

BULK RATE
U.S. POSTAGE PD.
ROUND ROCK, TX

PERMIT NO. 533

P.O. Box 1343, Round Rock, TX 78680

Postmaster: Address Correction Requested

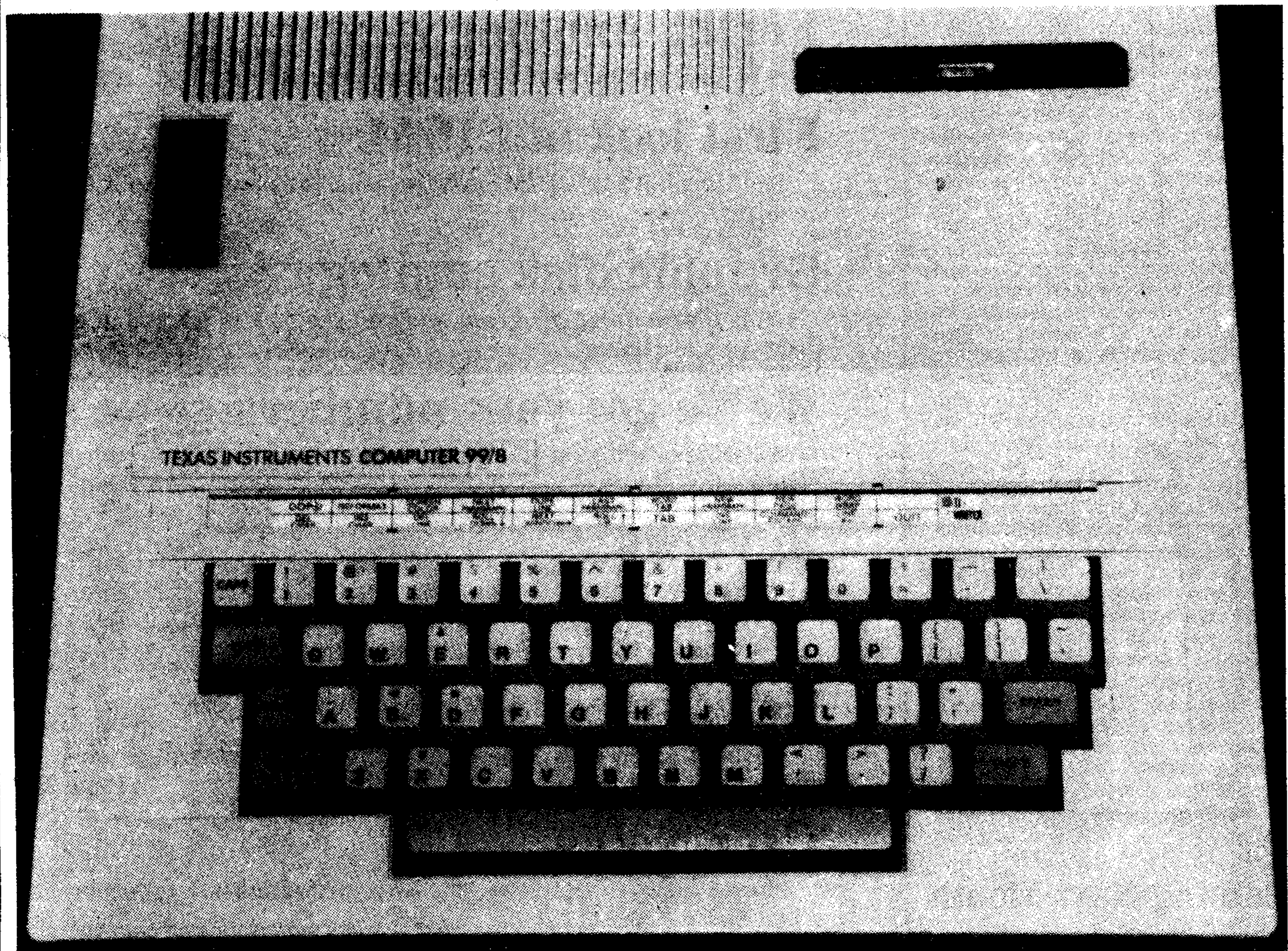
MICROpendium

Covering The TI99/4A Home Computer And Compatibles

Volume 1 Number 11

December 1984

\$1.50



The one that got away

Contents

MICROpendium

MICROpendium is published 12 times annually in Round Rock, Texas. No material published in the pages of MICROpendium may be used without permission of the publisher. Computer user groups that have signed exchange agreements with MICROpendium may excerpt articles appearing in MICROpendium without prior approval.

While all efforts are directed at providing factual and true information in published articles, the publisher cannot accept responsibility for errors that appear in advertising or text appearing in MICROpendium. The inclusion of brand names in text does not constitute an endorsement of any product by the publisher. Statements published in MICROpendium which reflect erroneously on individuals, products or companies will be corrected upon contacting the publisher.

Unless the author specifies, letters will be treated as unconditionally assigned for publication, copyright purposes and use in any other publication or brochure and are subject to MICROpendium's unrestricted right to edit and comment.

Display advertising deadlines and rates are available upon request.

All correspondence should be mailed to MICROpendium at P.O. Box 1343, Round Rock, TX 78680. We cannot take responsibility for unsolicited manuscripts but will give consideration to anything sent to the above address. Manuscripts will be returned only if a self-enclosed, stamped envelope is included.

All editions of MICROpendium are mailed from the Round Rock (Texas) Post Office. Subscriptions are \$12 for 12 issues, delivered via third class mail. In Canada, add \$3.50. Subscribers in the United States who wish first class delivery may also add \$3.50 to the basic subscription price.

Mailing address: P.O. Box 1343, Round Rock, TX 78680

Telephone: (512) 255-1512

Source: TI4596

John Koloen Publisher

Laura Burns Editor

Coming Next Month

—Advice from the experts on how to care for your TI system

—Review of the Super Sketch graphics pad

—What can a hard disk do for you?

©Copyright MICROpendium

Table of Contents

At the Faire

The fabled TI99/8 only one of the highlights of the 99/4A Computer Faire Page 10

Black Friday

Announcements about the demise of the TI99/4A turn out to be a bit premature..... Page 18

Forth: Another view

Will TI Forth become the dominant version?..... Page 21

First look at CP/M

The Morning Star CP/M card gives the TI a new personality in 40 columns..... Page 25

Graphic disk catalog

This disk catalog program lets you see how much space your programs are using Page 27

We've got your numbers

A listing of selected electronic bulletin boards from around the country for TI users..... Page 28

Reviews

Data Base Manager System..... Page 29

Gravity Master Page 32

Learning 99/4A Assembly Language Programming..... Page 33

Newsbytes

About that new chip, Myarc now shipping disk controller card, a system diagnostic disk, etc. Page 35

User Notes

More Freeware, better motion with sprites and how to resurrect a bad disk..... Page 36

Classifieds Page 38



PROGRAMS WANTED

If you have any programs which you have written yourself or have translated from other computers and are interested in having them published - contact us for an "Evaluation Agreement." We will then evaluate your programs to determine their marketing potential. If we determine that they do indeed have marketing potential we will then offer to enter into a marketing agreement with you to publish your programs. We will also work with you to make suggestions for possible improvements or changes and pay you a royalty on each copy sold.

COLOR FUN (Only \$12.95)

This program is designed for young children who want to learn about colors and numbers. It is designed to make learning FUN and INTERESTING for the child. There are two parts to the program, the first part displays moving objects on the screen and allows the child to change colors of the objects by pressing only one key. New objects may also be selected at any time. The second part allows the child to change the colors of the clothing worn by a little girl and boy. A special surprise reward is included.

(Ext. BASIC Required, Speech Synth. Recommended)

HELP YOUR KIDS WITH THEIR SCHOOL HOMEWORK! (You can also use it yourself - for household and/or business use.)

This system has many great capabilities and provides a neat easy way to organize information for school or home use. It provides a convenient method for entering all classes and assignments for each class. It also has a section for writing and printing book reports. And that's not all, it can also be used as a "word processing" system, because it has a built-in Typewriter function. Last but not least is a 20,500 word dictionary which can be used to look up words and to automatically check the spelling of all the words used in your reports.

\$49.95 (Disk System and Memory Expansion Required)

NEW POWERFUL INFORMATION MANAGEMENT SYSTEM (Data Base Manager)

Allows you to design your own "Fill-in-the-Blanks" form on the screen with complete flexibility. Each form can contain up to 255 blank spaces for information to be entered. You may create and save any number of these forms and enter your information on them at any time. Once you have entered and saved your information, it can be sorted and/or printed in any order. During printing, information can be reordered and/or omitted if so desired. Complete flexibility is what this system provides. Visit our showroom for a demonstration and complete details.

\$69.95 (Disk System and Memory Expansion Required)

TINY LOGO (Only \$19.95)

All you need is the basic machine and a cassette tape recorder to use this all new LOGO language. Includes a 32-page detailed booklet with sample programs. Allows you the ability to create colorful graphics with the turtle and learn programming.

SPELLING CHECKER (Only \$49.95)

Includes a 20,000 word dictionary and provides you the ability to add your own words and your own dictionaries. Automatically corrects spelling in your documents. Also flags unrecognized words or terms and allows you to decide on the action to be taken. (Disk System, TI-Writer or Ed. Assem. Required)

TRIVIA (Only \$16.95)

Includes two versions of a Trivia game (Disk and Tape), two versions of a Data Base program and a book which introduces you to data bases, their applications, and how simple data bases work. Also compares advantages and disadvantages of Disk and Tape files as well as how to design records and make your programs more efficient.

FINALLY, YOU CAN NOW GET AT THE FULL POTENTIAL OF DRAWING ON YOUR SCREEN IN FULL BIT GRAPHICS MODE WITHOUT HAVING TO LEARN ASSEMBLY LANGUAGE.

This package allows you to draw and color almost anything on your screen using your joystick and keyboard. You can also save your drawings and print them with your printer. You have to see this package to believe it. This one is truly SUPER! The over 80 drawing functions include: foreground stroke, background stroke, draw arc and circle, draw horizontal or vertical line, store stroke, repeat stroke, and many more. Also includes unique connect-the-dots function and you can paint the interior of any shape in any color. Mac is nothing compared to this fantastic tool.

(Ext. BASIC, Disk System & Memory Exp. Required)
\$59.95 Drawing Program \$24.95 Printing Program

PROGRAMMERS WANTED

If you are experienced in writing programs for the TI 994/A in any of the following languages: BASIC, Extended BASIC, Assembly Language, FORTH, or PASCAL and would like to earn some extra cash, contact us for details.

Specialist In

The Texas Instruments Home Computer

1815 Ford Road (612) 544-6219 Mks. MN 55343

"WE'LL MEET OR BEAT ANY PRICE THAT IS NOT BELOW OUR COST"



Comments

Why is it so late?

This is our second consecutive 40-page issue, which is the size we were aiming at last January when we mailed our first edition of 24 pages. But there is a price to be paid for 40 pages. You see, it takes about a week longer to put a 40-page edition together than it does to put a 32-page edition together. We're still doing this at night and on weekends.

This hasn't caused much of a problem for subscribers who have the magazine mailed to them via first class mail (or air mail for those in Europe, Australia and elsewhere). It does create a problem for the bulk of our subscribers whose copies are sent via domestic third-class mail. Because it takes longer to produce, the magazine gets mailed later in the month. This results in erratic delivery dates. With a 24-page magazine, we print and mail it about the 15th of the month. A 40-page magazine, however, may not get mailed until the fourth week of a month. The November edition, for example, was mailed Oct. 30, which is late even for us.

It can take as long as five weeks via third-class delivery for the magazine to reach you after we've delivered it to our local post office. We have been told that our October edition, mailed in late September, was not delivered to one Washington, D.C., subscriber until Oct. 30. However, that same subscriber received his July edition within a week of its mailing.

Which is why those who pay a little extra for first class delivery are getting their money's worth, because the magazine is being delivered within three or four days of mailing. I haven't heard a lot from readers about our larger issues, but we hope to sustain it in the coming year. Right now, 40 pages is the maximum we can do without increasing our postage costs significantly. The next plateau is 48 pages, which we will attempt if and when the magazine is able to provide either the editor or me with full-time work. It simply cannot be done on a part-time basis. Also, we are going to be increasing our subscription price to \$15 a year. We're going to start this new rate with the February 1985 edition (Vol. 2, No. 1). However, for now you may extend your subscription for a year at the \$12 rate if you like. To do so, simply send us a check

for \$12 and a facsimile of your mailing label to us and we will extend the subscription. If you are currently receiving the magazine via third class mail but decide to have your extended subscription delivered via first-class mail, simply add \$3.50 to the \$12 and we will see to it that it is done. Texas residents must add 5.125 percent sales tax.

We're continuing our "freeware" offer, but have institutionalized it a bit. Elsewhere you will find information about what we have to offer and how to get it. In addition to the TI-Writer and Multiple file updates and Super Bugger, we are offering TI-Forth. However, there will be a charge for TI-Forth because of the extensive documentation—some 232 pages in all. (At this point we are missing one page, and will wait to receive it before reproducing the manual. It's Page 3 of Chapter 4 for anyone who would like to help us out.) The system disk will include Forth, Forth screens and Forth demonstration programs. We will include these on two single-sided diskettes. This all depends on a minimum of 100 orders, however, so we'll hold your check until we've got 100 and then we'll send everything out. By the way, we obtained Forth from the Los Angeles 99ers Users Group, which has a very active Forth membership.

THE BIG SELLOUT

Now is the time for all TI users to decide what cartridges they want to have and to buy them. The word from several sources is that Christmas 1984 will be the last time we'll see the TI-produced cartridges in stores. Prices are down, too. The major chains are expected to stock the cartridges for the season and then push everything that remains on the door come January.

TI LICENSING AND WARRANTIES

Although you may see a number of TI cartridges being produced by third parties under license from TI, do not expect TI to provide a warranty on these products. TI warranties cover only TI-produced products. Companies that negotiate for the production rights to selected cartridges will be responsible for any warranty of the product.

The BIGGEST TI-99/4A SOFTWARE OFFER



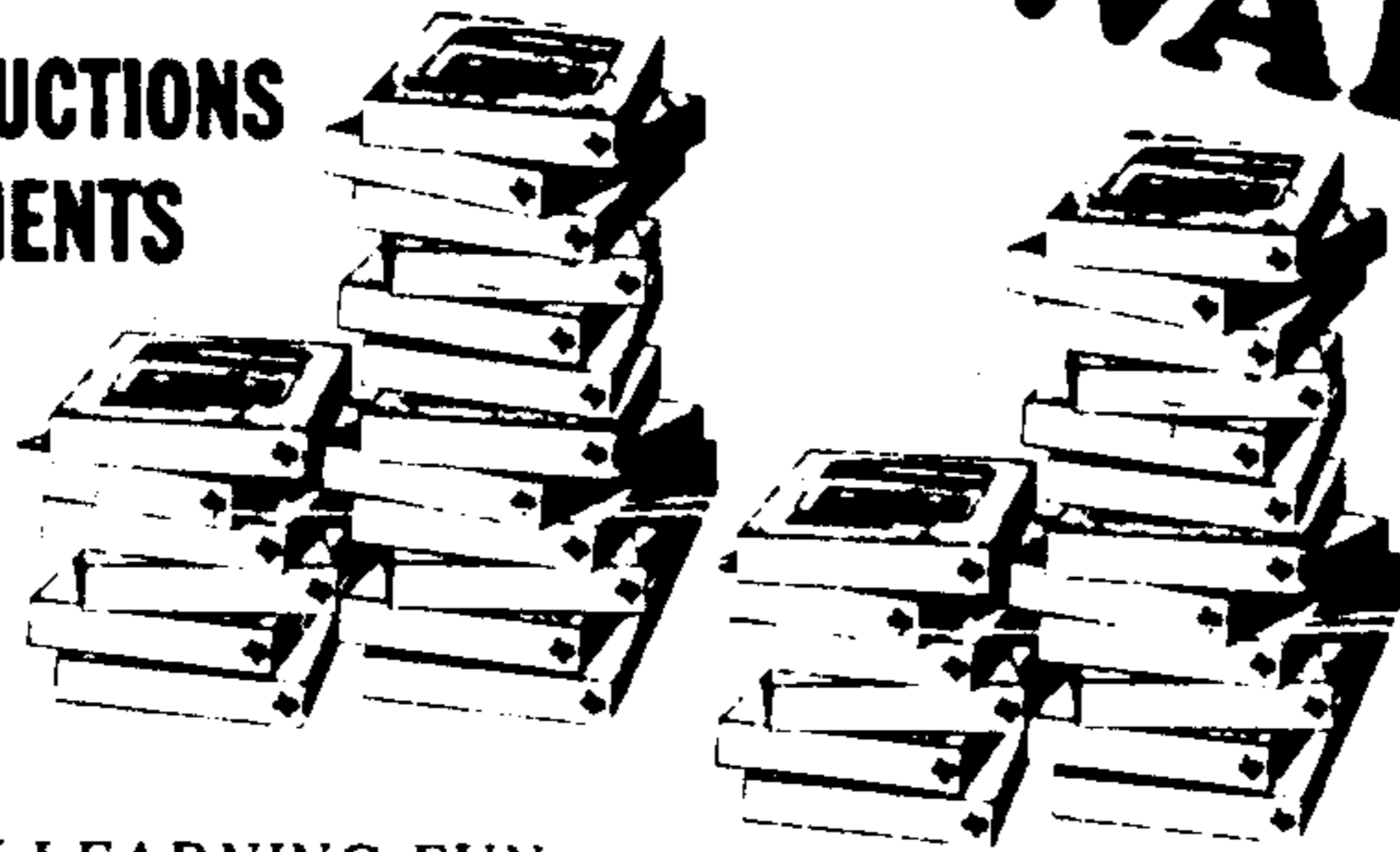
TEXCOMP™

TI USERS SUPPLY

PRESENTS:

TEXAS INSTRUMENTS & **TEXCOMP**

Announce
DRASTIC PRICE REDUCTIONS ON TEXAS INSTRUMENTS COMPUTER SOFTWARE



of 1984

\$995

- PHM 3002 EARLY LEARNING FUN
- PHM 3003 BEGINNING GRAMMAR
- PHM 3004 NUMBER MAGIC
- PHM 3016 TAX INVESTMENT REC. KEEPING
- PHM 3013 VIDEO GAMES
- PHM 3022 PERSONAL REAL ESTATE
- PHM 3023 HUNT THE WUMPUS
- PHM 3030 AMAZING
- PHM 3031 ATTACK
- PHM 3032 BLASTO
- PHM 3052 TOMBSTONE CITY
- PHM 3053 TI INVADERS
- PHM 3054 CAR WARS
- PHM 3056 ALPINE
- PHM 3057 MUNCHMAN
- PHM 3095 FRACTIONS (MILL)
- PHM 3098 NUMBER READINESS (MILL)
- PHM 3099 LAWS OF ARITHMETIC (MILL)
- PHM 3100 EQUATIONS (MILL)
- PHM 3101 FORMULAS (MILL)
- PHM 3229 HOPPER
- PHM 3112 PARSEC

\$495

- PHM 3042 TUNNELS OF DOOM + CASS OR DISK
- PHM 3041 ADVENTURE + CASS OR DISK
- PHM 3114 ALLIGATOR MIX
- PHM 3116 DEMOLITION DIVISION
- PHM 3115 ALIEN ADDITION
- PHM 3118 MINUS MISSION
- PHM 3119 METEOR MULTIPLICATION
- PHM 3169 WORD INVASION
- PHM 3185 WORD RADAR
- PHM 3034 HUSTLE
- PHM 3037 HANGMAN

\$695

- PHM 3009 FOOTBALL
- PHM 3010 PHYSICAL FITNESS
- PHM 3015 EARLY READING (speech)
- PHM 3043 READING FUN
- PHM 3046 READING ON
- PHM 3047 READING ROUNDUP
- PHM 3048 READING RALLY
- PHM 3082 READING FLIGHT
- PHM 3027 ADDITION & SUBTRACTION 1
- PHM 3028 ADDITION & SUBTRACTION 2
- PHM 3029 MULTIPLICATION 1
- PHM 3049 DIVISION 1
- PHM 3050 NUMERATION 1
- PHM 3051 NUMERATION 2
- PHM 3088 COMPUTER MATH GAMES 6
- PHM 3059 SCHOLASTIC SPELLING 3
- PHM 3060 SCHOLASTIC SPELLING 4
- PHM 3062 SCHOLASTIC SPELLING 6
- PHM 3090 ADDITION (MILL)
- PHM 3091 SUBTRACTION (MILL)
- PHM 3092 MULTIPLICATION (MILL)
- PHM 3093 DIVISION (MILL)
- PHM 3094 INTEGERS (MILL)
- PHM 3020 MUSIC MAKER
- PHM 3067 OHELLO
- PHM 3064 TYPING TUTOR
- PHM 3233 BURGERTIME
- PHM 3220 MICRO SURGEON
- PHM 3219 SUPER DEMON ATTACK
- PHM 3224 MOONSWEEPER

19111111-9
30
270
350
200
1820

FREE SHIPPING ON ALL SOFTWARE ORDERS OVER \$100.00★

SEND ORDER AND MAKE CHECKS PAYABLE TO:

TEXCOMP™

P.O. BOX 33084 - GRANADA HILLS, CA 91344

Texas Instruments



VISA and MASTERCARD HOLDERS CALL DIRECT:

(818) 366-6631

add 3% for credit card orders



24 HOUR ORDER LINE

TERMS: All prices FOB Los Angeles. For fastest service use cashiers check or money order. Personal checks take at least 10 days to clear. Add 3% shipping and handling (\$3.00 minimum). Easy 10% deposit. 4.9% free shipping on all software orders over \$100.00. We will ship UPS 2-D with 25% deposit. C.O.D. to be paid by cash or certified check. All products are sold with the original manufacturer's guarantee, when requested. Prices and availability subject to change without notice. We reserve the right to limit quantities.

NOTE: Payment in full must accompany all orders. Credit-Card Company, Check or Money Order for immediate shipment. Personal checks require up to 4 weeks to clear. California orders add 6.25% sales tax.

WHEN IN THE LOS ANGELES AREA VISIT OUR MODERN WAREHOUSE OUTLET STORE WHERE YOU CAN PURCHASE ALL TI ITEMS AT OUR REGULAR DISCOUNT PRICES. CALL FOR LOCATION & HOURS!

SEND \$2.00 FOR OUR NEW EXPANDED CATALOG AND RECEIVE A \$5.00 SAVINGS CERTIFICATE!!!

Feedback

Answers sought

Your publication certainly is useful, the letters, the reviews, the "political" type articles and especially the advertisements. I have several questions that I have never seen explained in my past two years of reading everything that I can find on the TI. They seem so fundamental I can not understand why no one has written on them.

First, from all the technical articles and notes that seem directed at assembly programmers and alluded to with the SIZE command in Extended BASIC, it seems that the RAM memory is accessible to different languages. The situation is compounded with the 32K. It seems that accessing this in a BASIC program is not altogether complete. Could you give an explanation clarifying all this that won't fly over this BASIC programmer's head?

The second question is on the same topic. In using string variables and arrays, just how much memory is allotted for each string? For instance, it seems that a big chunk of memory is set aside for each string variable or array member no matter how big or small it is. To conserve memory, does it make sense to concatenate a bunch of short strings together and save them as a single longer string? An example would be a mailing list program. I have one that saves the first name, the last name, the street, the city, etc., all as separate strings. Even with 32K memory added, the program holds only 100 names. If I rewrote this concatenating all these strings together for each person, using SEG functions to split it apart as needed, would the program have more room?

Frank Krautter
Sec/treas Penn Ohio Users Group
Youngstown, Ohio

ED: Briefly, the expansion memory cannot be accessed without the use of a cartridge such as Extended BASIC, TI-Writer, Editor/Assembler, etc. Even so, the available memory is not all directly accessible. About 24K of a 32K expansion memory is available as RAM, while the remainder is available through the use of Assembly language code. As for the second question, concatenating strings would save some room, but the longer the program the less room will be available in RAM for data files, even with

expansion memory. Designing a program to read and write relative files would greatly increase the number of files you could write because they are stored on the disk and called up only upon command. Sequential files are somewhat easier to use but must be loaded entirely into memory at the same time, thus severely limiting the number of individual records that can be entered.

Forth and TI-Writer

I sent off for a few software items at good prices and may be led back to playing with Forth again after reading the Wycove articles. (I was one of the original Wycove I purchasers and "played" with it before I ever got TI Forth from a users group.) Later I got the Version 4 (?) TI Forth from Tex-Comp and the Wycove II with the enhancements I'd suggested be included by analogy with TI Forth. They did an excellent job. Miller's Graphics newsletters have had a pretty good series on TI forth and starting up.

As an early TI-Writer fan, I was pleased to see a defense of it. It also works well with the upgraded (i.e., PSRX) 128K Foundation card and is a much maligned piece of software and GROM. I would point out that TI-Writer does chain files and print them (unlike the "Companion" reviewer erroneously stated). All one has to do is create a file that is simply a series of .IFs (include files) for each file and in printing they will be printed sequentially, as, for example, chapters of a book. (See the TI-Writer manual, page 109, for an example.) The beauty of TI-Writer is that, aside from the fact it's run as two pieces of software, it is always full of little tricks to someone willing to ... try out the obscure (or even clear text) capabilities. If only it would sort lists as L. Smith's word processor Magictouch (authored and closely distributed at TI-Dallas just as October 1983's axe fell, and never published) does.

Remember ... we bought the last Peripheral Expansion Boxes, etc., from employee sales and the cable cards were S/N 200,000's, while my first PEB card was a 50,000 S/N range. Perhaps there are over 200,000 well-filled PEBs out here. We need and will support advertisers with \$\$\$.

Yes, Virginia, Commodore is a joke, but it does have REAL production support and

software support. Its disk system is late stone age in speed and the only thing more clumsy is Adam's disappearing (or is it disappearing Adam's?) tape system.

Ron Castleton
Richardson, Texas

On piracy

Having recently received and read your October issue, I would like to congratulate you on what was your best journalistic effort yet — on software "pirating." It was thorough and insightful and provided us "average" 99ers (i.e., non-professional programmers) with "insiders" views of the situation.

My own opinion on the matter is that the programmer has every right to "protect" his/her creation in in any way he/she chooses, but I have the right to copy it if I can find a way to do so (at least for my own personal use) — but I do NOT have the right, legally or morally, to distribute the copy for personal gain or profit. In fact, I now REFUSE to buy any software that I can't copy because:

a) I enjoy tailoring the software so that it makes fullest use of all of my system's capabilities (after all, I DO have all of this hardware sitting around);

b) Many if not most software distributors use cheap diskettes in order to keep costs down — good for their earnings but bad for the purchaser, of course;

c) I refuse to pay \$5 or more for an official replacement when I can get top-quality blank diskettes (single-sided) for less than \$2 now; and

d) by the time my program disk wears out the author and/or distributor may have done so also!

Steve Casman
Danbury, Connecticut

Bad name

After looking through your August issue I tried using the "useful stuff" and I got a "Bad Name" error. These are the steps I took:

1. Load BASIC program from disk
2. Entered Call Load (-31888,0)
3. Got error "Bad Name"

(Please turn to Page 8)

.....Texas Instruments TI-99/4A — COMPUTERS, COMPONENTS AND SOFTWARE..... tm

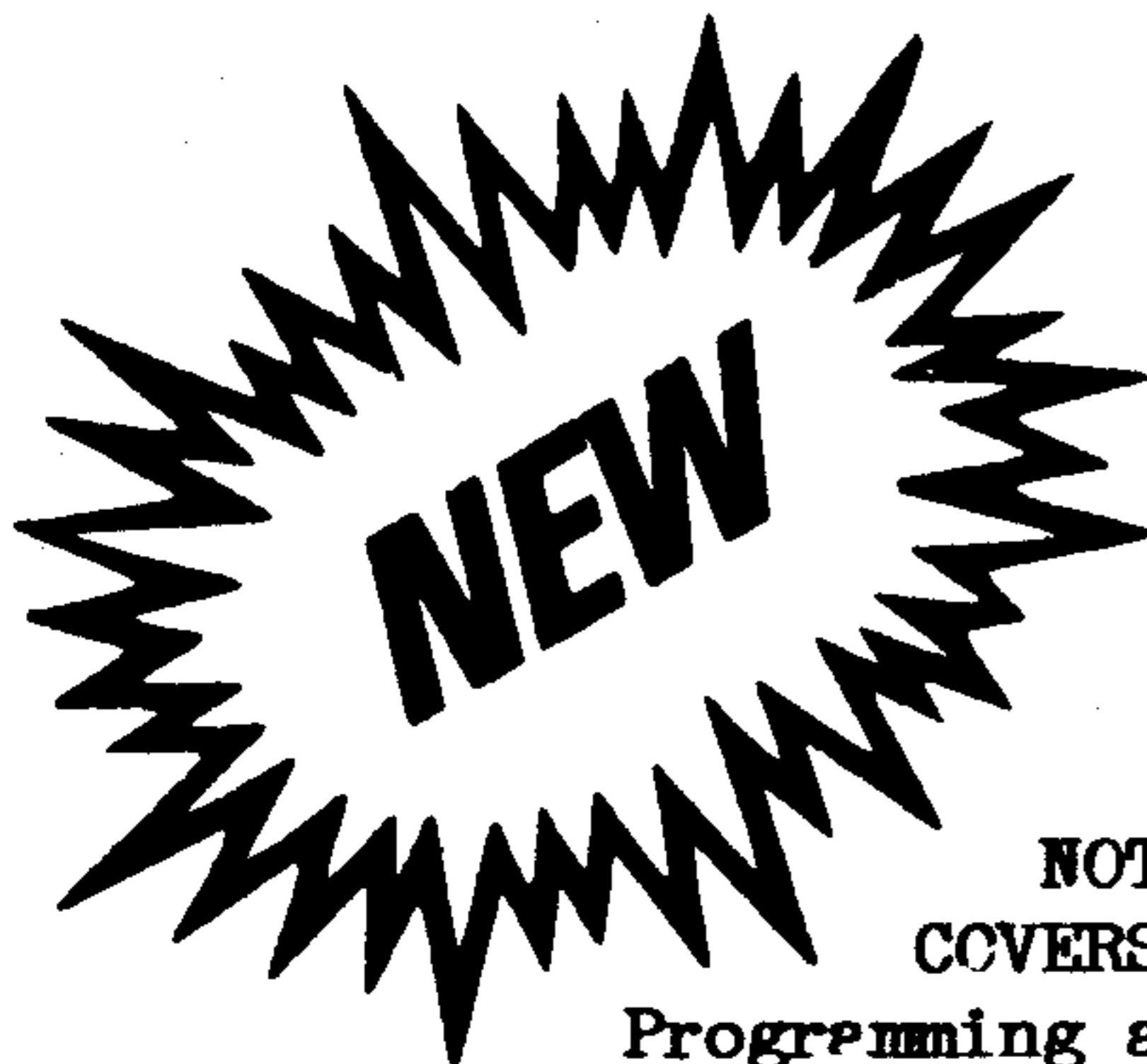
TEX+COMP



America's Number One TI computer retailer

AUTHORIZED DEALER

TI-99/4 PRODUCTS AT PROFESSIONAL PRICES



Bits And Bytes Of Computer Action!

For the Texas Instruments Home Computer ...

50 READY-TO-RUN PROGRAMS



ON CASSETTE OR DISKS



INCLUDES 141 PAGE "BITS & BYTES", AN EASY TO READ BOOK WHICH NOT ONLY LISTS OUT AND COMPLETELY EXPLAINS ALL 50 PROGRAMS, BUT COVERS: Using and Understanding Commands...A dozen hints and tips, Programming and Flowcharting made easy. .. a \$150+ value.

OFFERED EXCLUSIVELY BY TEX-COMP

INCLUDES:

- SECTION #1 PROGRAMMING COMMANDS MADE SIMPLE
- SECTION #2 FLOWCHARTING FOR EASY PROGRAMMING
- SECTION #3 PROGRAMMING HINTS AND TIPS
- SECTION #4 FIFTY READY TO RUN PROGRAMS ESPECIALLY FOR THE TI-99/4A

- FLAG AND NATIONAL ANTHEM (B)
- MAZE BOGGLE (XB)
- WORD SEARCH (B)
- BASEBALL QUIZ (B)
- NOVEL TI (B)
- BASIC MAGNIFY (B)
- MESSAGE BOARD (XB)
- MUSIC MAKER (B)
- BILL FILING SYSTEM (XB)
- DOODLE (B)
- FLASHCARDS (XB)
- BYTEMAN (XB)
- ARITHMETIC EXERCISE (XB)
- SPELLING EXERCISE (B-TE2)
- STATE CAPITOL QUIZ (XB)
- SPACE FURY (XB)
- DEATH MOBILE (B)
- GRIZZLEY (B)
- TONK (B)
- CURVE PLOT (B)
- CIRCLE PLOT (B)
- TOE-TAC-TIC (B)
- LOAN CALCULATING PROGRAM (XB)
- KEYBOARD TEACHER 1 (B-TE2)
- KEYBOARD TEACHER 2 (B-TE2)
- MARTIAN PROBE (XB)
- SOUND EFFECTS CATALOG (XB)
- HOUSEHOLD INVENTORY (B)
- GEEN GAME (B)
- WORD CRAZE (B)
- WONDER MATH (B)
- HOME PLANT CARE LIBRARY (XB)
- DOXOLOGY (B)
- ARTILLERY ACE (B-TE2)

- SECTION #5 APPENDIX'S
- A. ASCII CHARACTER CODES
 - B. CONVERSION TABLE/PATTERN IDENTIFICATION
 - C. MUSICAL TONE FREQUENCIES/ADDITIONAL MUSIC CAPABILITIES
 - D. SAMPLE SHEET OF CHARACTER DEFINING GRAPH PAPER

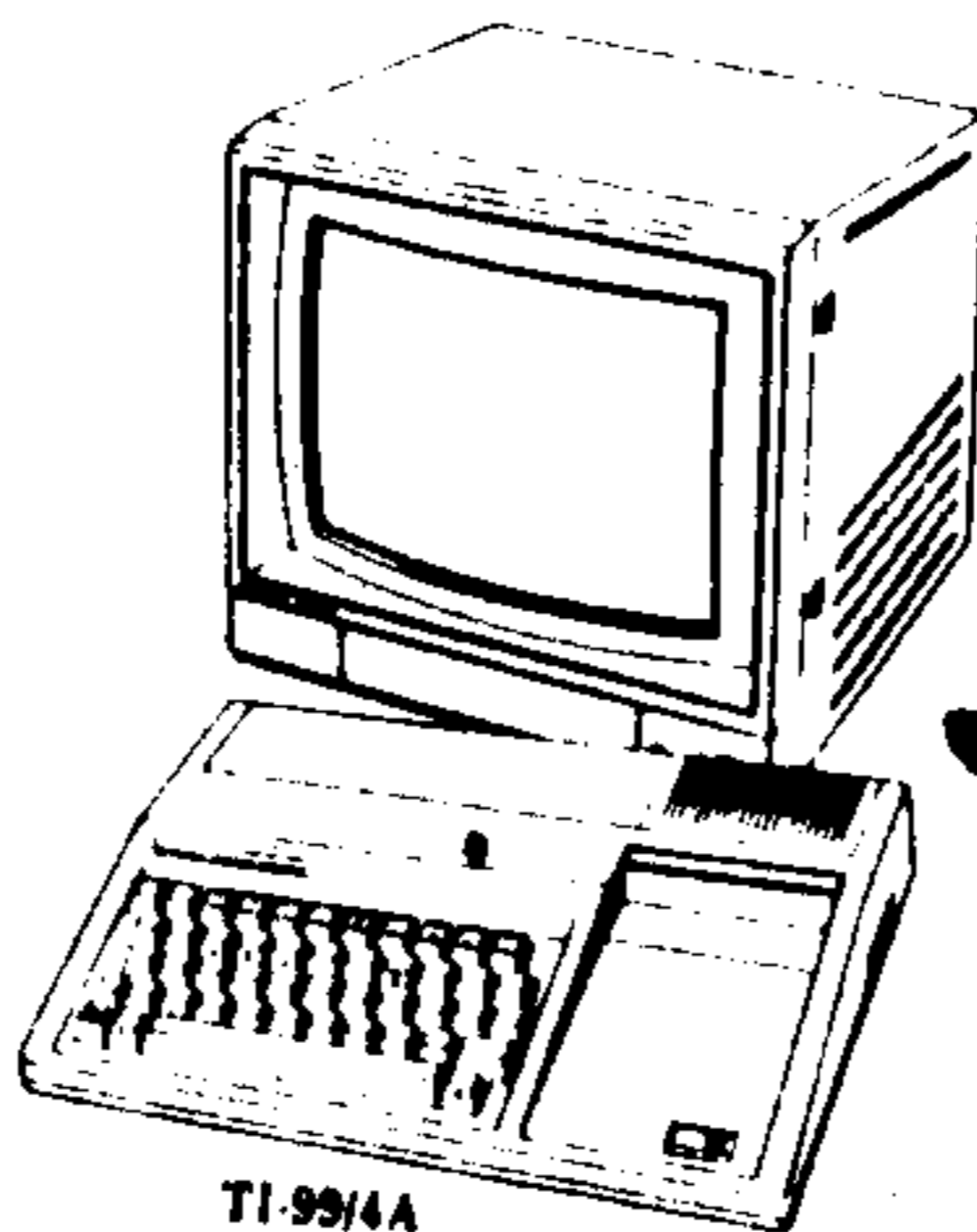
NO Disk Drive or Memory Expansion Needed!

ONLY \$19⁹⁵

Cassette

post paid

*Continental U.S. ONLY



TI-99/4A

- Games
- Educational
- Business



- SKI RUN (XB)
- HAPPY BIRTHDAY (B)
- VISUAL VALENTINE (B)
- BLACK JACK (B)
- TRAP (B)
- MATH CHALLENGE (B)
- STRANDED (B)
- LAS VEGAS LUCK (B)
- GRAVITY SIMULATION (XB)
- SKYDIVING CHALLENGE (XB)
- MAZE MADNESS (B)
- MAIL AND PHONE LIST (B)
- SPEECH SOUNDER (B-TE2)
- EVIEL-EYEVIL (XB)
- SPACE SHUTTLE COLUMBIA (XB)
- QUEST (XB)

GRAPHICS, SPEECH & EXTENDED BASIC

TEX+COMP™

TI USERS SUPPLY COMPANY

"YOUR LUBBOCK CONNECTION™"

• P.O. BOX 33084, GRANADA HILLS, CA 91334 •

AUTHORIZED DEALER

BITS & BYTES (CASSETTE).....\$19.95

BITS & BYTES (DISKS).....\$26.95

Free shipping to surface UPS areas

Add \$3.00 for non-UPS areas

Add \$4.00 for Canada

Add proper postage for foreign orders

Mr./Mrs./Ms. _____

Address _____

Apt. _____

City _____

State _____

Zip _____

CHECK ONE: Payment Enclosed \$
Please Charge My: MasterCard VISA

CARD NO. _____

EXP. DATE _____

All prices have been discounted for cash,
add 3% for credit card orders.

Visa and MasterCard Holders Order Direct

(818) 366-6631

24 HOUR ORDER LINE

Feedback

(Continued from Page 6)

Could you possibly explain what I am doing wrong. I would appreciate any ideas or solutions as I hate to continue to turn off the P-box and use tape unless there is no other way.

**Douglas Gilliatt
Roswell, Georgia**

ED: We tried it in BASIC and got the same BAD NAME message. Of course, this is due to the fact that a CALL LOAD can only be executed with a memory expansion which cannot be accessed through console BASIC. Both Extended BASIC and a memory expansion are required to execute CALL LOADs.

Graphic suggestion

I particularly like your reviews of utility programs and would like to see more. One of the more interesting applications of such utilities is in the area of high-resolution graphics. I hope that in a future issue you will devote some time to this very interesting and important area of utility programming.

**James Dancer
Indianapolis, Indiana**

Bunk, bunk, bunk!

I'm getting tired of these crybabies sobbing on all our shoulders about all those MEAN & NASTY pirates out there stealing their software. If they don't like it THEN DO SOMETHING ABOUT IT! In the software marketing game, developers are expected to stay a step ahead of the pirates. If they can't, then they should get a hacker who really knows how to program to help. This is part of their job, and there will always be a better protection scheme to devise and a hacker who wants to break it. The cycle continues ad infinitum.

There is no "ultimate protection" for ANY computer, much less the 99. This is the route taken by John Brown, who had the only decent protection put on TI software. Very few people have been able to completely break it, and he has now come out with an even better system that, to my knowledge, has not been broken yet. Mr. Brown obviously takes a great deal of pride in his work and takes the time to protect it properly. If

he provided a backup disk as part of the package as you suggested, I would have no reason to try to break his protection. For those "software developers" relying on the proprietary protections that TI provided, I have a deaf ear to their screams of "foul." The majority of stuff like this is junk anyway, and if they're capable of writing a good program, they should be capable of protecting it. Or better yet, take Jim Peterson's of Tigercub or Gene Harter's of Not-Polyoptics view that good, cheap, even unprotected software will sell well.

As for the idea that there are 10 pirated programs for every one that's bought, I say BUNK! And to the claim that there are programmers leaving the TI in droves out of fear of piracy, DOUBLE BUNK! Let them get out into the real world of Apple, Commodore and IBM, and they'll think they have been thrown to the wolves. On this point, Earl Hall is dead wrong about Apple users being consumers only. There are more experienced hackers, much more elaborate protection schemes and vastly more pirated software on the Apple than any other machine. If you don't agree, just get on one of the many Apple pirate BBS's around. In that arena, you play with pros, and developers are constantly having to come out with new protection schemes to stay ahead of the pirates. Even the naive "consumer" can get into the game with the many software and hardware protection breaking kits commercially available. So the TI programmers should be thanking their lucky stars that they are in such a sheltered environment.

I must make one last rebuttal to Earl's statement that "In another six months it will be all over." TRIPLE BUNK!!! That's EXACTLY what "they" said a year ago when TI left the market, and things have never been so good for the 99! Evidence this by the software released in '84 that surpasses anything B.T.I. (Before TI), as well as the growth of BBS's and Compuserve TISIG which didn't exist a year ago but now has members numbering in the thousands. LONG LIVE THE 99!

**Curt Purdy
Phoenix City, Alabama**

Light show

I have a comment on the CR Remover program which was shown in the User Notes section of the October issue of MICROpendium. After having "sophisticated" it with some DISPLAY ATs and options for two disk drives, I decided to try it out. I have the TE1200 which has sector 0022 altered to save downloads as DISPLAY/VARIABLE 80 format instead of 128, and also has the screen color changed to the same as TI-Writer. After logging off the Source with a downloaded file of user messages (from the TI POST) I tried the CR Remover program with some rather strange results.

The program would run for about 10 seconds when suddenly it would crash and the screen would go into an impromptu light show reminiscent of the Fillmore East! I at first thought it might have something to do with one of the POSTs that I downloaded, in which a user described a method of getting the computer to go into a very colorful but bizarre light show. But knowing that this could not be the problem due to the fact that POST was a text file, I tried other solutions. It finally came down to this: I found that if the first line of the file to be "CR-Removed" contains only a carriage return and line feed symbol, that the program would always crash. If I deleted that first line, resaved the file and then ran the remover program, everything would then work fine. I intend eventually to rewrite the program to take care of this condition, but for now I thought you might like to be aware of the problem in case other subscribers had a similar problem. Maybe Mr. Purdy, the original author, has a fix for this.

**Mark A. Keeler
Danbury, Connecticut**

ED: We have had no problem using this carriage return remover. Perhaps the changes you made to it had an unexpected effect.

The Feedback column is for readers. It is a forum to communicate with other readers. The editor will condense excessively lengthy submissions where necessary. Contributors should restrict themselves to one subject for the sake of simplicity. Mail Feedback to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

TEX+COMP™


America's Number One TI computer retailer
TI-99/4 PRODUCTS AT PROFESSIONAL PRICES

PRESENTS:

The BIGGEST BOOK & SOFTWARE OFFER

of 1984

TEX+COMP™
Special Purchase

ON  **DATAMOST** INC For the Texas Instruments Home Computer...

the most important books
you can turn to for TI-99/4A
guidance.

SAVE up to **80%** PLUS READY-TO-RUN CASSETTE & DISK SOFTWARE PROGRAMS

Computer Books and Software from DATAMOST INC

Special Offer: BELOW DEALER COST!

*** GAMES TIs PLAY**



The authors have compiled a large selection of classic computer games along with many clever new ones. Written in TI BASIC, they are formatted in a way which lets you easily adapt all or portions to your own programs. Each game is explained in clear simple terms--allowing you to customize and modify them to your heart's content! You'll learn text formatting, word games, data statements, and input routines. Many of the games will help you understand how grids are constructed and graphics animated. Helpful techniques let you dissect BASIC programs and learn what makes them tick. Learn programming and de-bugging from working with these games. 260 pages--sprial bound--published at \$14.95..Ready-to-run programs \$24.95. TEX-COMP price complete with 32 programs on cassette..\$7.95.

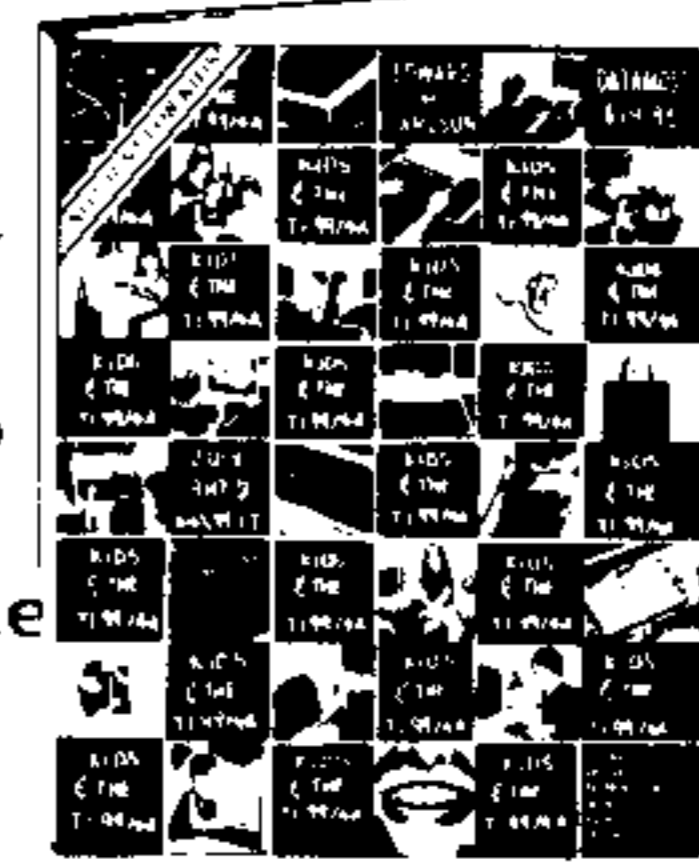


REG. \$14.95 **\$7.95**

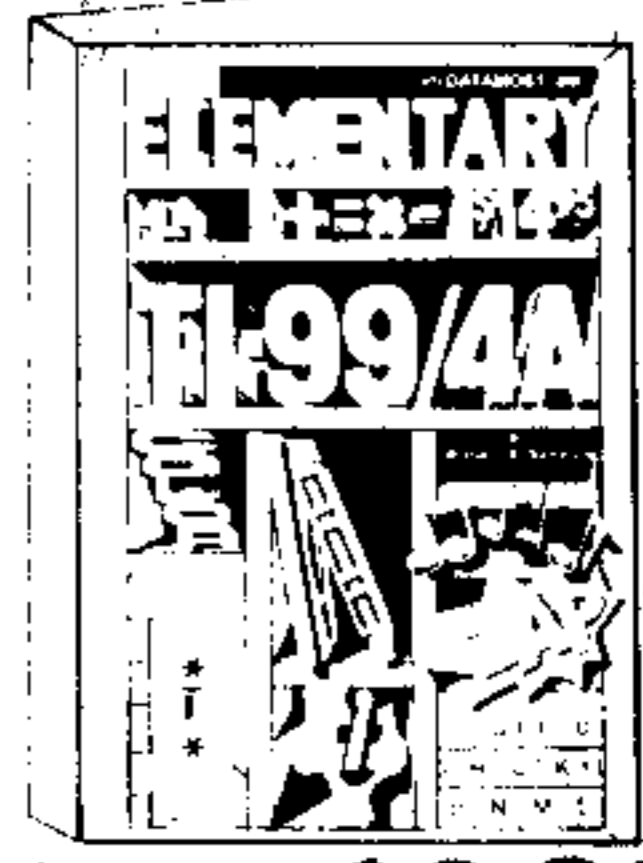
WITH 32 READY-TO-RUN CASSETTE GAME PROGRAMS

*** KIDS AND THE TI-99/4A**

The most popular introduction to the 99/4A ever published. 33 step-by-step lessons introduce the reader painlessly to the wonderful world of the TI-99/4A. Each lesson includes notes for teacher or parent as well as a review quiz at the end of each chapter. Illustrated with dozens of cartoons to make learning computer literacy fun. Suitable for Adults! 236 pages--sprial bound published at \$19.95. TEX-COMP price.....\$4.95



REG. \$19.95 **\$4.95**



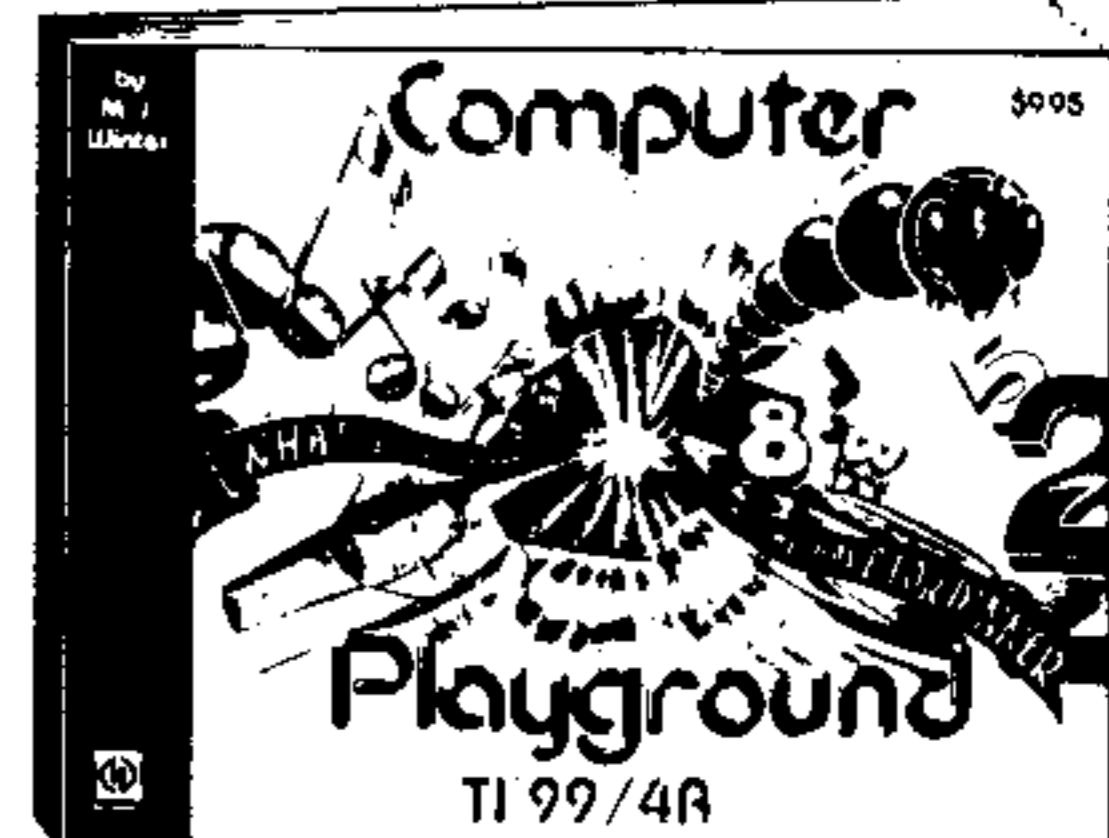
REG. \$14.95 **\$2.95**

*** THE ELEMENTARY TI-99/4A**

Ten chapters lead you step-by-step through the process of hooking up the TI-99/4A, loading and saving programs, creating graphics, music, and all kinds of handy utilities. It is written in a concise and progressive manner so when you are finished you will be writing and using programs. Even if you already are programming, this will provide a lot of helpful information and will appeal to all members of the family. 256 pages--sprial bound--illustrated-pub. at \$14.95 TEX-COMP price \$2.95.

*** COMPUTER PLAYGROUND ON THE TI-99/4A**

This is the perfect book to provide children grades 2-6 with their first exposure to the world of computers. Everthing is kept simple with over 70 pictures and drawings to color and a series of simple activities to lead the child through elementary computer understanding and programming. Ideal for both schools and computer camps. Contains sample programs and lessons on how to modify and write them. Many illustrations in full color 128 pages--published at \$9.95 TEX-COMP price.....\$1.95



REG. \$9.95 **\$1.95**

TEX+COMP™

TI USERS SUPPLY COMPANY
"YOUR LUBROCK CONNECTION™"
P.O. BOX 33084, GRANADA HILLS, CA 91334

CHECK ONE: Payment Enclosed \$
Please Charge My: MasterCard VISA

CARD NO. _____
EXP. DATE _____



PLEASE SEND ME THE FOLLOWING DATAMOST BOOKS:

- GAMES TIs PLAY including cassette with 32 PROGRAMS- ENCLOSED IS \$7.95 for each. (add \$3.00 for disks)
- KIDS AND THE TI-99/4A-ENCLOSED IS \$4.95 for each.
- THE ELEMENTARY TI-ENCLOSED IS \$2.95 for each.
- COMPUTER PLAYGROUND ON THE TI-99/4A- ENCLOSED IS \$1.95 for each.
- SHIPPING AND HANDLING--CONTINENTAL US ENCLOSED IS \$2.95 for any number of books up to 4. ADD \$3.00 for HI,AK, APO, PPO & CANADA.

NOTE: Payment in full must accompany all orders. Credit-Card, Company Check or Money Order for immediate shipment. Personal checks require up to 4 weeks to clear. California orders add 6 1/2% sales tax.

SEND ORDERS TO:

TEX+COMP™

P.O. BOX 33084
GRANADA HILLS, CA. 91344

All prices have been discounted for cash, add 3% for credit card orders.
Visa and MasterCard Holders Order Direct

24 HOUR ORDER LINE (818) 366-6631

At the Faire

Nearly 1,500 turn out for exhibition in Chicago dedicated to the 'orphan' computer

By DAVID WAKELY

On Nov. 10, the Chicago TI99/4A Users Group held its second annual 99/4A Computer Faire at Triton College in River Grove, Illinois. Months of preparation for the Faire culminated when the doors opened at 10 a.m. and visitors were admitted to the large exhibit room which held displays by 21 vendors. In addition to being issued doorprize tickets, fairegoers were given free shopping bags with the message "Still Goin' Strong at the 2nd Chicago TI99/4A Users Group Computer Faire, Nov. 10, 1984" printed on the side.

While most of the vendors of TI and third party software and hardware were from the Chicago area, tables were also taken by companies from Michigan, Nebraska, Ohio and Texas. From a list gleaned from various magazines which cover the 99/4A, the Chicago group had mailed vendor applications to just over 100 companies which could be identified as carrying TI-compatible products. Former Chicago group president and Faire coordinator Sam Pincus said that the group was pleased with the 20 percent response rate.

In a sense, preparations for the Faire could be said to have begun last year, when the group had put on the first such event. As it happened, the infamous "Black Friday," the day Texas Instruments announced it was dropping the 99/4A computer, had occurred just two weeks prior to the first Faire. As a result of that, the group was somewhat surprised when just over 1,000 persons, or about three times the number who belonged to the Chicago group at that time, attended the Faire and



proceeded to strip vendor displays clean of TI software.

Hence, by the time of the second Faire, TI owners had been "orphans" for a year, and the need for a display of "TI power" seemed in order to once again demonstrate the fierce loyalty for which the TI user is known. Through aggressive advertising both in Chicago and over The Source and CompuServe, the Chicago group began drawing attention to the Faire, and TI users from all over began making inquiries as to the location of the site, Triton College. Several local motels were booked up on the evening before the Faire, and by the end of Saturday just under 1,500 persons were estimated to have passed through the doors.

While about 90 percent of the

Place: Chicago
Subject: TI99/4A
Attendance: 1,500
Exhibitors: 21
Highlights: Plenty

membership of the Chicago 99/4A Users Group attended the Faire, visitors also came from other states. TI users from all over stopped by the Chicago group booth to say hello. Ed York from the Cin-Day Users Group checked up on our group newsletter; Chris Goodman from the DC group seemed to be enjoying the proceedings; and a small group from Coraopolis, Pennsylvania, stopped to say thanks for the directions to the college from O'Hare Field. The Chicago group booth was busy all day. Winners of three door prize drawings picked up their software packages. Hundreds of free copies of MICROpendium were given away, a top quality Zenith color monitor was awarded to a lucky winner and two arcade game contests drew small

(Please turn to Page 12)

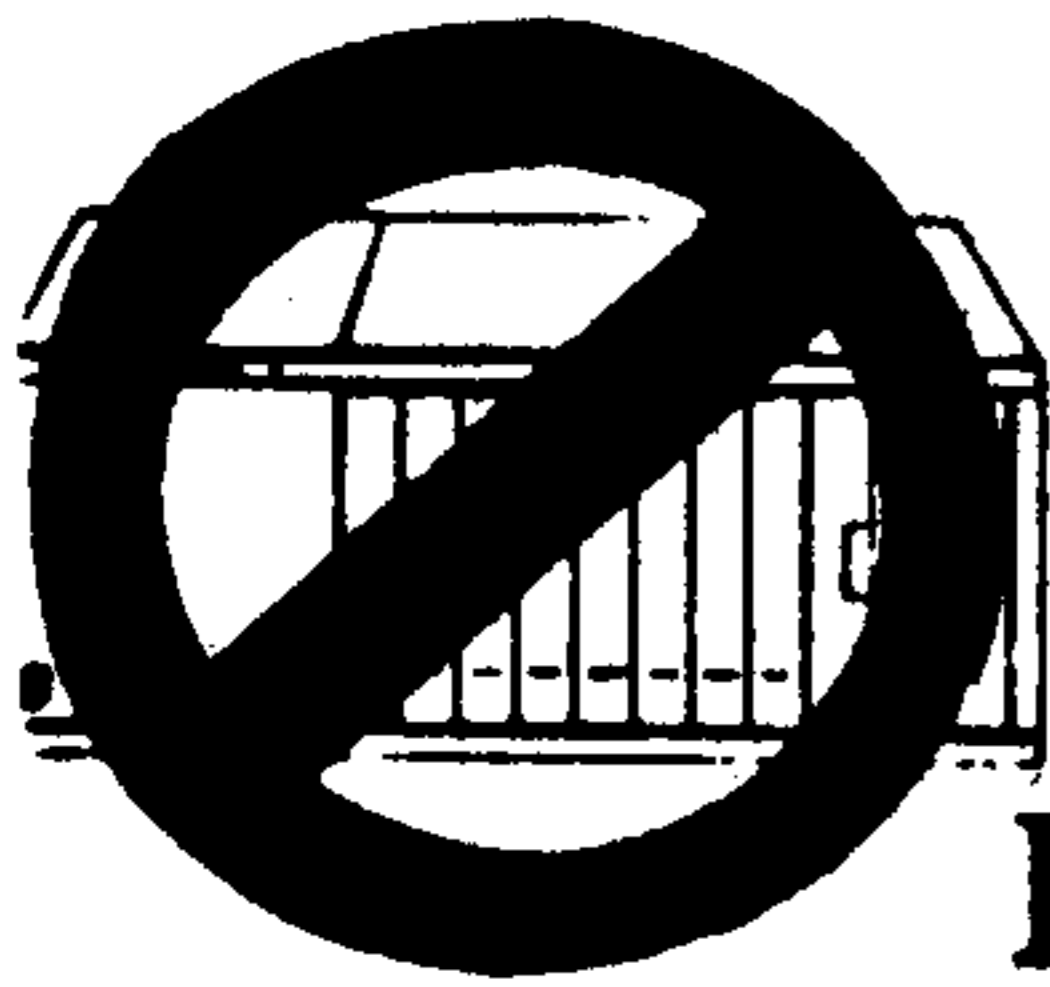


TEX COMP TM

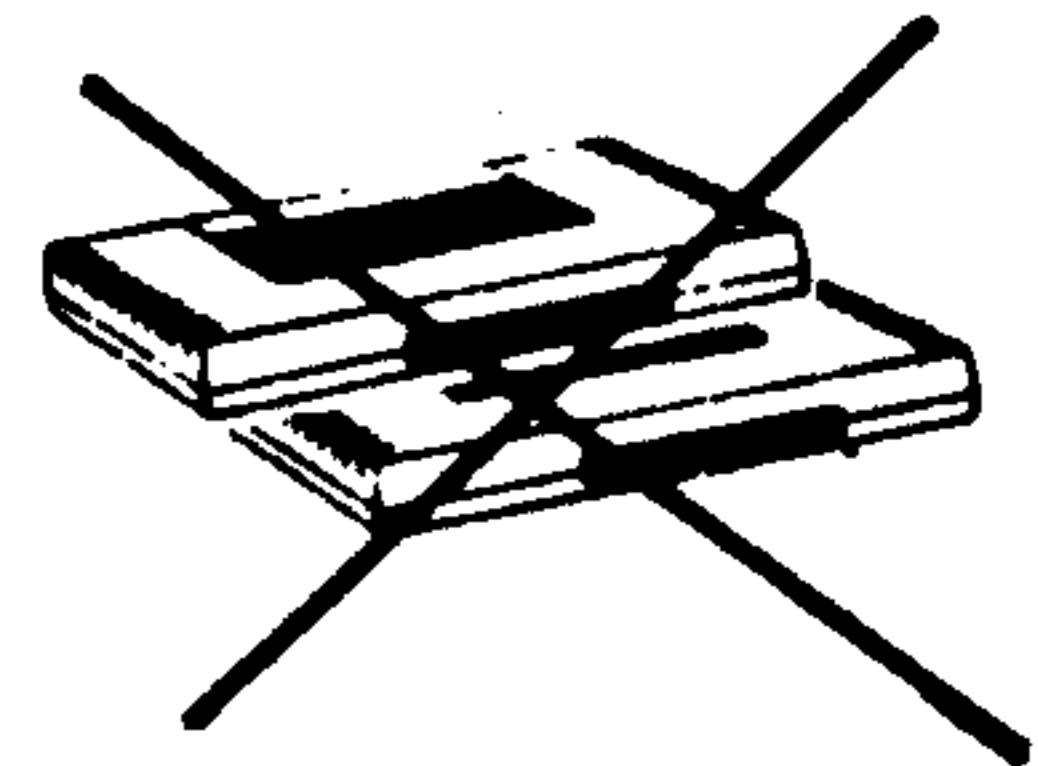


America's Number One TEXAS INSTRUMENTS dealer.

Proudly Introduces

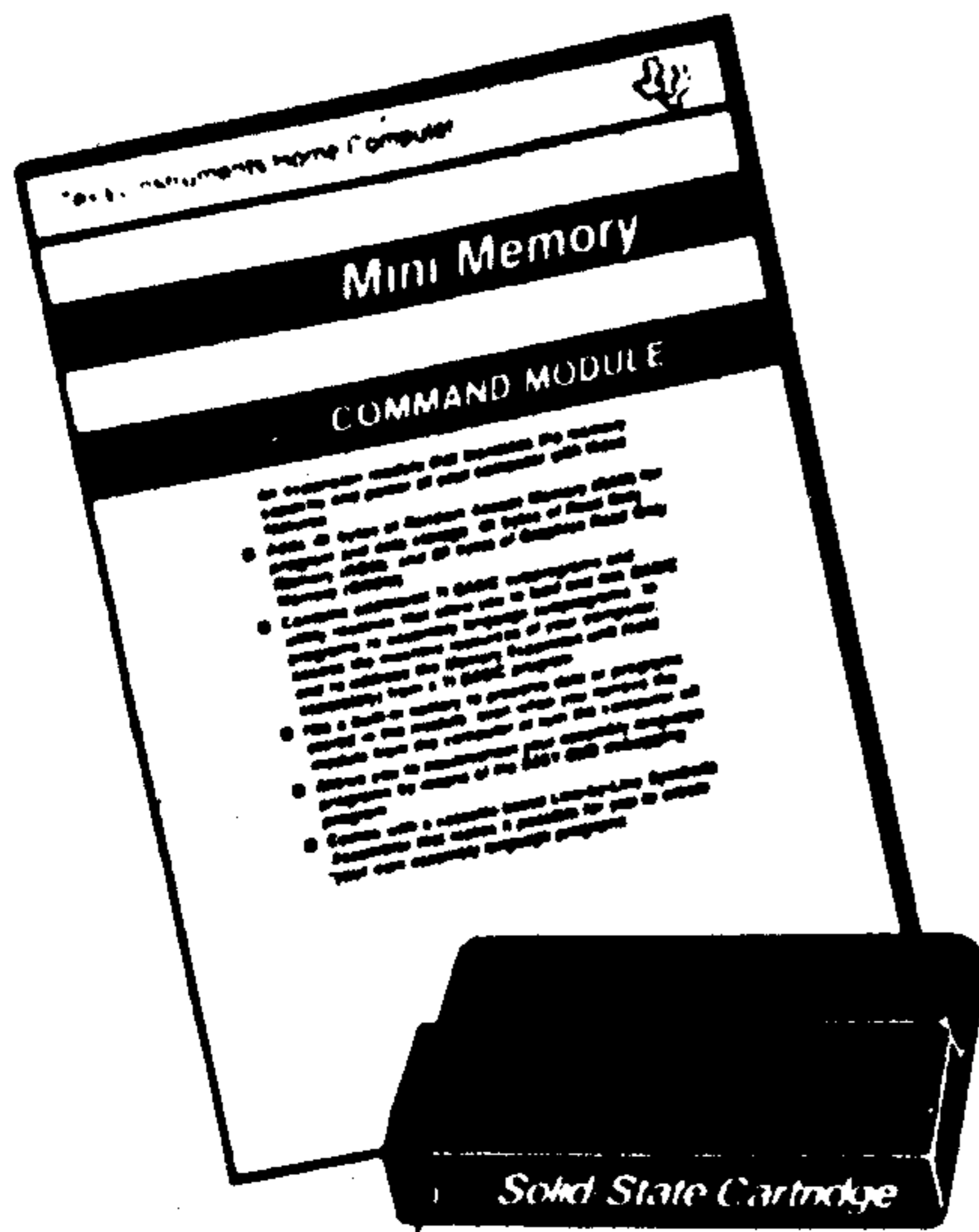


A COMPLETE LOW PRICE WORD PROCESSING SYSTEM



For the Texas Instruments Home Computer

TEX-COMP NOW OFFERS THE FIRST PROFESSIONAL QUALITY WORD PROCESSING AVAILABLE FOR THE TI-99/4AA EQUIPPED WITH ONLY A CASSETTE RECORDER. THE MINI-WRITER CASSETTE PROGRAM MAKES USE OF THE EXTRA MEMORY POWER OF THE TI MINI-MEMORY COMMAND MODULE. NOW YOU HAVE THE FULL POWER OF PROFESSIONAL WORDPROCESSING WITHOUT THE NEED FOR A DISK DRIVE OR MEMORY EXPANSION. BY ADDING THE NEW AXIOM PRINTER WHICH REQUIRES NO RS232 INTERFACE, LOW COST QUALITY PRINTING ON PLAIN PAPER (NOT SUB-STANDARD THERMAL PAPER) CAN BE COMBINED FOR A COMPLETE WORD PROCESSING SYSTEM AT A VERY MODEST COST.



MINI-MEMORY
\$74.95

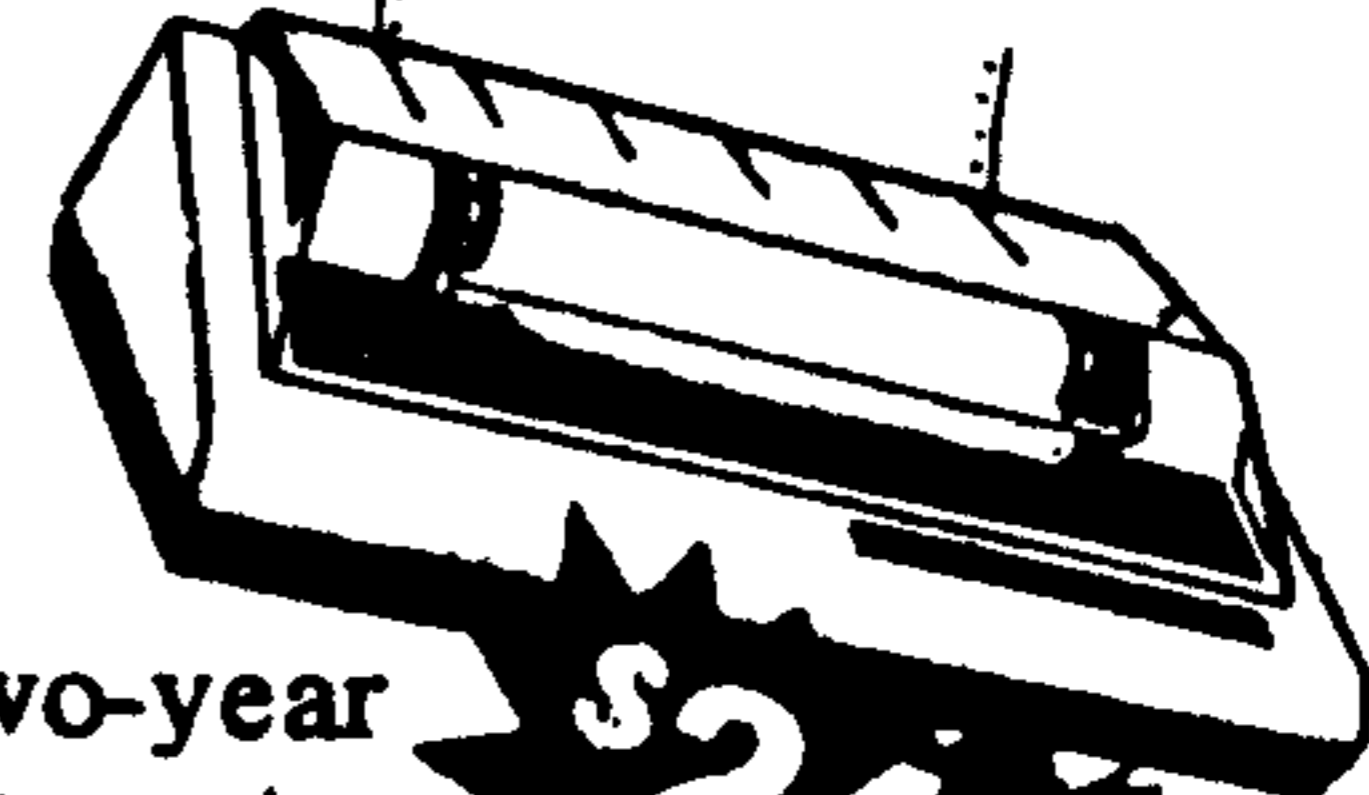
No More Erasing,
Strikeovers or
Messy Correcting Fluids!



MINI-WRITER
\$19.95

DESCRIPTION: A "MINI" WORD PROCESSOR WHICH FEATURES:
FULL SCREEN TEXT EDITING; 24 X 40 CHARACTER "WINDOW", 80 CHARACTER LINE,
9500 CHARACTERS STORED PER FILE, ADD/DELETE CHARACTERS OR LINES,
MOVABLE COPY, UPPER AND LOWER CASE CHARACTERS,
SAVE OR LOAD TO OR FROM ANY STORAGE DEVICE, PRINT VIA THE
PRINTER;
SEARCHES FOR DESIRED INFORMATION,
SCROLLS SCREEN (UP, DOWN, LEFT, RIGHT), PURGES TEXT BUFFER AND HAS CANCEL
COMMANDS.
TI-MINIWRITER IS DESIGNED TO LOAD FROM CASSETTE INTO THE MINI-MEMORY
CARTRIDGE.
MAKES REPORT AND LETTER WRITING EASY AND FAST.
LOW COST TO CONSUMER FOR WORD PROCESSING CAPABILITY
EASY TO LEARN AND USE

Uses standard width
fan-fold paper



Two-year
warranty
Graphics
capabilities

\$249.95

AXIOM

Direct-Connect
Printer, GP-100TI
(no interface required)

Powerful Yet
Simple To Use

SYSTEM TOTAL \$344.85

SPECIAL BUY THE ENTIRE SYSTEM (3 PIECES) AND WE INCLUDE FREE SHIP&INS (UPS ONLY), A FREE TI DUAL CASSETTE CABLE AND A STARTER PACK OF PRINTER PAPER. A \$40.00 + RETAIL VALUE!

ADD 3% S, M&I & 4.5% W OF MISS (\$3.00 MIN). ALL ORDERS SUBJECT TO CURRENT AVAILABILITY. WE RESERVE RIGHT TO LIMIT QUANTITIES.

SEND \$2.00 FOR OUR CURRENT CATALOG AND ORDER KIT. A \$5 CERTIFICATE IS INCLUDED. VISIT OUR WAREHOUSE OUTLET. CALL 818-366-6631 FOR HOURS.



VISA and MASTERCARD
HOLDERS CALL DIRECT:

(818) 366-6631

ALL PRICES REFLECT A 3% DISCOUNT FOR CASH
ADD 3% IF PAYING BY CREDIT CARD



Send Orders To:
TEX  COMP TM
P.O. BOX 33084
GRANADA HILLS, CA 91344

NOTE: Payment in full must accompany all orders. Credit-Card, Company Check or Money Order for immediate shipment. Personal checks require up to 4 weeks to clear. California orders add 6 1/2% sales tax.



A full house

Nearly 1,500 persons attended the second annual 99/4A Computer Faire near Chicago. Pictured is the main exhibit floor and displays of some of the 21 exhibitors.

WATCHING THE 99/8—

(Continued from Page 10)

crowds of supporters for their favorite "gamers."

All fairegoers experienced a demonstration that the TI Home Computer is indeed quite alive for those who have stayed active and involved. The Chicago TI Users's Group held a series of tutorial presentations during the day to show the continuing versatility and usefulness of the 99/4A. Seaborn Smith, whose TI-FORTH programs and newsletter column are becoming known to other TI groups, gave an interesting and well-attended introduction to this quite flexible program language. These tutorials were held in a separate room which could seat about 250, and which was usually filled for each presentation.

Between presentations, Faire

attendees could observe TI myths of both the past and the future. At the Softmail Inc. booth, for example, was displayed the near-legendary TI 99/8. Don Bynum, former head of TI's Home Computer Division, stated that only 250 "8's" had been built, all of them going either to the design team, TI executives or the production line employees. The TI 99/8 was indeed the home computer hobbyist's dream. According to Bynum, the 99/8 featured 64K of CPU RAM and 16K of VDP RAM, compared to the 99/4A's 256 bytes of CPU RAM (also known as "scratch-pad" RAM) and 16K of VDP. This never-released computer also featured a built-in p-Code system and a 10MHertz TI-9995 CPU. The built-in BASIC was compatible with Extended BASIC and contained

additional commands such as "LINE," "DRAW" and "FILL" for easy graphics generation. When booted up, the TI 99/8 offered several option screens, including choices of p-Code, BASIC or whatever module was plugged into the vertical cartridge port. In design, the 99/8 was reminiscent of the beige 99/4A consoles, yet was both wider and deeper, and featured a full "selectric" style keyboard layout. One of the option screens also offered both "FAST" and "SLOW" (the 99/4A 3 MHertz) processor speeds, and did so before other choices. Hence, at one point a TI Invaders cartridge was selected in FAST mode with hilarious results less reminiscent of an invasion than of a blitzkrieg.

(Please turn to Page 14)

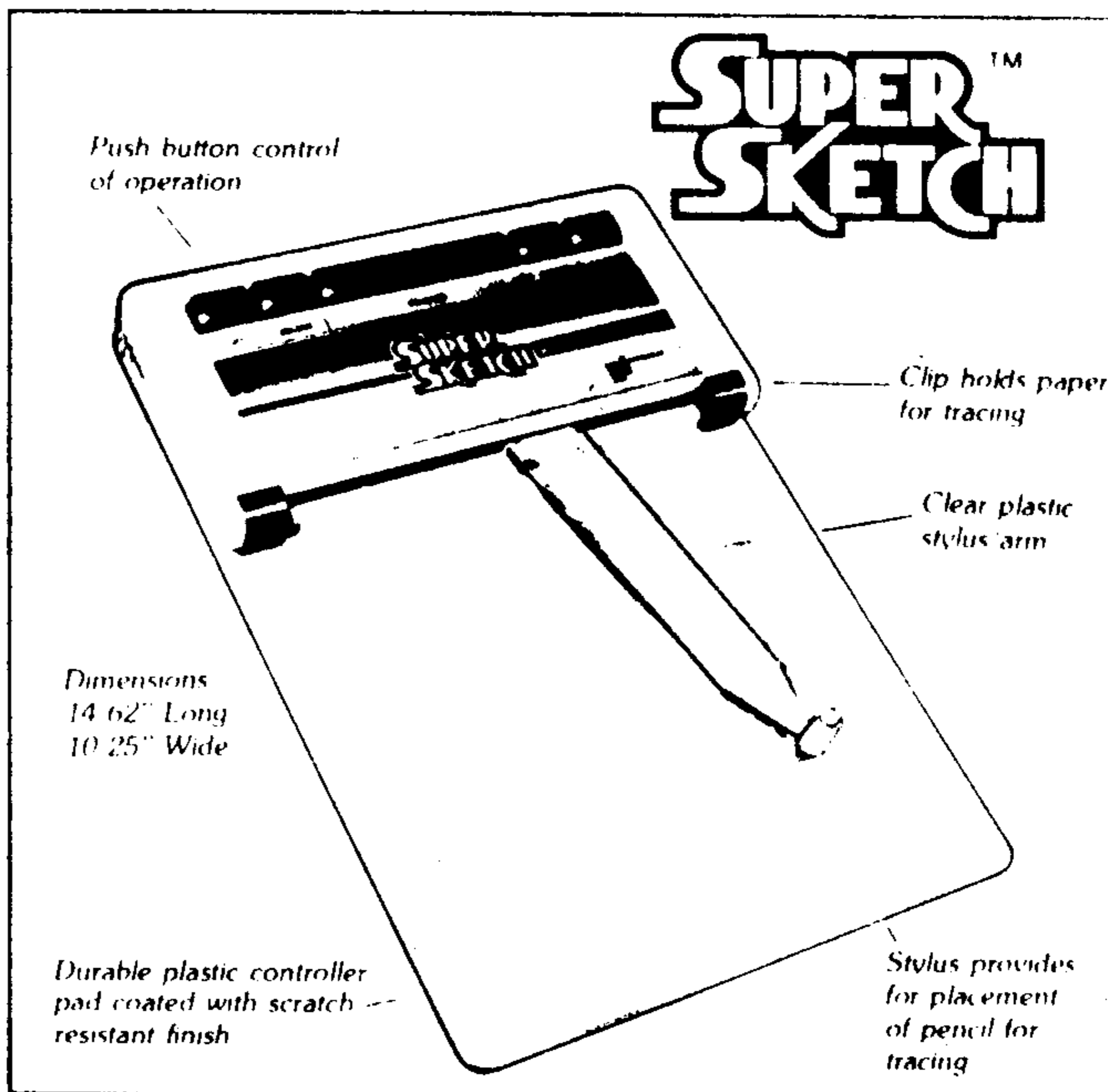
For the Texas Instruments Home Computer...

SUPER SKETCH

Included in each package is all you need to create super graphics. A software cartridge is included in each package along with the Super Sketch controller pad (as described on the package). Also included is a comprehensive instruction manual and a "Starter Kit" that consists of several drawings that can be traced from the pad.

Creates Super Video Graphics Is Absolutely Simple To Use

By simply moving the stylus control on the plastic frame, the motion is instantly reproduced on your video screen. Any drawing can be made from freehand or from a picture or photo. Fill in any combination of up to 16 colors and selectively erase all or part of any drawing. The Super Sketch connects to your 99/4A through a special module that is connected to the sketch pad. Everything you need to create "computer art" is included.



SEND ORDERS TO:
TEXCOMP™
P.O. BOX 33084
GRANADA HILLS, CA. 91344



*CANADA & APD
add \$1.00 shipping & handling

All prices have been discounted for cash, add 3% for credit card orders.
Save \$47.95 ONLY
post paid
*Continental U.S. ONLY
Save \$47.95 ONLY
post paid
*Continental U.S. ONLY
Save \$47.95 ONLY
post paid
*Continental U.S. ONLY
Save \$47.95 ONLY
post paid
*Continental U.S. ONLY

(818) 366-6631

24 HOUR ORDER LINE

NOTE: Payment in full must accompany all orders. Credit Card, Company Check or Money Order for immediate shipment. Personal checks require up to 4 weeks to clear. California orders add 6.25% sales tax.

VENDORS DISPLAY PRODUCTS—

(Continued from Page 12)

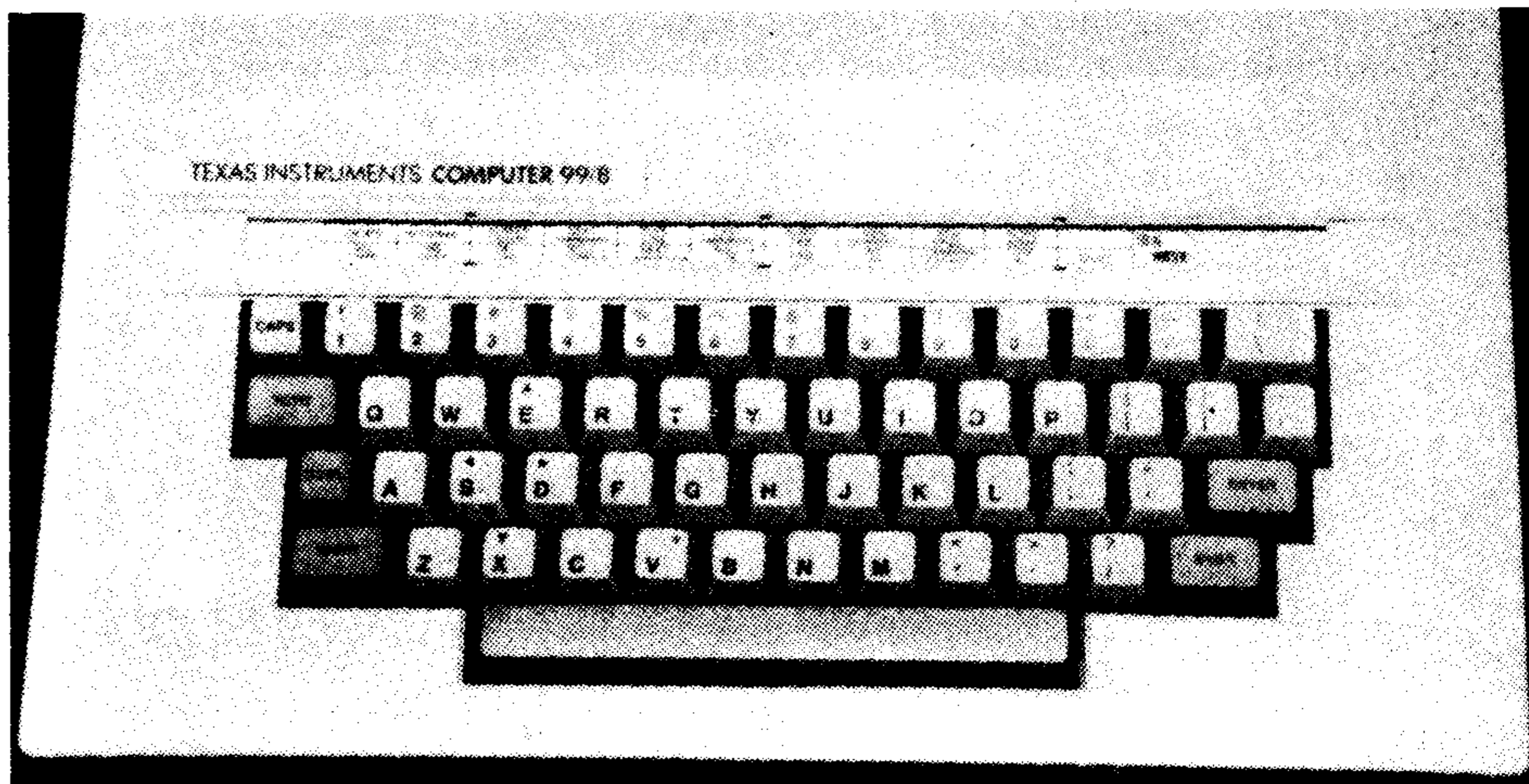
An elaborate, and obviously bit-mapped graphics demonstration ran on the TI 99/8 most of the day, and was later revealed as a 180-line BASIC program. When questioned as to why TI never brought the 99/8 to market, Bynum stated that some TI executives doubted that the public would be interested in a home computer with a suggested retail price of \$600. He also stated that he considers the possibility that TI will release the design to someone else as "practically nil," noting that TI would probably not want to see someone else make money on a product they never saw fit to market. On the other hand, during his guest talk late in the day Bynum exhibited a guarded optimism about the future of the 99/4A.

Other vendor booths featured either still available TI software, or new and sophisticated application packages for the 99/4A, ranging from graphic adventure games to useful system utilities. Unisource Electronics, by special arrangement with CorComp Inc., showed off the new 9900 Micro-Expansion system, a unit about the size of two speech synthesizers but packing the power of a "loaded" peripheral expansion box, with a double-density disk controller, RS232 and 32K memory all built in.

Between trips around the vendor tables, TI users could take in some of the other tutorials, such as Sam Pincus' presentation on control codes and TI-Writer, or Len Rovner's introduction to Microsoft Multiplan. Traffic was heavy all day between the main room and the vendor area.

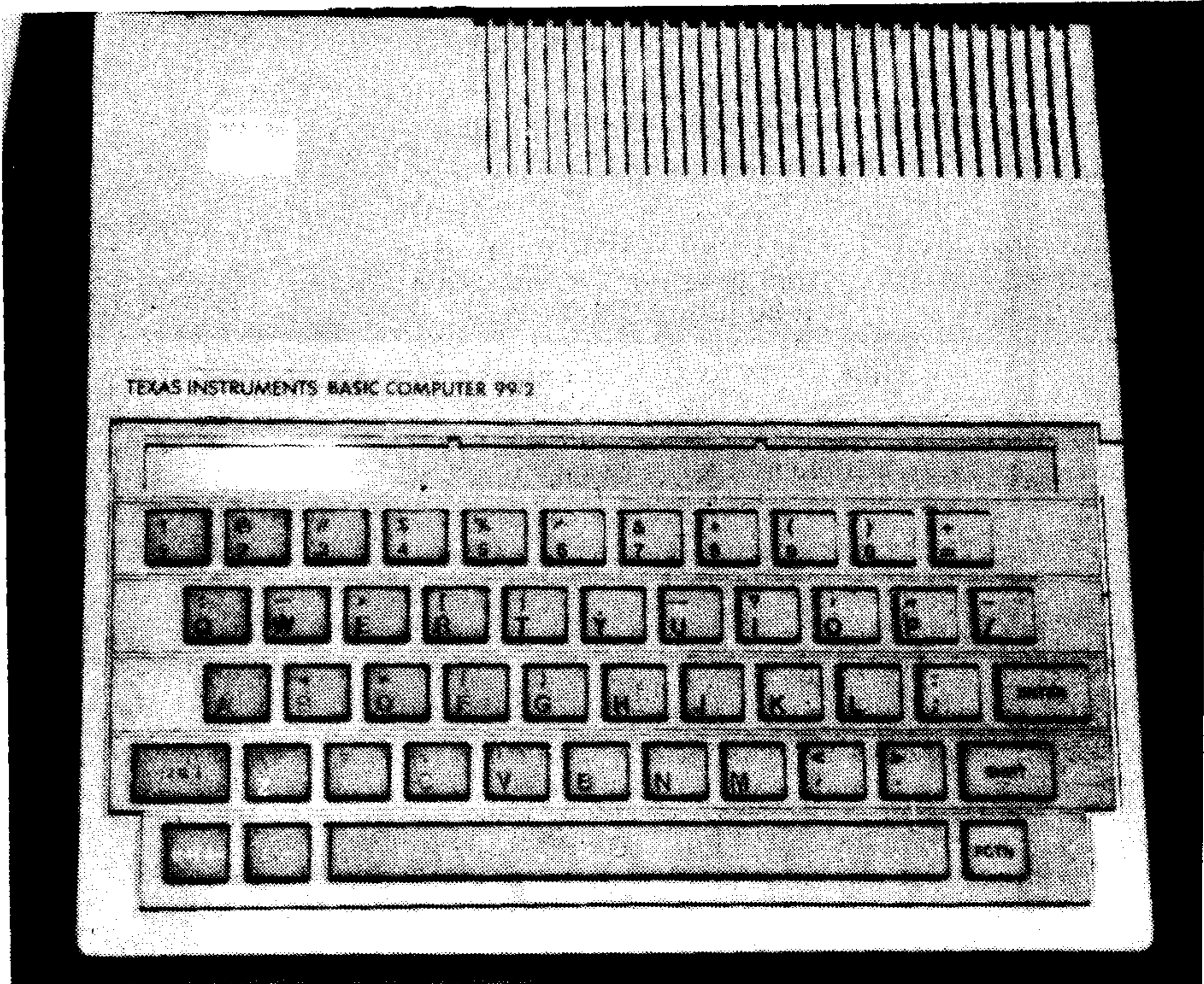
During the keynote speech to the largest audience of the day, Bynum, now the driving force behind Soft-mail Inc. and Texas Peripherals, stated unequivocally that 2.4 million 99/4A units were sold, making it by far the largest selling computer of any kind. The two concerns he reported were the belief that recently up to 1,000 99/4As per day

(Please turn to Page 16)



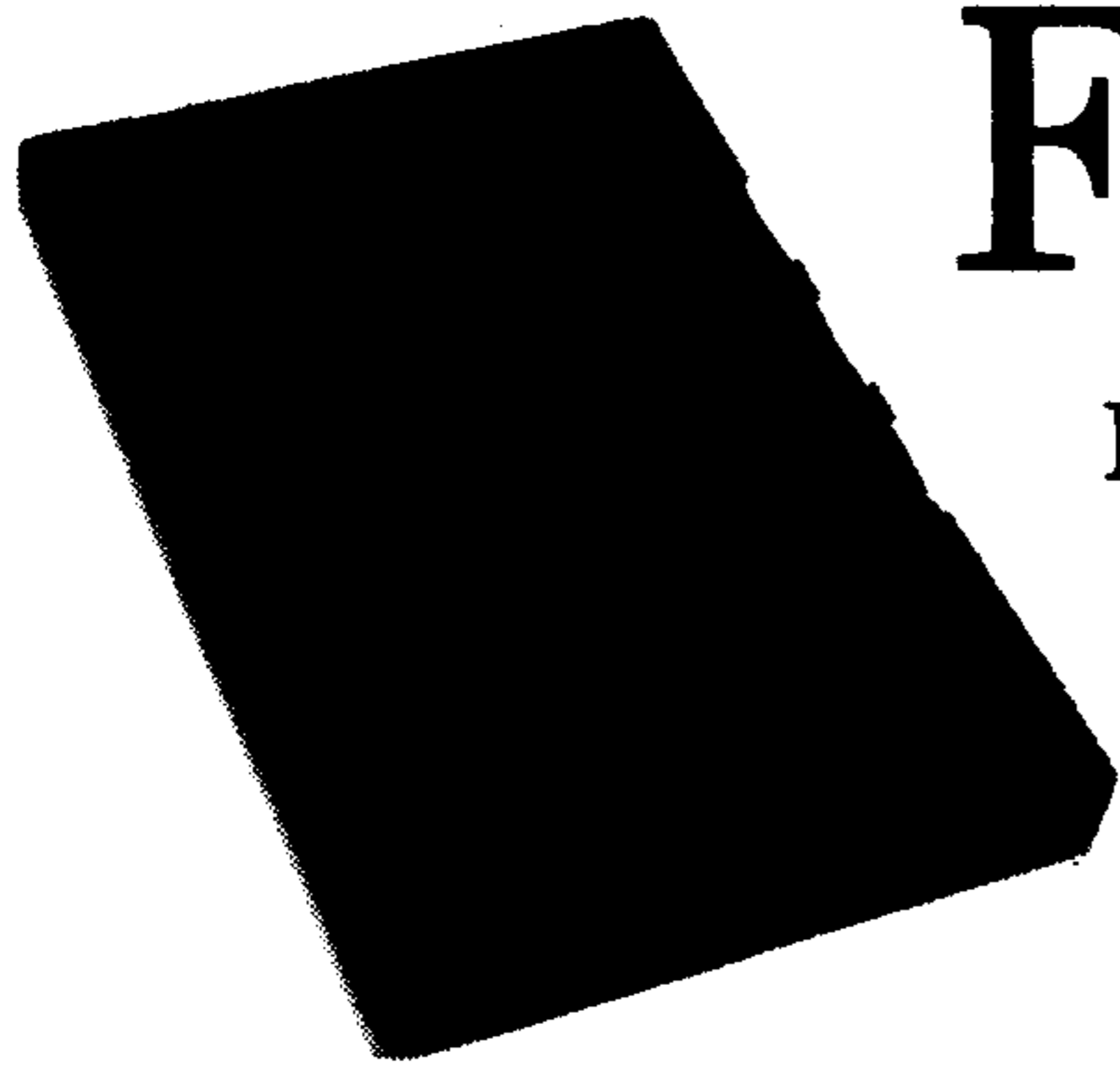
The one that got away

Pictured above is the TI99/8 home computer. Only 250 of the 64K RAM machines were produced before Texas Instruments made the decision to leave the home computer market. The machine features a built-in p-Code system, 64K of CPU RAM and 16K of VDP RAM. Program modules are loaded vertically into the top of the machine. (Photos courtesy of Dave Wakely)



The little TI

The TI99/2 was designed to serve the low-end of the home computer market. Like its big brother, the 99/8, the machine never made it to dealer shelves. Even if TI had remained in the home computer business, however, this machine would probably have never been released since by November of 1983 prices for the 99/4A had eroded so much that the 99/2 would have been competing directly with the 99/4A.



FREE! Cartridge Expander

Buy two or more Cartridge software products and we'll throw in one of our popular Cartridge Expanders at no extra cost. (Regular price \$ 39.95).

Act now! This offer expires December 31, 1984.

SPEED 49.95 READING



Improves reading speed and comprehension. Versions for children, teens, and adults. Cartridge Software, no extra equipment required.

Version A for teens and adults: This new program provides extensive practice in taking in more print faster. Frequent tests prove that not only is your rate of reading greatly increased, but you are also improving your level of comprehension. Complete workbook included.

Version B for children: A comprehensive course created especially for children 8 through 13. Practice drills are geared to increasing reading speed and improving comprehension levels. Progress tests and scores add to satisfaction and confidence. Complete workbook included.

HOMEWORK HELPER 49.95



Makes homework fun, develops basic computer skills. This new educational program for children 8 years and older, features a built-in 20,000 word checker dictionary to identify spelling errors. Homework Helper is a simple-to-use tool for improving study habits, written work quality, and planning class assignments. Homework Helper contains a word processor which includes standard format for book reports and class projects. DISK DRIVE REQUIRED.

DISK FIXER 39.95

Unlocks the secrets of the disk and lets you access hidden or "lost" information. Disk Fixer is a must for the serious TI 99/4A user who has a "sick disk" which suffers from a damaged directory. This program lets you recover unscathed information by searching your disk by sector rather than file name. Disk Fixer lets you display/print the actual binary contents with a single command. It allows you to change any byte on any sector, even move data from one sector to another.

NAVARONE NAVARONE INDUSTRIES, Inc.



510 Lawrence Expressway, #800
Sunnyvale, CA 94086

Telephone: (408) 985-2932

CONSOLE WRITER 49.95



Turns your console into a word processor without disk-drive memory. With just your console, a printer and this unique cartridge program you can begin word processing today. Features include a full screen text editor that lets you Insert and Delete characters and complete lines. The program is extremely easy to use yet powerful enough to handle most home word processing applications.

DATA BASE 69.95 MANAGEMENT

A customized transaction, filing and reporting system for the small business. This comprehensive program controls customer activity, organizes inventory, and tracks business transactions. It allows you to develop and organize your files, design your own screens, customize data entry and index information by multiple keys. A powerful sort utility will organize entire disk files in any sequence by up to six keys. DISK DRIVE REQUIRED.

SUPER-DUPER 39.95

Safeguards masters fast. Use the high-speed Super-Duper program cartridge to duplicate your disks, single and double sided, then lock away your originals. For single drive-systems, a special data-compression routine stores most of your information in expanded memory to reduce disk swapping. Most disks are copied in one or two passes — and Super-Duper works even faster with multiple-drive systems. The program automatically formats blank diskettes before copying and allows you to verify your back-ups byte for byte against the originals.

This offer expires December 31, 1984.

Please indicate the items you wish to order, the quantity, the price of each item.

We accept casher's checks or money orders (personal checks take an additional 10 days to clear). C.O.D.'s add \$5.00.

VISA or MasterCard are welcome.

Add 5% of total order for shipping and handling (Outside U.S. add \$10.00).

CA residents add 6.5% sales tax. Allow 2 weeks delivery.

TEXNET SYSTEM EXPLAINED—

Continued from Page 14

were estimated to be "going into closets," and the rampant epidemic of software piracy. Of the latter, he stated his belief that these so-called "pirates" are actually criminals who are rapidly destroying the third-party marketplace. The possible outcome of this, according to Bynum, could be "less and less quality software" appearing for the 99/4A as programmers see their profits disappear.

On a more positive note, Bynum noted some excellent resources for the TI user, including the International User Group, MICROpendium and especially the new TEXNET service on the Source (of which Bynum is the TI Sysop). This new TEXNET will feature an online TI magazine, information about TI user groups, TI news and an active software exchange. In fact, Bynum noted that, despite the few upgrades to TEXNET over the past year, the

TI program exchange is still the Number 3 database on the Source in terms of use. TEXNET will also feature credit-card purchasing of new, inexpensive (\$4.95-\$9.95), downloadable software, and Bynum stated that programmers will be offered 20 percent royalties for their work if selected for inclusion in this service.

Source subscribers who have dropped their membership may be reinstated by contacting the Source and giving the appropriate credit card number.

Bynum fielded questions on the future of TI's support for the 99/4A.

He noted that with other consumer products TI has given up to five years of exchange service, and, while making occasional disparaging or humorous comments about TI's marketing philosophy, he described their corporate integrity as



Playing to win

Visitors to the Faire could participate in a number of activities, including an arcade game contest. Here a player gives his undivided attention to the business at hand.

"incredible."

(NOTE: The talk with question-and-answer session was more than 90 minutes long, and user groups or other interested parties may obtain a VHS-format tape of the session by sending \$25 to the Chicago TI 99/4A User's Group, P.O. Box 578341, Chicago, IL 60657.

And what of the future for the TI user and TI user groups? Was there

must indication that there would still be interest in the 99/4A in, say, another year? The Chicago group signed up more than 40 new 1985 members at the Faire, and, when asked if another such event could possibly be in the plans for next year, Chicago group president Dave Wakely commented, "You bet, and next year we go for TWO days!"

Ed: Wakely is an officer in the Chicago 99/4A Users Group which hosted the Faire.

Software contest entries due Dec. 20

The deadline to enter the most recent MICROpendium Software Improvement Contest was initially set for Dec. 10, but because delivery of the November edition was delayed, the deadline has been changed to Dec. 20.

The following "organ" simulator program will be used as the basis for the contest. Readers are asked to improve the program, in BASIC only, using no more than 1,500 bytes. First prize is \$50 and second prize is \$25. The winning entry will be published in a future issue of MICROpendium.

Improvements may range from the use of graphics to the implementation of "pedals," etc. Use your imagination. Entries must be submitted on tape or diskette. Entries will be returned provided that sufficient return postage is included.

Mail entries to MICROpendium Contest, P.O. Box 1343, Round Rock, TX 78680. Entries must be post-marked no later than Dec. 20 to be considered.

```

100 OPTION BASE 0
110 DIM NOTE(20)
120 FOR A=0 TO 20
130 READ NOTE(A)
140 NEXT A
150 DATA 40000,220,247,262,
294,330,349,392,440,494,523
,587,659,698,784,880,988,10
47,1175,1319,1397
160 CALL KEY(1,K1,S)
170 CALL KEY(2,K2,S)
180 K1=K1+1
190 K2=K2+1
200 CALL SOUND(-1000,NOTE(K
1),0,NOTE(K2),0)
210 GOTO 160
    
```

March of Dimes
BIRTH DEFECTS FOUNDATION

SAVES BABIES

HELP FIGHT
BIRTH DEFECTS



THIS SPACE CONTRIBUTED BY THE PUBLISHER

TURBO COPY

A HIGH SPEED DISK COPIER
AND FORMATTER FOR THE 99/4A

DUPLICATE COPY PROTECTED DISKETTES FOR BACKUP PURPOSES
COPIES ENTIRE SINGLE SIDED DISK BETWEEN TWO DRIVES IN LESS THAN ONE
MINUTE WITH FULL DATA VERIFICATION ON THE COPY DISKETTE
COPIES DOUBLE SIDED DISKETTES IN LESS THAN TWO MINUTES
TEST OPTION ALLOWS COMPARISON OF COPY DISKETTES TO MASTER DISKETTE
FORMATS SINGLE SIDED DISKETTES IN THIRTY FIVE SECONDS WITH COMPLETE
DATA FIELD TESTING (SEVENTY SECONDS FOR DOUBLE SIDED DISKETTES)
COPIES FROM DRIVE ONE TO DRIVES TWO AND THREE TO ALLOW QUICKER MASS
PRODUCTION OF SOFTWARE
SPECIAL FORMATTING OPTION ALLOWS YOU TO USE SEQUENTIAL TRACK/SECTOR
ARRANGEMENT FOR QUICKER DISK I/O WITH SOME PROGRAMS WHILE REMAINING
FULLY COMPATABLE
WORKS WITH EDITOR/ASSEMBLER, MINI MEMORY, EXTENDED BASIC, TI-WRITER
ONE OR MORE DISK DRIVES AND 32K MEMORY EXPANSION

ONLY \$21.95

SLINKYBUG

A DEBUGGING AID FOR 99/4A
ASSEMBLY LANGUAGE PROGRAMMERS

SCREEN DISPLAY OF 256 BYTES OF BRAM, VDP, OR CPU MEMORY IN BOTH HEX
CODE AND ASCII AT THE SAME TIME
EXAMINE AND TOGGLE ANY CRU BIT WITH DISPLAY OF 128 BITS AT ONE TIME
ENTER AT ANY POINT IN CHOSEN MEMORY AND PAGE FORWARD OR BACKWARD TO
OTHER BLOCKS OF MEMORY
CURSOR DRIVEN TO TYPE ASCII OR HEX CODE DIRECTLY INTO SPECIFIED VDP
RAM, OR CPU RAM MEMORY LOCATIONS AS THEY ARE DISPLAYED
40 COLUMN DISPLAY WITH THE ADDRESS OF THE LEADING BYTE IN EACH LINE
DISPLAYED IN THE LEFT COLUMN
CONTAINS HEX COUNTER WHICH UPDATES EACH TIME YOU MOVE THE CURSOR SO
YOU KNOW WHICH ADDRESS IT IS POINTING TO AT ALL TIMES
EXECUTE OTHER MACHINE CODE PROGRAMS FROM SLINKYBUG
SLINKYBUG CAN BE ACCESSED FROM TI BASIC, OR OTHER ASSEMBLY LANGUAGE
PROGRAMS THROUGH BREAKPOINTS
MENU ALLOWS INSTANT EXAMINATION OF THE WORKSPACES OF OTHER ASSEMBLY
LANGUAGE PROGRAMS AS THEY ARE AT THE POINT OF ENTERING SLINKYBUG
RETURNS TO ANOTHER PROGRAM AT THE POINT OF LEAVING AND RESTORES THE
SCREEN AS IT WAS AT THE TIME SLINKYBUG WAS ACCESSED
THE CURSOR CAN BE SWITCHED BETWEEN ASCII AND HEX CODE AND WILL KEEP
IT'S PLACE AT THE BYTE YOU ARE EXAMINING
ANY PAGE CAN BE PRINTED TO ANY OUTPUT DEVICE EXCEPT CASSETTE
RELOCATABLE WITHIN THE 32K MEMORY EXPANSION, OR CAN BE MADE TO LOAD
ENTIRELY WITHIN THE MINI MEMORY CARTRIDGE
DISKETTE INCLUDES VERSION WHICH CAN BE ACCESSED THROUGH BREAKPOINTS
IN BIT MAP PROGRAMS
WELL COMMENTED SOURCE CODE IS INCLUDED ON THE DISKETTE TO ALLOW YOU
TO MODIFY SLINKYBUG TO SUIT YOUR NEEDS
REQUIRES EDITOR/ASSEMBLER OR MINI MEMORY, MEMORY EXPANSION AND DISK
SYSTEM

ONLY \$29.95

SYSTEM TESTS

A PACKAGE OF TEST PROGRAMS
FOR THE 99/4A COMPUTER SYSTEM

CONSOLE TEST PROGRAM TOGGLES EVERY VDP RAM BIT TO MAKE SURE DATA IS
BEING MAINTAINED, CHECKS FOR ADDRESSING ERRORS, VERIFIES ALL SYSTEM
SOFTWARE, CHECKS SCRATCHPAD RAM, AND ALSO INCLUDES DIAGNOSTIC ERROR
REPORTING
MEMORY EXPANSION TEST CHECKS EVERY RAM BIT IN THE MEMORY EXPANSION,
CHECKS THE REFRESH, AND INCLUDES DIAGNOSTIC ERROR REPORTING
SPEECH SYNTHESIZER TEST CHECKS TO MAKE SURE YOUR SPEECH SYNTHESIZER
IS WORKING PROPERLY
ALL TESTS INCLUDED ON ONE DISKETTE
CONSOLE TEST AND SPEECH TEST REQUIRE 32K EXPANSION, DISK DRIVE, AND
EITHER EXTENDED BASIC, MINI MEMORY OR EDITOR/ASSEMBLER
MEMORY EXPANSION TEST MUST BE LOADED WITH MINI MEMORY

ONLY \$17.95

TAPE TO DISK

TRANSFERS CASSETTE
BASED FILES TO DISKETTE

TRANSFER SCOTT ADAMS ADVENTURES FROM CASSETTE TO DISKETTE (FOR YOUR
PERSONAL USE ONLY)
CAN ALSO BE USED TO TRANSFER PROTECTED EXTENDED BASIC PROGRAMS FROM
CASSETTE TO DISKETTE
REQUIRES DISK SYSTEM AND MINI MEMORY ALONE OR EDITOR/ASSEMBLER WITH
MEMORY EXPANSION

ONLY \$17.95

CASSETTE BACKUP

BACKS UP CASSETTE
BASED FILES TO CASSETTE

PROTECT AGAINST LOSS OF VALUABLE SCOTT ADAMS ADVENTURE CASSETTES OR
VALUABLE PROTECTED EXTENDED BASIC CASSETTES
AVAILABLE ON CASSETTE FOR USE WITH MINI MEMORY

ONLY \$12.95

GREAT IDEAS COME FROM KNOW-WARE

SEND CHECK OR MONEY ORDER TO:

KNOW-WARE
BOX 53674
LUBBOCK, TX 79453

(TEXAS RESIDENTS ADD 5% SALES TAX)

| | | | |
|----------------------|---------------------------|-------|--|
| NAME _____ | NAME OF PROGRAM | PRICE | |
| ADDRESS _____ | | | |
| CITY/STATE/ZIP _____ | | | |
| | 5% SALES TAX (TEXAS ONLY) | | |
| | TOTAL | | |

Black Friday

Reports of the demise of the TI home computer still premature

Only secondarily does this refer to the 1939 stock market crash. To the truly dedicated TI99/4A user, it's the day in November 1983 when TI announced that this computer would be produced no more.

Responses to the pullout at the time varied from anger and despair to euphoria.

Jackirae Sagouspe of Cor-Comp, recalls that that company had just introduced its first card for the TI Peripheral Expansion Box, a 32K memory expansion card, and got a good response from consumers.

Because of their market position, there was a kind of "mania" in reaction to TI's announcement, "a gold rush type of excitement," she says.

Since then, she says, "the dust has settled," and evaluations have been made as to how long-lasting and how strong the TI market continues to be and how best to serve it. She adds that CorComp is strongly dedicated to the TI and its user base.

She notes that the longevity in the market in size and numbers is impressive.

"Until you get the phone calls and letters" she says, it is difficult to conceptualize the "strong emotion out there."

She notes a "tremendous response from the European market," citing West Germany, Holland and France. TI "did an excellent job in reaching the European market," she says. As a result, Sagouspe, says, Cor-Comp has distributors and dealers in seven countries.

Lou Phillips of Myarc says that Black Friday was "quite a shock," especially as Myarc had a lot of money invested in TI-compatible technology and had various agreements with TI.

However, he adds, the company is "doing just as well if not better" as when the 99/4A was being produced and sees that "for the coming year the TI market is still going strong for us."

He notes that "we helped TI develop a lot of new products."

Myarc produces the WDS/100 Winchester Disk and Controller System, and the MPES/50 mini-peripheral expansion system, complete with 32K expansion memory, RS232 serial and parallel interfaces, floppy disk controller and disk drive.

"That was a year ago and we still talk about it," says Gene Harter of Not-Polyoptics. "I really didn't know what would happen. I called everybody I knew in the business and told them. They seemed to be optimistic. It took all that weekend but by Monday I felt a lot better."

He notes, "The market's holding up. I didn't expect that the market would hold up like this. It's like a car—an Edsel or a Cord—that ceases being sold, and the people that buy parts for the car. I can't remember anything like this in business."

He adds, "People have made a lot of bad decisions in the computer business because it's a new kind of product. TI made a lot of mistakes because there was no pattern. Somebody has to make all the mistakes first and somebody else comes along and learns from the mistakes."

Jerry Price of Tex-Comp, a mail order company which supplies TI-compatible products says that Black Friday was not a surprise because of evidence that TI was "winding down" in peripherals.

When it occurred, he says, "we immediately geared up. The mass merchandisers were getting out like rats and a handful of us saw a market for a good product."

With marginal distributors and mass merchandisers out of the market, he notes, business was better the year after TI got out. He notes that this is an advantage to consumers in that dealers such as Tex-Comp, Unisource and Tenex know the computer they are dealing with and are "really making an effort to keep things going. It's almost better this way.

People who are really serious know where they can go."

It has been a surprise, however, as to how much a demand there has been for everything, he says.

Price notes that "the biggest problem we have is scrambling to keep hard-to-get software in stock. Extended BASIC is very scarce."

And what of the future? CorComp's Sagouspe says "I wish I had a crystal ball."

She notes that although the TI market will wind down, persons are passing their systems to other people so that there is now a "second generation of TI users."

CorComp will be directing its attention toward education and schools where TI units are in place.

"Hardware is very important in school systems and we are still working on it," she says, adding that they are working on packaging software utilities for the education market as well.

Phillips declined to specify, but said, "Watch for Myarc to be doing a lot of neat things in the coming year."

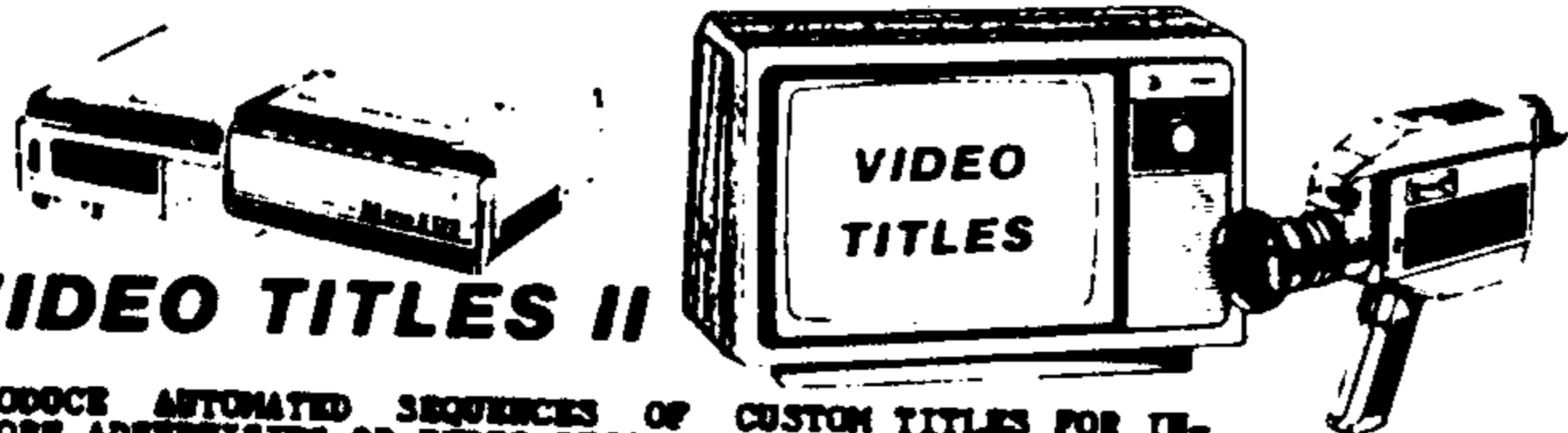
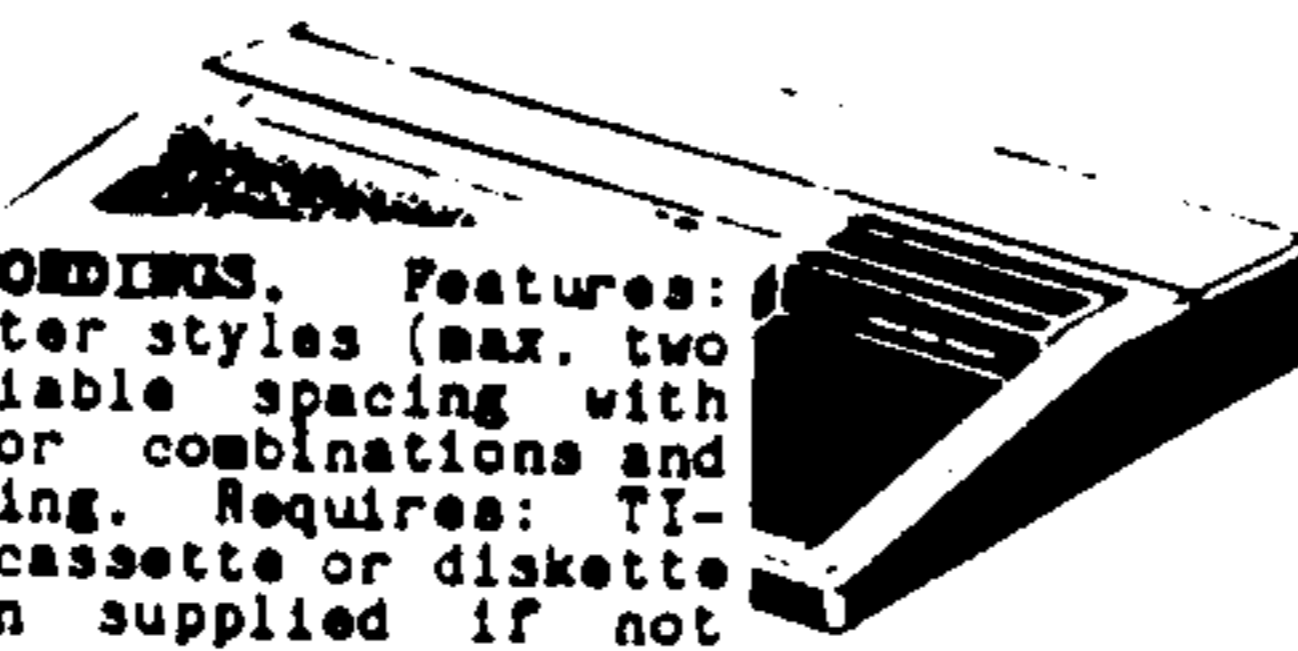
"I read a letter from Charles LaFara of the International Users Group and his idea is that the user base is eroding rapidly," says Harter of Not-Polyoptics. "It's true that TI cartridges themselves are becoming scarce but our stuff's still around. I've seen users become more sophisticated. They've expanded their system. People who bought for \$50 — that's where the user base will be disintegrating."

However, he adds, "There isn't the good buy in computers any more. The person with an expanded TI will stick with them, and should stick with them."

He continues, "As far as what's happened in the last year, I think we've all gone through a feeling of being betrayed and cut
(Please turn to Page 20)

VIDEO TITLES I

PRODUCE CUSTOM TITLES FOR VIDEO RECORDINGS. Features: Three proportionally spaced character styles (max. two per title), automatic centering, variable spacing with automatic eye correction, 26 color combinations and multiple screen division with scrolling. Requires: TI-BASIC, 16K. Price: \$29.95 for cassette or diskette version, postpaid. (Cassette version supplied if not specified).



VIDEO TITLES II

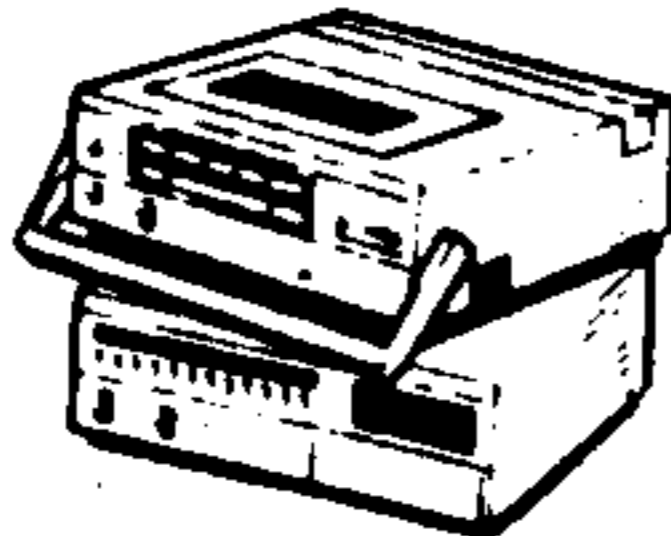
PRODUCE AUTOMATED SEQUENCES OF CUSTOM TITLES FOR IN-STORE ADVERTISING OR VIDEO RECORDINGS. Features: Three proportionally spaced character styles, choice of justification for each title line (left, centered or right), variable spacing with automatic eye correction, choice of four frame styles, overlay of custom designs such as logos, etc., and storage of forty titles, forty sprite patterns and ten title sequences. Requires: TI-EXTENDED-BASIC, 16K, Disk Controller and Disk Drive. Price: \$49.95 for diskette version, postpaid.

VIDEO TITLES III

PRODUCE CODING TO GENERATE CUSTOM TITLES IN YOUR OWN PROGRAMS. Features: Three proportionally spaced character styles, choice of justification (left, centered or right) and variable spacing with automatic eye correction. Requires: TI-BASIC, 16K. Price: \$24.95 for cassette or diskette version, postpaid. (Cassette version supplied if not specified).

character styles

BOLD
COMPUTER
MINIATURE



J & K H SOFTWARE
2820 S. ABINGDON ST.
ARLINGTON, VA 22206
(703) 820-4131

Virginia residents
add 4% sales tax.

A POWERFUL GROUP OF MORE THAN 100 TMS9900 ASSEMBLY LANGUAGE SUBROUTINES WHICH, IN CONJUNCTION WITH EXTENDED BASIC & MEMORY EXPANSION, SUBSTANTIALLY EXPAND THE PROGRAMMING CAPABILITIES OF THE TI-99 4A

\$99.95 FAR EXCEEDS THE WILDEST IMAGINATION OF A BASIC PROGRAMMER
The New York Times

J&K SOFTWARE
2820 S. ABINGDON ST.
ARLINGTON, VA 22206

Phone: (703) 820-4131
Dealer Inquiries Invited
Send 1st Class Stamp for FREE CATALOG

Circuitous paths

By LAURA BURNS

Computing being a relatively new field, the roads into it are diverse ones.

Consider the persons interviewed in our accompanying article.

Jackirae Sagogue spent 10 years in the field of education. She left in order to find greater scope for her entrepreneurial ideas and worked in marketing and administrative positions.

She was employed by a management consulting firm working for CorComp Inc. and began working for the firm itself as marketing director. She later moved to the position of general manager and is now president.

Lou Phillips joined Texas Instruments in 1973 after receiving his master's degree in electrical engineering and computer science.

When he joined TI, he recalls, the consumer group was part of the semiconductor group and calculators "were brand new."

The Datamath calculator cost more than \$100. He worked on the chip which enabled the same calculator to sell for \$10 a year later.

He received an MBA in the meantime and went to New York City where he worked in applying computer technology to business. He worked with Chase Manhattan in placing home banking on the Apple.

Entry into the peripheral business occurred when TI announced its peripheral expansion box. Phillips has been president of Myarc since August 1982.

"My partner and I went to the University of Virginia together and learned computers on the computer there," Gene Harter of Not-

Polyoptics says. "Years later we ended up together. He wanted to buy a computer for \$1,000 in 1980, which was cheap then. It was a choice between the Apple and the TI. He liked the 16 colors of the TI and its sound synthesizer. I had always wanted to write games for computers. So we sort of got together and became one of the first software producers."

TI enclosed a pamphlet from Not-Polyoptics in each computer they sent out and TI's supply company bought their software.

"When our name was in every computer sold, we got a head start," he says.

Jerry Price, vice president and general manager of Tex-Comp, is a graduate engineer and attorney, who has been a patent attorney with corporations.

In the mid-1970s he was in a family manufacturing business in Los Angeles. He
(Please turn to Page 20)

'SPIRIT OF THE HACKERS'—

(Continued from Page 18)

off to a feeling we can survive without them, which also, of course, is something completely new, that we can keep this thing going without a company to back us up or without a major magazine. It's like the spirit of the hackers reborn."

Tex-Comp's Price sees a gradual decline in the TI base, with a "fraternity of dedicated owners and users" remaining.

"At this point I don't see a replacement computer but I could be surprised," he says. "There will be continued accessories and

software coming out. We probably will spend a lot more time beating the bushes to find products."

Noting that last year more new products were developed after TI got out than when they were dominating the market, he foresees "for software developers at least a good year if they direct toward quality."

He sees a future especially for extensions of modules that will be disappearing, "forthcoming disk programs to take you further along."

BACKGROUNDS—

(Continued from Page 19)

purchased the TI computer and wrote fluid dynamics software for selecting fluid devices. Persons to whom he supplied this software asked for other software.

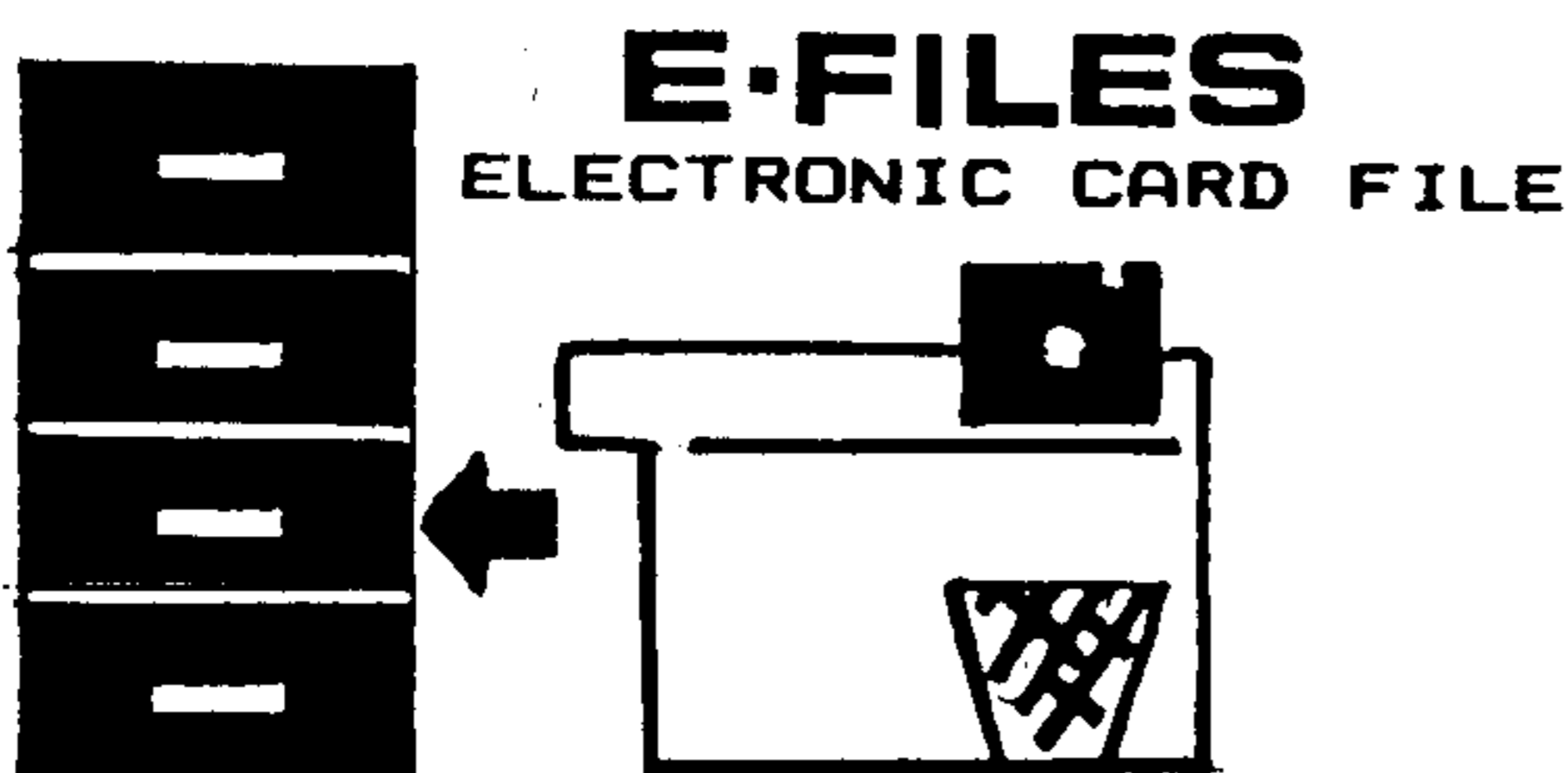
"We began ordering and selling professional software," he says.

Later, he says, they started carrying the entire TI line.

"We were one of the leaders," he says, recalling that at the October 1982 TI-Fest they introduced Pro Stick II and the Anchor Mark III modem.

Tex-Comp has been an independent firm since April 1983 with four warehouses and a warehouse outlet store in the San Fernando Valley. It is a regional depository for TI products.

NEW FOR
TI-99/4A IBM PC Jr.
COMMODORE 64



E-FILES
ELECTRONIC CARD FILE

A VERSATILE FILING SYSTEM WITH EASY TO USE PICTURE DRIVEN MENUS. JUST POINT AND ENTER. NO MOUSE IS REQUIRED. SORT, SEARCH, COMPILER REPORTS. MAIL LIST/LABEL OPTION. USE WITH ANY PRINTER/COMPUTER. TI AND C-64 DISK VERSIONS STORE UP TO 200 CARDS PER FILE. 3 FILES PER DISK. PC JR 300 CARDS PER FILE. 4 FILES PER DISK.

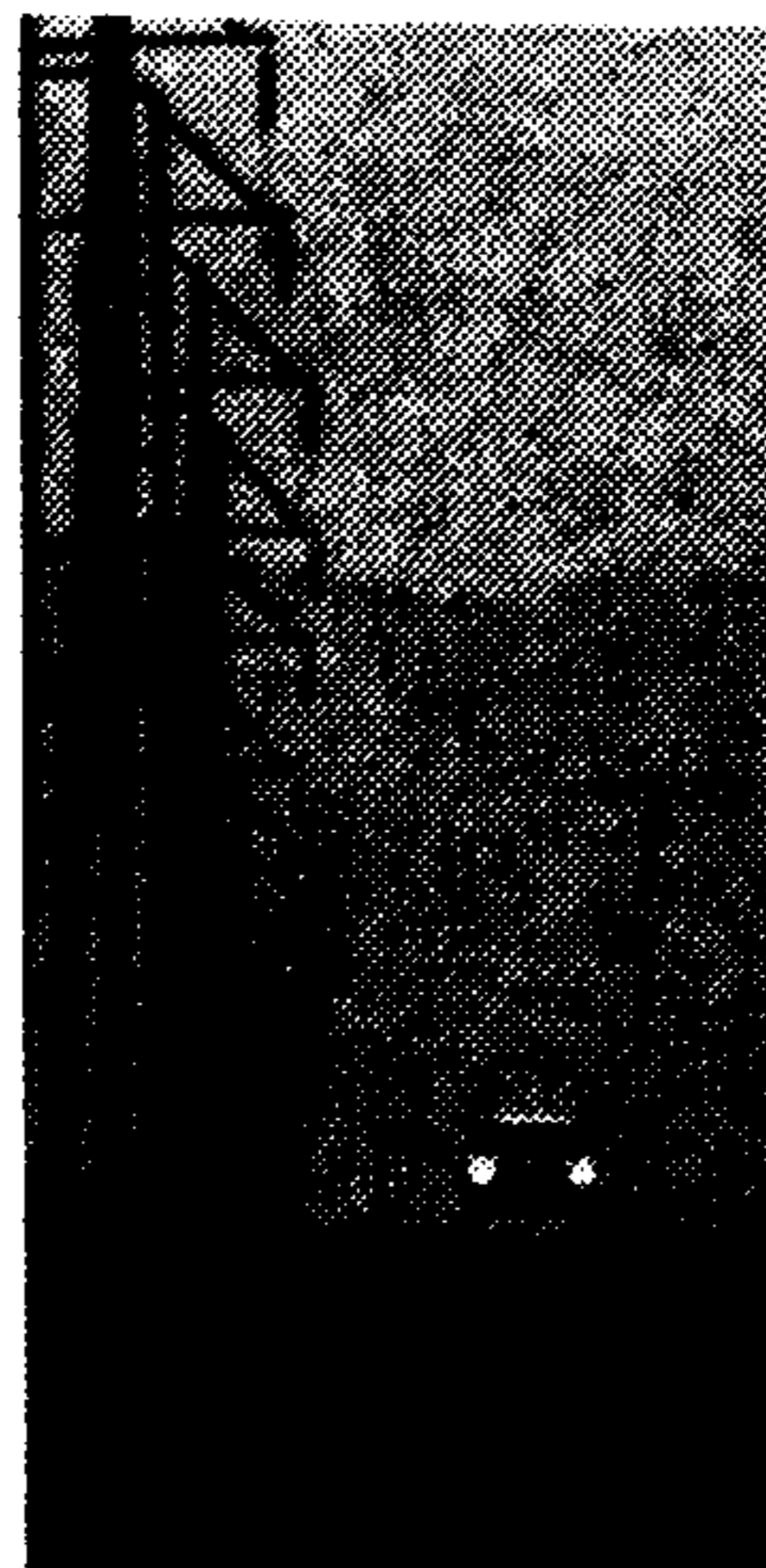
32K MEM EXP SUGGESTED, XBASIC REQ'D FOR TI-99/4A.
DISK \$21.95

CHECK OR MONEY ORDER TO:

VMC SOFTWARE
P.O. BOX 326
CAMBRIA HTS. N.Y. 11411

N.Y. RES
ADD
SALES TAX

POSTAGE PAID



There is a road.

Many cancer patients need transportation to and from treatments. That's why we ask for volunteers who can give some time each month to drive them. A cancer patient's road to recovery can be a long one, but it's made much easier when there's a friend who can help along the way.

AMERICAN CANCER SOCIETY

ARCADE ACTION FROM X-BASIC WITH THE BASIC COMPILER

Write a program in Extended Basic and the COMPILER transforms it into a machine language subroutine (like that used by arcade games). Then, call the subroutine from your regular program and get:

HIGHER SPEED

Hundreds of times faster graphics and arithmetic.

BETTER GRAPHICS

Access to other types of screen display: 40 characters per row or 768 definable characters with 16 colors each, and more.

MORE MEMORY

Access to an additional 8K segment of the Memory Expansion. The compiled subroutines can be saved on or loaded from cassette or disk while running X-Basic. Requires X-BASIC and Mem Exp. Send SASE for information. To order, send \$19.95 (check or MO) to:

ADVANCED SOFTWARE

181 Carnegie Avenue
Clairton, PA 15025

TEXAS INSTRUMENTS 99 4/A

1. LUNAR • TIC™



Running low on fuel, Astronauts must battle "LUNAR • TICs" to reach the cave where crystals are hidden. "Quicksand-Gooie" guards the crystals so beware! Astronauts defend themselves by firing laser blasts.

Cassette X-Basic \$19.95 ea.

2. JET • CHOPPER™ Fly Jet Chopper across enemy lines to deliver supplies. Avoid being hit by aircraft and ground missiles. Cassette X-Basic \$14.95 ea.

3. \$\$ • SLOTS™ Bet up to 3.00 each time. Looks and sounds like you're in Reno. See how much you can win! Joystick required. Cassette X-Basic \$8.95 ea.

4. KRAZY • KENO™ Select up to 15 spots. Right corner of board lights up as you enter your numbers. Left corner of each number lights up as 20 numbers are selected. Displays hits. Cassette X-Basic \$8.95 ea.

5. BLACK • JACK™ For 1 to 4 players. Double Down, split, hits, accumulating winning/losses each player. Cassette X-Basic \$14.95 ea.

Please Rush

- LUNAR • TIC \$19.95
- JET • CHOPPER \$14.95
- XMAS BONUS \$24.95
- \$\$ • SLOTS \$8.95
- KRAZY • KENO \$8.95
- BLACK • JACK \$14.95

XMAS BONUS
LUNAR • TIC & JET • CHOPPER
Both for \$24.95

Games Total \$ _____
Handling Charges \$ 2.00
CA Res. Add 6.5% Sales Tax \$ _____

Enclosed is my check Money Order Amount \$ _____
Bill my M/C Visa Exp. Date _____

Account Name _____

Address _____

City _____ State _____ Zip _____

ATMenterprises™ P.O. Box 1145, Millbrae, CA 94030

GAMES REQUIRE EXTENDED BASIC - Order now in time for X-mas.

Another view

TI Forth vs. Wycove Forth

(ED: This analysis of Forth is being published in the interest of increasing the reader's appreciation of Forth. (A review of Wycove Forth appeared in the September issue of MICROpendium.)

By **HECTOR SANTOS**

Those of us who have had a chance to experiment and play with TI Forth have probably been polarized into two groups: those who like it very much and those who hate it with passion. Nobody who has attempted to learn the language can remain indifferent to it. Forth, which is both a language and an operating system, is almost like a religion to some. To the rest, it is a weird language whose code is unreadable except to its writer. To those who have decided to stay with us and stick with Forth, read on.

There is another version of Forth available for the TI99/4A. It is called Wycove Forth and has been around for over a year. The current release is Version 2.0. It is available from Wycove Systems Ltd., P.O. Box 499, Dartmouth, Nova Scotia, B2Y 3YB Canada and costs \$50. How is it different from TI Forth and which one is better?

The first difference is that in Wycove Forth, you can use Editor/Assembler, Mini-Memory or Extended BASIC as the host module. You may also boot up the system from either disk or cassette (both are provided). I cannot imagine anyone running Forth, with its virtual memory system, on a cassette recorder. It is too cumbersome. However, it can be done and those who do not have a disk system can run Forth if they are willing to put up with the inconveniences resulting from using a cassette recorder.

I imagine an accomplished Assembly language programmer can write a loader program for TI Forth so that it will also load from either the Mini-Memory or Extended BASIC modules. With the proper loader program, it may also load from tape. The Wycove Forth loader is written in Extended BASIC but has some machine code (non-printing) imbedded in it.

Compatibility screens (58 and 59) are provided in Wycove Forth. These allow you to use most of the words straight out of "Starting Forth" by Leo Brodie. Since these screens have already been compiled and made part of the kernel, you do not need to load them. They were probably listed so that

you can see the source code and know what "Starting Forth" words are available. You can easily make similar screens for TI Forth by using the information provided in Appendix C of the TI Forth manual.

After TI Forth is booted up, you are shown a menu listing additional utilities that you may want to load. In Wycove Forth you are not given such a menu. You will have to remember which screens to load (or look in the manual) if you want to add other utilities to the Forth kernel. Naturally, you can write your own screen so that a menu will show automatically after booting.

Wycove Forth has screens 65 and 66 for implementing sound and screens 48 to 54 for speech. These screens obviously took a lot of effort to write and are very useful. You can also learn a lot about the internal structure of the TI99/4A by studying these screens. You will have to provide your own sound and speech screens in TI Forth since none are provided.

When writing programs, it is usually more convenient to use decimal numbers for quantities and hexadecimal numbers for addresses and graphics. In most Forth systems, the
(Please turn to Page 22)

CASINO SIMULATION GAME

By MOOSEGRIN

Programs in TI BASIC, on cassette, instructions included.

- BULGY BERTHA** — A progressive slot machine with Cherries, Plums, Bells, Oranges, Bars and Sevens. Choose your coin denomination, it even teases you the way a real slot would.
- NEATO KENO** — Play from 1 to 15 spots, payoff odds based on real keno boards.
- JACKS & BETTER** — Just like the Poker Machines in Nevada. Payoffs based on the value of your Hand.
- LOWBALL POKER** — Try to get the worst hand possible.

When ordering, specify one of these packages:

| | | |
|----------------|--------------------------------|---------|
| Slot-Keno | (Bulgy Bertha & Neato Keno) | \$11.95 |
| Poker-Package | (Jacks&Better & Lowball Poker) | \$14.95 |
| Casino-Package | (All four programs) | \$19.95 |

Add \$1.00 for postage and handling, CA residents add 6% sales tax. Please send name and address, along with check or money order to: **MOOSEGRIN P.O. Box 21624 San Jose, CA 95151**

BEST EDITOR AROUND—

(Continued from Page 21)

number base (hex, decimal, octal, etc.) has to be declared. It starts at a default setting and stays the same until a new base is entered. Shifting from one base to another can cause problems, especially if the shift was not intended. This is the main reason you see R-> BASE at the start and BASE-> R at the end of most screens.

An unintended switch may occur if the system aborts compilation in the middle of a screen. It may stop because of a bug, an undefined word, or some other reason. I have had this happen to me on a few occasions. Once, I was trying to load screen 51. Every-time I entered 51 LOAD, it seemed that I was loading something else. It turned out that I was in hex and whenever I entered 51 LOAD, I was actually loading screen 81 (51 hex=81 decimal).

Wycove Forth has an interesting feature that lets you forget about keeping track of your number base. It allows you to enter hexadecimal numbers directly. A ">" preceding a number tells the system it is a hexadecimal number, regardless of what base is in effect. You may, therefore, stay in the default base (decimal) all the time and use a ">" to enter hexadecimal numbers. A ">22" will be a decimal 22 and a "> 22" will be the same as a decimal 34. Of course, you may still switch bases at any time.

Another difference between the two systems is in their editors. Both Wycove Forth and TI Forth have 40 and 64-column modes. A good monitor, preferably monochrome, is mandatory when using the 64-column mode. A color TV is practically useless and even an inexpensive color monitor may not do very well.

In the 40-column mode, TI Forth gives you the standard Forth screen of 16 lines by 64 columns. Sixty-four columns are accommodated by providing a window that shifts between the left and right halves of the screen. Line and column numbers are visible at all times. Almost all the features that you need to manipulate characters or lines are provided. It is a joy to use and is one of the best Forth editors around.

Wycove Forth basically provides the same editing features in its 40-column editor as TI Forth. However, screens are implemented as 24 lines by 40 columns, the usual implementation in computers with 40-column displays.

You can only get 960 bytes per screen, losing 64 bytes of the 1024 that a screen can have. This does not bother me as much as the fact that line and column numbers are not shown in the edit mode.

In the 64-column mode, TI Forth wins handily. It has exactly the same features provided in the 40-column mode. Wycove Forth's 64-column editor has a very limited capability.

Up to this point, all the differences we have discussed were of such a nature that they could be equalized, minimized or even overlooked. The rest of this article will be devoted to the biggest difference between Wycove and TI Forth—their use of the disk system.

I must apologize to those who are not technically inclined and also to those who do not care about the inner workings of the disk system. I realize that it is not necessary to understand the internal workings of the computer to be a good programmer. However, I have no choice but to go through all these to properly discuss this last and most crucial difference between the two systems. In this article, I use screens to mean both blocks and screens because it has become common usage. Technically, screens should only refer to blocks that contain source code.

It is first necessary to understand how the TI99/4A Disk Operating System (DOS) works. This is the DOS you are most familiar with—BASIC, the Disk Manager, and many other modules use it. Let us take a single-sided, single-density (SSSD) disk containing 360 (>0168) sectors to explain the disk organization. To keep things simple, let us further assume that our disk has no fractured files (split into non-consecutive parts of the disk), has a total number of files less than 32, and uses not more than 326 sectors for actual file data. The majority of disks would fit this category.

The first sector (>0000) is the disk header and contains the following information: disk name, total number of sectors on the disk, number of sectors per track, density, and a bit map showing what sectors have been used and what are available.

Skipping past the second sector for now, the next 32 sectors (>0002 to >0021) contain file headers. As each new file is entered, a sector assigned consecutively from >0002
(Please turn to Page 23)

99/4A AUTO SPELL-CHECK

* for TI-WRITER *

Quickly check your text
for unsightly spelling
errors.

send:

\$ \$49.95+\$3.00 S&H \$

MC/VISA: Include card #,
phone #, expiration date.

to:

DRAGONSLAYER ASC
2606 PONDEROSA DR.
OMAHA, NE 68123
(402)291-8323

Support Our Advertisers

SST EXPANDED BASIC COMPILER

The SST Expanded Basic Compiler translates your Basic Program directly into machine language while allowing you to edit and debug using T.I. Basic

Contains:

- Sprites, Sound and String Functions
- Bit Map Mode for High Resolution Graphics
- Integer Arithmetic for Speed and Memory Conservation
- The Ability to Read and Write to a Disk Drive
- The Ability to Access the RS232 Interface
- The ability to allow you to build your own features into the Compiler. If you need a feature not in the Compiler, you can easily add it.
- Requires Memory Expansion, Disk Drive and either Editor/Assembler or Mini-Memory

Send \$95.00 for the SST Expanded
Basic Compiler

SST BASIC COMPILER

Contains many of the features of T.I. Basic. If you need a portable system or you do not have memory expansion or a Disk Drive, this is the Compiler for you. Special features include graphics and both integer and floating point arithmetic. Requires only mini-memory and a cassette recorder. Available on Disk or Tape.

Send \$30.00 for the SST Basic Compiler

SST SOFTWARE, INC.
P.O. Box 26
Cedarburg, WI 53012
(414) 771-8415

Wisconsin Residents Add 5% Sales Tax

EB Software

presents

TI Runner

for the TI-99/4A

You are a highly-trained commando who has been captured and imprisoned deep in the catacombs of the evil Kryon Empire. Will you be able to mount a successful escape and still get away with the Kryon booty?

There are 50 completely different levels awaiting you on your quest for fun and adventure. However, there are guards that are hot on your trail. You will be running, jumping, drilling passages, and outfoxing life-threatening guards as you escape from the Kryon dungeon.

100% Pure Assembly for only \$24.95.

Requires Editor/Assembler or Mini Memory, Memory Expansion, and Disk System. Send check or money order to:

EB Software
12912 Villa Rose Dr.
Santa Ana, CA 92705

LOST TREASURE OF THE AZTEC

A CHALLENGING ADVENTURE GAME

- *Continual disk access gives you the depth found only in 32K RAM programs
- *No Memory Expansion required
- *100+ word vocabulary
- *Save game feature
- *A thought-provoking game you'll take weeks solving
- *Read the review in MICROpendium June '84



\$16.95

(checks only please)
Extended BASIC and one
Disk Drive required

New Address:
Mind Games Software Co.
325 56th St.
Newport News, VA 23607
(804) 380-5525

DISK SYSTEM PRIMER—

(Continued from Page 22)

is allotted for directory information. This directory information consists of the following: file name, file type (program, DIS/VAR 80, INT/VAR 254, etc.) and write protection code, file size, starting sector address, relative address of last sector in file, etc.

The rest of the disk, sectors >0022 to >0167, contain file data. Note that a file occupies on the disk the number of sectors of actual data plus one sector for the directory. Now, back to the second sector (>0001). This sector shows the order in which sectors >0002 to >0021 fit in an alphabetical sort of their filenames.

All of the above information is needed for housekeeping and tracking of files. When we access a disk file, the system refers to the directory to find out where to go to read the data. When we want to write a new disk file, the system checks the disk header for available sectors that can be used. When we delete a file, only its header is erased. The disk header is updated but the file data are re-

tained in their original locations. However, since the system can no longer tell where they are, it assumes that they are gone and the originally occupied sectors can now be written over.

Let us get back on track with how the two versions of Forth use the disk system. Wycove Forth relies entirely on TI DOS for its disk access. It needs the disk header and the directory to be able to LIST, EDIT, LOAD, BLOCK, or FLUSH (SAVE-BUFFERS) screens. Screens are implemented as relative files of 1024 bytes (plus 4 bytes for screen number, etc.). The screens have to be pointed to by the directory. TI Forth is more like a "pure" Forth system. Screens are accessed strictly by their location on the disk, i.e., screen 0 is sectors >0000 to >0003, screen 1 is sectors >0004 to >0007, etc.

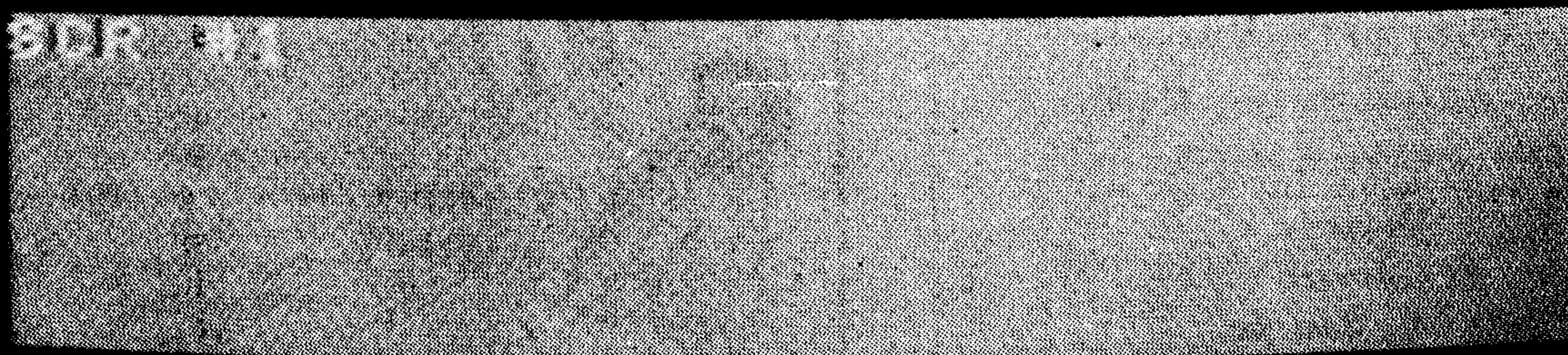
The TI Forth system disk is a hybrid disk. It has a disk header, the alphabetical order list and file headers. It can, therefore, be accessed by BASIC and the Disk Manager

module. The reason the headers are needed is that TI Forth is booted up through the Editor/Assembler module. The E/A module needs to know where "FORTH" is (it is on sectors >0022 to >0026). "FORTH" is a loader program that loads "FORTHSAVE," the actual Forth kernel which is on sectors >0027 to >0119. "SYS-SCRNS," the TI Forth screens, does not really need a file header. It was provided so that the whole disk can be copied by using the Disk Manager. After Forth is booted up, the system has no need for the original DOS anymore.

An interesting disk that illustrates this is the Forth Demo Disk. It has a disk header and file headers for FORTH and FORTH-SAVE. However, the program screens do not have a file header. This disk, therefore, can only be copied in Forth, Pascal or Assembly language. Anyone who tries to make a copy using the Disk Manager module will find that only FORTH and FORTH-SAVE can be copied.

(Please turn to Page 24)

THIS IS THE 64-COLUMN EDITOR OF TI FORTH. IT IS DIVIDED INTO TWO PARTS. THE UPPER PART IS HAS A BLACK BACKGROUND WITH WHITE TEXT. THE LOWER PORTION IS BLUE WITH WHITE TEXT. THE LOWER SCREEN UTILIZES THE NORMAL 32-COLUMN MODE.



WHICH FORTH IS BETTER?—

(Continued from Page 23)

Wycove Forth has a very powerful word, SAVE-SYSTEM, for adding words to its kernel. You simply define the new words you want to add and SAVE-SYSTEM will take care of it. You may customize the kernel so that it includes words that you often use.

In TI Forth, customizing is accomplished in a different manner. The kernel cannot be changed easily. You have to define your new words and BSAVE the compiled words onto screens that you specify. This saves the compiled words on your disk in internal format. You may then BLOAD these screens from screen 3, the screen that is loaded automatically by the booting process. This saves the interpretation steps and is only slightly slower than the Wycove Forth method.

Since only the "SCREENS" file is available for access in Wycove Forth, there is no chance that you will inadvertently change the kernel by erasing or writing over it. This is a possibility in TI Forth and is the price you pay for having the contents of the SCREENS file. The screens in TI Forth cover the con-

tents of the whole disk. There is one thing about the Wycove Forth screens that puzzles me. I cannot find screen 0. Numbering starts with 1, a very unForthlike way.

It is apparent that Wycove Forth, in its original form, cannot copy a whole disk. It does not have a word for such a task nor does it have one for initializing disks. TI Forth has these capabilities and also a word, DISK-HEAD, to make its disk compatible with BASIC and the Disk Manager module. Using DISK-HEAD gives you a hybrid disk, with one file called "SCREENS" covering the entire disk except for two sectors. This is analogous to the Zero command in the p-System.

Which Forth is better? This is the point where most writers start equivocating. I am tempted to do the same because they are both good. On simple looping benchmarks, Wycove Forth is faster (see November MICROpendium). It has sound and speech words and can operate using only a cassette

recorder. It also has a unique method for entering hexadecimal numbers directly.

However, unless one of the above is a determining factor for you, you are better off with TI Forth. It has one of the best Forth editors in existence and uses the disk system in a more flexible manner. Its deficiencies, when compared to Wycove Forth, can be overcome by writing additional screens. Best of all, it is in public domain and costs very little. You may also write programs using the language for commercial distribution without having to pay licensing fees. It cannot help but be the dominant version of Forth for the TI99/4A.

Who is Wycove Forth for, then? Wycove Forth is for the individual who wants to explore a different implementation of Forth. He can learn a lot from the screens supplied on the disk for functions such as speech, sound, peripheral access, etc. He will probably take some of the unique ideas from Wycove Forth and incorporate them in his own customized version of TI Forth.

First impressions of CP/M

By JOHN KOLOEN

CP/M is a disk-operating system that has enjoyed wide popularity over the years. With the advent of other operating systems, however, CP/M never became the universal business system that was once thought to be its destiny. This is largely because IBM and Apple did not adopt it as the operating system for their microcomputers. Of course, CP/M is available as an option on Apple and IBM machines, not to mention a large number of other brands. It is now even available for the TI home computer as a card for the peripheral expansion box.

Morning Star Software, 4325 SW 109 Ave., Beaverton, OR 97005, began shipping its CP/M card. It

was preceded by a year's worth of advertising during which time the company took no orders from prospective buyers. Instead, the company sent those who responded to its ads a packet of information on the yet-to-be-completed card and available software.

MICROpendium has been working with the card for about a month, using it with the Personal Pearl database program. Actually, the database "program" comes on 12 single-sided diskettes. A business program on 21 disks is also available.

The CP/M (Control Program for Microprocessors) card looks like any TI peripheral expansion box card. Internally, however, it is like

no other TI card. The heart of the card is an Intel 8085 microprocessor, an eight-bit chip that essentially gives the TI a new identity and personality. By plugging in the card and selecting the CP/M option from the main menu, users leave the world of Texas Instruments behind.

Note at this point that the card is compatible with the TI disk controller and the CorComp Inc. disk controller, according to company president Scott Swensen. It also requires a memory expansion.

The Morning Star card uses software written in the Osborne I format. Osborne is single-sided, single-density. Any disk used with the (Please turn to Page 26)

YOU ASKED FOR IT — WE DID IT! The first TRUE Database System for the TI99/4A

DON'T WANT TO PROGRAM? ACORN 99 IS:

EASY — Step-by-step instruction manual with complete examples of applications. Non-programmers can easily create, update, search, and report from databases of their own design.

FLEXIBLE — YOU determine item types and sizes, number of items, record sizes, and number of records. Up to four different types of related records can be stored in a single database.

ACCURATE — User-specified range and value checking can be applied to inputs to ensure that only correct data is entered into the database.

DEVELOPING YOUR OWN PROGRAMS? ACORN 99 IS:

POWERFUL — Extended BASIC programs can access up to three databases simultaneously. This, along with a two-level record structure, allows applications that just aren't possible with less-capable systems.

TIME-SAVING — A complete database subsystem, ready for use in your programs. A pre-processor automatically inserts required statements and subroutines into Extended BASIC programs you write.

COMPLETE — In addition to the database, a subset of our exclusive 40-column "Display Enhancement Package" is included and can be used with programs you write.

FAST — Critical functions written in Assembler Language for maximum speed. Comes on TWO disks; complete instruction manual included. One disk drive, 32K memory expansion, and Extended BASIC required. Only \$59.95.

***** COMING SOON *****

Expanded Pre-processor — generates Extended BASIC statements to produce custom menus, screens, and reports from your specifications WITHOUT PROGRAMMING.

***** AVAILABLE NOW *****

Display Enhancement Package — 40-column display, forward/backward scrolling, split screen, enhanced keyboard functions, much more. Still only \$29.95

SMASH — The Program Optimizer — Compress XBASIC programs up to 30%. \$24.95

French Drill — Create, maintain, and practice with vocabulary lists. \$19.95

Super Checkbook — Easy to use checking account manager. \$19.95

ALL PROGRAMS REQUIRE DISK AND XBASIC. ALL EXCEPT "SMASH" REQUIRE 32K ADD-ON.

Send check or MO to: OAK TREE SYSTEMS, 3922 VALENTINE RD., WHITEMORE LAKE, MI 48189

CP/M USES 40-COLUMN DISPLAY—

(Continued from Page 25)

CP/M card must be formatted (initialized) by the card in the Osborne I format using CP/M. Essentially, this limits users to 90 kilobytes of storage per disk

At first glance this may seem to be a step backward for TI users, who have worked their way up from single-sided, single-density drives to double-sided, double-density drives. Prior to the release of Disk Manager II, 90K was the standard TI disk capacity. Whether this is a limitation depends on the user and the type of software being used. Personal Pearl, for example, can be used to create database files written on multiple diskettes.

CP/M, of course, is the creation of Digital Research. The CP/M program loads from a disk that is supplied with the card. The system boots itself by selecting the CP/M option from the main title screen. The system disk includes a number

of commands, including those used for such common disk operations as displaying a disk directory, changing file names and saving files. Each of these functions is loaded from the system disk when required.

The disk includes an assembler program, an editor program and a debugging program, among others. These programs are largely of use to those who program in assembly language. Morning Star says BASIC and CBASIC are available as languages.

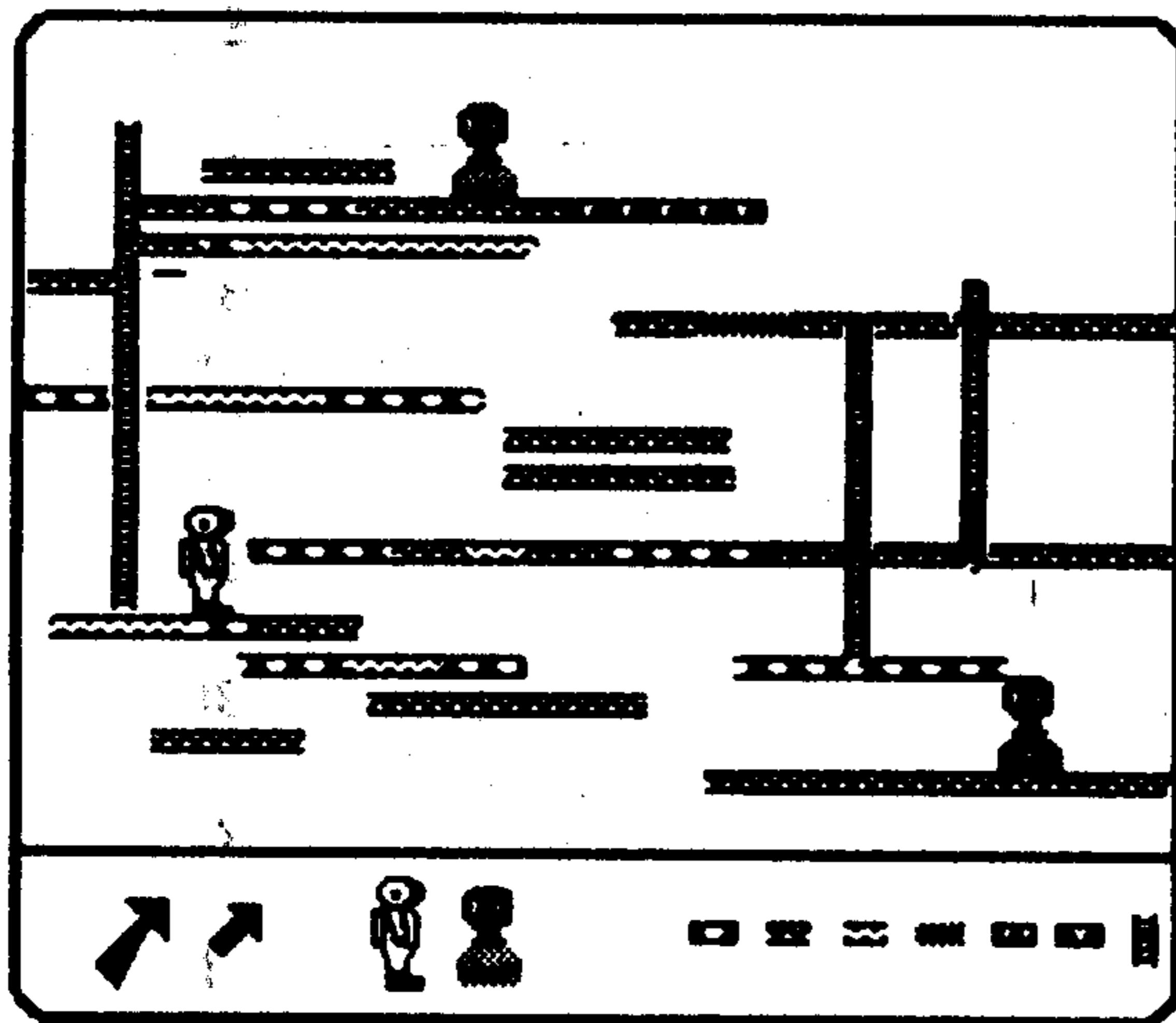
Not being an assembly language programmer, I have found no particular advantage to programming with CP/M. The disk operating commands are easy to learn and in many ways more flexible than TI's operating system. Of course, programs written using the TI operating system cannot be accessed by the CP/M system, and vice versa.

The CP/M card uses a 40-column by 24-line screen. However, most

CP/M software uses an 80-column screen. The Morning Star card uses two techniques to get around this limitation: windowing and scrolling. These operate in much the same way as TI-Writer and Microsoft Multiplan, horizontally and vertically. Whether scrolling or windowing is used, programs such as Personal Pearl cannot be configured for 40-column display. This means that on-line instructions for the program must be read across the 80 columns, one line at a time, scrolling back for the beginning of each line. My first reaction to this was to try it a few times, turn the computer off and pull the card out. I let it sit for a couple of weeks and then returned to it, my mind better prepared for the scrolling that would be necessary to work with Personal Pearl. That is the point at which I am right now. How things go in the future will be the subject of another story.

GRAVITY MASTER

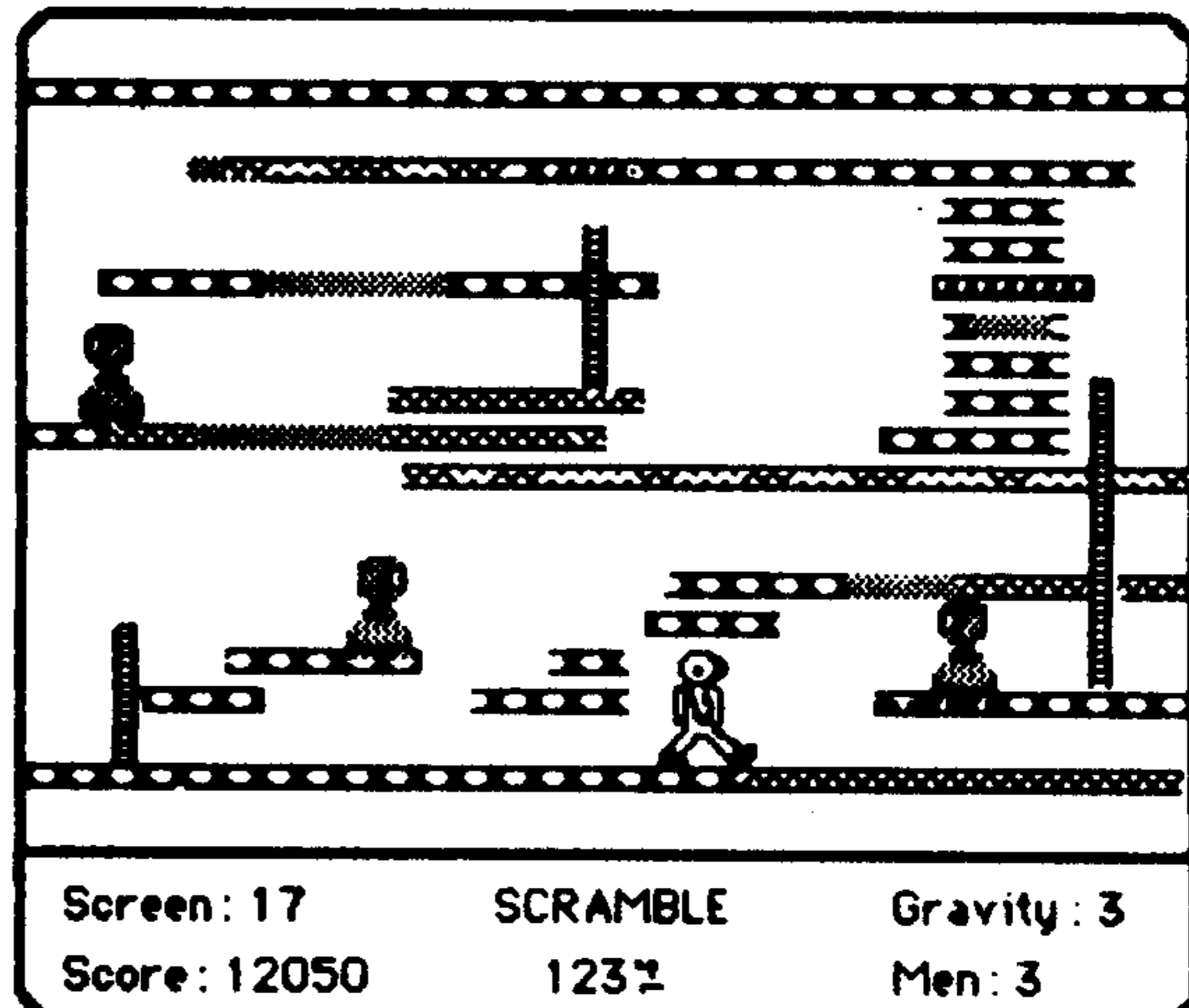
COMPLETE GAME CONSTRUCTION SET FOR THE TI 99/4A



Put up to 20 screens together to form your own games. You have total control over almost every factor.

©1984 by
CSI Design Group
Box 50150
St. Louis, Missouri 63105

Build an infinite number of screens with the easy to use Editor. Use girders, ladders, energizers, and don't forget to add a few berzerk robot guards. Set Gravity, time, and other factors to make it as tough (or easy) as you want.



Screen: 17 SCRAMBLE Gravity: 3
Score: 12050 123% Men: 3

Graphics give this disk catalog a new look for TI users

Disk catalog programs are among the most useful tools any computer user can have. Without them, few would be able to keep track of what is and isn't on their disks.

Of course, there are many disk catalog programs floating around, most of them in the public domain.

The one included on this page comes from Ron Castleton of Richardson, Texas. He writes: "Someone may be mildly interested in...DISK-GRAPHX... (which) presents a graphic and text catalog. It is an old users group program, heavily reworked for multiple disks, double- and single-sided and screen or roll

advance."

We are publishing it because it takes advantage of color and graphics, making it somewhat more

elegant in design and display than the run-of-the-mill catalogs most of us use. The program requires Extended BASIC to run.

```

100 REM DISKGRAPHX;SCRE
EN/ROLL SELECTION & FUL
L DISK DISPLAY COURTESY
:R.CASTLETON JULY-AUG 1
983, RICHARDSON, TEXAS
110 REM DOUBLE-SIDED DI
SK ALGORITHMS BY M.FLOR
ES,AUG.1983,DALLAS,TX
120 CALL CHARSET :: CAL
L CLEAR :: CALL SCREEN(
4)
130 FOR AZ=1 TO 8 :: RE
AD A$ :: CALL CHAR(AZ+9
5,RPT$(A$,8)):: NEXT AZ
140 DATA FF,80,C0,E0,F0
,F8,FC,FE,FF
150 CALL COLOR(9,7,1)::
CALL COLOR(10,5,5)
160 OPTION BASE 1 :: CA
LL CLEAR
170 IMAGE ##
180 DISPLAY AT(8,8)ERAS
E ALL:"DISKGRAPHX MENU"
:: DISPLAY AT(10,8):"DI
SK? (1-3): 1" :: ACCEPT
AT(10,22)BEEP SIZE(-1)
VALIDATE("123"):D$
190 DISPLAY AT(12,2):"D
ISPLAY-ROLL/SCREEN(R/S)
?:S":: ACCEPT AT(12,28)
BEEP SIZE(-1)VALIDATE("
RS"):RS$ :: CALL CLEAR
200 D$="DSK"&D$&". " ::
OPEN #1:D$,INTERNAL,RE
LATIVE,INPUT
210 INPUT #1:N$,A,B,C :
: I=0
220 IF B>358 THEN DISPL
AY AT(1,1)ERASE ALL:"DO
UBLE-SIDED ";D$&N$: : "U
SED";B-C :: CALL G(3,9,
(B-C-32)/4)
230 IF B>358 THEN DISPL
AY AT(4,1):"FREE";C ::
CALL G(4,9,(C-32)/4)::
Z$=" # FILE NAME T USE D
SECTOR" :: GOTO 250
240 DISPLAY AT(1,1)ERAS
E ALL:"SINGLE-SIDED ";D
$&N$: : "USED";B-C :: CA
LL G(3,9,(B-C-16)/2) ::
DISPLAY AT(4,1):"FREE";
C :: CALL G(4,9,(C-16)/
2)
245 Z$=" # FILE NAME T
USED SECTOR"
250 DISPLAY AT(6,1):Z$
260 Z$=RPT$(CHR$(104),2
8) :: DISPLAY AT(2,1):Z
$ :: DISPLAY AT(5,1):Z$
:: DISPLAY AT(7,1):Z$
270 N=0
280 X=0
290 X=X+1
300 N=N+1
310 INPUT #1:P$,A,B,C
320 IF LEN(P$)=0 THEN 3
50
330 DISPLAY AT(X+7,1):U
SING 170:N :: DISPLAY A
T(X+7,4):P$;TAB(15);A :
: CALL G(X+7,17,B):: DI
SPLAY AT(X+7,25):B
340 IF X=15 THEN 390 EL
SE 290
350 DISPLAY AT(23,1):RP
T$(CHR$(104),28):"ANOTH
ER DISKGRAPHX(Y/N)?:Y"
:: ACCEPT AT(24,26)BEEP
VALIDATE("YN")SIZE(-1)
:A$ :: IF A$="Y" THEN R
UN ELSE 360
360 CALL CLEAR
370 CLOSE #1
380 END
390 IF RS$="R" THEN 280
ELSE 400
400 DISPLAY AT(23,1):RP
T$(CHR$(104),28):TAB(3)
;"REST OF DISK (Y/N)?:Y
" :: ACCEPT AT(24,23)BE
EP VALIDATE("YN")SIZE(-
1):RD$
410 IF RD$="Y" THEN 430
ELSE 350
430 FOR W=8 TO 22 STEP
+2 :: CALL HCHAR(W,1,32
,32):: NEXT W :: FOR V=
21 TO 9 STEP -2 :: CALL
HCHAR(V,1,32,32) :: NE
XT V
440 GOTO 280
450 END
460 SUB G(R,C,N)
470 A$=""
480 A=INT((N-.5)/8)
490 B=N-A*8
500 IF N>7 THEN A$=RPT$(
CHR$(96),A)
510 IF INT(B)=8 THEN A$
=A$&CHR$(96)
520 IF B=0 THEN 530 ELS
E IF INT(B)<8 THEN A$=A
$&CHR$(96+B)
530 DISPLAY AT(R,C)SIZE
(LEN(A$)):A$
540 SUBEND

```

Follow the numbers to bulletin boards across the country

Scott Darling of Spokane, Washington, is one of thousands of TI users who tune in to electronic bulletin board systems operated by TI994/A users.

Although TIBBS is a trademarked word that refers to the Texas Instruments Bulletin Board Service software marketed by a firm in Atlanta, Georgia, not all bulletin board systems operated by TI users are TIBBS. (See the June MICROpendium for more information about TIBBS.)

Anyway, Darling is Sysop (system

operator) of Caltex 8 in Spokane and provided the following list of TI electronic bulletin boards because "I'd like to see that everyone gets as much information as possible on TI."

Because of the nature of electronic bulletin boards, we cannot guarantee that all of those listed here are still operating. Most of them operate at 300 baud only. Those who are not listed here may mail a phone number to MICROpendium (we keep losing notes on phone calls) and we will include it in a future issue.

Electronic bulletin boards

| Location | Telephone No. | Location | Telephone No. |
|-------------------------|---------------|--------------------------|---------------|
| Brick, NJ | 201-477-7263 | San Jose, CA | 408-926-8767 |
| Portland, ME | 207-797-5690 | Fremont, CA | 415-794-8050 |
| Reading, PA | 215-929-5348 | Patchague, NY | 516-794-8050 |
| Cleveland, OH | 216-289-7311 | San Francisco, CA | 415-431-3783 |
| Washington, DC | 301-434-0117 | Indianapolis, IN | 317-631-994A |
| Washington, DC | 301-681-5065 | Glendale, CA | 818-507-6219 |
| Hyteville, MD | 301-927-7079 | Spokane, WA | 509-328-0553 |
| Newark, DE | 302-322-3999 | Santa Cruz, CA | 408-426-1482 |
| West Palm, FL | 305-793-8050 | Rocklin, CA | 916-624-3328 |
| Orlando, FL | 305-831-5990 | San Jose, CA | 408-578-6264 |
| TI-WEST | 312-766-2797 | Phoenix, AZ | 602-252-4499 |
| Chicago TI-BBS(Private) | 312-848-3669 | Toledo, OH | 419-385-7484 |
| MAGS | 312-598-5955 | Gresham, OR | 503-661-0408 |
| Warren, MI | 313-751-1119 | Knoxville, IA | 515-842-2104 |
| Hazel Park, MI | 313-544-0714 | Albany, NY | 518-765-4993 |
| Detroit, MI | 313-544-7788 | Minnesota | 612-920-1889 |
| Wichita, KS | 316-681-3167 | Knoxville, TN | 615-573-2136 |
| Rhode Island | 401-728-8117 | Burlington, MA | 617-273-3262 |
| Atlanta #1, GA | 404-425-5254 | San Diego, CA | 619-276-3173 |
| Atlanta #2, GA | 404-928-4278 | TIBBS-CAL | 714-350-8583 |
| Atlanta #3, GA | 404-471-1283 | N. Tonawonda, NY | 716-692-7289 |
| Ringold, GA | 404-935-4054 | Tonawonda, NY | 716-837-6635 |
| Pittsburgh, PA | 412-854-5575 | Virginia Beach, VA | 804-486-1484 |
| Milwaukee, WI | 414-649-TEAM | Hawaii | 808-536-0998 |
| Appleton, WI | 414-739-5380 | Tampa Bay, FL | 813-525-7998 |
| Freedom, WI | 414-788-9730 | St. Petersburg, FL | 813-526-1265 |
| San Francisco, CA | 415-364-8517 | Kansas City, MO | 816-444-4163 |
| San Francisco, CA | 415-355-3092 | Pasadena, CA (7-11 p.m.) | 818-578-0678 |
| Fremont, CA | 415-651-4147 | Raleigh, NC | 919-851-8460 |

POLYOPTICS
SOFTWARE FOR THE TI 994(A)

absolutely!
FREE
CATALOG

POLYOPTICS
13721 LYNN STREET, SUITE 15
WOODBIDGE, VA 22191

Data Base Manager System

Keep track of lots of data

By JOHN KOLOEN

Data Base Manager System by Navarone Industries is a sophisticated file manager in a cartridge. (The program also includes a system disk that contains examples, among other things.) It allows users to define up to 25 fields of data per record. Navarone says the program can handle up to 32,000 records using a hard disk. Otherwise, it is limited to the amount of space on a floppy disk. I found it to be compatible with single- and double-density diskettes.

Performance: The Data Base Manager System consists of four programs, each of which is loaded separately into computer memory via the GROM port. The four are:

Setup
Entry
Sort
Reports.

The Setup section is used to design data entry formats. The Entry section is used to enter data using the Setup format. The Report section is used to design forms for printer or screen. Sort is used to sort records developed through the Entry section.

The Setup section is well-conceived and executed, offering the user considerable flexibility in designing a database form. (Although the program is named Data Base Manager System, I do not regard it to be a true database manager since it cannot access more than one database simultaneously.) The user may create up to 25 fields of data, with a maximum of 28 characters per field. Each record may consist of up to 255 characters.

The Setup mode starts out as a blank screen. It is here that the user defines his fields by giving them a name and by determining the field length. The name is entered by simple typing and the entry field is created by using the INSERT key. Each time the INSERT key (FCTN 2) is pressed a red square appears in the field. After creating the field, the user presses PROC'D to go to the field definition screen. This screen displays the position of the first character of each field relative to the fields that precede it as well as the number of characters in the field. This screen also prompts the user to determine whether the field is numeric and whether it is a key sort field.

Review

Report Card

Performance: A
Ease of Use: A
Documentation: B
Value: B+
Final Grade: B+

Cost: \$69.95 (cartridge)

Manufacturer: Navarone Industries, 510 Lawrence Expressway, #800, Sunnyvale, CA 94086, (408) 985-2932

Requirements: console, monitor or television, disk system, memory expansion, printer optional

A unique feature of the Setup program is the ability to create a key message field. This is entered using the field definitions screen. Essentially, the user inputs information about the field that might be of use to persons who will be using the DBMS to enter data. This message is called up by simply pressing the AID key. This can be very useful if the person who enters the data is not the person who designed the Setup format.

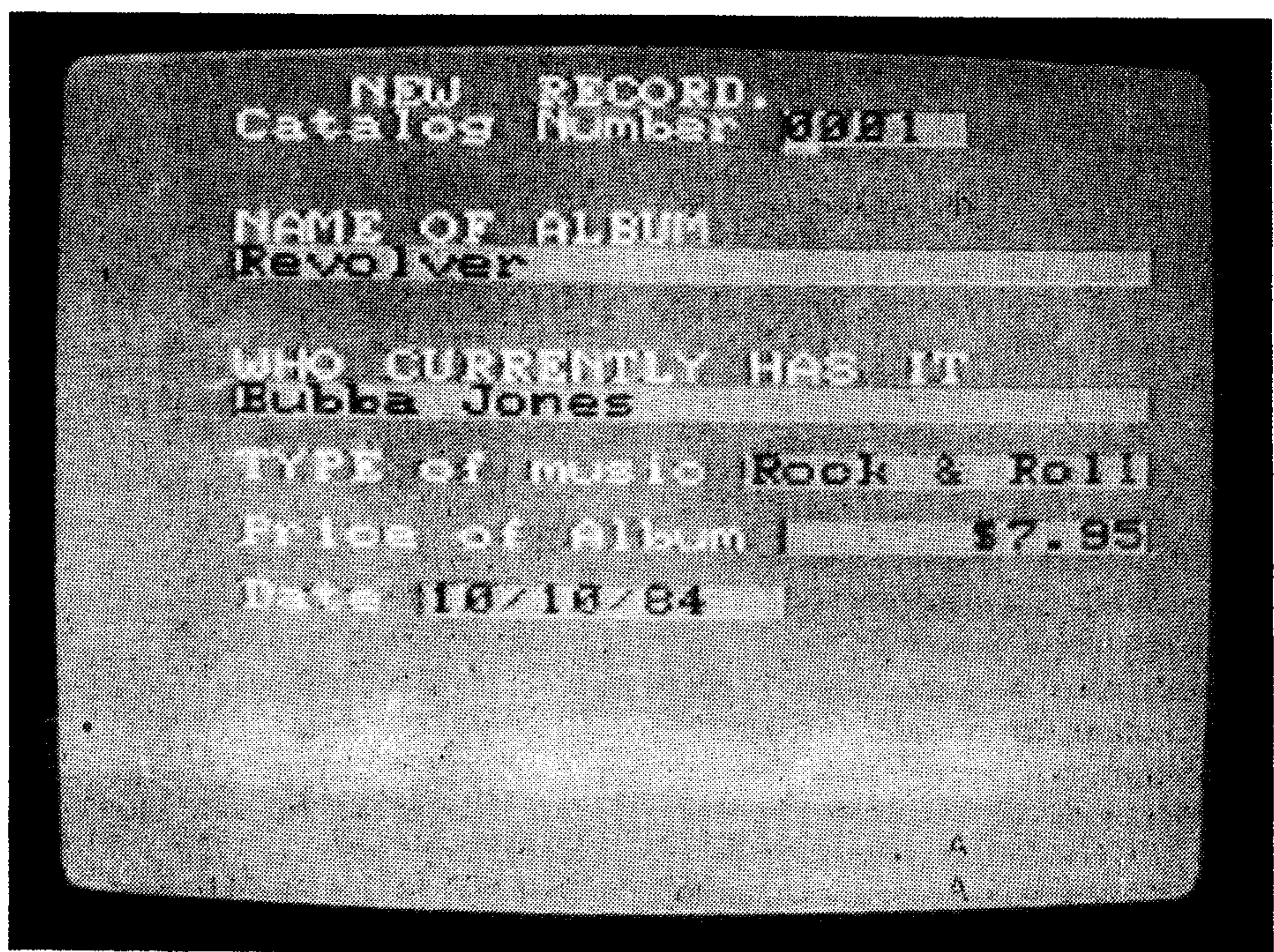
DBMS requires that at least one field be defined as the key sort field. Because data entered into this field must be absolutely unique, the user will probably want to assign a number to it, incrementing it by one for each subsequent entry.

The Setup portion of the program allows for complete editing of any field name, field length or field definition entry. Users may even modify the Setup structure after it's been used to enter data, though field positions and lengths cannot be changed without altering the location of data. However, new fields may be added to the end of the Setup at any time without affecting previously entered records.

Users may also break up individual fields if they like. For example, suppose you want to enter telephone numbers in the following format: (555) 555-5555. You would insert the parenthesis and hyphen in the Setup file. Then, when entering data, the user would enter "555", press enter, "555," press enter, and "5555."

Once the user has defined his Setup format, he presses BACK and is prompted for "auto format." Auto format automatically aligns fields within a record. The user is then

(Please turn to Page 30)



DATA BASE MANAGER SYSTEM—

(Continued from Page 29)

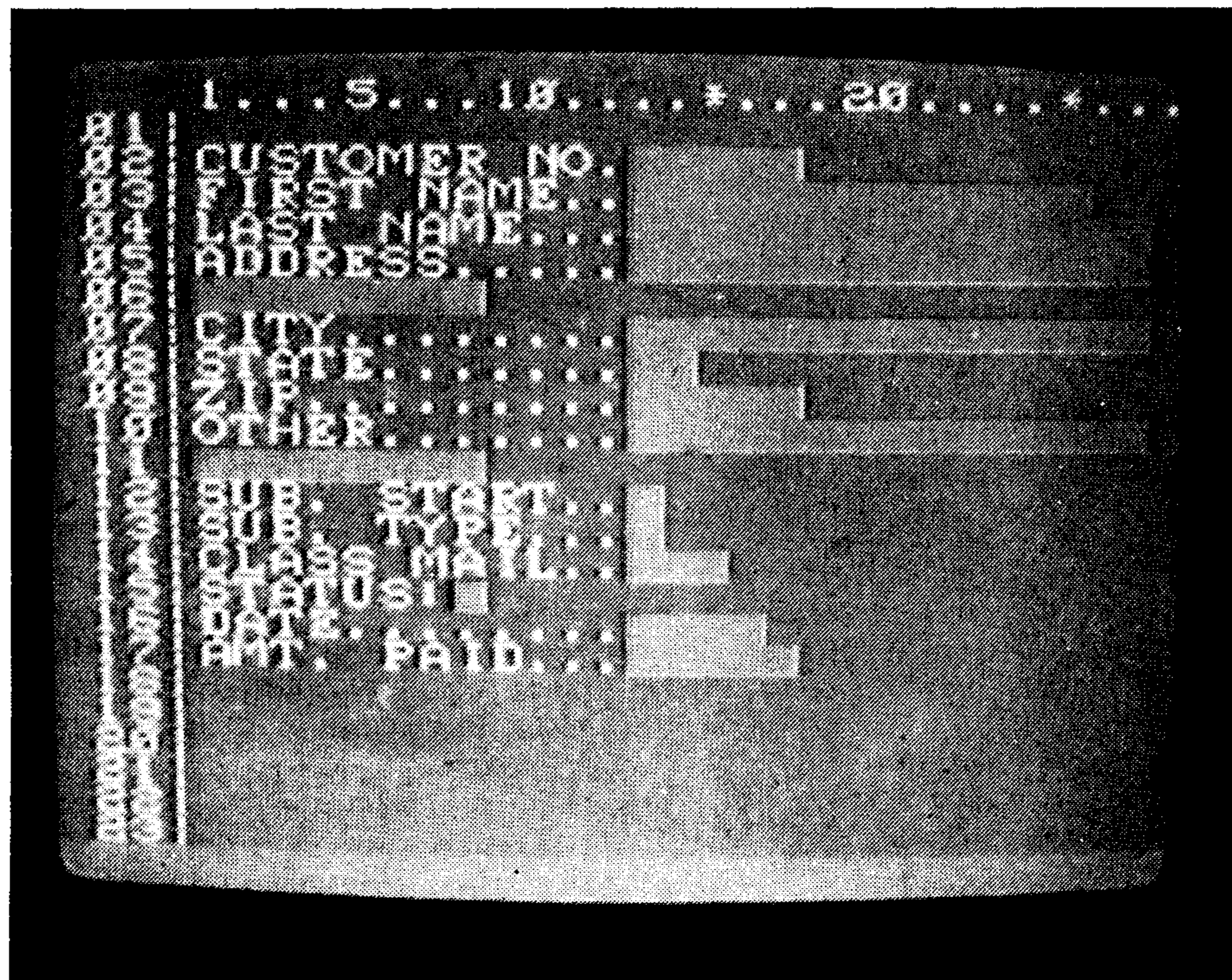
prompted to enter a name for the data file that will be the database for the Setup format and then the user gives a name to the Setup form itself. Both of these are saved to disk. The format for both of these is: disk drive number/filename.

DBMS writes and reads display/variable 80 files. Those with existing databases, such as a mailing list, may create a Setup file that matches the characteristics of the existing database, use a BASIC converter program to convert the existing database into D/V80 and be able to write and read the database using DBMS. The most critical aspect of this conversion is to make sure that during the conversion process each field is "padded" with spaces to fill out each field. Otherwise, the data will not appear in designated locations when called up using the Setup file. There are some examples in the DBMS manual to help you out, but I found some of the programming hints to be erroneous.

Having finished with the Setup mode, one leaves the program via FCTN QUIT. Bringing back the cartridge's menu, the next logical selection is the data entry mode. Selecting this option, the user is asked to enter the Setup file name and the data file name. (You can create as many data files per Setup file that you want. Likewise, you can create any number of Setup files that you want. All of these may be stored on the same disk, though each must have a different name.)

The data entry mode allows the user to call up previously entered records based on the key sort field. The importance of a numeric key sort field becomes evident here. The user must first place the cursor under the first position of the key sort field, then, by entering a number in this field, the corresponding record appears. If the key sort value does not exist, the program lets you know. By calling up the most recent key sort number you can continue the sequence of entries without having to make note of the last entry each time it is made.

To enter new records, the user presses BEGIN. The Setup screen appears and the user simply fills in the relevant data. Pressing enter moves the cursor to the beginning of the next data field. Having entered the data, press PROC'D and the record is written to diskette. Records are written to disk very



quickly. The initial screen reappears and the user pressed BEGIN again to enter new data.

Existing records may be modified by simply calling a record up using the key sort field. Make the changes and then press PROC'D and the new record is written to disk. All of the data entry functions are executed very quickly, virtually instantaneously. This is because the program is written in Assembly language.

While entering data, the message field can be called up simply by pressing AID. The message appears at the bottom of the screen, consisting of up to 112 characters.

Although it is not necessary to have a color monitor, DBMS screens uses colors to highlight entry fields.

The Reports mode asks the user for the name of the Setup file and loads it into memory. From there, the user may manipulate the data fields in whatever way he wishes, using an 80-column wide screen to do so. (The screen scrolls from left to right.) Of course, if you are designing a report to be outputted to the screen, you would limit yourself to a 28-character screen since the screen can be scrolled only during the Reports design stage.

The Reports screen displays line and column numbers, as well as the template for

the Setup file, making it very easy to manipulate the various record fields. This is the easiest to use report generator that I have seen for the TI. All the information you need to design a report is always in front of you. Fields are also very easy to move. Simply place the cursor at the first position of a field, press CTRL M and use the cursor keys to move it to any location on the screen. Having placed the field where you want it, press CTRL M again and it will remain there until you decide to move it.

You may rename the fields if you wish, or not use names at all. The field names may be placed in the page header so that they appear only at the top of each page, whether outputting to screen or printer. The user also specifies page length, output device, whether to suppress details (such as names, etc. so that only numeric totals appear), whether to pause between pages and the name of the data file that you want to use.

The user may also duplicate fields, have totals summed on numeric fields, have numeric fields formatted with up to four decimal places or (two decimal places and a dollar sign) and have trailing blanks removed from a field.

The user may also use the Reports mode without a previously defined Setup file. The

(Please turn to Page 31)

DATA BASE MANAGER SYSTEM—

(Continued from Page 30)

Report format may be saved to disk for future use.

Like the Setup program, the Reports function is enormously flexible. Users may even enter printer control characters into the Reports file.

The final program in DBMS is the Sorts program. The user may sort records by up to six fields. During the sort, the program creates a second file to store the sorted data so that the original file can continue to be used for data entry.

The user decides which field to use as the primary sort field. Subsequent sort fields are entered in the order of the priority of the sort as defined by the user. For example, to sort a database for mailing purposes, the user would probably select the state as the first priority, ZIP code as second, last name as third priority, etc. By designing a mailing label form using the Reports program the user can output a list of names that is printed out alphabetically by state, in ZIP code order and alphabetically by last name within each ZIP code.

Each sort field must be entered based on its starting position within the total record as well as its length in bytes. To do this, one would need to record this information from the field definition screen in the Setup mode.

The primary sort field allows the user to specify a particular string within the field as a "mask" or template. Also, this field may be sorted on the basis of items being equal to or not equal to the mask. Subsequent sort fields are sorted on the basis of ascending or descending order.

Having entered all the parameters, the file is sorted in two passes and written to disk. The number of records sorted is displayed when the sort is over.

Ease of Use: This is a very sophisticated file management program. It provides the user with virtually unlimited flexibility in designing database formats and reports. The sort routine is the most powerful that I know of for the TI home computer. To take advantage of all this sophistication and power, the user must spend time to learn how to use it.

I would say it is no more difficult to use this program than TI's Personal Record Keeping cartridge and far easier to use than the Personal Report Generator cartridge which uses PRK files to generate reports.

Documentation: If this package has a fault it is in the documentation. The manual is 36 pages long, and divided into sections. Although it strives to be a tutorial, information is not necessarily presented in the order that it is required. This is particularly true of the portion that deals with the Sort program. Also, there are some errors regarding tips on how to convert files for use with DBMS which, if followed by the user, can result in the waste of a great amount of time.

I feel the author of the manual may have assumed too much when it comes to the sophistication of his potential audience. Many concepts are left totally unexplained, such as the use of "string masks." For \$69.95 I expect to get a manual that answers all my questions about the program, not create them.

Value: At first, I didn't like the idea of having the program loaded into a cartridge. But given how each program segment depends on the others, I find it very convenient—not

to mention much faster than loading from diskette—to call up each program from the cartridge menu and get on with the work at hand. Of course, the primary reason for loading into cartridge, according to Navarone, is to prevent the program from being copied.

I found no problem in the fact that users are limited to 25 fields. Though I tried, I was not able to come up with a database that was longer than 18 fields without naming subsequent fields "miscellaneous." There is really only so much data that can be useful in the context of this type of program. I would like to have seen a few more calculation options (such as multiplying and dividing). An auto-incrementing counter that would record the number of entries automatically would have been nice.

The program is expensive, placing it in the company of the Companion word processor and, to some extent, TI-Writer and Microsoft Multiplan, though the latter are still selling in the \$80 range in many places. For the purpose of data management, I feel this program is the equivalent in sophistication of the word processing programs.

Although it is not my policy to give "plus" grades above "A," I would give DBMS an "A+" for performance if my policy were different.

Reviewed in MICROpendium

Listed below are the products that have been reviewed in MICROpendium and the issues in which the reviews appeared.

| | |
|--|----------|
| B-1 Nuclear Bomber | February |
| Tandon TM-100 Disk Drive | February |
| Void | February |
| Beanstalk Adventure | February |
| Microsurgeon | February |
| On Gaming | February |
| Database 500 | February |
| Star Trek | March |
| Escape From Balthazar | March |
| Garkon's Getaway | March |
| Sky Diver | March |
| Mail-Call | March |
| Prowriter 8510 Printer | March |
| Monthly Budget\$ Master | April |
| Budget Master | April |
| Home Budget | April |
| Thief | April |
| Donkey Kong | April |
| Khe Sanh | April |
| Companion Word Processor | May |
| Q*Bert | May |
| Mad-Dog I&II | May |
| Programs for the TI Home Computer | May |
| Creative Expressions Accounts Receivable/Ac- | |

| | |
|--|-----------|
| counts Payable | June |
| CDC 9409 Disk Drive | June |
| Starship Concord | June |
| Lost Treasure of the Aztec | June |
| ASW Tactics II | June |
| Theon Raiders | July |
| Introduction to Assembly Language for the TI Home Computer | July |
| Game of Wit | July |
| Pole Position | July |
| TE-1200 | August |
| Tower | August |
| Galactic Battle | August |
| Galaxy | August |
| Wycove Forth | September |
| 99/4 Auto Spell-Check | September |
| QUICK-COPYer | September |
| Wizard's Dominion | September |
| Anchor Automation Mk XII Modem | September |
| Killer Caterpillar | October |
| ZORK I | October |
| Defender | October |
| 9900 Disk Controller Card/Manager | November |
| Super Bigger | November |
| Transtar 120S Printer | November |
| Floppy-Copy | November |
| Data Base-X | November |

Gravity Master

Build your own game

By CHRISTOPHER BOBBITT

It is sort of a truism that every computer game comes set up to play right out of the box. For practically every game, once it is loaded, the player simply begins playing. It doesn't take genius or great artistry to set up or play most games. There is, however, a new genre of games being produced which have educators and parents on their ears. These are the "interactive" games, where the player has the opportunity to create his own game environment, or screen, using a set of predefined figures.

This type of game allows the budding artist in everyone to get a workout, as it is in our own interest to create interesting games for ourselves. It also gets a number of children interested in doing something else with a computer than just play games, namely, create them. About the most well-known of this type, and, alas, not available for the TI, is Pinball Construction Set from Electronic Arts. Since Electronic Arts didn't think it was reasonable to write their games for the two million TI99/4As out there, we will have to do without their excellent game.

However, we don't necessarily have to settle for second best. There is another game of this type exclusively for the TI99/4A, which is everything the quality program Pinball Construction Set is. CSI, formerly Challenger Software, may not have the big name and reputation of Electronic Arts, but in my humble (and often heard) opinion, their program Gravity Master is the equal of anything Electronic Arts has produced.

Gravity Master actually is sort of a hybrid, since it can be played directly after loading. It includes two sample games of different levels of difficulty, each with a number of screens. These two games are merely examples, albeit alone worth the price of the game. The real star of the program is the game

Review

Report Card

| | |
|----------------------|----|
| Performance: | A |
| Ease of Use: | B+ |
| Documentation: | B- |
| Value: | A |
| Final Grade: | B+ |

Cost: \$19.95 (diskette)
Manufacturer: CSI Design Group,
Box 50150, St. Louis, MO 63105
Requirements: monitor or television,
disk drive system, 32K memory expansion,
Extended BASIC

screen editor, which allows the player to create games, each with up to 20 screens. Each of the screens can be designed in an infinite number of ways. If the player gets tired of the game, he merely has to design more screens.

The game has a very familiar plot and playing screen. The screen is covered with girders of various

types at different levels, ladders connecting some of the girders, and robots moving back and forth menacingly on some of the levels. The player's character, vaguely shaped like a robot, is placed on another area of the screen, safe for the time being.

The game play resembles the play of 2049'er, from Tigervision. The player must move his character over the girders, back and forth, until they are a particular color. Once all the girders have been "painted" that color, the player moves on to the next screen. The player may jump from one girder level to another, eluding robots, and changing girders to different colors. Some girders are beneficial, allowing the player to destroy robots once these particular girders have been touched. Some disappear once they have been stepped on, destroying a possible means of escape from those terrible enemy robots.

The "gravity" part of Gravity Master has to do with the jumping
(Please turn to Page 34)



Learning TI99/4A H.C. Assembly Language Programming

Filling in the learning gap

By CHRISTOPHER BOBBITT

For the first three or so years of the TI99/4A's existence, the only documentation available on the machine's Assembly language, 9900 Assembly, was that available from Texas Instruments itself. Not to fault those few books that did with 9900 Assembly (hereafter Assembly), but most of them weren't on a par with the Beginner's BASIC manual that accompanies the console, as tutorials. The actual Editor/Assembler manual is a fine reference tool, but is no substitute for an easy to understand Assembly tutorial. The Mini-Memory manual was even worse, even though the module was touted as a great way to get into Assembly language.

As if TI's departure from the scene was a starting gun, books on the 99/4A have become as common as the ones for the TRS-80 machines and the T/S 1000; a giant increase in quantity. Most of these books are simple tutorials on BASIC or Extended BASIC, and feature one or more programs. Some are wholly programs, and others are wholly text, but most seem to deal with the most simple facts about the unique features of the 99/4A. For the advanced student, the people that bought into the computer early, or learn fast, the lack of Assembly language books was unbearable. At last, a few books have come out, but not in the prodigious numbers of the BASIC books.

One, if not the first of the five or so available Assembly language books to appear in the marketplace was the one reviewed in the July issue of MICROpendium—Introduction to Assembly Language for the TI Home Computer by Steve Davis. True to its title, the book serves only as an introduction, albeit a very good one. This book gives the Assembly enthusiast a taste of Assembly, while providing the reader a number of very useful routines. It gives the reader an example

Review

Report Card

Performance: A-
 Ease of Use: B+
 Documentation: A
 Value: A
 Final Grade: A-

Cost: \$16.95**Manufacturer: Wordware Publishing Inc., Plano, TX 75074****Requirements: console, monitor or television, Mini-Memory or disk drive system, 32K expansion and Editor/Assembler cartridge**

of the breadth and scope of Assembly but, as a tutorial, it lacks completeness and the proper viewpoint. It attempts to teach Assembly by giving examples and providing the reader with an understanding of how the various commands work. It is really teaching how to use 9900 Assembly, not how to understand Assembly per se.

The book Learning TI99/4A Home Computer Assembly Language Programming, by Ira McComic, (I wish these writers would give shorter titles to their books) fills in many of the gaps of the other book. This book, one of the most recently published, teaches the reader Assembly from the bottom up. Lacking are the great routines found in the Steve Davis book, but present are the real meat and potatoes issues of Assembly: how the commands work, how they interact with each other, how they change their functions under different conditions and more. This book is one of the best for getting into Assembly language in the first place; the Steve Davis book is best for expanding your knowledge of the 9900 Assembly and its peculiarities.

Performance: Learning TI99/4A Home Computer Assembly Lan-

guage uses a variety of teaching styles to get its points across. Each particular term, instruction and addressing format is explicitly defined in an easy to read manner, using few technical terms. Diagrams and examples are used to explain how each particular item functions. Each of the 19 chapters has a brief, concise summary of what is covered.

Within each chapter, the subjects are delineated by section numbers so they are easy to find when referenced in later chapters. At the end of some chapters, page and chapter references are made to the Editor/Assembler manual, the Bible of the Assembly language programmer.

The book divides the study of the instruction set into neat, logical units. An individual chapter covers the data movement instructions, the compare instructions, the jump instructions, the logical instructions and others. There are also chapters describing the use of the programming tools (the Debugger and Loader) and the Assembly editor and assembler. There are chapters on virtually every aspect of Assembly language, from the structure of data to machine code formats. At the end of the book are three appendices, including a summary of all the instructions, a comparison of the number systems used in Assembly and, for those like me who have lost their Editor/Assembler reference card, a table of ASCII character codes.

The programming examples that appear in the book are rather generic. The big program of the book is an Assembly program to translate characters into Morse Code. The book, however, gives a programming example or a diagram after virtually every instructions explanation. Many of them are very enlightening. However, if you are only in the market for a book of

(Please turn to Page 34)

ASSEMBLY—

(Continued from Page 33)

Assembly language routines, this book is not recommended.

The many types of teaching methods and the cornucopia of teaching tools used makes the book far from boring. It almost draws the individual into reading on, to see how the chapter is going to be taught in any case.

Ease of Use: Logical design was apparently a big consideration when this book was written. Since each chapter is made into sub-sections, and sub-sub-sections, looking up a particular item is extremely easy. The way each chapter covers only one subject shows the author was thinking of the poor reader. The book even has an index, something that can't be taken for granted when it comes to computer books.

My only complaint lies in an area where the author excels—organization. The chapters themselves are for the most part self-contained, but have been arranged almost haphazardly. The chapter on the structure of the TI home computer and the chapter on the anatomy of an Assembly language statement come after the chapter on the structure of data. All these chapters come before the chapter on how to use the Editor/Assembler. The chapter on how to use the Loader and Debugger come before the chapters on the types and definitions of the instructions. It is inequities like these which make Assembly language harder to learn than it should be. Overall though, if the reader is willing to skip around in the book, he or she shouldn't have much difficulty.

Documentation: The book is well documented. The table of contents gives, as usual, the chapter numbers and titles and page numbers. After each chapter is a list of the sub-sections and their page numbers, which is pretty useful when you want to look something up quickly.

Appendix A covers the entire Assembly language instruction set. Each statement is quickly defined and categorized, and a diagram

accompanies each instruction indicating the status bits affected by the statement.

Appendix B is really useful for the Assembly language programmer who doesn't have a calculator to do number system conversions. Binary to decimal to hexadecimal conversions are given attention. The last chapter, a table of all the ASCII codes and characters, is superfluous unless, like me, you have lost your Quick Reference Card. The index is rather short, but one index is better than no index. Overall, the book is complete.

Value: This is the section the book excels in. As Assembly books go, it is nearly perfect. It is concise, no nonsense and easy to read. The technical terms are defined as the readers goes along, and are used VERY sparingly. The explanations of data and the statements, as well as the instructions on how to use the Assembly language debugger, are alone worth the price of the book. The sections on machine code formats, and the appendices are an added value. This book gets you into Assembly the easy way. But as the book says in its introduction, no book can teach Assembly unless the reader really wants to learn Assembly and looks upon it as something fun to do and not as a chore. Assembly, the paragon of computer languages, can only be learned if you have the proper attitude. This book will give you this knowledge. That is why this book is superior to the rest available.

GRAVITY MASTER—

(Continued from Page 32)

one can do. The higher the gravity level of the screen, the more likely it is that the character will be killed if it jumps off a ledge. This is a game in which the player must balance a complicated set of factors. The object: to survive to see the next level.

Performance: Gravity Master requires a fair amount of hardware to run. The user must have an Extended BASIC cartridge, disk drive system and a memory expan-

sion. Though this may seem to be a lot, it is quite reasonable for a game like this. Most, if not all, of the advanced applications and better games today require the ability to access Assembly language routines. BASIC simply doesn't have the power of Assembly. If the disk containing the program is in disk drive one, the program loads and automatically runs when Extended BASIC is selected. Once loaded, the user is faced with a menu containing a number of options.

The first option available to the user, and the focal point of the program, is the Builder, or game screen editor. The editor is extremely "user friendly," a term used in conjunction with many programs nowadays.

To create the game screen, the user uses one of two different-sized arrows to pick up objects arrayed in a menu and place them where he wants them to be. The smaller arrow is used to pick up the smaller pieces, such as the various types of girders, while the larger arrow is used to move around the player's character, or the opposing robots. To pick up a piece, the user simply moves the appropriate arrow over the desired object and presses the space bar. To place a copy of the object being carried by the arrow, the user only has to put it over the desired area on the screen and press the space bar again. Once the user has created the desired screen, he can save it to disk.

If the user wishes to test the screen, the next option is just what the doctor ordered: the Tester. This option lets the user try out each screen, to make sure all the girders are accessible and in the proper places. The robots are not active, so the user doesn't have to worry about "dying." The screens can be edited again with the Builder after being tested.

After the screens have been tested, the Linker option is used to put them all together in one game. The Linker can be used to play a screen already in the program's memory, or may be used to create a

(Please turn to Page 39)

Newsbytes

More PEB cards

Myarc has begun shipping a disk controller card and RS232 card for the Peripheral Expansion Box. The disk controller will control up to four floppy drives. The card can take advantage of single-sided, double-sided, single and double-density drives. It comes with the Disk Manager II cartridge. The cartridge is used to initialize double-density diskettes. The RS232 card is being produced because supplies of TI RS232 cards are virtually nonexistent, a company spokesman said. Actual sale prices are determined by distributors, but the spokesman said the cards are "comparably priced" with cards by other companies.

Also, the company is offering a cable for its MPES/50 mini-peripheral system. The four-foot cable is used to connect the MPES to the console. The MPES otherwise is directly connected to the console peripheral port.

For more information, contact Myarc at P.O. Box 140, Basking Ridge, NY 07920, or call (201) 766-1700.

New products

Quality 99 Software has been introducing a number of new products recently, and the most recent batch include a disk manager program that once loaded into the computer's memory remains there for instant access until the machine is turned off.

Called Disk Manager III, the disk-based program requires a memory expansion and Extended BASIC. The resident disk manager program includes such functions as disk catalog to screen or printer, disk initialization (double-density included), diskname and filename changing, file protection change, and file delete. The program operates without disturbing the program in memory. These functions may also be used in Extended BASIC programs. The price is \$39.95.

Other new programs include Chart Maker, which creates charts and graphs for display on screen or printer, \$19.95; SDUMP, a resident screen dump utility, \$19.95; and QS-Writer, allows TI-Writer to be loaded from Extended BASIC, Editor/Assembler or Mini-Memory, \$29.95.

For more information, contact the company at 1884 Columbia Rd., -500, Washington, D.C. 20009, (202) 667-3574.

Pay later

Looking for a way to use ISAM files? ISAM (indexed sequential-access method) is a file-accessing technique that is faster than sequential-access method and slower than the random-access method which requires more file space.

ISAM allows the user to read relative record files by use of an alphanumeric key, which simplifies record searches and response time. A Massachusetts company is offering ISAM to users for \$25. The user must also submit a disk for the program. Included are an ISAM initializer and help utility. The program requires Extended BASIC and a disk system. The unique aspect of this operation is that users need not pay unless they are satisfied with the product. "Our policy: if you like what you get then send us \$25," the company says. Write to: Software Tools, P.O. Box 191, Newton, MA 02168.

Football analyst

Looking for help in predicting the outcome of professional football games? Ridge Services claims its Pro Football Analyst has chosen selected NFL Overlays (best bets) at a 66.3 percent win rate over the past five years. The company says it can be used to predict winners against the point spread, as well as for pools and total point choices. Statistics from newspapers are used for input. The price is \$35 on diskette or cassette, with BASIC and Extended BASIC versions available. The company also markets Personal Social Register, Puzzler and Personal Inventory Program. For more information, write to 170 Broadway, Suite 201, New York, NY 10038.

System doctor

Know-Ware is offering a system diagnosis disk for the TI99/4A that can be used to check the health of VDP RAM, system software, scratchpad RAM, memory expansion and speech synthesizer. Requires XB, A/S or MMM, disk system, memory expansion. The expansion memory test requires MMM. The cost is \$17.95. Write to the company for information: Box 53674, Lubbock, TX 79453.

More hardware?

CorComp Inc. is engaged in market research regarding the production of a number of items for the TI99/4A, according to Jackirae Sagouspe, president.

She says that the company has "put out feelers" on a mouse, time clock card, internal modem card, Koala-type graphics pad and RAM disk card. She notes that if there is a demand, none of these items would be "overly difficult" to produce.

Unisource Electronics, a mail-order firm dealing in TI products, demonstrated CorComp's 9900 disk controller card at the Chicago TI Faire Nov. 10, she noted.

Biggest yet

Tex-Comp's new catalog is the biggest one that the mail-order company has ever done, according to Jerry Price, Tex-Comp's vice president and managing director.

Those wishing to receive the 30-page TI99/4A Catalog and Buyers' Guide may send \$2 to Tex-Comp, P.O. Box 33084, Granada Hills, CA 91344 for the catalog and a \$5 certificate good on TI products. The catalog features many new items never available before, Price said.

About that chip

The TMS9228 VDP chip is not "plug compatible" with the TI99/4A, according to informed sources. The new chip, referred to in the September edition, can address up to 64 kilobytes of RAM and offers five graphics and two text modes. It was earlier believed that the new chip might be used to replace the TMS9918 VDP used in the TI console.

However, there is at least one hardware manufacturer that is believed to be looking into the chip for use in a card for the peripheral expansion box. No one wants to be quoted on this at this time.

Newsbytes is a column of general information for TI99/4A users. It includes product announcements and other items of interest. The publisher does not necessarily endorse products listed in this column. Vendors and others are encouraged to submit items for consideration. Items submitted will be verified by the staff before inclusion and edited to fit the Newsbytes format. Mail items to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

User Notes

Smooth motion

Dan Parrott, president of SMAUG of Grand Bay, Alabama, writes: "Smooth, curvilinear sprite motion can be achieved with sine and cosine functions. The trick is to store the factors derived from the trigonometric functions in an array that can be called much faster than having to recalculate each time. For example:"

```
100 CALL CLEAR :: CALL
SCREEN(2)
110 CALL INIT
120 DIM A1(28),A2(28)
130 FOR A=1 TO 28
140 CALL SPRITE(#A,46,1
6,98,128)
150 A1(A)=SIN(A/4.456)*
40 :: A2(A)=COS(A/4.456
) :: NEXT A
160 FOR A=1 TO 28 :: CA
LL MOTION(#A,-A1(A),-A2
(A)) :: NEXT A
170 GOTO 130
```

Parrott recommends you vary the constants in line 150 to produce different results. This requires Extended BASIC and a memory expansion. The program may also be run without the memory expansion by eliminating line 110.

Floppy revived

Jerry Trinkl of the Milwaukee Area 99/4 Users Group in Wauwatosa, Wisconsin, had a floppy disk that would no longer revolve in its jacket. Was the fit too tight? Read on.

"I had the unfortunate experience of losing a disk full of programs. It didn't happen all at once, I occasionally couldn't load a program and sometimes got the error message, 06, the error for no disk drive. Looking at the disk I found two circular gouges, one on the inside track close to the hub and one towards the outer most track. I tried to move the disk inside its jacket and, ah ha, the problem was that of a cheap disk that jammed up. It could not be turned even by hand.

"I had some very good programs on that disk and wasn't about to throw it out just yet.

My first thought was to try Disk Fixer. But if the disk would not turn, then Fix could not even read a sector. Okay, so now what?

"I carefully cut out the bad disk from its jacket and inserted it into an empty Verbatim cleaning jacket. And voila, it worked! I quickly backed up my makeshift cleaning disk on a good disk and was tempted to turn el cheapo into a frisbee. But I decided to save it as a backup and a reminder of a great idea that actually worked."

Correction

A typographical error in a review last month of the Transtar 120S printer makes it seem that the printer is slower than a snail. It isn't. The review said that the printer plods along at four characters per second, when, in fact, it chugs along at 14 characters per second.

Edge connectors

Have you purchased a second or third disk drive only to find that you no longer have a 32-position edge connector card for the external cable? This can happen, since the cards were originally included with the TI disk controller card and are probably unavailable from local electronics shops. Using these cards makes it a lot easier to connect external drives.

But never fear, TI is still there to support you. Those who are in need of an edge connector can let their fingers do the walking by calling the TI toll-free number (800) 842-2732 to receive one. Simply request an edge connector for your disk drive and the operator will take your name and address and have one sent to you. The cost is the same as for the toll-free call.

Not a bad deal.

From BASIC

The following program operates out of BASIC using the Mini-Memory or Editor/Assembler cartridge. Of course, a memory expansion is necessary. Although in its present form it doesn't provide you with a useful utility, it demonstrates what can be done in BASIC. Enter the following program, in BASIC mind you:

```
90 PRINT "PRESS:":"N FO
R NORMAL MODE":"C TO CL
EAR SCREEN":"T FOR TEXT
MODE":"M FOR MULTICOLO
R MODE
100 PRINT "B FOR BIT MA
P MODE"
110 CALL KEY(3,G,S)
120 IF G<>78 THEN 140
130 CALL POKEV(-32768,0
)
140 IF G<>67 THEN 160
150 CALL POKEV(-32352,0
)
160 IF G<>84 THEN 180
170 CALL POKEV(-32272,0
,"",-POKEV(-32272,0,""
,-30945,0)
180 IF G<>77 THEN 200
190 CALL POKEV(-32280,0
)
200 IF G<>66 THEN 220
210 CALL POKEV(-32766,0
)
220 GOTO 90
```

Now, type RUN and press the C, N, T or B keys. What happens. "N" is for normal mode, "T" is for text mode, "M" is for multicolor mode in which each character is a 4X4 block, and "B" is for bit map mode. To get out of the program you must FCTN QUIT. This program comes from the Arizona 99 User Group of Phoenix.

Different Colors

The following brief routine will allow you to display numbers in a different color than letters on the screen. It comes via the Upper Pinellas 99'er Group of Largo, Florida. According to the Floridians, it appeared previously in the DC User Group newsletter and was credited to Phil Newton.

```
100 For A=5 TO 12
110 CALL COLOR(A,16,1)
120 NEXT A
130 CALL CLEAR
140 CALL SCREEN(5)
```

(Please turn to Page 37)

User Notes

(Continued from Page 36)

Sound mystery

This Extended BASIC program—a memory expansion is required, too—produces a veritable symphony of sounds. It comes from the Southwest Ninety-Niners of Tucson, Arizona. The FCTN CLEAR will cause it to stop running.

```

90 CALL INIT
100 FOR A=1 TO 255 :: CA
LL LOAD(-31744,-A):: NEX
T A
110 FOR A=1 TO 255 :: CA
LL LOAD(-31744,A):: NEXT
A
120 FOR A=1 TO 255 :: CA
LL LOAD(-31744,A):: NEXT
A
130 FOR A=1 TO 255 :: CA
LL LOAD(-31744,-A):: NEX
T A
140 FOR A=1 TO 255 STEP
4 :: CALL LOAD(-31744,-A
):: NEXT A
160 CALL SOUND(100,110,0
)
170 FOR B=1 TO 2 :: NEXT
B

```

FUNCTION X

Phil Bennis of the New Horizons Computer Club offers a very "functional" way to edit programs in BASIC or Extended BASIC. This method is used when you know what program line you want to look at. Simply enter the line number you wish to see and press FCTN X. And there it is. You may make whatever changes you wish and hit the enter key and the line will be changed. (Actually, you don't even have to hit enter.) Of course, pressing the FCTN X key again will bring up the next program line while entering FCTN E will bring up the previous program line. And so forth.

Quick transfer

Terminal Emulator II is a wonderful program, but when it comes to transferring data via electronic bul-

letin boards it is a bit on the slow side. That's because it operates at 300 baud.

However, the transfer rate can be speeded up considerably when transferring BASIC of Extended BASIC program via phone lines. According to Larry Prikockis of the Northcoast Users Group, which is affiliated with the Cleveland Area 99/4A Users Groups, the following method can speed up file transfer by up to five times while still operating out of a 300 baud modem.

How's it done? Read on.

"First, both the sender and receiver must select TI BASIC. Then, load the program to be sent into memory and type SAVE RS232, but do not press enter yet. The receiver should type OLD RS232. When you are ready, switch over to the modems and press enter. The receiver should wait about five seconds and then press enter also. Both users should see a number, corresponding to the number of blocks of the program, at the top of the screen. This number will slowly count down to zero, at which point the transfer is complete. Since the program is loaded directly into memory, the receiver must remember to SAVE the program to disk or cassette."

This approach seems to work only between TI home computers and not with such telecommunications services as The Source or CompuServe.

Freeware

MICROpendium is continuing its offer to provide a selection of software free of charge to subscribers. Currently offered are the file updates for TI-Writer and Microsoft Multiplan and the Super Bugger utility.

To order any of these, readers must enclose an initialized diskette and include a self-addressed, stamped return mailer. The TI-Writer and Multiplan updates require a single-sided, single-density diskette. The Super Bugger requires a single-sided, single-density diskette. All three will fit on

a double-sided, single-density diskette. (Please, do not send single-sided disks that have been altered to allow files to be written to both sides.)

Allow at least two weeks for delivery. Orders may be mailed to FREEWARE, c/o MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

MICROpendium will also provide TI Forth and documentation, if a minimum of 100 readers order it. The Forth program includes two example program. Because of the cost of reproducing the 232-page manual, there will be a \$20 charge (checks or money orders only). This includes postage and packaging. Readers must also submit two single-sided diskettes. Order TI Forth separately from the FREEWARE. Checks will be held until the minimum number of orders are made. To order write to: FORTH, MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

All of these programs were released into the public domain by Texas Instruments Inc. No warranties of serviceability or usability are implied.

A little hint

The current MICROpendium software improvement contest has to do with improving a program that simulates an organ. Here's a little hint from the Houston (Texas) Users Group that may give you some ideas.

Enter the following routine for tremola:

```

140 FOR J=1 TO 8
150 CALL SOUND(-50,N,1)
160 CALL SOUND(-50,N*1.03
,1)
170 NEXT J

```

User Notes is a column of tips and ideas designed to help readers put their home computers to better use.

The information provided here comes from many sources, including TI home computer user group newsletters. MICROpendium will pay \$10 for any item sent in by readers that appears in this column. Mail tips to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

Classified

Policy

Classified advertising is a unique feature of MICROpendium. The cost is 20 cents per word. Classified advertisements must be paid in advance. Classified advertisers may request a category under which they would like their advertisement to appear, but the final placement decision is the responsibility of the publisher.

Classified deadlines will be kept open for as long as practical. For the purpose of classified advertising deadlines, any classified ad received later than the first

day of any month cannot be assured of placement in the next edition. We will do our best to include every advertisement that is submitted in the earliest possible edition.

The publisher offers no guarantee that any advertisement will be published in any particular issue. Any damages that result either from errors in copy or from failure to be included in any particular edition will be limited to the amount of the cost of the advertisement itself. The publisher reserves the right to reject any advertisement.

The advertiser may elect to publish

the advertisement in subsequent editions at the same charge, payable prior to publication. The deadline for carryover classifieds is the same as for new advertising.

In submitting an ad, please indicate whether you would like a refund if it is not published in the requested edition or whether you would like us to hold it for the next edition. Cancellations and refunds cannot be made after the second day of the month.

Send classified advertising to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

Software For Sale

ASSEMBLY LANGUAGE SCREEN IMAGE DUMP Program for the TI99/4 or TI99/4A. Dump a screen image in 45 seconds. Editor/Assembler or Mini-Memory module required for BASIC dumps, Extended BASIC required for Extended BASIC dumps. Any printer capable of 8-bit dot addressable graphics can be used. (Fully tested on the TI-Impact, Epson, Gemini 10 and 10X Prowriter and NEC printers) PRICE \$15.00. Educational, Business and Game Software also available. Send for catalog to BRIGHT MICRO KOMPUTERS, 2781 RESOR ROAD, FAIRFIELD, OHIO 45014. n11

The Best TI99/4A Software Bargain 140 terrific cassette programs only 50 cents each! Hours of enjoyment. An exceptional value. Your best software buy! Free catalog. THE EXCHANGE, HCC-5, P.O. Box 46, Sterling, VA 22170. Phone (703) 435-2789. n13

TI99/4A SOFTWARE

125 programs available, only \$3 each! Not public domain, not translations, not pirated, not brief routines, these are absolutely original, innovative programs utilizing full color and sound capabilities of the TI99/4A. Programmed in BASIC but X BASIC, etc. often optional. Games, education, music, displays, programmers' aids, etc.. Catalog \$1, refundable. Tigercub Software, 156 Collingwood, Whitehall, OH 43213. n11

THE ACCOUNTANT

Buy this software package and thank yourself at Tax time. Helps organize your life. You can record over 400

checks and deposits and assign specific budgeting or tax accounts for each of the entries. Get a balance in each budget or tax account at any-time. At year end, you will have all entries organized and summed for tax or budget purposes. Requires Disk, 32K memory, printer and Extended BASIC. Send \$16.95 to: PROSOFT, 4328 E. LaPuente Ave., Phoenix, AZ 85044. n11

Investment Analysis Program

"BORROW & INVEST, OR SAVE?" is a sophisticated investment analysis tool to be used by anyone interested in maximizing their investment dollar. "B&I/S" is a unique, original program that combines a common sense approach with high-tech financial analysis methods. "B&I/S" provides automatic alternate investment analysis, ROR, debt service, debt amortization, equity accumulation, tax effects, net cash flow analysis. Very user friendly, 34-page documentation. Can pay for itself many times over! 32K, 1 disk, X BASIC required. Mail \$32.00 for disk to: BUEHRER-HAHN SOFTWARE, 16223 MILL POINT DR., HOUSTON, TX 77059. n11

ARRO-SOFT SYSTEMS

QUALITY TI99/4A Software featuring USER FRIENDLY MENU DRIVEN programs for HOME & BUSINESS. ARROSCRIBE WORD PROCESSOR for personal and business letters, theme and term paper writing. CREATE-A-FILE personal filing system including mailing list management. Other programs: INVOICE, AMORTIZE, BIORHYTHM, LABELMASTER, TEACHER'S RECORD grading & storage, IRA. Also EDUCATIONAL SERIES. Send for free catalog. ARRO-SOFT SYSTEMS, P.O. Box

1761, EDMOND, OK 73083. (405) 341-8567. n11

TIPS FROM THE TIGERCUB, for TI99/4A, full disk of 50 programs, routines, files from the well-known Tigercub Tips newsletters #1-14. \$15 postpaid. Tigercub Software, 156 Collingwood, Whitehall, OH 43213. n11

NUTS & BOLTS. A diskfull of 100 (!) utility subprograms for the TI99/4A in X BASIC MERGE format, ready to merge into your programs. With documentation, just \$19.95 postpaid! Tigercub Software, 156 Collingwood, Whitehall, OH 43213. n11

FIVE ARCADE GAMES FOR TI99/4A ON CASSETTE OR DISKETTE ONLY \$20. X BASIC and joystick required. TREK2 cassette game only \$5. Free catalog. Send check or M.O. to: Best Software, P.O. Box 22446, Baltimore, MD 21203. n12

Lifestyle TI Software from Ridge PERSONAL SOCIAL REGISTER. Your computer becomes your social events director and makes your address book and calendar obsolete! Disk, 32K/XB...\$35
PRO FOOTBALL ANALYST. Picks both NFL and USFL winners against the point spread simply and accurately. C/D...\$35
PERSONAL INVENTORY PROGRAM. Your home inventory cataloger will supply complete and thorough records in the event of disaster. C/D, XB...\$20
ORDER C.O.D.—Call (718) 833-6335 or send check/M.O. to: RIDGE SERVICES, 170 Broadway #201, New York, NY 10038. Free catalog available. Dealer Inquires invited. n1

Classified

RESOLVE TO ORGANIZE YOUR RESOURCES IN 1985 AND ENJOY EFFECTIVE BUDGETING ON THE TI99/4A

BUDGETPLAN can manipulate 960 entries (each to \$999,999) for 40 user named categories of actual and budgeted income and expenses over any 12-month period. Extensive screen presentations show how expenses can be distributed to meet monthly commitments. All data is always in memory, allowing rapid review and budget changes at any time. Data entry is simple, directly in the appropriate area on the selected spreadsheet, with instantaneous updating of all screen information. A built-in 4-function calculator may be used anytime, without disturbing displayed data. Cassette save/load all data is less than 5 minutes.

BUDGETPRNT outputs fully detailed reports to any printer in monthly, quarterly and year-to-date format. Needs Extended BASIC only. Printer optional. Both programs and manuals, Cassette \$20, Disk (memory expansion required) \$22, including shipping. Bug free money back guarantee. Price: Bradbury, 2024 Sandalwood Dr., Cedar Rapids, IA 52402. n12

ATTENTION GEMINI-10X OWNER

Unleash the power of your Gemini with one of the most practical software packages ever written for the TI99/4A. No more troublesome control codes to worry about. Set font styles, pitch, line feed, form feed, margins and tabs using convenient menu. Easily place your Gemini into any of its special print modes—double strike, emphasize, underline, subscripting. Once you set up your Gemini using this program, you can store these setups for later use. TI Extended BASIC, expanded memory and disk system required. On diskette only for \$11.95 plus \$1.00 postage and handling. **GEMBAR GRAPHICS**, 455 Amherst Circle East, Satellite Beach, FL 32937. n11

Merry Christmas, Happy Birthday or any other banner you desire can be printed using "SIGN LANGUAGE." Available characters are symbols, punctuation, numbers 0-9, upper case and true descending lowercase letters. Works with serial or parallel printers. Extended BASIC, extended memory, SSSD disk and printer required. Send

check or money order for \$24.95, includes postage, to SBC, P.O. Box 149, Broad Brook, CT 06016. n11

THE CHECKBOOK PROGRAM for people who WANT to reconcile is here! TI99/4A Cas. \$24.95/Disk \$39.95. **ROCKETMAN**, 4104 San Pablo Dam Rd., El Sobrante, CA 94803, (415) 222-1621. n11

TI & 3rd Party hardware & software available. Write for list. Carroll Eddy, 4624 Dixie Hill Road, Fairfax, VA 22030. n11

WHIZSPREAD

A spreadsheet type report generator program is for Cassette (16K) or disk (32K) systems owners. Printer options available for most any type printer. Great for cost studies. Price is \$60, either version. Ask for information sheet on this program. **PROGRAMMERS:** Consider **TIMOSSA**, for independent programmers wanting to reduce advertising and sales literature costs. Ask for free information on **TIMOSSA** only if you are a programmer wanting to sell your programs. James Harvey, 159 Dover Rd., Spartanburg, SC 29301. n11

GRAVITY MASTER—

(Continued from Page 34)

game out of several screens already saved to disk. Individual screens may be linked together in any order the user desires.

The program also contains an option which allows the user to catalog disks, by program files or game screen files, and delete files. I found this to be pretty useful when it comes time to link together game screens into one game, since I often forgot the filenames I given the screens.

The program seems to perform perfectly. The only difficulty I had with it, which I traced back to my console, was in saving a game screen. I didn't find out it was the console's fault until after I asked the manufacturer for a new review copy. I am happy to report that CSI very fast service; I received a guaranteed copy within a week

after I mailed my letter.

Ease of Use: For the most part, this program gets top marks for ease of use. The screen editor is extremely easy to use, and the many options are menu-oriented and easy to access. The program is arranged logically, a plus, and works very quickly.

Documentation: This is my only real complaint with this package. Several facets of the program, in the Linker and Editor, go unexplained. In the review copy a number of crucial things went undocumented; for one, the fact that the user is to use the arrow keys in the editor.

The manual is not arranged in a logical fashion. You would expect the simplicity of the program would be reflected in the manual, but there is no table of contents, explanations for the parts of the Linker are not in the order that the program requires them and explanations for use of the Tester and disk utility options are inadequate. The manual is also difficult to read, assuming the user has a lot of knowledge he may not have, and it assigns acronyms haphazardly. The various sections seem to be arranged rather randomly. To top it off, the manual I received had two page eights and no page seven. (This has been corrected in subsequent manuals, according to CSI.)

The manual isn't without its strengths, however. The explanation of how to play the game is quite good, and the cover graphics are excellent.

Value: An arcade game is an arcade game, you either like it or you don't. This game, I believe, has more value than most arcade-type games. The option allowing the user to make an infinite number of screens insures infinite variations. The player isn't as apt to get tired of it as quickly as most games, and the game will always be as challenging as the player wants it to be. Never mind that the actual plot of the game is rather old, the game situations can always be new.

The beginner may find this game to be difficult to use, but once the constructs of the game are familiar, the user is assured of hours of excitement and scores of interested and challenging situations.

The ONLY monthly devoted to the 99/4A

Subscription Fees

- \$12 for 12 issues via domestic third-class delivery
 - \$15.50 for 12 issues via domestic first-class delivery
 - \$15.50 (U.S. funds) for 12 issues Canadian delivery
 - \$18.50 (U.S. funds) for 12 issues foreign delivery via surface mail
 - \$25.50 (U.S. funds) for 12 issues foreign delivery via air mail
- (Texas residents add 5.125% state sales tax)

Address Changes

Because MICROpendium requests address corrections from the postal service, subscribers who move will have the delivery of their most recent issue (s) delayed unless MICROpendium is notified six weeks in advance of address changes. The U.S. Postal Service will not forward MICROpendium but will supply us with the new address of the subscriber. Please include your old address as it appears on your mailing label when making an address change.

Back Issues

Back issues of MICROpendium are available to subscribers. Those wishing back issues may notify us of the issue (s) desired and we will backdate existing subscription to account for the back issues. These will be delivered via third-class mail. Those wishing to have their subscriptions backdated but want to receive the back issues via first-class mail must send 30 cents per issue for postage. Those who wish to have back issues but do not want their subscriptions backdated may do so by sending \$1 per issue (plus 30 cents per issue if first-class delivery is desired).

**SUBSCRIBE
NOW!**

**Keep Up With
TI99/4A
News & Views**

Send me the next 12 issues MICROpendium. I am enclosing _____ in a check or money order in U.S. funds. (Texas residents add 5.125% sales tax.) Mail to: MICROpendium, P.O. Box 1, Round Rock, TX 78680.

Name: _____

Address: _____

City: _____

State: _____

ZIP: _____