shift, the pizza person is given a stack of pizzas to deliver. He begins to deliver the pizzas when all of a sudden he spots a flare in the air. He has been well trained and he knows that when the flare goes up he is to drive to a predetermined spot to get further information. He puts a check mark on his delivery list so he knows where to take the next pizza and heads off to the predetermined location, which happens to be the park bench nearest the drinking fountain at the local picnic ground. At the bench will be a brown paper bag that contains two cards: one card tells him where he is to pick up the instructions for the new job and the other card tells him what to do with the car load of pizzas. An important point to note is that this predetermined location did not contain the actual instructions for the new job, but rather where to find the instructions. The location card says, "Corner of 27th street and Eagle Lane". The "what to do with the pizzas card" says, "Park the truck and take the '56 Cadillac".

The pizza man exchanges the truck for the Caddie and drives over to the indicated address. At that address, he finds the owner's daughter waiting for him and she has his new instructions: "Dad said that you would drive me to Mary's pajama party". After dropping her off, he exchanges the Caddie for the delivery

truck and once again returns to his job of delivering pizzas.

Do you see the advantage of the flare? If there were no way to alert him if and when he was needed, he might be told to check out the park bench after each and every pizza was delivered. Since the brown paper bag would not often contain a new job, a lot of time would be wasted and the pizzas would get cold.

Returning to the old job is not an essential feature of the interrupt process. The old job could likely be discontinued and this will be determined by the new job instructions. The important thing about interrupts is that a capability to return to the old job exists, if it is needed.

Let's look at an actual example of interrupt use in the Home Computer. Some other models of computers require that the console be turned off when inserting modules; not so with the 99/4. You can be smack in the middle of a program when you yank out one module and stick in another.

Module insertion sends up an interrupt request flare that is nicknamed "Reset". Reset happens to be the highest priority interrupt recognized by the TMS 9900 microprocessor (more on priorities later). When the module is inserted in the port, the processor receives the reset signal, which tells it to fetch the two words of memory at addresses >0000 and >0002.

The first address contains the memory location of what will be register 0 of the reset routine's workspace. This is true for all 990 family microprocessors, whether they are used in the Home Computer or in the International Users-Group \$70,000 mainframe computer. This changing of workspaces is like the change over from the truck to the Cadillac in the pizza analogy. The workspace of the old job is saved so that its data will be preserved should you wish to return when the interrupt routine is completed.

The second data word, which for reset will be >0002, contains the memory location of the first instruction of the interrupt routine's program coding. The processor will begin program execution at the address contained in >0002 immediately after the workspace changeover.

TI refers to the memory addresses containing the new workspace and program location addresses as "context vectors". You may have seen this term used to explain the "bullwhip" instruction (Branch and Load Workspace Pointer, BLWP). The functions of the bullwhip instruction and interrupt are identical except that the BLWP is encountered within a program while interrupts are generated outside of the program. Both return to the original program via the Return with Workspace Pointer (RTWP) instruction.

There are sixteen levels of interrupts available on the TMS 9900 microprocessor. Each level has its own allotted context vector at an address predetermined by the silicon substrate of the microchip. Each level is also a priority, which allows more important program routines to take priority over less important ones; so one interrupt can actually "interrupt" another interrupt. The interrupt priorities of the TMS 9900 are numbered 0-15; the lower the number, the higher the priority.

The programmer is able to decide what priority of interrupts will be acted upon by the processor by using the Load Interrupt Mask Immediate (LIMI) instruction. Within the status register that is finely etched upon the TMS 9900 silicon are four status bits that form the interrupt mask. The programmer sets/resets these bits via an LIMI instruction to tell the processor which interrupts to act upon and which to ignore. The processor constantly samples the interrupt lines and will only execute interrupt priorities of equal or higher precedence as specified by the mask.

Again using the pizza delivery example, suppose that when deliveries fall behind more than thirty minutes, the driver has been instructed to ignore green colored flares and only act upon red flares. When the critical time delay is reached, the driver puts on a pair of green-lensed glasses. Now he won't be able to see the green flares (nor green traffic signals for that matter, but that's not the point), but he will still see the red ones, which perhaps may indicate the store has been robbed and he is needed at once. The green glasses would be analogous to the status register interrupt mask.

The 99/4 is set-up to use interrupts numbered two or lower. All external interrupts are done on level two and these are done by means of the 9901 microcircuit soldered within the console. The versatile chip is called a Programmable System Interface (PSI). The PSI is capable of recognizing its own set of interrupt levels, but all of these are still presented to the processor as level two interrupts. I'm not going to give you an excessive amount of information on the PSI in this article, I just want you to have a nodding acquaintance with the interrupt PROCESS within your system. The PSI, however, is of great use to the advanced Assembly language programmer and responds to Communications Register Unit (CRU) instructions such as SBO, SBZ, TB, STCR and LDCR. The Editor/Assembler manual doesn't tell you all that the PSI is capable of doing for you; I had to get a copy of the 9901 designer manual

to learn all its secret powers. The PSI will provide an advanced interrupt capability to the user who has a solid background in computer hardware and needs to use his 99/4 for external control. However, there is one interrupt that the novice user can access with a very simple piece of hardware that he can fabricate for under \$2!

Reset is the most powerful interrupt in your home computer. However, it is of limited use to you because its context vector is in ROM, frozen into a factory chosen state of existence. Oh!, if only we were allowed to change those two memory words at >0000 and >0002, what powers we could command! Luckily, there is a very powerful and very useful interrupt which has a context vector that resides in RAM; it is called the "Load" interrupt. Load has the second highest priority, topped only by Reset. Like Reset, Load interrupts on Level 0, but the system can differentiate between the two and Load uses memory words >FFFC and >FFFE as its context vector.

Load and Reset share the quality of being the only two interrupts that are non-maskable. The processor will always jump to attention whenever Load or Reset tickles its interrupt control lines and the interrupt mask is powerless to stop them.

What this means to you is that for \$2 you can have supreme control over your computer, being able to snatch control away from whatever program is being executed, be it the BASIC interpreter or a Command Module. Let me give you a practical example of this.

Suppose you are writing/debugging a program and for some reason it keeps "locking up" the console. In the past, you had to turn off the main console switch and scratch your head — the "lock-up" can be the most difficult bug to find. Imagine instead of resorting to the on/off switch you pressed a switch that generated the Load interrupt and brought up the debugger. Now you can check around in memory to see what happened right when your console was locked up.

Another example will show that even those of you who don't program could make good use of a Load generator. You could press the Load button and get a printout of the monitor screen even if you were using a Command Module that lacked a print capability! That could come in very handy. What does it take to achieve this miraculous power? Assuming you have the memory expansion, which you need to give you memory addresses >FFFC and >FFFE, all you need is a connector to fit your I/O port (which is the one your peripherals attach to), a switch and a soldering iron.

*****CAUTION: I TAKE NO RESPONSIBILITY FOR ANY DAMAGE THAT MAY RESULT BY USING THE DEVICE I'M ABOUT TO DESCRIBE. I HAVE BEEN USING ONE FOR OVER SIX MONTHS WITH NO DAMAGE NOTED, BUT THAT IS NO GUARANTEE OF COMPLETE SAFETY. TRY IT AT YOUR OWN RISK.*****

I call my \$2 Load generator the Gro-nos GROMbuster. It is simply a normally open switch soldered to pins 13 and 21 of a connector that mates to the I/O port connector. If you can find a 44 pin connector for the I/O port, it will probably cost you at least \$5. I couldn't get one at my local electronics surplus store, so I bought a 32 pin connector and hack sawed one of the ends off to make it fit onto the I/O port. I used a Cherry micro-switch that straddled pins 13 and 21 with just a little bending, soldered it into place and then molded some epoxy around it to add a little strength. Looking straight on at your I/O port, pin 1 is on the bottom left, pin 2 is top left, pin 3 is directly right of pin 1, etc. Works Great!

Of course, I have the old freight train style of peripherals and all I need to do is to carefully insert the GROMbuster onto the port of the last car in the train. All of you with Expansion Boxes will have to devise a style of GROMbuster to work with your systems. You might try locating the correct pins on your Speech Synthesizer and mount the switch under the flip-up cover. Again, I take no responsibility for any damage this may cause.

For the combined cost of a 75 cent connector, a 50 cent switch and a few pennies worth of epoxy, I have a device that has saved me a great deal of debugging time and has allowed me to learn many more 99/4 secrets. Oh, I guess I left out one important part; the software. Here is a short example to demonstrate the format:

```
REF VMBW
ST LI 0,302
LI 1,TX
LI 2,4
BLWP @VMBW
LIMI 2
JMP $
TX 'TEST'
WS BSS 32
AORG >FFFC
DATA WS,ST
END
```

To test your GROMbuster, assemble this program and load it into memory, use "Quit" to return to the title screen, Press the GROMbuster switch and "TEST" should appear near the middle of the screen.

If you want to use the debugger with GROMbuster, assemble the following code:

```
AORG >FFFC
DATA >20BA, >BOBE
END
```

Load the debugger, then load the above program. If you want to use debugger with one of your own programs, load it after you've loaded the above two programs and then press GROMbuster when ever you want to leave your program and access the debugger.

This inexpensive Load generator has a drawback; it is subject to mechanical switch bounce and thus will not properly store the information needed to return to the original program via the RTWP instruction. A GROMbuster that will do this requires a few logic chips that will debounce the switch and properly time the "Instruction Acquisition" signal (IAQ) on pin 41 of the I/O port.

This concludes my explanation of how interrupts are used in general within the 99/4A. Now I will continue with GATB lesson two.

GETTING BACK TO GATB

In order to explain Assembly language use of Sprites, I had to give you an introduction to interrupts. If you only wanted to use Sprites without automatic motion, this would not have been necessary. However, the big advantage of Sprites just happens to be this self-moving feature, which the 99/4A performs through the use of an interrupt.

The interrupt that performs the automation is generated by the PSI, which, as explained earlier, means that it must be a level two interrupt. Unlike the Gronos GROMbuster which caused an interrupt by manually pushing a switch, the sprite interrupt is controlled via a clock pulse. Not the 3 megahertz clock that controls the computer processor, but a separate

clock that is used in conjunction with the Video Display Processor to synchronize your monitor display. This is a 60 hertz clock, which means your Assembly language program is going to be interrupted 60 times each second whenever you want Sprites to move.

I referred to this as being a Sprite interrupt, but that is only one task that is taken care of during the execution of the interrupt. Automatic sound processing and screen time out counting are also updated at the same time.

LIMI 2: A SIMPLE INSTRUCTION THAT CAN BE TANTAMOUNT TO OPENING A PROGRAMMER'S PANDORA BOX.

The Assembly programmer allows this Sprite/sound/screen interrupt by using the LIM2 instruction. By doing so, he relinquishes program control to a built in routine that will be executed every time the clock ticks. Of course, this is mostly transparent to the programmer because the interrupt routine takes only a small fraction of that 1/60 second delay between pulses. Although his program is being bypassed at what seems to be an alarming rate, it can perform as many as a thousand instructions between each interrupt!

A simple demonstration of interrupt use can be shown by the following two short examples:

```
DEF RUN
REF VSBW
RUN LI 0,767
LI 1,'AA'
LP BLWP @VSBW
DEC 0
JOC LP
JMP $
END
```

```
DEF RUN
RUN LI 0,767
LI 1,'AA'
LP BLWP @VSBW
DEC 0
JOC LP
LIMI 2
JMP $
END
```

What will be the differences when these two routines are run? The first will fill the screen with "As" and then duplicate a console lock-up, requiring that you turn off the console to end the program because "Quit" is an interrupt that has been masked out.

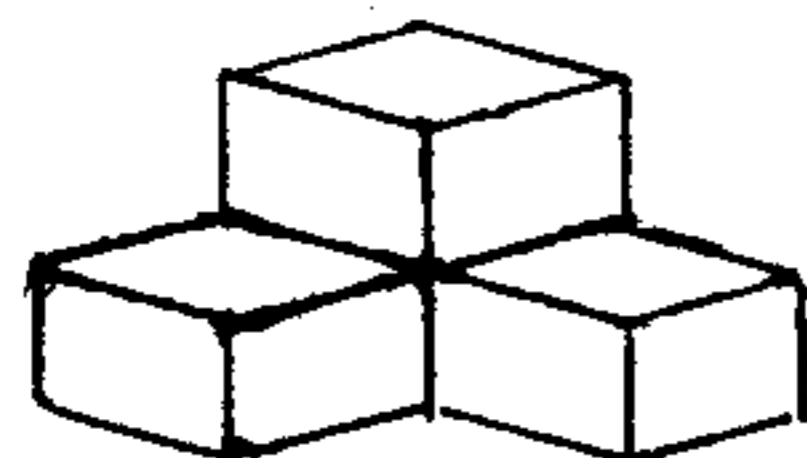
In the second program, we enable interrupts after filling the screen. If you wait several minutes, the screen will blank out; this would not happen in the first example unless you didn't pay your electric bill. Also, we now find that the "Quit" function is once again "armed" and shutting down the console is not necessary.

Oh!, remember me saying that Reset was a non-maskable interrupt? If you load and run the first program again you might try inserting a module rather than using the on/off switch to end the program. If you built the GROMbuster you could also use it to get out of that endless loop.

The LIM2 instruction, while essential for many programs, can give you a world of headaches. You must always disable interrupts with a LIM0 instruction before you access VDP memory. If you don't, it's very likely that data will be read from or written to the wrong VDP location because the interrupt routine accesses VDP memory and the address pointer will be changed when execution returns to your program.

The bugs that can result from forgetting to turn the interrupts off can be quite insidious. You might get a messed up screen, the sound processor may start blaring or the display format is changed into bit map mode. The weird part is that these bugs may not occur until you add new code or alter a previous instruction. This uncertainty results because of the timing factor; if the routine was able to execute totally between interrupts, and remember this could be over 1000 instructions, no harm will be done. However, when you modify an instruction or squeeze in some more code, your routine may not make it in time and the latent bug epidemic to your program unleashes an epidemic. The worst part is that you'll probably think the last instructions you entered were incorrect and you end up spending hours looking in the wrong place; take it from someone who learned this the hard way!

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```

0038 JNE SE2
0039
0040 ** DEFINE ALL SPRITES TO BE UNUSED **
0041
0042 *TURN MOTION OFF ON ALL SPRITES
0043 LI 10,>4780
0044 BL @VDP
0045 LI 0,128
0046 SE3 MOV 1,@>8C00
0047 DEC 0
0048 JNE SE3
0049
0050 ** LOCATE ALL SPRITES OFF SCREEN AND
0051 *DEFINE THEM AS CHAR 255
0052 LI 3,32
0053 LI 0,>300
0054 LI 1,SE5
0055 LI 2,4
0056 SE4 BLWP @VMBW
0057 AI 0,4
0058 DEC 3
0059 JNE SE4
0060
0061 ** SPECIFY THAT ALL SPRITES
0062 *MAY HAVE MOTION
0063 LI 0,>2000
0064 MOV B 0,@>837A
0065
0066 ** SET FLAG SO INIT WILL
0067 *NOT BE REPEATED WHEN THE
0068 *SPRITE ROUTINE IS USED AGAIN
0069 SETO @SPFLAG
0070 *** END OF INIT ***
0071
0072 ** PROCESS SPRITE PARAMETERS **
0073
0074 *GET 7 PARAMETER VALUES
0075 SE1 LI 9,14
0076 BL @GVAL
0077
0078 MOV @P1,10
0079 SLA 10,2
0080 AI 10,>4300
0081 BL @VDP
0082 MOV B @P4+1,@>8C00 Y LOC
0083 AI 10,>480
0084 MOV B @P5+1,@>8C00 X LOC
0085 NOP
0086 MOV B @P2+1,@>8C00 CHAR#
0087 NOP
0088 MOV B @P3+1,@>8C00 COLOR
0089 BL @VDP
0090 MOV B @P6+1,@>8C00 Y MOTION
0091 SWPB @P7
0092 MOV B @P7,@>8C00 X MOTION
0093 RTWP
0094 SE5 DATA >D100,>FF00
0095 SPFLAG DATA 0

```

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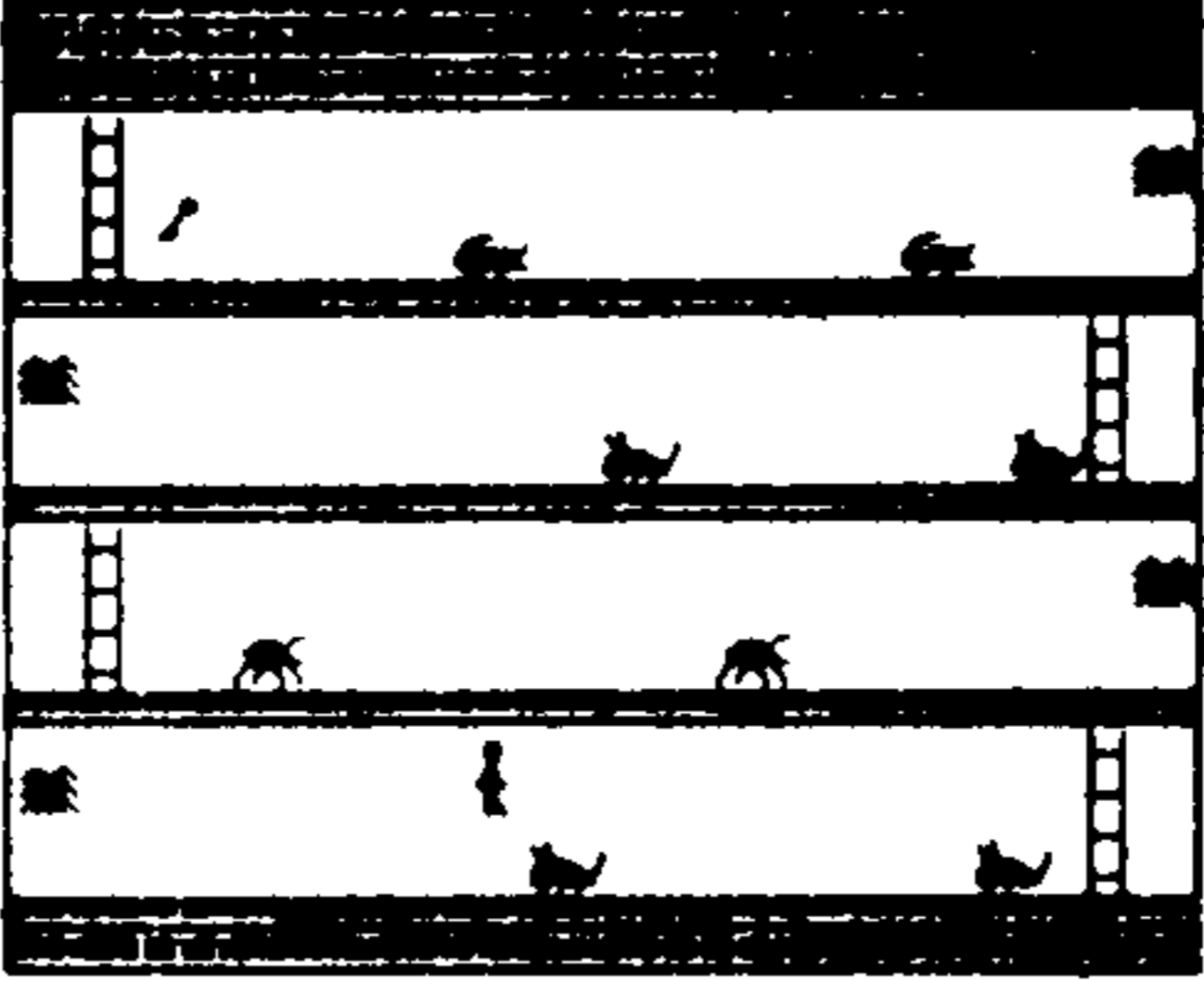
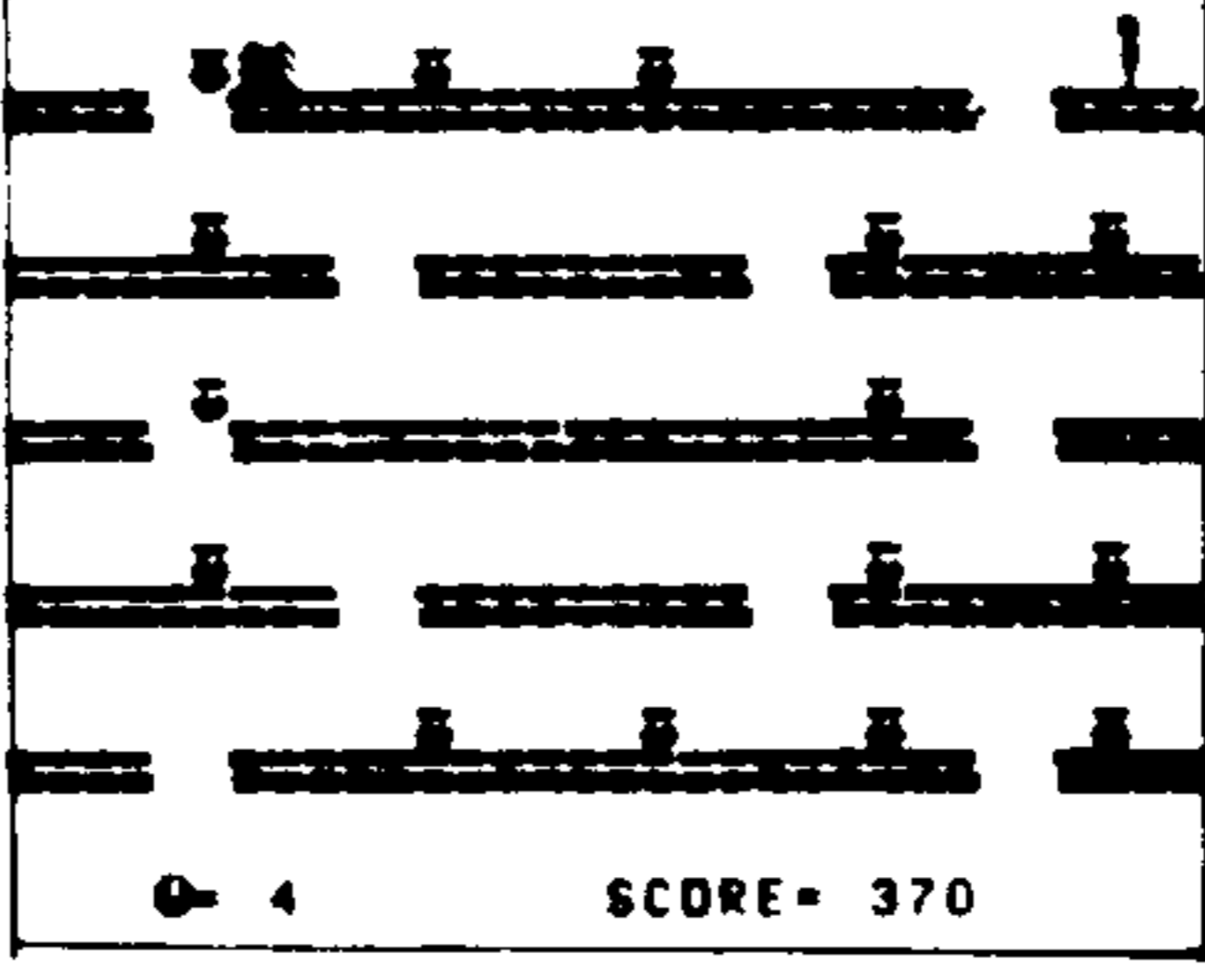
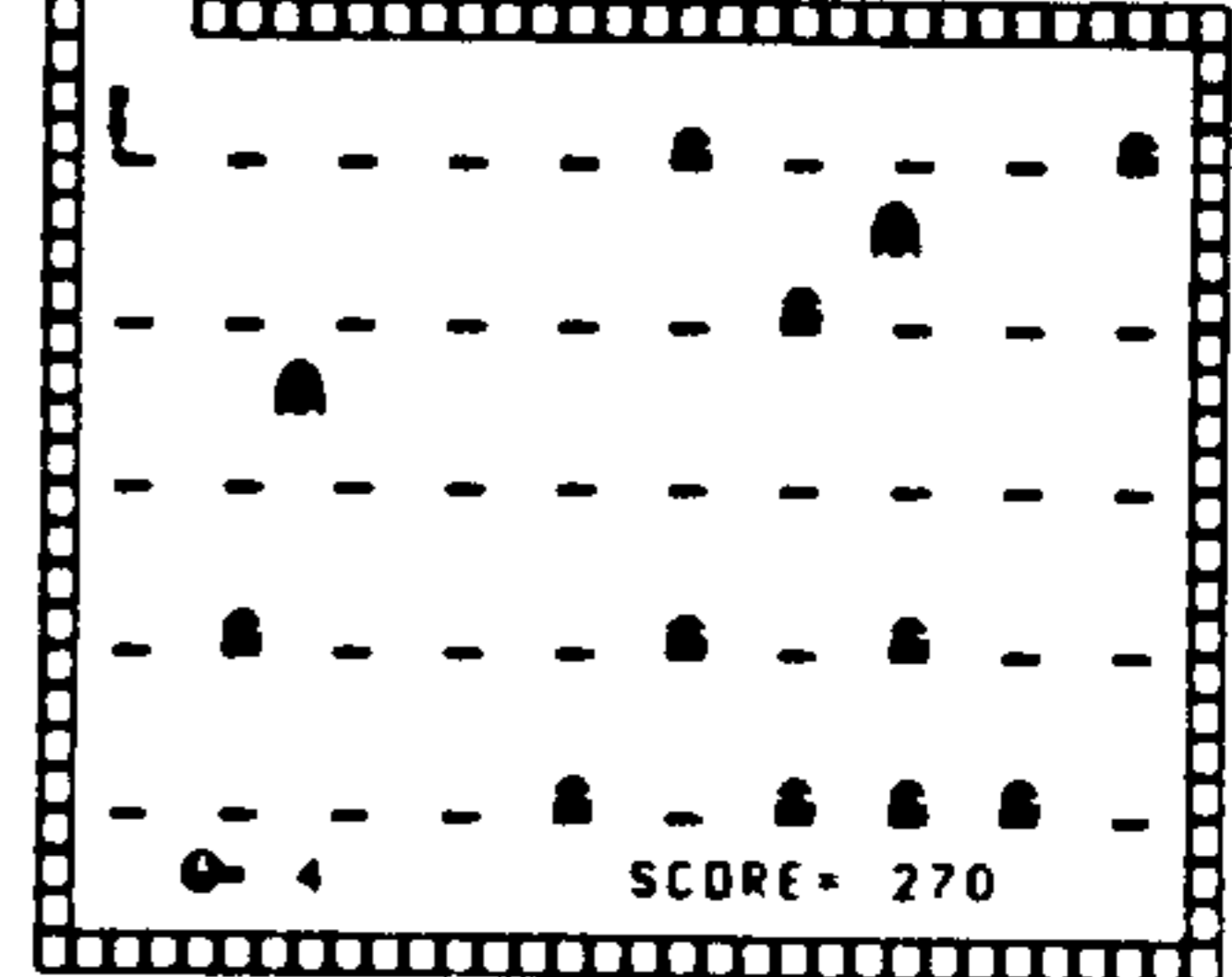
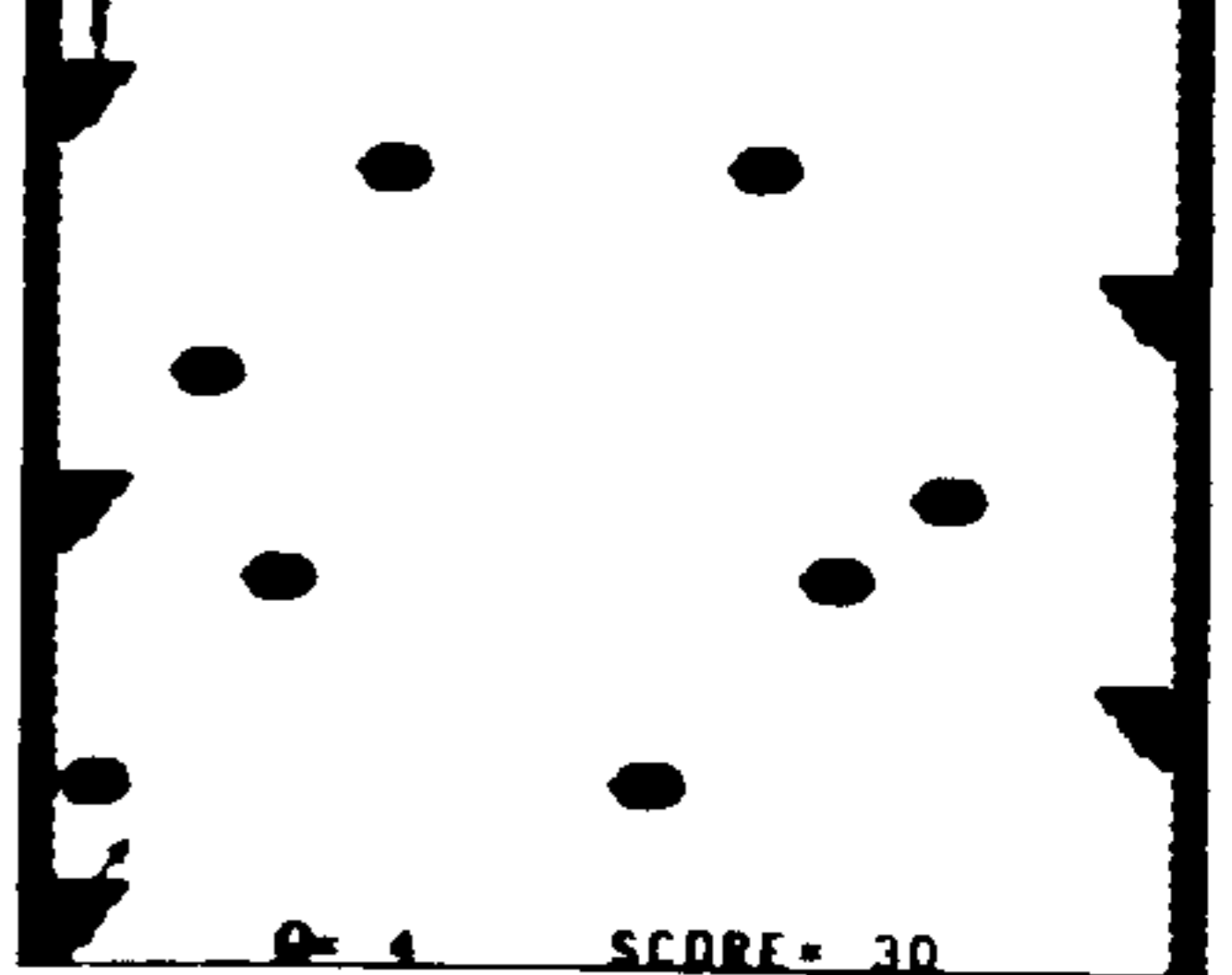
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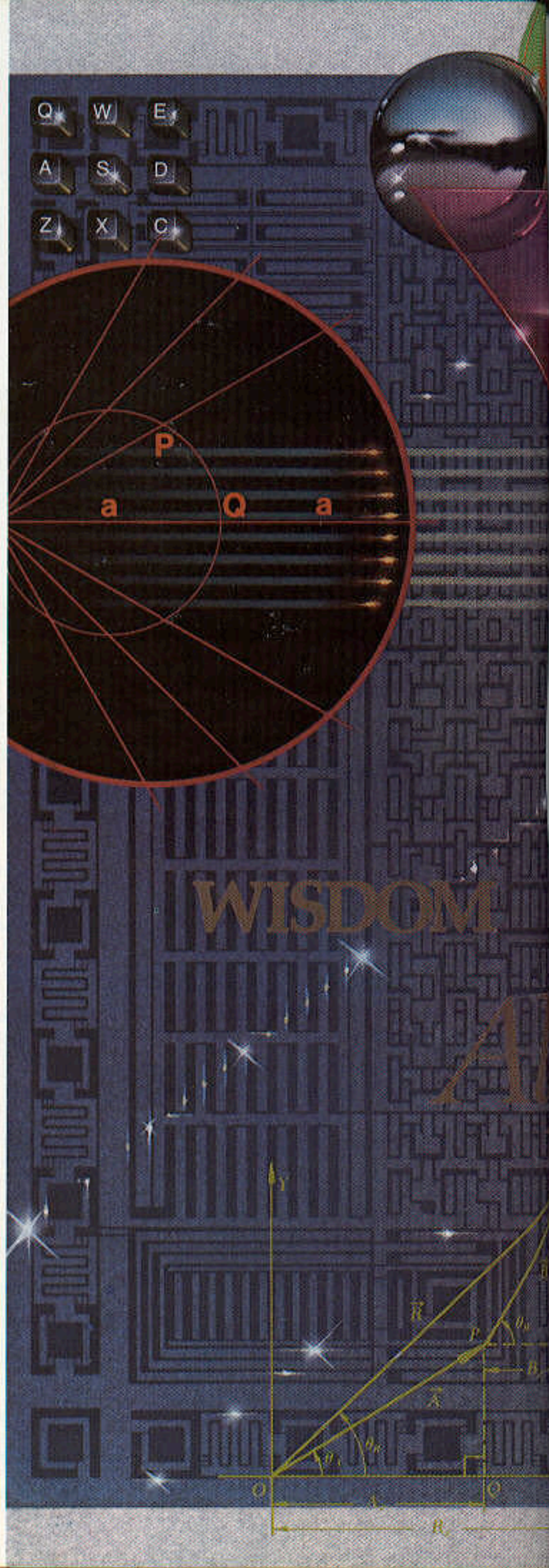
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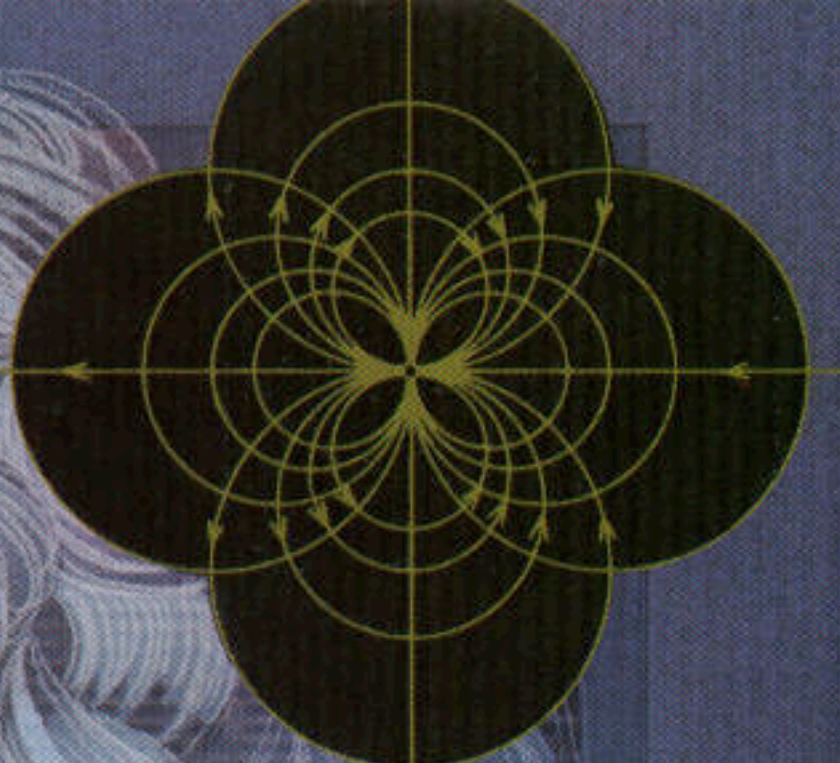


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Many ComputerCraft facilities include a classroom as well as a show-



COMPUTERCRAFT, INC.

room for every customer who purchases a computer. In addition, these computer owners may attend free seminars for beginners conducted by ComputerCraft personnel. For more advanced users, ComputerCraft frequently conducts seminars dealing with a range of computer-related topics.

ComputerCraft Learning Centers provide plain English, hands-on instruction to more than 1,000 people per month. Eighty classes, each limited to 10-12 people, cover 25 courses ranging from "getting started" to wordprocessing, electronic spreadsheets, accounting, database management and programming. Special classes are held for teenagers and children ages six and up.

A "Hands-On Workshop for Women" takes the mystery out of computers and helps housewives use their personal computer in daily budgeting, record-keeping and word processing practices.

ComputerCraft also has a subsidiary company, SeminarCorp. In November 1982 the first class was held, and since then over 7000 Houstonians have learned to use microcomputers. The company has been expanded to include facilities in

Dallas and San Antonio, and by this November, SeminarCraft, under the new name, ComputerCraft for Learning Center, will remain as an autonomous curriculum learning facility. Strictly a teaching facility, some courses will offer product evaluations and comparisons of computer lines ComputerCraft does not carry.

ComputerCraft has also placed over 8,000 personal computers in Houston area public schools, and in addition, helped train the instructors in their use. They are trained by professional educators with many years' experience in Houston area schools.

A ComputerCraft for Education retail facility is located in Houston, and its product line is devoted exclusively to educational hardware and software. Students from nursery school age through high school are catered to at this Houston residential facility.

ComputerCraft also sells to purchasers of large numbers of microcomputer systems, corporations, hospitals, colleges and universities. For more information about ComputerCraft, write ComputerCraft, Inc., 1616 South Voss, Suite 900, Houston, TX 77057, or call (713) 977-8419.

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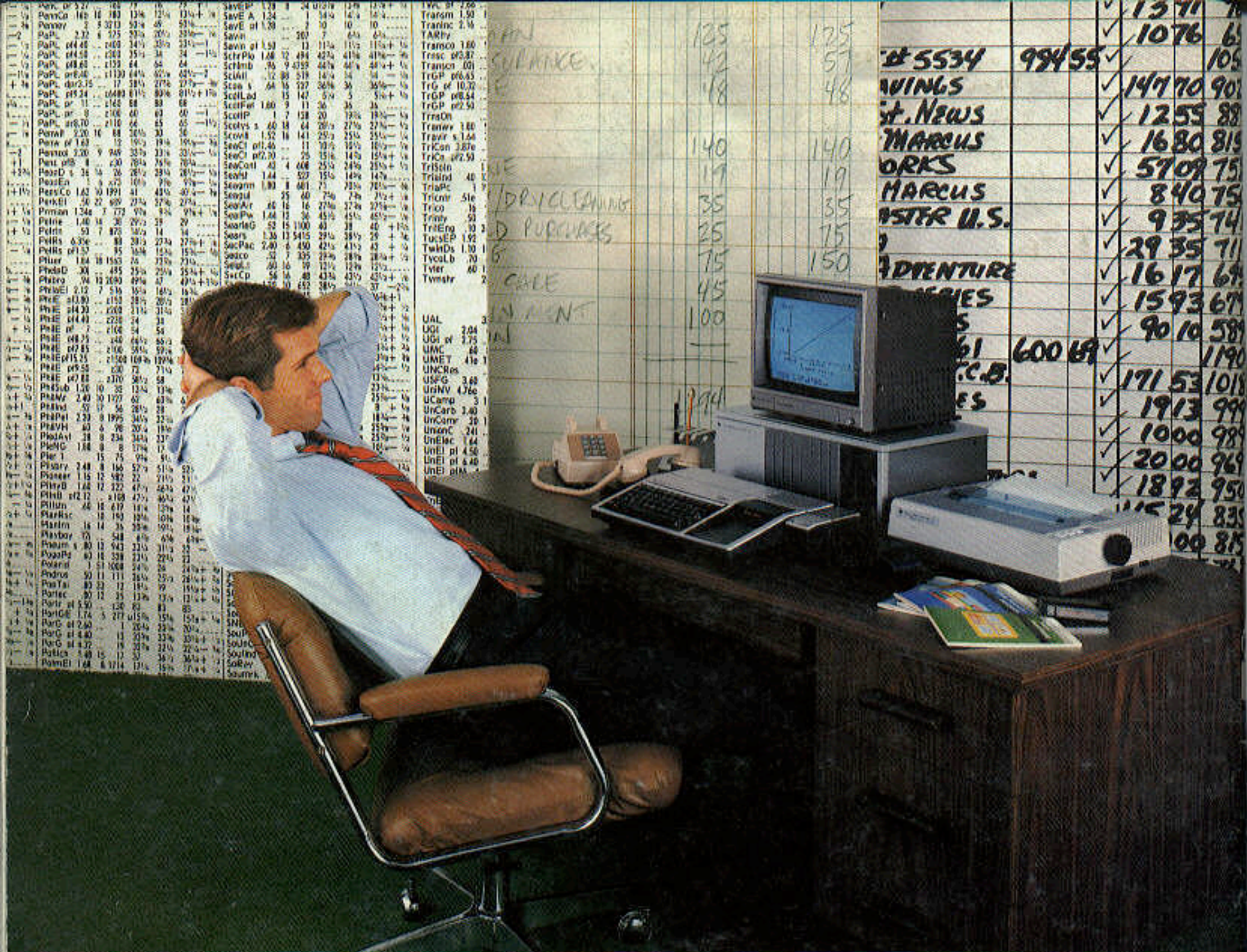
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