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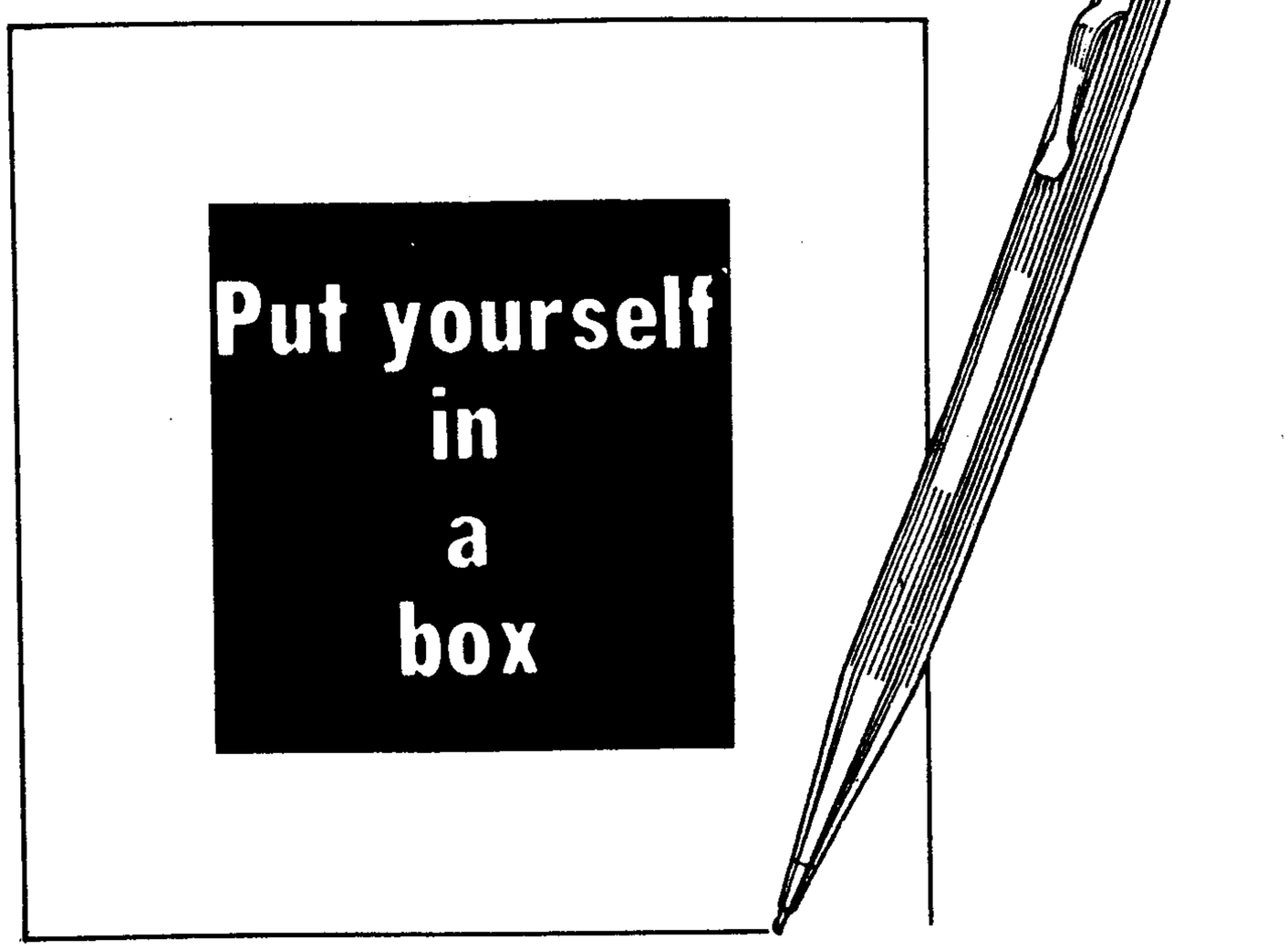
MICROpendium

Volume 3 Number 10 | November 1986 | $1.50 per copy



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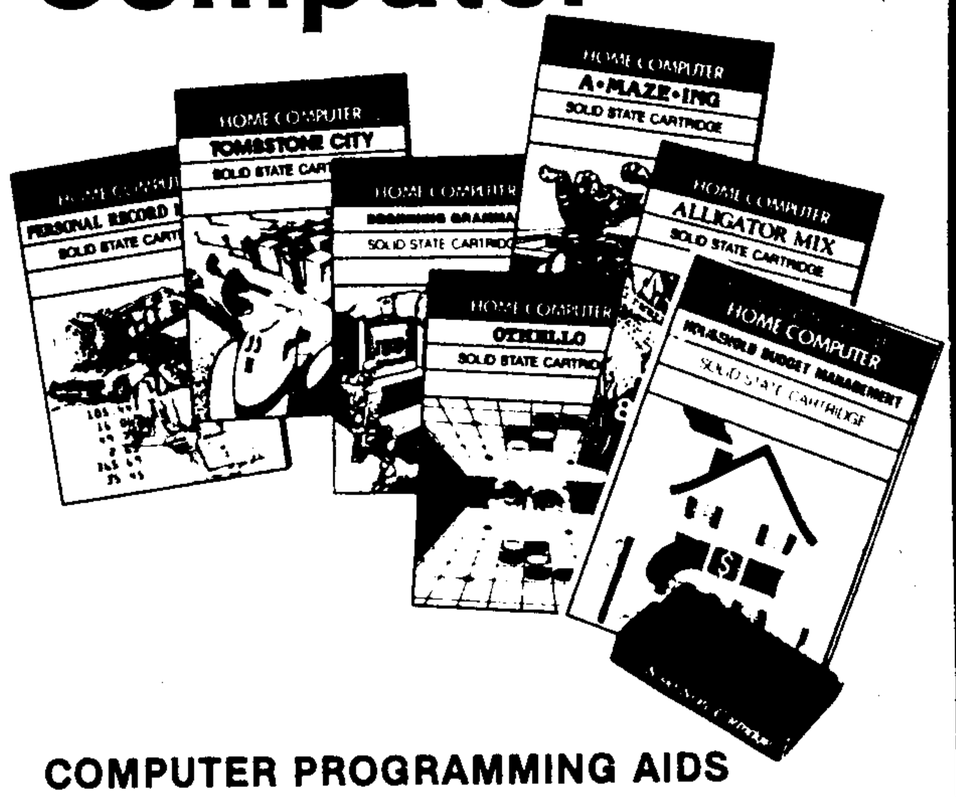

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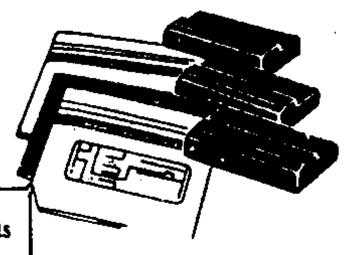

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John Koloen.....Publisher
Laura Burns.....Editor
Mack McCormick....Technical Editor

Coming next month

—Review of Rave 99 keyboard
—Things you can do with chips, by Mack McCormick
—Three-dimensional tic-tac-toe

Table of Contents

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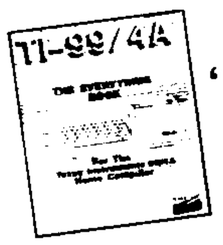

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LOST HITS "REDISCOVERED"

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Some of you may remember that Thorn EMI, the British entertainment giant, developed three super games for the TI. Just before the games were released, TI pulled the plug on the 99/4A and Thorn decided to drop the introductions. At last, TENEX brings you these "lost hits" by special arrangement with a U.K. firm who convinced Thorn to make the program rights available. All three programs are packaged on one convenient disk!

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Comments

User group listing proposed

I'm afraid that my report on the third annual Chicago TI Faire, sponsored by the 600-member Chicago TI User Group, doesn't say much about the Faire, concentrating as it does on Lou Phillips and his 9640 computer (the 9 stands for the TI99/4A and the 640 is for 640 kilobytes of RAM). And it's not that nothing else happened there. There was a lot going on, ranging from a computer-cello performance by J. Peter Hoddie to a discussion among user group leaders on how to keep their groups viable. And let's not forget the scores of vendors on the exhibition floor, selling everything from cassette recorder cables to the latest, hot off the presses software. (Hoddie finished the final code for two new programs, GRAM Packer and Font Writer, several days before the Faire got under way. And it was a good thing, too, since the two new programs seemed to be selling like hotcakes.)

The article about the 9640 sort of grew out of my notes and when I finally finished it I still hadn't squeezed in everything, all the emerging facts about this wondrous new machine. There will be time and space for the rest of that in the future when the machine finally rolls off the production line. But there is one thing that I didn't get into the article that should be noted. After Phillips had finished his presentation, which ran longer than scheduled, a member of the Ottawa TI99/4A Users Group approached the front of the meeting hall bearing a handmade plaque made by a TI user group in North Bay. The inscription read: "Presented to Lou Phillips and Myarc by the Ottawa TI99/4A Users Group for TI users worldwide." This was followed by a burst of applause and this response from Phillips: "Many times I've asked what am I doing here...and it's mainly you folks and those who appreciate these things that we do that really touches me."

Phillips deserves the accolades as one of the driving forces behind the 99/4A marketplace.

Returning to user groups, Dave Wakely chaired the user group discussion in Chicago and emphasized that a few active members can make any user group a success but to really get things going a group has to actively seek new members. Advertising in local newspapers, posting notices in public places, obtaining a mailing list from Texas Instruments of 99/4A users in particular areas are among the recommendations for building membership. Although we are not involved directly in user group activities, we can provide a service that may help our thousands of non-affiliated members get in touch with other TI users. What we'd like to do is provide a listing of user groups to be included in our January or February edition, with regular updates in the future, much as we have been updating our Freeware list. To keep things standardized, we'd like every user group within reading distance to fill out and return the form below as soon as possible.

EXTENDED BASIC VERSION 2.11

The lastest update to Myarc's Extended BASIC II seems to have exterminated the bugs contained in earlier versions. I've been running a lot of Extended BASIC software with it without crashing, something that I couldn't do with earlier versions. Although I haven't been running it very long, I'm already getting accustomed to the speed with which programs such as the TI-Count package run. (TI Count wouldn't run under earlier versions because of its reliance on DEF statements.) I'm not sure whether there is much of a difference on I/O operations, but I have measured significant speed increases in the running of all Extended BASIC programs. When I enter RUN, the program starts RUNning immediately, not after a delay of several seconds. This holds true for even the simplest disk catalog program in BASIC. I haven't had the time to exploit its enhanced graphics commands and other features, though the demo that comes with it is very impressive in highlighting the capabilities of version 2.11. Purchasers of Myarc's Extended BASIC who have yet to receive a 2.11 update disk should contact the company.

FEEDBACK ON FORTH

We've been running articles about Forth fairly regularly but we're not sure if that's what Forth programmers want. We're curious about reader preferences: Would it be better to run a monthly Forth column, a Forth tutorial series or continue as we have been with single subject articles. We'd appreciate your thoughts on this.

ASSEMBLY FLIGHT SIMULATION

A last minute addition to this month's Newsbytes is an item from Not-Polyoptics about its Spad Flight Simulator. The program is expected to be on the market in January. See Page 50 for details.

LOOKING FORWARD

Any woman with six children deserves a break once in a while, but we reiterate that we can hardly wait until C. Regena (Cheryl Whitelaw) begins with us as a columnist in our January issue. Judging from the notes enclosed with subscription renewals, etc., the anticipation is shared by numerous readers.

—JK

Group Name_____
Contact Person_____ **Phone No.**_____
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Meeting Dates_____ **Place**_____
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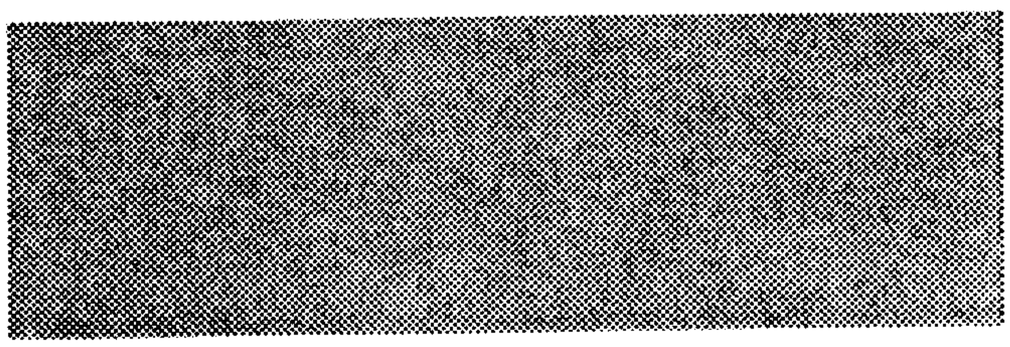
Asgard Software

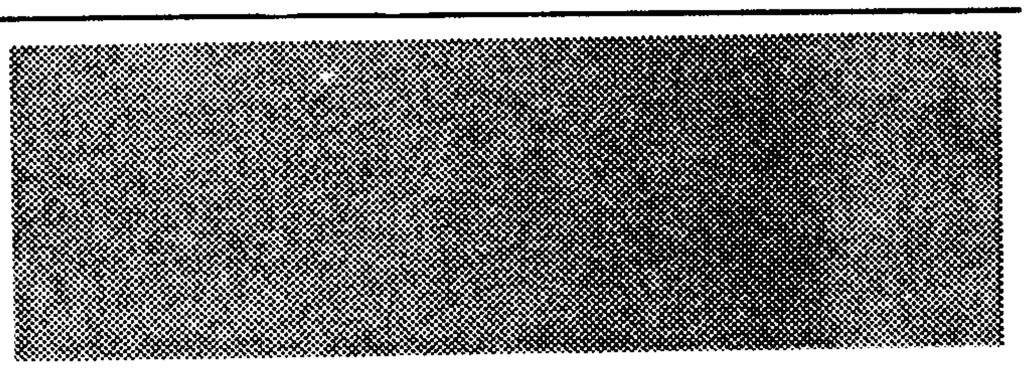
is proud to present a piece of the future:

The first two commercial programs written in c99 for the 99/4A — The fastest language for the 99/4A outside of assembly!

High Gravity

- Is **High Gravity** an educational game or a game program that's educational? Who knows which, and it really doesn't matter considering that this incredible simulation written in c99 (a language faster than Forth and easier to use than BASIC) is one of the best programs ever written for the 99/4A in any language!
- **High Gravity**, by Tom Wible (a professional programmer), puts you in command of a relief spacecraft sent to aid a space station trapped in a strange solar system. The planets in the system are thick as flies, and prevent anyone from leaving or entering the solar system to rescue the unfortunate people in the space station. Your mission is to shoot a capsule of supplies to the stranded astronauts, and you only have ten capsules of supplies on hand. Worse yet, you can't guide the capsules through since they have no engines. Fantastic graphics make this game colorful as well as exciting.
- **High Gravity** is also an extremely accurate simulation of the Laws of Gravity and the motion of projectiles. The fact that this program is a sophisticated lesson on physics is not apparant — it's a really fun game that gives hours of enjoyment to children AND adults. However, for the educational user all varibles of the program may be pre-set; including the initial velocity, the density, size, and spacing of the planets, and much more. High Gravity will even let you save and load interesting flight paths of projectiles for later study — a library of such paths is included with the program.
- In short, **High Gravity** is a sophisticated simulation of space flight that is both entertaining and educational. It is an ideal teacher for the physics student (of all levels), and an ideal game for all ages.





It is simple to use and fully documented. It requires the Editor/Assembler module, 32 K and a disk system. Available for only $14.95.

Total Filer

- Do you have disks and disks full of TI-Writer text files cluttering up your disk library? Do you often catalog one of your TI-Writer disks and find files that you didn't know you had, or even know what they are? Well then, we would like to introduce to you the greatest tool for user's of TI-Writer since the spelling checker; the first and only database designed for text — **Total Filer** by Warren Agee.
- Some database programs say they will let you organize anything, but nothing matches the speed, power and flexibility of a program exclusively designed to let you organize text when it comes to organizing your TI-Writer files. **Total Filer** is a very easy-to-use solution for a complex problem. It is written in c99, an incredibly fast language for the 99/4A, and was designed specifically for handling text.
- With **Total Filer** you can easily create a file-by-file reference of all your text files. Your index can include multiple keyword references for quick searches, as well as several layers of keywords for in-depth descriptions. For searching, **Total Filer** even includes utilities for creating a master listing of the index, as well as letting you compress it to save space on your data disks. **Total Filer** is truly a tool for the "power user."
- **Total Filer** is also very flexible, allowing users to do everything from configure the program for any hardware combination to setting the names of the prompts for different functions. **Total Filer** is the penultimate tool for organizing text of any sort, from magazine articles to computer files, yet it is easy to use and fully documented. It requires the Editor/Assembler module, 32K and a disk system. Available for only $24.95.

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"Serving the TI Community"

Note: c99 compiler for the 99/4A by Clint Pulley

Feedback

TI-Artist preferred

I read your article comparing GRAPHX and TI-Artist (August 1986) with interest. I have TI-Artist and have used GRAPHX and I agree with most of the things that Mr. Bobbitt has to say.

However, I don't necessarily agree with his conclusions. I prefer working with TI-Artist because it is so much faster going from one function to another. Waiting for and selecting from the menu seems to take forever with GRAPHX!

Mr. Bobbit made one mistake in his review that I must correct. He stated that one big disadvantage of TI-Artist is that it has no cursor speed control. It does have such a feature. The speed of the cursor can be changed by pressing FCTN—, (comma). It is practically essential to have such an option when working in the Zoom mode. Perhaps he did not know this because the instructions are rather obscure in some areas.

In the same issue with this article was a notice that there is a new version of TI-Artist available. I hope that it will correct some of the limitations of Version 2.

By the way, is there a bridge-playing program available for the TI?

Judy North
Newport News, Virginia

Bridge Bidding programs manufactured by TI are available from some dealers.—Ed.

Where to get PEBs

Please pass the following information along to Bryan D. Turner who was asking about where to buy PEBs (Feedback, October '86).

Our group (Mid-South 99 User Group) received a flyer from a place called "The Captains Wheel," TI99/4A Specialists, 17295 Chippendale Ave., Farmington MN 55024, phone number (612) 460-6348 telling about a three-slot expansion kit for $35 (plus shipping and an added $10 if you wish to power a disk drive off the same power supply) with which you assemble the box yourself. If you are looking for a low-priced PEB and know a little about electronics that might be worth looking into.

Also, I read in the September HV 99ers newsletter of Australia that they are embarking on a group project to build their own three-slot PEB themselves. You might want to contact their secretary to see how they are building their PEBs. Their address is HV 99ers, 6 Arcot Close, Tarro, N.S.W. 2322 Australia.

Then one last place to look is in the local paper, as I occasionally see someone with a system for sale in the local want ads.

Gary Cox
Memphis, Tennessee

Finding PE box

I recently received a catalog from Ryte Data which contained information that may provide an answer for Bryan D. Turner of Great Bend, Kansas ("Make a P.E. box!" Feedback, Oct. '86).

In the Ryte Data catalog, the "99AT expansion system" was described as follows:

—lower cost expansion system with more features than any other system;

—up to four disk drives in the system;

—five expansion slots for standard TI size cards;

—smaller connector cable;

—contemporary design and future upgrade;

—support for the Myarc "Geneve" 9640 computer system.

As this project is just now being completed, we are taking advance orders. The 99AT project was designed by Pat Saturn and implemented through Millennium Computers. For full expansion capability; new peripheral cards, disk drives and the new Myarc computer system...the 99AT expansion unit is the only expansion choice. To order yours, simply send us your advance order with your phone number. Your "99AT Expansion Unit" will be ONLY $210.00 Canadian funds or $155.00 U.S. funds.

The catalog showed a drawing of the system with space for four half-height drives (in the horizontal position) in an attractive, modern enclosure.

For more information, interested persons should write to Ryte Data/Millennium Computers, 210 Mountain St., Haliburton, Ontario K0M 1S0 (Canada).

Randall L. Griggs
Louisville, Kentucky

Another wish list

1. Eliminate need to name Multiplan disk "TIMP" or allow data files to be loaded from second disk.

2. A home financial manager/stock portfolio program. Does any exist?

3. A way to print Graphx (or other files inverted and shifted so a card can be made (front picture on the lower left corner with text inverse on upper right corner so that card can be folded so picture on the outside opens to text in the inside). Needs to be able to print upside down and on righthand side of page.

Dennis Wood
Bellevue, Washington

Direct connect for acoustic modem?

I own a TI acoustic modem and I would like to know if there is anyone who has tried to bypass the acoustic pickup and make it a direct connect type. Also, does anyone have any suggestions as to whether or not this is even possible?

Keith Onchuck
Chicago, Illinois

We have never used an acoustic modem, so cannot answer you, but welcome comments from readers.—Ed.

Numeric keypad built

I began my numeric keypad project some time ago. I had rounded up a loose keypad, perf board and other

(Please turn to Page 10)

MYARC T.M.

ANNOUNCING MYARC'S 640K RAM

GENEVE t.m.

MODEL 9640 FAMILY COMPUTER

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Feedback

(Continued from Page 8)

parts from a local electronics store and set to work. Unfortunately, I incorporated two pole momentary switches for the cursor keys. My first test revealed that they wouldn't work because half the time I would get only an "E" (or S, D or X).

Tony Johnson's article in your May 1986 issue of MICROpendium saved the day. His excellent tutorial guided me through the parts and process necessary to make the whole thing work.

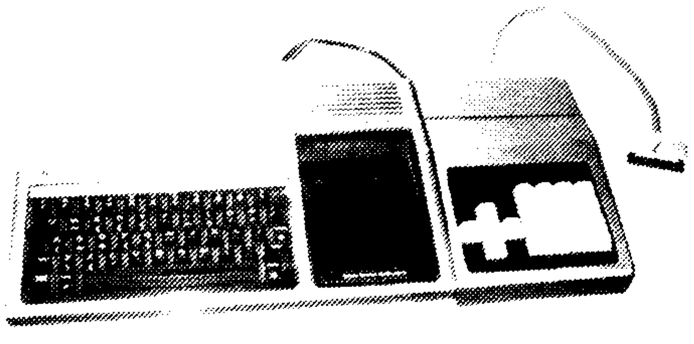
Rather than build an entire keyboard like Tony, I went with a detachable keypad designed to match the TI console. It's based on a sheet metal frame with plexiglass mounts and face. An aluminum shell tops the whole thing off.

I incorporated an earlier project of mine that allowed me to remote the TI flat I/O cable behind the expansion box. This required a 22/44 card edge connector, 25 pair telephone wire and a homemade male connector. I installed an interrupt switch on the side for screen dumps and a "clear buffer" key for my Triple Tech card.

The keys themselves are wired via a cable with a 15-pin plug. On the computer end, wires were tack soldered on the TI keyboard and terminated at a 15-pin plug mounted at the rear of the console.

Many thanks to Tony Johnson for his concise and thorough tutorial.

Jim Edwards
Member, San Fernando Valley 99ers
La Crescenta, California



Program problems

Here's a problem that someone could help me with!

First: I keyed in a program and instead of using "SAVE DSK1.FILENAME" I used SAVE DSK1."FILENAME" and now I can't retrieve it. How come?

Second: I keyed in another program before I had my disk drive and saved it on tape.

I tried to retrieve it into my computer with the disk drive on, but I kept getting "ERROR IN DATA".

And it didn't matter how many times I tried, it still wouldn't take it, even trying different volume and tone levels.

So I tried it again without the disk drive on, with both BASIC and XBASIC and the computer took it!

While the program was in the computer I turned the disk drive on and tried to save it on disk, but when I keyed SAVE DSK1.FILENAME it would lock up so I had to shut down the computer and try again.

After three or four times of retrieving the program without the drive on and turning the drive on, I finally succeeded in getting it on the disk, but I have the same problem; I can't retrieve it!

Third: I keyed in another program, SAVE DSK1.FILENAME.

Now there is nothing on the disk except the "Auto Load" program.

After saving it I went back to the title screen.

I pressed "2" for XBASIC and the "Auto Load" asked what drive I was using and keyed in "1" and gave me the menu: 1. Filename, 2. Load, 3. Exit. I pressed "1" and after I waited a few seconds the screen gave me "Error in line 13" but I don't have a "line 13" in the program!

Well, after listing I found that the program merged with the load program! Double help!

Going back to the programs I can't retrieve: I know they're there. I used the CALL LINK ("Cat") and also TI-Writer and they both show that they do exist.

Can you or anyone explain? Oh, I also used the E/A program and that didn't help either.

Arthur Dubea[redacted]
Woonsocket, Rhode Islan[redacted]

We'll answer what we can.

As to the use of quotation marks as part of your filename, we have been unable to duplicate the problem in Extended BASIC or BASIC. The quote marks are treated like any other character in this usage.

Lots of users are familiar with the problems associated with loading a program from cassette with a disk drive on. But there's no pat answer.

One explanation starts with the fact that the computer uses some 2K of memory to operate the disk system. Thus, if the program is very long, it won't load in its entirety because there's not enough RAM to hold it. (A cassette recorder won't load into an expansion memory.) Turning the drive off, either by a CALL LOAD or mechanically, frees up this 2K, permitting the entire program to load. (One would think that a "memory full error" would pop up at these times, but that would occur only if the program was actually loaded and RUN. The memory full message would result if all the stack space were used up between the time the RUN command is initiated and the prescan completed.)

Loading the program from disk, with the 2K of memory overhead it requires, would seem to leave less than enough RAM for the program. This is not a comprehensive answer to the cassette-diskette problem, which has many other aspects.

Perhaps the Auto Load program was inadvertently merged with the FILENAME program, or vice versa. Several years ago we were fooling around with an Auto Load program that created its list of programs at startup. It had a habit of merging the selected program into itself. Not knowing which Auto Load program you have, we can't offer any specific advice.

Readers who'd like to go into greater detail on the subject of cassette-diskette transfers and their pitfalls are encouraged to submit an article or User Note.—Ed.

The Feedback column is for readers. It is a forum to communicate with other readers. The editor will condense excessively lengthy submissions where necessary. We ask that writers restrict themselves to one subject for the sake of simplicity. Our only requirement is that items be of interest to persons who use the TI99/4A home computer. Mail Feedback items to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

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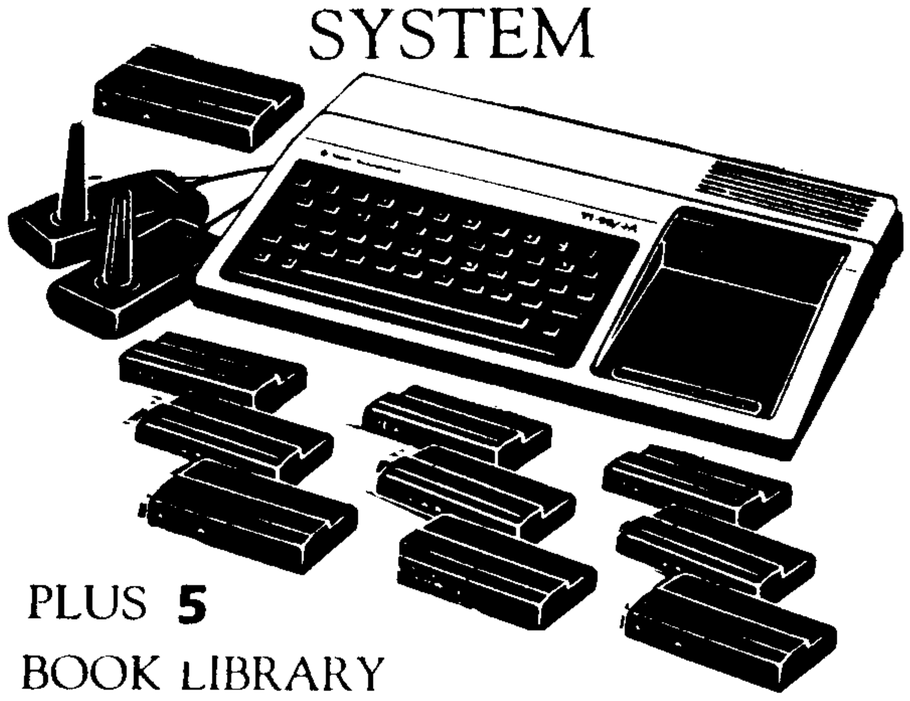

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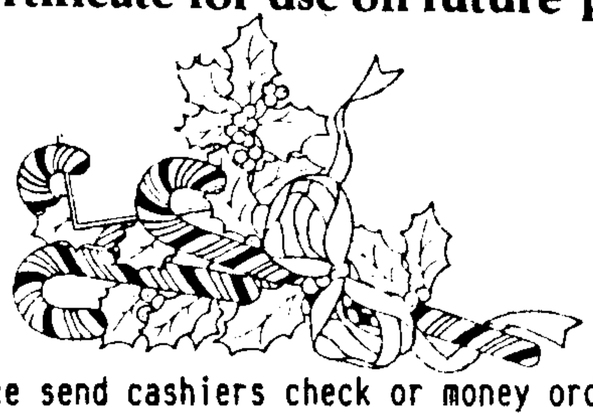

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Getting at the guts of your TI's disk controller card

By MACK McCORMICK
Technical Editor

I think we all find disks and file access to be a mystery. There has been much discussion on disk protection schemes and on what information is contained on a disk. (I might add that I am saddened to see track copy programs floating around. They will surely lead software programmers to devote more energy to hardware projects which aren't so easily compromised.) The intention of this tutorial is to provide insight into the mystery of disks.

This tutorial takes the basic information we have learned and applies it to applications for reading sectors at the disk ROM and direct access to the controller chip level. This tutorial is a bit advanced but if you've been following the previous ones (published periodically in MICROpendium since October 1985) it shouldn't be too difficult.

In reviewing the information I have on the subject I find the entire subject is covered in five books totaling about 2,000 pages. Obviously, I must limit my discussion. I'll break this into several sub-series'.

The disk DSR (device service routine) is developed on three levels:

Level 1—Basic disk functions. Sector Read/Write, head control, drive selections, track formatting and buffer allocation.

Level 2—The "file" concept. Each file is accessible by its name and an offset of a 256-byte block relative to the beginning of the file.

Level 3—Extension to the user level. Fixed or variable length records or files.

One other level which you won't find documented is direct access to the controller chip in the controller card.

(See Page 14)

Sector I/O Routine

```
*******************************************
*                                         *
*   SECTOR I/O ROUTINE DEMO USING         *
*              DSRLNK                     *
*   ACCOMPANIES SECTOR I/O TUTORIAL       *
*         BY MACK MCCORMICK               *
*                                         *
*******************************************
       DEF  SECTOR
       REF  VMBW,VMBR,DSRLNK

PABI   DATA >0110          SUBPROGRAM 010
CPUBUF BSS  256            CPU BUFFER


SECTOR LI   R0,>F80        ADDRESS OF PAB
       LI   R1,PABI        PAB
       LI   R2,2           TWO BYTES
       BLWP @VMBW          WRITE PAB TO VDP
       LI   R1,>0101
       MOV  R1,@>834C      /DISK DRIVE 1, <>0=READ
       LI   R1,>1000
       MOV  R1,@>834E      /VDP BUFFER START ADDRESS/ AT LEAST 256K
       CLR  R1
       MOV  R1,@>8350      /LOOK AT SECTOR 0
       LI   R1,>F80
       MOV  R1,@>8356      POINT TO THE PAB AT >8356
       BLWP @DSRLNK        ACCESS THE DISK
       DATA >A             USE DISK DSR SUBROUTINES (10 BYTES PAST HEADER)
* NORMALLY YOU WOULD CHECK FOR ERRORS AT >8350 HERE
* YOU COULD ALSO CHECK >834A FOR ACTUAL SECTOR READ

*-----------------------------*
*  PUT IT UP ON THE SCREEN    *
*-----------------------------*
       LI   R0,>1000       VDP BUFFER ADDRESS
       LI   R1,CPUBUF      CPU BUFFER ADDRESS
       LI   R2,256         MOVE 256 BYTES DOWN
       BLWP @VMBR
*THIS WOULD BE THE PLACE TO MANIPULATE DATA BEFORE WRITING IT BACK UP
       CLR  R0             SIT POSITION 0
       BLWP @VMBW          WRITE UP TO SCREEN IMAGE TABLE
*-----------------------------*
*  WRITE BACK OUT TO DISK     *
*-----------------------------*
       LI   R1,>0100       /DISK 1, WRITE/
       MOV  R1,@>834C
       BLWP @DSRLNK        WRITE IT BACK OUT
       DATA >A
       JMP  $              YOU WOULD EXIT THE PROGRAM HERE
       END
* YOU CAN SEE HOW EASY IT IS TO WRITE A SECTOR COPIER JUST FROM THIS SHORT CODE
* ADD A FEW WHISTLES AND BELLS AND YOU HAVE A FIRST CLASS PRODUCT


*******************************************
*            2D EXAMPLE                   *
*   SECTOR I/O ROUTINE DEMO USING         *
*        DIRECT ROM ACCESS                *
*   ACCOMPANIES SECTOR I/O TUTORIAL       *
*         BY MACK MCCORMICK               *
*                                         *
*******************************************
```

(See Page 14)

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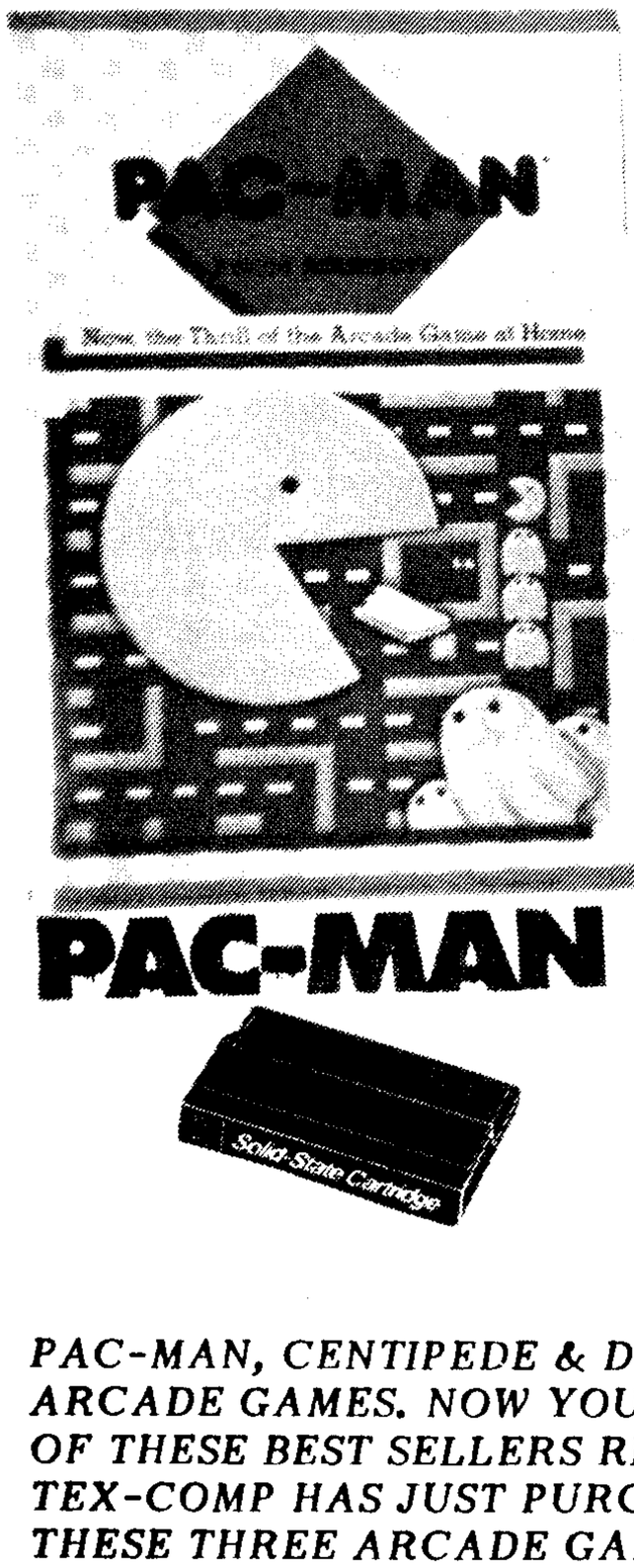

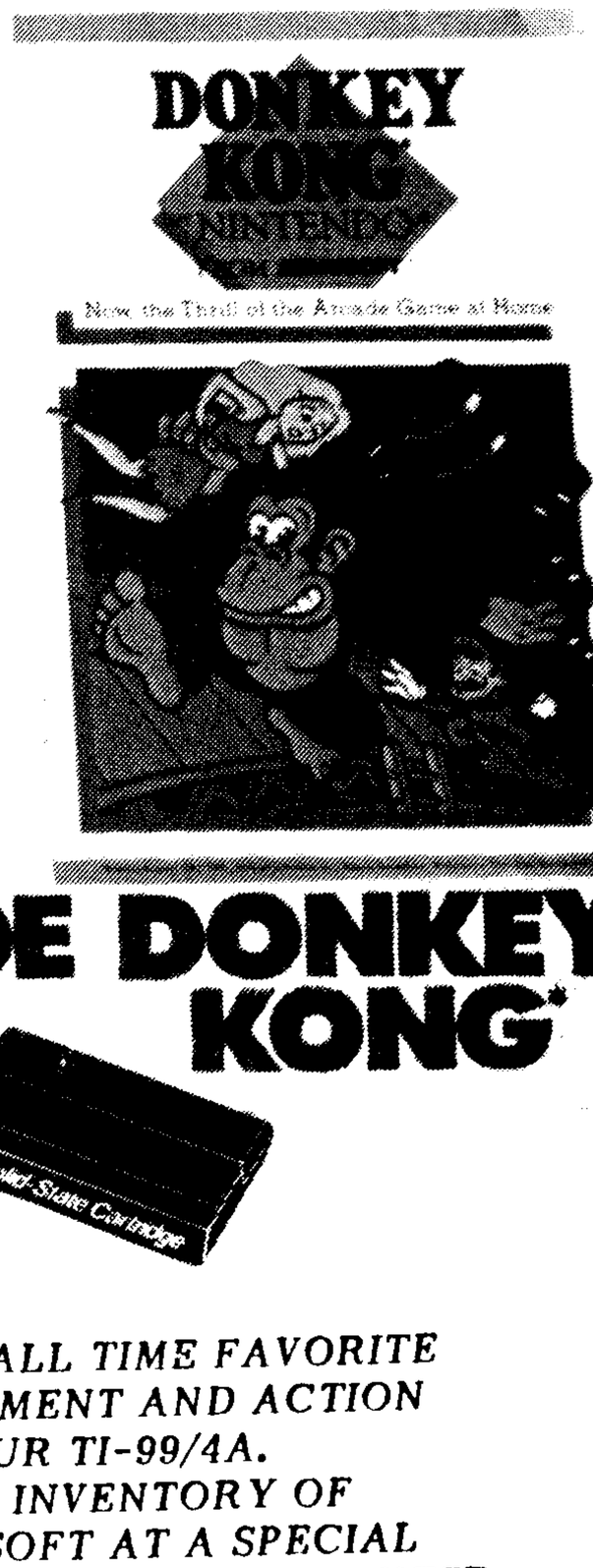

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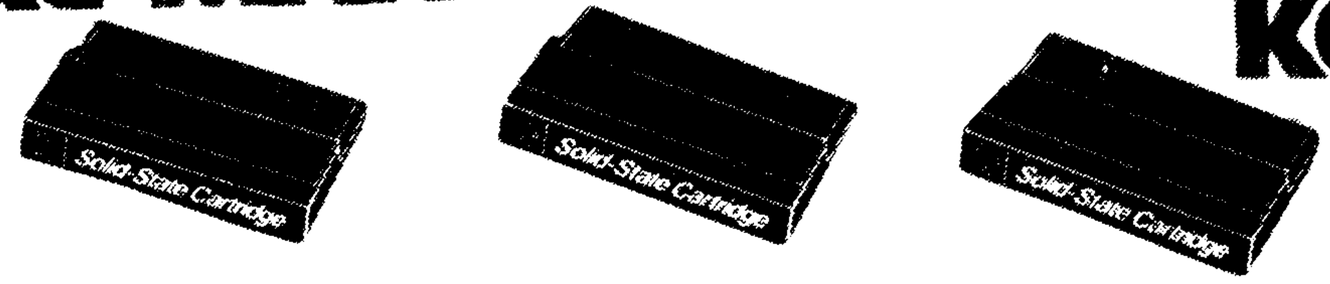

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DISK CONTROLLER—

(Continued from Page 12)

I intend to confine my discussion to level 1 and chip level routines. Due to length, this tutorial will focus on sector I/O, followed in subsequent tutorials with formatting, direct file access, and buffer allocation (ie. CALL FILES).

There are three different controller chips contained in the three different controller cards on the market (TI, CorComp, Myarc). The chips are all made by Western Digital. They are the WD 1771, WD 2793 and the WD 1770, respectively. I will limit this tutorial to the TI controller card and its chip. Everything in this tutorial will pertain to all three cards except direct access to the controller chip and its associated commands for the MYARC card. If you own one of these other cards and need additional information let me know, but I will not release proprietary information on the CorComp or Myarc controllers.

First, let's review the TI controller card features and ROM. As you know it can control up to three DS/SD drives. There are 40 tracks per drive and 9 sectors per track. Each sector is 256 bytes in length. Track 0 is closest to the outside and track 39 nearest the center of the disk. There is a built in DSR ROM which contains six level one routines which may be executed by branching to them. These will accomplish almost all we need to do, except such things as track I/O, Volume Information Block update, etc. To get at these routines you must access the Floppy Disk Controller (FDC) chip directly. To accomplish this we need to know how the FDC chip accesses the drive and build from there.

Here are some of the features of the WD 1771 chip: Automatic track seek with verification, in the read/write mode single/multiple sector read/write with automatic sector seek. Writes entire track for formatting. Programmable track to track step times. Six registers:

Data shift register—Assembles serial data from the disk read and transfers during write.

Data Register—8-bit holding register during read/write operations. During a seek command it contains the desired track position.

Track Register—8-bit register that contains the track number of the current read/write head position. Incremented by one as the head steps in toward track 39 and decremented by one towards track 00. Contents are compared with the disk track number in the ID field during read, write and verify.

Sector Register—8-bit register for holding the desired sector position. Contents compared with the disk sector ID field during read and write operations.

Command Register—8-bit register for the command to be executed.

Status Register—8-bit register to hold drive status.

(See Page 16)

SECTOR I/O ROUTINE—

(Continued from Page 12)

```
       DEF  SECTOR
       REF  VMBW,VMBR,GPLWS

SUBR   DATA >0110          SUBPROGRAM 010
CPUBUF BSS  256            CPU BUFFER
MYREG  BSS  >20            MY WORKSPACE


SECTOR LWPI GPLWS

       LI   R1,>0101
       MOV  R1,@>834C      /DISK DRIVE 1, <>0=READ
       LI   R1,>1000
       MOV  R1,@>834E      /VDP BUFFER START ADDRESS/ AT LEAST 256K
       CLR  R1
       MOV  R1,@>8350      /LOOK AT SECTOR 0
       LI   R12,>1100      SET CRU REGISTER TO BASE ADDRESS OF >1100 DSK DSR ROM
       SBO  0              PAGE IN THE DISK DSR ROM TO >4000

* Of course you could eliminate the next five instructions and manually scan the
* DSR ROM for the word which immediately proceeds >0110 and loaded R9 with that
* value which is >56DC in the case of the CorComp card and BL directly to it.
* I scanned the link table so this program could be used with other DSR
* subroutines and with all controller cards.
       LI   R9,>4000       BEGINNING OF DISK DSR ROM
NEXT   C    *R9+,@SUBR     SEARCH LINK TABLE FOR ENTRY POINT
       JNE  NEXT
       AI   R9,-4          SUBTRACT 4 FOR ENTRY POINT
       MOV  *R9,R9         GET THE ENTRY POINT ADDRESS
       BL   *R9            BRANCH TO THE ROUTINE

* NORMALLY YOU WOULD CHECK FOR ERRORS AT >8350 HERE
* YOU COULD ALSO CHECK >834A FOR ACTUAL SECTOR READ

*------------------------------*
*  PUT IT UP ON THE SCREEN     *
*------------------------------*
       NOP                 NOP IS REQUIRED HERE BECAUSE THE DSR ROUTINE INCT's THE
*                          RT ADDRESS
       LI   R0,>1000       VDP BUFFER ADDRESS
       LI   R1,CPUBUF      CPU BUFFER ADDRESS
       LI   R2,256         MOVE 256 BYTES DOWN
       BLWP @VMBR
*THIS WOULD BE THE PLACE TO MANIPULATE DATA BEFORE WRITING IT BACK UP
       CLR  R0             SIT POSITION 0
       BLWP @VMBW          WRITE UP TO SCREEN IMAGE TABLE
*------------------------------*
*  WRITE BACK OUT TO DISK      *
*------------------------------*
       LI   R1,>0100       /DISK 1, WRITE/
       MOV  R1,@>834C
       BL   *R9
       SBZ  0              PAGE OUT DISK DSR
       JMP  $              YOU WOULD EXIT THE PROGRAM HERE
       END
```

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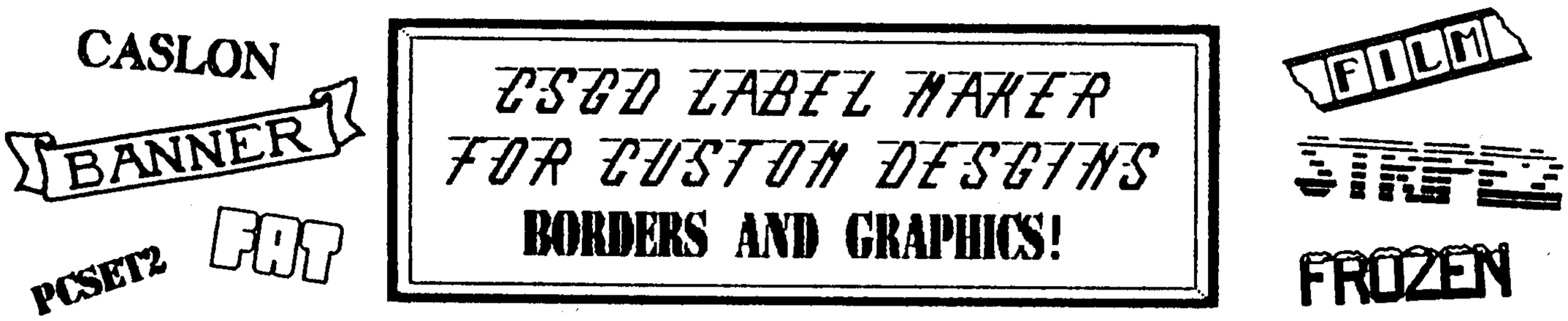

The complete three disk package comes with 25 fonts, 40 small graphics, and thorough documentation, for only $17.95. CSGD III requires a disk system, 32K memory expansion, TI Extended Basic, and either an Epson or Prowriter graphics compatible printer (specify your printer when ordering).

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Since CSGD III is a continuation of the CSGD series, all previous fonts and graphics libraries are compatible with it. Thus, CSGD III is already a fully supported software package. You can order User Disk #1 (7 fonts, 3 graphics) for $5.95, User Disk #2 (two disks: 12 fonts, 127 graphics) for $10.95, and User Disk #3 (two disks: 22 fonts, 86 graphics). Please specify printer when ordering.

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DISK CONTROLLER—

(Continued from Page 14)

There will be much more information on these registers as the tutorials progress.

There are 11 commands available:

Type	Command	Bits 7 6 5 4 3 2 1 0
I	Restore	0 0 0 0 h V r1r0
I	Seek	0 0 0 1 h V r1r0
I	Step	0 0 1 u h V r1r0
I	Step In	0 1 0 u h V r1r0
I	Step Out	0 1 1 u h V r1r0
II	Read Command	1 0 0 m b E 0 0
II	Write Command	1 0 1 m b E a1a2
III	Read Address	1 1 0 0 0 E 0 0
III	Read Track	1 1 1 0 0 1 0 s
III	Write Track	1 1 1 1 0 1 0 0
IV	Force Interrupt	1 1 0 1 I3I2I1I4

Plug in the appropriate values by type command:

Type I

h = Head load flag. 1-beginning. 2-not beginning.

V = Verify. 1-verify on last track. 0-no verify.

r1r0 = Stepping motor rate. 0 0 - 6ms. 1 0 - 10ms. 1 1 - 20ms.

u = Update flag. 1-update track register. 0-no update.

Note: Head step times are based on the 1 MHz clock contained in the controller card.

Type II

m = multiple record. 0-single. 1-multiple.

b = Block length flag. 1-IBM format (256 Byte). Other flags only if need to know.

a1a0 = Data Address Mark 00- >FB(Data Mark)

Type III

s = Synchronize Flag. 0-Single density.

Type IV (interrupt condition flags)

I0 = 1, not ready to transition.

I1 = 1, Ready to not ready transition.

I2 = 1, Index Pulse

I3 = 1, Immediate Interrupt

E = Enable head load and 10 msec delay 1-delay. 0-head already loaded no delay.

This may seem confusing now but before it's all over you should have a better understanding of the process.

"Head loading" means the read/write heads are placed in contact with the disk (the click you hear when the drive activates) and data may be transferred. The head stays loaded until a command is received to unload or until timeout occurs (two revolutions of the disk).

I suppose this is the best place to

(See Page 18)

Sector Read

```
*********************************************
***                                       ***
*** This program does a sector read       ***
*** at the FDC level FD1771.              ***
*** Will only work with TI card as        ***
*** written. Must INV commands to work    ***
*** with CorComp. TI card is on an INV    ***
*** data bus. CorComp is not.             ***
***                                       ***
*********************************************
       DEF  SECTOR

WS     EQU  >83E0          LETS USE SOME HIGH SPEED RAM FOR OUR WS

*****************************************
*       FD1771 DEFINITIONS              *
*  THESE LOCATIONS ARE MEMORY MAPPED    *
*****************************************
FDS    EQU  >5FF0          READ STATUS
FDRT   EQU  >5FF2          READ TRACK REGISTER
FDRD   EQU  >5FF6          READ DATA REGISTER
FDC    EQU  >5FF8          COMMAND REGISTER
FDWT   EQU  >5FFA          WRITE TRACK REGISTER
FDWS   EQU  >5FFC          WRITE SECTOR REGISTER
FDWD   EQU  >5FFE          WRITE DATA REGISTER

*****************************************
*       REGISTER DEFINITIONS            *
* ANOTHER WAY TO DEFINE WORKSPACE       *
*  REGISTER DEFINITIONS BY NAME         *
*****************************************
VALUE  EQU  0              GENERAL
VALUE1 EQU  1              GENERAL
RAMPNT EQU  2              VDP RAM POINTER
COUNT  EQU  6              GENERAL PURPOSE COUNTER
TEMP   EQU  7              USED TO STORE RT ADDR
TEMP1  EQU  8              USED TO STORE RT ADDR
CRUBAS EQU  12             CONTAINS CRU ADDRESS
VDP    EQU  15             CONTAINS ADDR OF VDPWA

*****************************************
*            CRU DEFINITIONS            *
*****************************************
MOTBIT EQU  1              MOTOR ON BIT OFFSET
WAIBIT EQU  2              WAIT LOGIC ENABLE
HLTBIT EQU  3              HEAD LOAD TIMING BIT
DS1BIT EQU  4              FIRST DRIVE SELECT BIT OFFSET

*****************************************
*            VDP DEFINITIONS            *
*****************************************
VDPWA  EQU  >8C02          VDP WRITE ADDRESS
VRD    EQU  >8800-VDPWA    READ DATA
VWD    EQU  >8C00-VDPWA    WRITE DATA
VRS    EQU  >8802-VDPWA    STATUS

*****************************************
*          MISC DEFINITIONS             *
*****************************************
T75M   EQU  75*40          75 MILLISECONDS
T1000M EQU  40000          ONE SECOND
NSEC   EQU  9              # SECTORS PER TRACK
SECLEN EQU  256            # BYTES PER SECTOR
MEMSTA EQU  0              VDP LOCATION FOR DATA (SCREEN IMAGE TABLE HERE)
```

(See Page 18)

NEW FROM MONTY SCHMIDT: **GPL LINKER V1.1 Run Time Version**

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This program provides the power to write, edit and assemble true GPL programs for the TI 99/4A. Create code that accesses console operating system routines directly. Develop programs that use the GPL Interpreter and all the features of the TI 99/4A.

This package includes the GPL Assembler disk, printed documentation, GPL tips and hints, update support service and commented GROM/ROM listings (with the book "INTERN"). An example for a command module type GPL program is included with source, object and list files on disk.

Requires: 32k memory, disk drive(s), TI Editor Assembler package. Printer/RS-232 recommended.

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The only **full** megabyte (1024k) RAM memory expansion for the 99/4A has now been introduced in North America. This new stand-alone unit attaches to the I/O connector to add the standard 32k PLUS 992k of extra memory. The innovative "SUPERVISOR" program monitors memory use, RAM-DISK functions and bank-switching for application programs. MegaRam works with XB or E/A languages and other TI modules which require 32k. Compatible with virtually all TI programs. MegaRam does not come as an Expansion Box card due to the direct address line access needed.

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As reviewed in Micropendium October 1985. This command module gives you all the features of Extended Basic PLUS 40 new commands. Totally compatible with TI's XB, this enhanced version gives your programs more power to access your 99/4A. Commands such as MLOAD, MSAVE, VPEEK, VPOKE, GPEEK are superior to most other Basic environments. Various demo programs and new applications using high resolution graphics make this module a "must" for Extended Basic users. Comes complete with a 95 page manual. Requires console and 32k. $75.00 (US) plus $2 shipping.

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DISK CONTROLLER—

(Continued from Page 16)

cover the disk format. Have you ever wondered what's in between the data fields (256 bytes)? Well, here it is. (Stick with this series and we will write a program to directly look at that data with a track read command.)

No. of Bytes	What's There
12	Index Gap. >FF
6	Sync >00
* Sector begins here. Repeat 9 times *	
1	ID Single density >FE
1	Track Address >00->27
1	Side >00
1	Sector Address >00->08
1	Sector Len >01
2	Cycle Redundancy Check >F7
11	Data Separator >FF
6	Sync >00
1	Data Address Mark >FB
256	File Data
2	CRC >F7
* Sector ends here *	
36	Data Separator >FF
240	End of track fill >FF

From this you can see there are 3177 bytes per track but only 2304 are actual data bytes.

So far we've covered the basic background. We will go into greater detail as we proceed.

There are three ways to perform a sector I/O. You may use the DSRLNK, access the disk ROM without DSRLNK, or access the controller chip directly. Let's examine the first two methods.

Sector I/O is commonly referred to as subprogram 010. All arguments for the I/O are passed through the FAC block in CPU RAM (834A). Here's how it maps out:

>834A-4B (Address of actual sector accessed when complete.)
>834C Disk Drive 1, 2 or 3.
>834D Read/Write 0=write. 0=read
>834E-4F VDP Buffer Address (256 byte size)
>8350-51 Sector number

Error codes returned at 8350 after operation. 0=no error. 1=error.

Program 1 is a straightforward (no fancy shortcuts) way to read a sector and write it back out to the disk using DSRLNK and direct ROM access. It should be documented well enough for you to follow. If you have questions that I have not covered, drop me a line.

The second program example demonstrates how to access the controller card chip directly without using a DSRLNK. It might come in handy if you ever need to save memory space.

(See Page 20)

SECTOR READ—

(Continued from Page 16)

```
*-- PROGRAM STARTS HERE --*

SECTOR
       LWPI WS
       LI   CRUBAS,>1100 CRU BASE ADDRESS
       LI   VDP,VDPWA    VDP WRITE ADDRESS >8C02 IN R15
       SBO  0            PAGE IN THE ROM SO WE CAN GET AT THE FDC

*****************************************
*        SELECT THE DRIVE               *
*****************************************
       LI   RAMPNT,>0100 DRIVE 1, >02 DRV #2, >04 DRV #3.
       AI   CRUBAS,2*DS1BIT   SET UP THE CRU ADDRESS FOR THE PROPER LINE
       LDCR RAMPNT,3     SELECT THE DRIVE (BYTE ADDR SOURCE OPERAND)
       AI   CRUBAS,-2*DS1BIT BACK OUT THE OFFSET
       LI   VALUE,T75M   WAIT 75 ms
DRIVE  SRC  TEMP,4       OK TO ROLL TEMP
       SRC  TEMP,4       JUST WASTING THE PROPER TIME
       DEC  VALUE
       JNE  DRIVE

*****************************************
*  SEEK SECTOR                          *
* This routine calculates the track and*
*  sector numbers from the logical     *
*  sector number and seeks the proper  *
*  track. Drive is restored to track 0.*
*****************************************

*-- RESTORE THE DRIVE --*

       BL   @LCMD        ISSUE A RESTORE CMD
       DATA >F500
* FOR EXAMPLE ON CORCOMP DRIVE THIS CMD INV IS >0A00

       BL   @BUSY1       WAIT FOR RESTORE TO COMPLETE

       SETO VALUE        INVERT 0 BYTE
       MOVB VALUE,@FDWT  OUTPUT THE CURRENT TRACK NUMBER (TRK 0)

*-- COMPUTE THE CORRECT TRACK NUMBER FROM THE LOGICAL SECTOR --*
       LI   VALUE1,0     THE NUMBER HERE IS THE SECTOR YOU WANT TO READ
       CLR  VALUE        DIVIDEND HIGH
       LI   TEMP,NSEC    PUT NUMBER OF SECTORS IN TEMP
       DIV  TEMP,VALUE
       SWPB VALUE        QUOTIENT IS TRACK #
       INV  VALUE        INV IT FOR FDC CHIP
       MOVB VALUE,@FDWD  LOAD FD1771 DATA REGISTER
       SWPB VALUE1       REMAINDER IS SECTOR #
       INV  VALUE1       FDC CHIP LIKES INV VALUES
       MOVB VALUE1,@FDWS LOAD FD1771 SECTOR REGISTER
       CB   VALUE,@FDRT  SAME TRACK AS LAST TIME?
       JEQ  SEEK         YUP...GO ON AND DO IT
       BL   @LCMD        SEEK AND VERIFY THE SECTOR ADDRESS
       DATA >E100
       BL   @BUSY1       WAIT FOR COMMAND TO FINISH

* NOTE HERE THAT SINCE THE DATA MUST BE MOVED FROM CPU RAM TO VDP RAM HOW MUCH
* TIME TI COULD HAVE SAVED BY GIVING US A CPU WRITE OPTION LIKE MYARC DID.
* INSTEAD IF WE WANT TO USE IT IN CPU WE MUST MOVE IT BACK DOWN WHEN USING THE
* DISK ROM.
*-- READ THE SECTOR --*
```

(See Page 20)

DISK CONTROLLER—

(Continued from Page 18)

Note that we load R12 with 1100 which is the Communication Register Unit (CRU) address for the disk controller card and then set bit on 0. R12 always contains the CRU base address. A SBO 0 instruction turns on the DSR ROM at memory address >4000->5FFF. The SBZ 0 instruction turns off the DSR ROM later in the program.

I recommend you take your DEBUG program and manually examine the first part of the DSR ROM. After loading DEBUG enter C 1100,1 then enter 1. Look at the memory using M 4000,40FF. You will see all of the level 1 routines we will discuss including the sector I/O (0110) routine. To page the ROM back out enter C 1100,1 and 0. The light should go out on the controller card.

Program three gets down to the nitty gritty and accesses the registers in the controller chip directly. The FD 1771 registers are memory mapped (similar to VDP access). I've tried to document the program sufficiently to explain it. Please write if you have questions.

Until next time, Assembler Executing!

Readers may write Mack at HHC, 1ST INF DIV(FWD), APO NY 09137.—Ed.

SECTOR READ—

(Continued from Page 18)

```
SEEK    LI    RAMPNT,MEMSTA MEMSTA IS VDP RAM LOCATION TO WRITE TO
        BL    @VDPLAW       PREPARE FOR VDP WRITE

        BL    @LCMD         FINALLY WE CAN READ THE SECTOR
        DATA  >7300         REMEMBER THIS IS INV
        SBO   WAIBIT        ENABLE WAIT LOGIC
        LI    COUNT,SECLEN  BYTES PER SECTOR
RSECT   MOVB  @FDRD,VALUE   GET THE BYTE
        INV   VALUE         IT WAS INVERTED SO REINVERT IT.
        MOVB  VALUE,@WWD(VDP) PUT IT IN VDP
        MOVB  @FDRD,VALUE   THESE INST ARE REPEATED BECAUSE SPEED IS CRITICAL
        INV   VALUE
        MOVB  VALUE,@WWD(VDP)
        DECT  COUNT         WE'VE WRITTEN TWO BYTES
        JNE   RSECT         FINISHED?
        BL    @BUSY         DISABLE WAIT LOGIC AND WAIT FOR MOTOR TIME OUT

        SBZ   0             PAGE OUT THE ROM
        LIMI  2             ENABLE INTERRUPTS
        JMP   $             THATS IT FOLKS. FCTN QUIT TO EXIT.

*****************************************
*SUBROUTINE-TURN MOTOR ON & ISSUE CMD   *
*     INPUT: CMD IN MSB OF DATA         *
*      NOTE: ALL COMMANDS MUST BE INV   *
*****************************************
LCMD    MOV   *R11+,VALUE  PICK UP COMMAND BYTE
        SBZ   MOTBIT       TOGGLE MOTOR ON CLOCK
        SBO   MOTBIT
        LI    COUNT,T1000M ONE SEC TIME OUT
MOTOR   SRC   TEMP,4       WASTE TIME
        SRC   TEMP,4         .    .
        DEC   COUNT
        JNE   MOTOR

        MOVB  VALUE,@FDC   LOAD THE COMMAND
        SBO   HLTBIT       SET HLT
        SRC   TEMP,8       WASTE MORE TIME (MOTORS ARE SLOW-
        SRC   TEMP,8       COMPUTERS ARE FAST (grin))
        RT

*****************************************
*      BUSY ROUTINE                     *
* Waits for the current command to be   *
* completed. No error on motor time out*
*****************************************
BUSY    SBZ   WAIBIT       DISABLE WAIT LOGIC

BUSY1
        MOVB  @FDS,VALUE   GET THE STATUS OF THE DRIVE
        INV   VALUE        INVERT FOR DATABUS LOGIC
*       JLT   NODISK       THIS IS WHERE YOU CHECK FOR NO DISK
        SRC   VALUE,9      CONTINUE WAIT LOOP?
        JOC   BUSY1        YUP...BEEN A CARRY
        RT

*****************************************
* VDP READ/WRITE SET UP ROUTINE         *
* Address in vdp is RAMPNT              *
*****************************************
VDPLAW  ORI   RAMPNT,>4000 SET WRITE BIT
        ANDI  RAMPNT,>7FFF STRIP MSB
        JMP   VDPLA1

VDPLAR  ANDI  RAMPNT,>3FFF STRIP OFF 2 MSB
VDPLA1  SWPB  RAMPNT       ALWAYS WRITE LSB FIRST
        MOVB  RAMPNT,*VDP  LOAD TO VDP
        SWPB  RAMPNT
        MOVB  RAMPNT,*VDP  NOW WRITE THE MSB
        ANDI  RAMPNT,>3FFF GET RID OF WRITE BIT
        RT
NINE    DATA  9
        END
```

FORTHRITE #02

Mini Word Processor in FORTH

By HOWARD H. ARNOLD

Here's another Forth program that again attempts to prove that *useful* programs can indeed be written in this language. Forthrite is a mini-word processor. It lacks many of the sophisticated features of bigger word processing programs, but compensates for this by being extremely simple, easy to use, and quick.

It also is an excellent exercise in Forth for those who may be just learning the language. The entire processor consists of just two screens and a revised screen 20 used as the menu and the complete operating instructions! Honest!

This great simplicity is achieved by making use of the excellent full-screen editor already contained in the Forth system disk as provided by TI. All we need do is to make provisions for margins, for sending output to the printer and for storing the text in easily identified files.

Without undue apology, I'll list some of the features found in professional word processors which you'll find missing in Forthrite. Perhaps most noticeable, word-wrap is not provided. You must watch the screen as you approach the line length that you have set for your file and go to the next line by hitting ENTER. This may actually be an advantage because you can see how the margins will appear in your printed copy and use hyphens or not in order to split words, just like we used to do with a good old typewriter! You have the advantages of all the editing features of the TI Forth editor, however, in deleting or adding characters, erasing or moving lines, etc.

The other noticeable difference between Forthrite and the "high-priced spread" is that you do not scroll continuously between screens, but you must overtly change to the next screen (FCTN 4) when you reach the end of the screen on which you're working. And lastly, you must add a caret at the start of a line to mark the end of the file for your printer.

On the positive side, you can store up to 50 kilobytes of text, split between five files, all of which can be instantly accessed through Forth's virtual memory capability.

Let's talk about the simple screens which constitute the word processor first. Then we'll review an installation pro-

(See Page 24)

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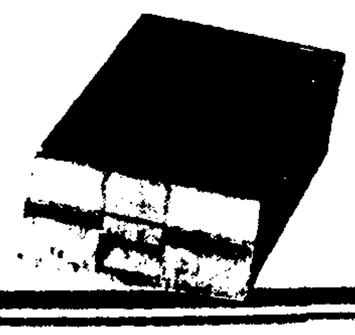

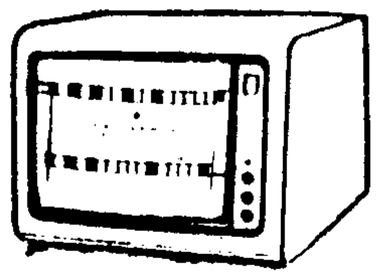

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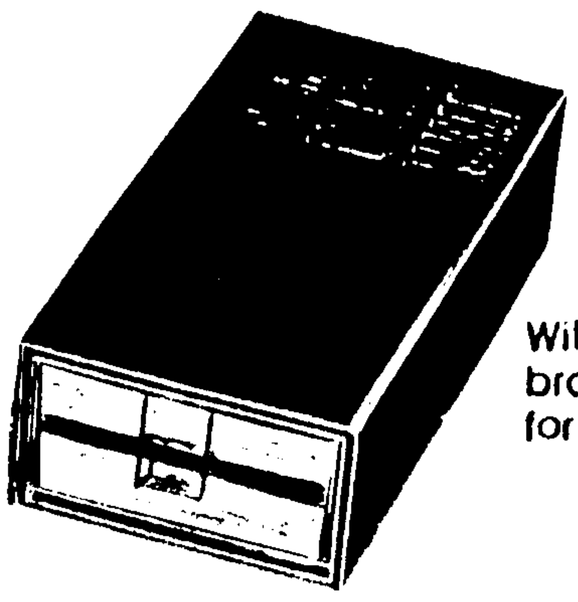

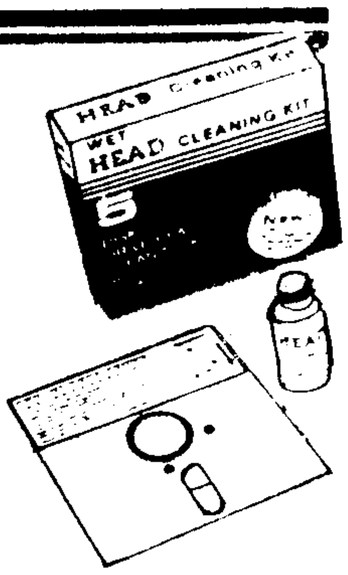

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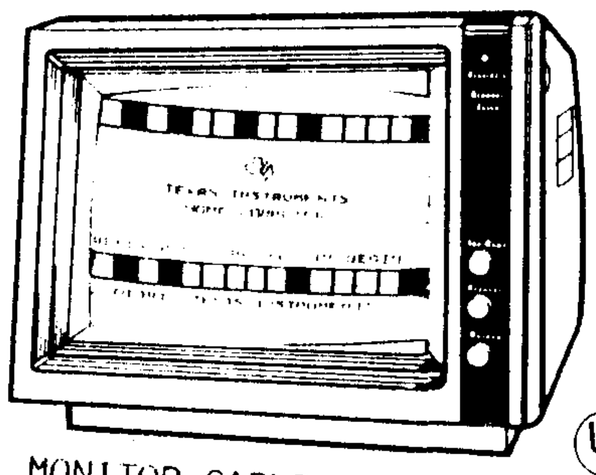

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FORTHRITE—

(Continued from Page 22)

cedure that gets it on your Forth disk for easy access and use.

Screen 30 declares and initializes variables for margins (MARG), line length (L/LENGTH), line number (LINE#) and the block number of the text buffer (BUF).

CHBF is provided to permit you to choose at which block you wish to store your text. You can choose any one of five storage blocks, permitting the simultaneous storage of up to five 10K documents.

Screen 31 provides instructins for changing margins (CHMARG) and line length (CHL/LENGTH). These words simply print appropriate instructions on the screen for changing from the default values for these variables. The word GO puts you into the editing mode from the menu and setup screens.

The word RITE is provided to initiate the writing function, calling all the above words.

PRINT initiates the printing operation, calling PRTPAGE to print one screen of stored text at a time. If a caret is found at the start of a line, the printing operation is aborted, returning you to Forth. In order to re-enter the editing or printing mode it is necessary only to type RITE or PRINT. PRTPAGE also keeps track of lines printed and skips over perforations. And of course PRINT calls PRTPAGE repeatedly until a caret is found at the start of a line, indicating the end of the file, or until all 10 blocks of text have been printed. Simple enough?

Now to install the silly thing! First load the Forth system. Then load the bsave, print and editor screens, preferably in that order. To do this type:

—BSAVE (ENTER)
—PRINT (ENTER)
—EDITOR (ENTER)

Then type:

: MENU CR 272 257 DO I MESSAGE CR LOOP CR CR CR ; (ENTER)

Be prepared to ignore the "MENU is not unique" message you should now receive at your terminal. Next edit screen 20 to make it read as shown in the listing printed here.

After entering and saving screens 30 and 31, load them into the system with the commands:

30 LOAD (ENTER)

It's now probably a good idea to clear all the screens from 40 through 89 by defining a word CLEARBUF as follows:

: CLEARBUF 90 40 DO I CLEAR LOOP ; (ENTER)

Then calling the word:

CLEARBUF (ENTER)

And finally:

FORGET CLEARBUF

Typing RITE should now put you in business. If everything checks out OK, save the system to a binary file with the sequence:

' TASK 21 BSAVE (ENTER)

Then edit screen 3 and add the words 15 BLOAD MENU ABORT following the comment (QUIT OFF!) on line 1.

The only remaining task is to rename the FORTH file on your disk to something a bit more descriptive of the application. I used Disk Manager 2 to rename FORTH to RITE.

Although the author feels that this application is simple enough to be entered from the keyboard and easily debugged, he will provide a freeware disk with the finished binary code as well as source screens. Send $5 for postage and handling to Howard H. Arnold, 210 Beech Valley Rd., Lewisville, NC 27023.—Ed.

```
SCR #20
  0  FORTHRITE-A Mini Word Processor
  1
  2     RITE permits entering text
  3
  4     <FCTN> 4 for next screen
  5     <FCTN> 6 for prev screen
  6
  7     CARET (^) at the start of a
  8       line terminates text.
  9     then <FCTN> 9 and FLUSH
 10
 11     PRINT sends all stored text
 12       to the printer.
 13
 14     MENU gets this screen.
 15

SCR #30
  0 ( FORTHRITE)
  1 8 VARIABLE MARG 64 VARIABLE L/LENGTH 0 VARIABLE LINE#
  2 40 VARIABLE BUF
  3
  4 : CHBF      ." CHOOSE BUFFER YOU WISH TO USE" CR
  5             ."     <1> BLOCK 40 " CR
  6             ."     <2> BLOCK 50 " CR
  7             ."     <3> BLOCK 60 " CR
  8             ."     <4> BLOCK 70 " CR
  9             ."     <5> BLOCK 80 " CR KEY
 10   CASE      49 OF 40 BUF ! ENDOF
 11             50 OF 50 BUF ! ENDOF
 12             51 OF 60 BUF ! ENDOF
 13             52 OF 70 BUF ! ENDOF
 14             53 OF 80 BUF ! ENDOF ENDCASE ;
 15 -->

SCR #31
  0 ( FORTHRITE)
  1
  2 : CHMARG CR ." Default Margin is 8 :" CR
  3             ." To change type n MARG !" CR
  4             ." where n is the new margin" CR CR ;
  5 : CHL/LENGTH ." Default Line Length is 64" CR
  6              ." To change type n L/LENGTH ! " CR
  7              ." where n is the new Line Length " CR CR CR
  8              ." type GO to start editing " ;
  9 : GO BUF @ EDIT ;
 10 : RITE CLS CHBF CHMARG CHL/LENGTH ;
 11
 12 : PRTPAGE DUP 1024 + SWAP DO SWCH I DUP C@ 94 = IF
 13   UNSWCH ABORT THEN MARG @ SPACES L/LENGTH @ TYPE CR
 14   1 LINE# +! LINE# @ 55 > IF 0 LINE# ! 12 EMIT THEN 64 +LOOP ;
 15 : PRINT BUF @ DUP 10 + SWAP DO I BLOCK PRTPAGE +! LOOP ;
```

Bowling League Manager released

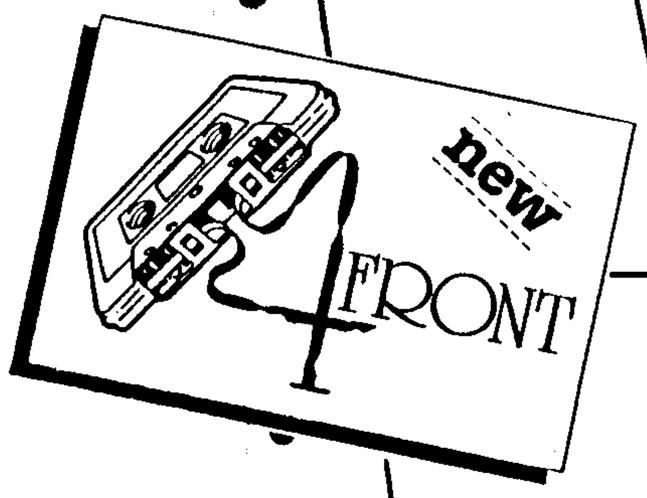
Ken Hayden, Ph.D., announces the release of his program Bowling League Manager.

The program is described as capable of being used for team statistics, bowler statistics, substitutes, league rosters, mailing labels and more.

Requirements are Extended BASIC, a 32K card and at least one disk drive. RS232 and a printer are optional.

Price is $29.95 plus $2. shipping.

For further information or to order, write Hayden at 1111 Park Ave. 303, Baltimore, MD 21201.



4FRONT MAGAZINE for the TI99/4a

Dear America,

With regard to NEW DAY COMPUTING and 4FRONT, let me first give you some background information:
I have been involved for some years in the TI scene over here, and last year decided to start up a computer business of my own, with the TI taking up about half of my resources and sanity. The idea of a mag on cassette was born, and the fact that many scoffed at the thought ('leave the idiot to it - he'll soon realize he's wasting his time') only made me more determined to have a go. After much time, money, and hair dropping out, the first issue hit the streets. To my shock, reaction was embarrassingly good!
In essence, the TAPE version is made up of articles and programs that will run in Basic OR Extended Basic. Some of the programs, however do need Exbas, PRK etc. The DISK version assumes Extended Basic/32k as standard. There are programs on tape in Basic that do not appear on the disk version, and items on disk that could not be included on cassette - eg Ed/Ass material. That way everyone gets good value according to his configuration. There are hints, tips, utilities, games, in fact all that you'd expect to find in a magazine - but ready to run!

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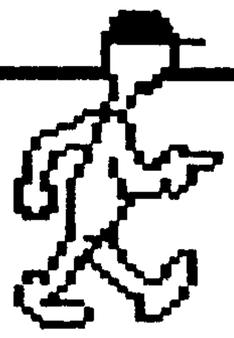
Well, that's about it. Go on, spoil yourself and try it. Then if you like it, don't pirate it, get your friends to purchase their own copy, thus keeping one balding English idiot half-sane for a little while longer....

Harry Pridmore



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GPL Assembler update

Bagnaresi offers new GPL Loader

By JOHN CLULOW

The review of the Weiand GPL Assembler (August 1986) noted that a loader for the Millers Graphics GRAM Kracker was not yet available. Paolo Bagnaresi has provided an elegant solution; one which should work for *any* GRAM simulating device and for *any* assembler which uses standard E/A object code tags. The source code is given below.

The program modifies the machine language for the standard E/A Option 3 loader. Whenever the loader would ordinarily write data to CPU RAM, the change makes it branch instead to Bagnaresi's GRMW routine. This routine simply puts the data in GRAM instead of CPU RAM and then returns to the E/A loader. Thus, this method allows all features of the E/A loader including the loading of multiple files and use of relocatable code (although the Weiand assembler generates only absolute code).

When the object file for the Bagnaresi modification is loaded, the GRAM routine is automatically run and the loader is placed in GPL mode. After all GPL files have been loaded, the E/A loader can be returned to its original status by entering 'CPURAM' at the Program Name prompt. Files written in 9900 assembly language can then be loaded as usual.

Of course, this method entails use of an E/A Option 3 loader. One approach would be to load the GRAM emulating device with the E/A module. The Option 3 loader can then be selected as usual and the Bagnaresi object file loaded. However, because the E/A module uses GROM 3 (H6000 to H7FFF), the GPL object files to be loaded must not overwrite this area.

Another restriction associated with use of the E/A module is that once any of the following occur, the loader returns to normal, CPU RAM mode: (a) the user exits the Load and Run screen; (b) a program is executed via the Run prompt; or (c) a file error occurs. In order to reinstate GPL mode, the Bagnaresi object file must be reloaded.

You can get around most of these restrictions, however, by using Bagnaresi's LAR file from a new version of his BEAXS disk: Bagnaresi Ed-Asm for Extended BASIC System. (Dr. Bagnaresi is also creator of BA-Writer, an Extended BASIC version of TI-Writer.) This version of BEAXS is available from the Southern California Users Group, P.O. Box 21181, El Cajon, CA 92021. Address your correspondence to Mrs. LaVerne Searcy, secretary and librarian of the users group. Program and documentation disks are available for $6. Make sure you specify the "MICROpendium—GPL Loader" version of BEAXS if you decide to order it.

Because the Option 3 Loader from the BEAXS disk is in

(See Page 28)

GRAM Loader

```
*--------------------------------------------------------------*
*                GENERAL PURPOSE GRAM/RAM LOADER               *
*                                                              *
* PAOLO BAGNARESI, Via J.F. Kennedy 17,                        *
* 20097 San Donato Milanese, Italy - Phone (02)-514.202        *
*                                                              *
* THIS CODE MODIFIES THE E/A OPTION 3 LOADER SO THAT IT        *
* WILL LOAD EITHER GRAM (GPL) OR CPU RAM AS USUAL.  THIS       *
* PROCEDURE SHOULD WORK WITH EXISTING AND FUTURE GRAM          *
* EMULATING HARDWARE DEVICES - GK, MAXIMEM, ETC. AND WITH      *
* ANY GPL ASSEMBLER USING STANDARD E/A TAG CHARACTERS.         *
*--------------------------------------------------------------*
*
       DEF CPURAM,GRAM ROUTINE NAMES USED TO SET THE LOADER
       AORG >3E00      PUT THESE AT END OF LOW 8K
*
* SET SO THE LOADER PUTS CODE IN CPU RAM AS USUAL
*
CPURAM LI   R0,>DDC0  >DDC0 IS OPCODE OF 'MOVB R0,*R7+'
       MOV  R0,@>24B6 AT >24B6, IN THE E/A LOADER ROUTINE.
       LI   R0,>DDE0  >DDE0 IS OPCODE OF 'MOVB @>20DB,*R7+'
       MOV  R0,@>24B8 ( >20DB IS THE RIGHT BYTE OF R0).
       RT             RETURN TO CALLING PROGRAM
*
* SET SO THE LOADER PUTS CODE IN GRAM MEMORY INSTEAD
*
GRAM   LI   R0,>0460  >0460 IS OPCODE FOR BRANCH
       MOV  R0,@>24B6 REPLACE THIS FOR OLD INST AT >24B6
       LI   R0,GRMW   GRMW IS ADDRESS OF OUR ROUTINE
       MOV  R0,@>24B8 REPLACE THIS FOR OLD INST AT >24B8
       RT             RETURN TO CALLING PROGRAM
*
*--------------------------------------------------------------*
* THE 'GRMW' ROUTINE BELOW WILL BE EXECUTED IF THE 'GRAM'      *
* ROUTINE ABOVE HAS BEEN EXECUTED.  R0 CONTAINS THE WORD       *
* TO BE WRITTEN TO THE ADDRESS IN R7.                          *
*--------------------------------------------------------------*
*
GRMRD  EQU  >9800 GROM READ DATA
GRMRA  EQU  >9802 GROM READ ADDRESS
GRMWD  EQU  >9C00 GROM WRITE DATA
GRMWA  EQU  >9C02 GROM WRITE ADDRESS
*
SAVGR  DATA 0  WORD WHERE GROM ADDRESS IS SAVED
*
* SAVE CURRENT GROM ADDRESS
*
GRMW   MOVB @GRMRA,@SAVGR   GET FIRST BYTE
       NOP                  WAIT
       MOVB @GRMRA,@SAVGR+1 GET SECOND BYTE
       DEC  @SAVGR          CORRECT FOR AUTO INCREMENT
*
* REPLACE IT WITH NEW GRAM WRITE ADDRESS
*
       MOVB R7,@GRMWA MOVE MSB OF R7 (CONTAINS LOAD ADDRESS)
       SWPB R7        SWAP MOST AND LEAST SIGNIFICANT BYTES
       MOVB R7,@GRMWA MOVE LSB OF R7 (REST OF LOAD ADDRESS)
       SWPB R7        RESTORE R7 TO ORIGINAL CONDITION
       INC  R7        INCREMENT R7 FOR FIRST BYTE OF WORD
*
* WRITE FIRST BYTE TO GRAM
*
       MOVB R0,@GRMWD MOVE 1ST BYTE TO GRAM WRITE DATA ADDR
       SWPB R0        SWAP MSB AND LSB OF R0
*
* WRITE INCREMENTED GROM ADDRESS
*
       MOVB R7,@GRMWA MOVE MSB OF R7 (WITH LOAD ADDRESS)
       SWPB R7        SWAP MOST AND LEAST SIGNIFICANT BYTES
       MOVB R7,@GRMWA MOVE LSB OF R7 (REST OF LOAD ADDRESS)
       SWPB R7        RESTORE R7 TO ORIGINAL CONDITION
       INC  R7        INCREMENT R7 FOR SECOND BYTE OF WORD
*
* WRITE SECOND BYTE TO GRAM
*
       MOVB R0,@GRMWD MOVE 2ND BYTE TO GRAM WRITE DATA ADDR
       SWPB R0        RESTORE R0 TO ORIGINAL STATE
*
* RESTORE OLD GROM ADDRESS
*
       MOVB @SAVGR,@GRMWA   WRITE FIRST BYTE
       NOP                  WAIT
       MOVB @SAVGR+1,@GRMWA WRITE SECOND BYTE
*
* CONTINUE EXECUTING THE E/A LOADER
*
       B    @>24BC   AFTER MOVB @>20DB,*R7+ IN E/A LOADER
*
* STOP ASSEMBLY AND INDICATE START ADDRESS
*
       END  GRAM     START EXECUTION IN THE GPL LOADER MODE
```

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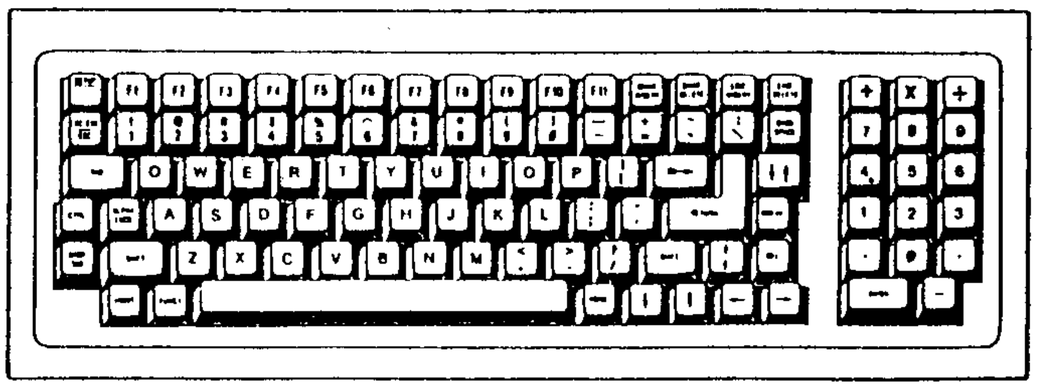

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+S&H

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* Separate number pad and cursor arrow keys.

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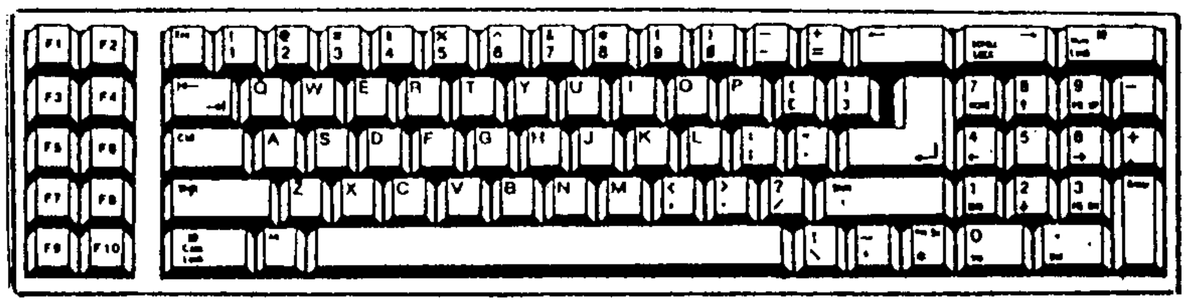

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GPL ASSEMBLER UPDATE—

(Continued from Page 26)

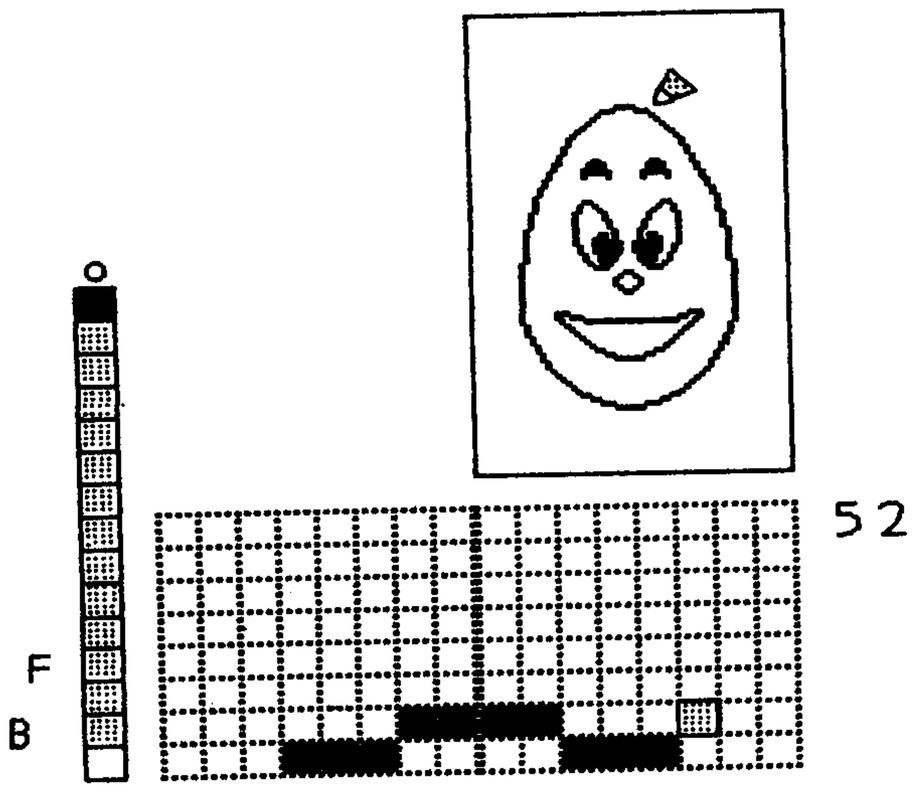
CPU RAM, *all* GRAMS are available for user programs. The BEAXS disk must be in DSK1 when the LAR file is loaded. With the MG GRAM Kracker, the 1 Load Module option is used with filename DSK1.LAR. With MAXIMEM (reviewed June 1986), the Option 5 loader of the resident E/A can be used to load DSK1.LAR. (The switch is set to MAXIMEM before loading GPL files.)

Other GRAM emulating devices may not allow direct loading of the LAR file. If either the E/A or TI-Writer module is loaded into a device, the Option 5 or utility loader can be used to load LAR. Once program control is transferred to LAR, of course, GRAM 3 becomes available for user programs. Horizon RAMdisk users with the John Johnson MENU ROS can use Funlwriter's utility option to load LAR, and there are other ways it can be loaded with other configurations.

In addition to making GRAM 3 available, use of the LAR program allows file errors and leaving the Load and Run screen without loss of GPL mode. However, if Option 4 (RUN) is used the object program must be reloaded to load additional GPL files—load all files into GRAM and CPU RAM before executing any program.

Readers who wish to contact Dr. Bagnaresi directly may do so by writing to: Paolo Bagnaresi, Via J.F. Kennedy 17, 20097 San Donato Milanese, Italy

CHARAMAT is a graphics development tool for Extended Basic programmers. It consists of an editor and 16 support routines all written in assembly language. The editor performs the following four functions at the same time:



* Allows you to draw smoothly within a rectangular window, in which 8 times 14 characters of Extended Basic are shown without spaces in between. In other words, you draw an instance of size 64 times 112 pixels.
* Displays the current character being drawn, magnified by a factor of 8. The left adjacent character is also displayed.
* Shows the ASCII code of the current character.
* Shows the colors of the current character. Colors can also be changed with the editor.

The editor has many additional features. It can, for instance, be used in debugging an Extended Basic program. - The 16 support routines allow use of the computer's memory for the storage of graphics data and perform data transfer to disk with assembly language speed. They open a new dimension to programmers interested in print graphics or screen animation. - The editor is easy to use and makes short work out of creating Extended Basic graphics.

$39.90 Requires 99/4A, TI Extended Basic, 32K, disk.

PRINT DESIGNER allows full use of the graphics capabilities of the Micronics SG-10 and NX-10 printers. It prints in three modes (compare the flower designs):

(1) single density
(2) double density horizontally and vertically
(3) quadruple density horizontally and double density vertically

Pictures are first drawn for print modes (1) and (2). Next a special routine can be used to double every pixel horizontally and make the picture ready for print in mode (3). The design can then be refined anywhere you want. A picture may have up to 1920 pixels horizontally and is limited vertically only by what fits on a disk. Use with GRAPHX, TI-Artist or our own graphics design program, BIGCHAR, which is included. Produce fancy letterheads and labels, fill the Christmas and New Year days creating a full page picture, or just print your GRAPHX or TI-Artist screens in double density format.

$29.90 Requires 99/4A, TI Extended Basic, 32K, disk, SG-10 or NX-10.
Two disk drives are required for use with GRAPHX or TI-Artist.

This ad was all made with PRINT DESIGNER and an NX-10 (using Basic for the text).

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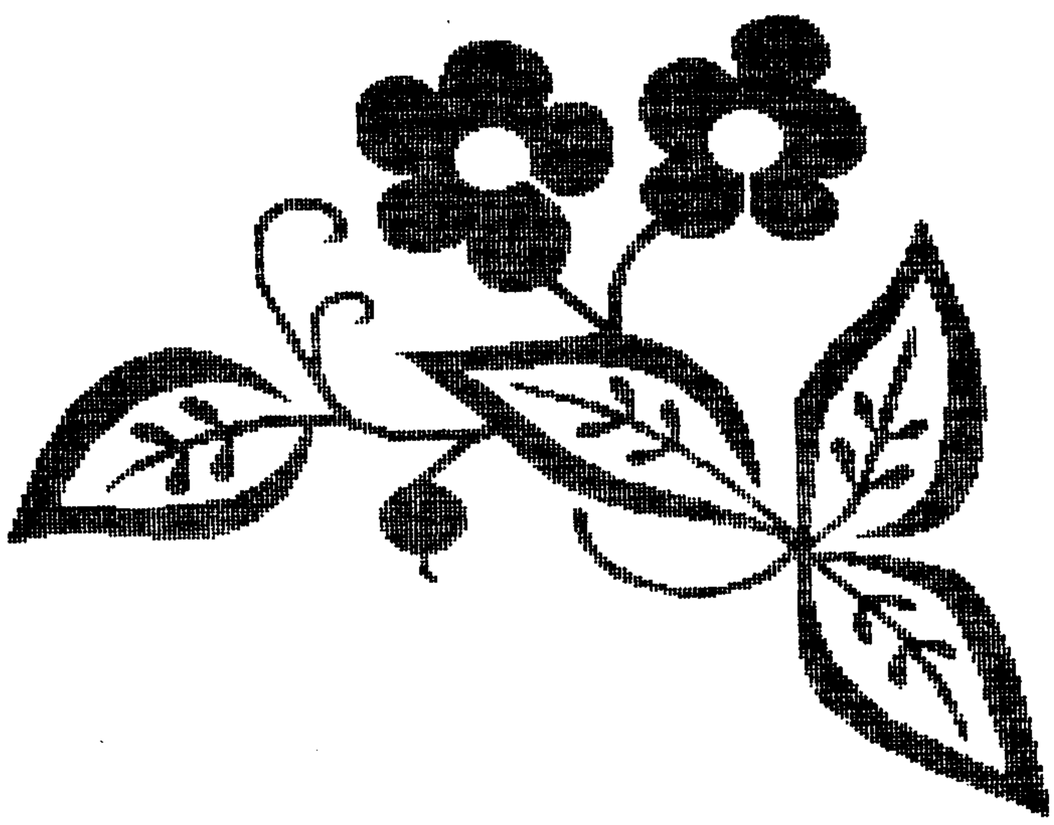

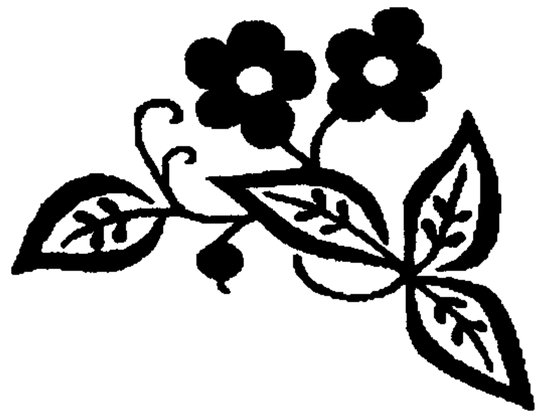

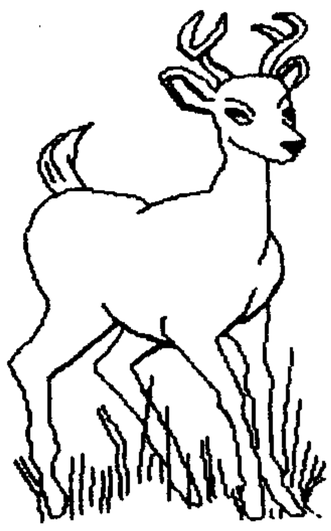

Myarc demonstration of 9640 highlights Chicago's TI-Faire

By JOHN KOLOEN

No matter where he goes, Lou Phillips is surrounded.

The president of Myarc Inc. and chief drumbeater for the company's much-discussed 9640 computer, Phillips is accustomed to spending hours fielding questions from TI users. There seems to be no end to the number of questions he takes on, whether they are asked by visitors to this company's booth on an exhibit floor or behind a podium in a packed conference room. Always there is patience in his voice, no matter how many times he hears the same question. And always he is animated when he speaks about his company's products, particularly the 9640, dubbed the Geneve ("it's just a catchy name," Phillips insists).

Trying to visit with Phillips requires patience. It is not uncommon for a ring of people three deep to surround his booth, each person waiting to get a question or comment. The wait can last a half-hour. Phillips seldom gives a yes-or-no answer to even the simplest question. And his listeners seem to like it that way.

Unlike last year's Chicago TI Faire, at which a demonstration of Myarc's computer was promised but never materialized, this year Phillips brought along "the first production board" of the 9640. The board, which was fitted into a Peripheral Expansion Box, included 512K of dynamic RAM, a Texas Instruments 9995 microprocessor, a boot ROM, a high-speed, no wait state static ROM for storing the code for floating point arithmetic and to display images on the screen, a real time clock and the same sound generator chip as used in the 4A. The board uses the same 9901 chip as in the 4A as an interrupt controller. A 9938 chip, produced jointly by Microsoft and Yamaha, with 128K of DRAM, is also on the board. Connectors include an 8-pin DIN connector for video, five pins of which are the same as the composite video connector used on the 4A. Users will thus be able to use their present monitor with the 9640. The remaining three pins are for RGB blue and green and the RGB synch signal. A jumper is used for the red signal. A user will be able to select RGB or composite display at any time. The board also includes ports for a mouse, joystick and IBM compatible keyboard. The only things not supported by the board is a cassette port and cartridge port.

The built-in mouse interface is compatible with the Commodore Amiga mouse. The RGB connector is also Amiga compatible. The joystick port is the same as used on the 4A.

The software bundled with the 9640 includes a disk operating system that is similar to MS-DOS 2.1. Commands are virtually "the exact same," Phillips said. Also included is Advanced BASIC by Myarc. Patches for TI-Writer and

In a crowd

Lew Phillips, second from right, was in his element at Chicago's TI Faire. The president of Myarc Inc. demonstrated his company's new computer, the 9640, at the event.

software to save cartridges to disk will also be provided. The format of the cartridge-saving software is the same as used by Miller Graphics' GRAM Kracker. Thus, those who have saved cartridges to disk using GK will be able to load the software into the 9640.

According to Phillips, production of the board is being held up because the gate array is not available. "This is the chip that should have been in long ago, and it's one that we custom-designed ourselves. It has 84 pins on it, 21 on a side. The gate array contains all the logic, the dynamic RAM refresh logic, the wait state logic so we can run this machine at various speeds.... It also handles the memory mapping

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9640 IN CHICAGO—

(Continued from Page 30)

that the 9995 uses to access more than 64K."

Phillips described at length the features of the 9938 chip, dwelling on its graphics and display capabilities. "It's really the most exciting feature of this board," he said.

In addition to a variety of commands, including draw, search, fill and an animation mode, are its graphics modes. While the 4A has four graphics modes: graphics 1 mode with 32 columns, a 40-column text mode, a multicolor mode and a high resolution graphics mode, the 9938 offers a bit-mapped graphics mode that allows users to control each pixil on the screen. The chip's high resolution mode displays 512x424 lines and in this mode any pixil may be any one of 16 available colors. Another mode is a 256x212 display allowing the user to select any of 256 colors for any bit on the screen.

Phillips says the 9640 supports a variety of existing disk controller and RS232 cards, including those manufactured by Texas Instruments, Myarc Inc. and CorComp Inc. The Horizon RAMdisk by Horizon Computers Ltd. and Myarc's RAMdisk card are also supported.

While it shouldn't come as a surprise to anyone, Phillips noted that he's not involved in the TI market to make a killing, and doesn't expect to make one with the 9640.

"The attitude we've taken all along is that one is certainly not going to make a fortune in this market anymore. The early '80s are long gone," he told the hundreds who listened to his presentation in Chicago.

Phillips was assisted in his presentation by Paul Charlton, developer of the Fast-Term terminal emulator, and J. Peter Hoddie, developer of Font-Writer and other software. Both

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The exhibit hall

Hundreds of TI users kept vendors busy throughout the day at the Chicago TI Faire.

9640 IN CHICAGO—

(Continued from Page 32)

are involved in the Myarc computer project.

Hoddie is modifying TI-Writer for 80-column display, which he demonstrated. Among the features of Hoddie's TI-Writer is the addition of a View File command that allows the user to look at a D/V or D/F 80 file on disk without having to load it into memory. Thus, a user would be able to work on a document in memory and look at a second document without erasing the first document from memory.

Other modifications may include moving the status line from the top to the bottom of the screen, a Show Directory command that will offer the option of listing only text files to the screen and the ability of the user to determine how much memory to devote to a text buffer. Mouse support for the cursor is also under consideration. The editor and formatter will reside in memory simultaneously.

Hoddie is also toying with the idea of creating a windowing capability that would include 255 columns. Text with 80 columns or less will be saved in D/V 80 format while text with longer lines will be saved in D/V 255, he said.

"Everything that is in TI-Writer is still there. You're not losing anything, but it's a lot faster," particularly with inserting and deleting functions, he said. The Find String function is also being changed so that it can be used to locate all occurrences of a string, rather than just the first occurrence. "It will work like the Replace String function," he said.

Phillips said that Mack McCormick is working on an 80-column patch for Microsoft Multiplan and Pecan Systems is supporting UCSD Pascal software, version 4.21. This will allow users to compile Pascal, Fortran 77, Cobol and BASIC. Myarc is also developing a two-pass BASIC compiler. Pike Creek Computers, producers of the TI-Count package of business programs, is developing business software for the system.

Charlton is modifying his Fast-Term terminal emulator for the new machine. Inscebot, which markets TI-Artist, is developing a MacPaint equivalent and windowing software, Bright Data is developing professional business accounting software that will print reports while simultaneously allowing data entry, and Clint Pulley, developer of C for the TI, is developing a C Compiler. Asgard Software, DataBioTics and other companies are also developing software for the new machine, Phillips said. Asgard is working on a multi-tasking operating system similar to the DX10 operating system used on TI mini-computers.

Computer on a card

Lou Phillips holds the 9640 computer in his hands. The single board is virtually a computer on a card.

"We feel that this will be a well-supported machine by the fact that it runs most 99/4A software. It will immediately start off with thousands of pieces (of software)," Phillips said. "As we all know, when Atari released (its) 520 they didn't even have a BASIC interpreter. But, painful as it was, we finally have our own BASIC interpreter, version 2.11, and we've been getting quite a few calls with raves as far as what it can do versus TI's Extended BASIC. And since our Extended BASIC 3 is based upon that we think it will be virtually bug-free or close to it on first release."

Existing 99/4A software that uses a keyscan method other than the standard console keyscan routine, such as Fast-Term and 4A-Talk, won't be compatible with the 9640, Phillips said. Also, some software won't work because of the timing used in addressing the VDP memory. "When we turn the machine on in the 4A mode, we look exactly like a 4A. Everything is memory mapped in the same place."

Noting the popularity of Lotus 1-2-3 in the PC and business market, Phillips said "that's the next area of concentration, a Lotus 1-2-3 look-a-like so that you can use your data disk from your IBM-PC and plug it in this machine."

Phillips said that benchmark tests between IBM-PCs using BASIC and the 9640 using BASIC 3 "we're running about 50 percent faster on some things than the PC. Considering the fact that all of our numbers are in double-precision floating point, I think that's saying something. What we're talking about is a machine that is about 50 percent more powerful than the PC and comes with the capability of addressing two megabytes."

Although the 9640 will be able to use files written using a PC, Phillips stressed that PC programs won't run on the machine, "because an 8088 is not a 9995. I want to have data file compatibility, but assembly language programs won't work. I would say that if anything we want to be compatible from the point of view of compilers and things like that."

"For example, there's a big difference between the TI BASIC interpreter and the Microsoft BASIC. In many respects the TI interpreter is much more powerful than the IBM, in its structure and its capability of interfacing with assembly language pro-

(See Page 36)

Introducing
the greatest thing for 99/4A computer graphics since, well, the introduction of the 99/4A!

For years TI-99/4A owners have looked longingly at programs such as Printshop (R) and Newsroom (R) for Apple, Atari and Commodore computers. We all have wished we could do the things that Fontrix (R) does on the IBM PC. Well, now there is a program for the TI-99/4A that does these things, and because of the special features of the 99/4A, does a whole lot more.

Font Writer, by J. Peter Hoddie (a master programmer — author of Pre-Scan it! and system software for the Myarc Geneve computer) makes text and graphics come truly together for the first time on the 99/4A. Font Writer will combine any TI-Writer text files, TI-Artist or CSGD fonts, and TI-Artist instances the way you want them to make an otherwise drab report, letter or article come alive!

Font Writer, like TI-Writer, is more then one program. The first program in the package is Font Editor — a program that will let you edit existing TI-Artist or CSGD fonts, or create new ones from scratch. Font Editor contains an innovative editing window, dozens of powerful menu-selectable utilities, and supports even more powerful user-defined macro drawing commands for drawing often used figures with a single command. As powerful as it is, like all Asgard products it's designed to be friendly and easy-to-use. It is so flexible that you can even edit TI-Artist instances.

The real power of Font Writer, and it's most innovative part, is the Text Formatter. This program accepts standard TI-Writer files with virtually every imbedded text formatting command supported by TI-Writer, along with many new such commands for graphics support, to allow you to integrate text fully with graphics easily. Text Formatter accepts new commands for printing text in different fonts, including pictures and other graphics, and more. This easy-to-use program is as simple to use as TI-Writer, yet does so much more.

The last, but not in any way least program in the Font Writer package is a powerful organization tool for graphics files. If you have ever tried ordering and maintaining TI-Artist fonts, slides, instances and pictures, you will later wonder why you ever tried without it.

Font Writer requires Extended BASIC, 32K, and a disk drive system. TI-Writer and TI-Artist are highly recommended. Extensive documentation by Walter Howe is included. Available for a suggested price of $24.95 from official Asgard Software dealers, from Teledata*Guide on Compuserve (page TDG-4), by sending Source Mail to TI9720 on Source, or directly from Asgard. All major credit cards accepted.

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Not all banks there will exchange currency. MBank in downtown Austin offers bank drafts in 21 currencies. You have to pay for it with cash or a cashier's check in U.S. funds, plus the fee which is added on to pay for the service.

Or, for the amount plus $2, you can buy an international money order at the post office (in Austin, at only the Downtown and University of Texas stations). Not all countries take them—"Pakistan won't"—said a postal spokesperson, but for western, developed nations there is generally no problem.

(By the way, your local bank and/or post office should be able to direct you to the nearest counterpart which deals in international currency).

All the postal money orders go to St. Louis, Missouri, to be converted into the appropriate currency. This adds to the mailing time and is one reason some persons would just as soon pay the higher bank fees.

Ron Becker of the Austin post office noted that, if the person on the receiving end has a problem or if the money order is lost, the person buying the money order can fill out a form 6684 at the post office to check into this. He says this cannot be done until 30 days after the money order is issued to give it a chance to clear.

Persons buying money orders should keep their receipts in case a problem occurs. If you make a photocopy of your receipt, you can send it to the person in the other country.

Becker says that recipients in Guatemala and Nicaragua seem to have trouble cashing U.S. money orders lately.

Reviewed in MICROpendium

1984

February: B-1 Nuclear Bomber, Tandon TM-100 Disk Drive, Void, Beanstalk Adventure, Microsurgeon, On Gaming, Database 500
March: Star Trek, Escape From Balthazar, Garkon's Getaway, Sky Diver, Mail-Call, Prowriter 8510 Printer
April: Monthly Budget$ Master, Budget Master, Home Budget, Thief, Donkey Kong, Khe Sanh
May: Companion Word Processor, Q*Bert, Mad-Dog I & II, Programs for the TI Home Computer
June: Creative Expressions Accounts Receivable/Accounts Payable, CDC 9409 Disk Drive, Starship Concord, Lost Treasure of the Aztec, ASW Tactics II
July: Theon Raiders, Introduction to Assembly Language for the TI Home Computer, Game of Wit, Pole Position
August: TE-1200, Tower, Galactic Battle, Galaxy
September: Wycove Forth, 99/4 Auto Spell-Check, QUICKCOPYer, Wizard's Dominion, Anchor Automation Mk XII Modem
October: Killer Caterpillar, ZORK I, Defender
November: 9900 Disk Controller Card/Manager, Super Bugger, Transtar 120S printer, Floppy-Copy, Data Base-X
December: Gravity Master, Data Base Manager System, Learning 99/4A Assembly Language Programming

1985

January: Super Sketch, Foundation Computing 128K Card, PTERM-99, TI-Runner
February: Super Extended BASIC, Beginning Assembly Language for the TI, ZORK II
March: Morning Star Software CP/M Card, WDS/100 Winchester Disk Drive, Sketch Mate, BMC Color Monitor
April: 9900 Micro Expansion System, Disk + Aid, Gemini 10X-15X
May: Character Sets and Graphics Design, Draw 'N Plot
June: GRAPHX, DATA BASE I
July: Acorn 99, Advanced Diagnostics
August: Model Dow-4 Gazelle, TI-Artist, PC-KEYS, Not-Polyoptics' Bankroll
September: Midnite Mason, Myarc 32K/128K Card, GRAPHX Companion
October: 4A/TALK, Extended BASIC II Plus, XB Detective, Console Writer 2.1
November: Foundation Z80A/80-column cards, 9900BASIC, Adventure Editor
December: Display Enhancement Package, Triple Tech

1986

January: BITMAC, Starcross
February: Night Mission, Peripheral Diagnostic Module, BA-Writer
March: Super Duper, Tunnels of Doom Editor, Business Graphs 99
April: U.S. Open Tennis, PRBASE
May: 4A Flyer, GRAM Kracker, Artist's Companion
June: Myarc Disk Controller Card, Maximem
July: Horizon RAMdisk, Old Dark Caves, Funlwriter, TI99/4A Macro Assembler
August: JOYPAINT 99, GPL Assembler, TI99/4A INTERN, GPL Linker
September: Mechatronic 128K card
October: TI-Forth Utilities, CorComp Memory Plus

9640 IN CHICAGO—

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gramming. On the IBM, it's horrendous. On the TI you just CALL LOAD, CALL LINK."

However, when asked about the likelihood of an IBM compatibility card, Phillips said, "Once you have an IBM keyboard like that I think it's down the road a short time from now. Today, though, we're selling 9640s and we want to support that. It's a very powerful and very capable computer."

Holding up the 5 x 7-inch board containing the 9640, Phillips said, "it's the equivalent of an IBM-PC motherboard, it's the equivalent of an EGA graphics card, it's the equivalent of an MS mouse interface card and it's the equivalent of a Quadram card minus the parallel and serial interface. I think we've done one of the finest jobs in terms of packaging a product in the entire personal computer field."

DOS offers insurance to programmers

In what was described as "a move to develop quality software for the TI99/4A," Disk Only Software (DOS) announced the availability of major medical and life insurance for its programmers.

In an agreement reached with a national medical insurance provider, Blue Cross and Blue Shield, DOS is permitted to provide full medical coverage for its employees working 20 or more hours per week developing software or hardware for the TI99/4A. A life insurance policy is automatically provided for persons joining the medical plan.

"The availability of medical and life insurance will now enable programmers, students and businessmen to take advantage of benefits never before seen in TI cottage industries," said Jeff Guide, president of Disk Only Software. "Besides receiving top royalties, employees will now be able to select an insuance option. In today's world of high medical costs DOS can provide an added incentive to those employeed by us," Guide said.

Disk Only Software is looking for qualified programmers and programs that will be marketed in the TI community worldwide, Guide says, adding that DOS provides top royalties for programs developed.

For more information, write to Disk Only Software at P.O. Box 244, Lorton, VA 22079 or call 1-800-446-4462 plus 89735 at the tone (touch tone required) or 301-369-1339. Guide asks that programmers provide information on either programs they have available or their areas of expertise.

TIBBS board on line in Sacramento area

Jim Goldsberry of Sacramento, California, announces that he has on line a new TIBBS board in the Greater Sacramento area.

The board, "TI'WIRE" supports 300 and 1200 baud and operates 24 hours a day at (916) 685-4068 in Elk Grove, California.

Goldsberry expressed appreciation for support from Ralph Fowler and Woody Large.

Buying from MICROpendium advertisers helps keep the TI market going strong!

Part 3 in a series on computer graphics

Displaying, scaling and moving shapes depends on coordinates

By DARREN LEONARD

At the end of last month's article, I promised to provide you with a complete program that incorporated all I have covered to date so you may see how all these things can work together.

The program is 180 lines long and will draw a square on the screen. It will then allow you to change the size or move it around the screen as you please.

Type the program in at this time and be careful that you do not make any typographical errors.

Save it to disk (or cassette) and then type "RUN".

The screen will clear and a menu will appear:

1-DISPLAY SHAPE
2-SCALE SHAPE
3-MOVE SHAPE
4-QUIT
ENTER YOUR CHOICE

If you select 1 to display shape, the screen will clear and a square will be plotted in the center of the screen with coordinates (20,20) (20,-20) (-20,-20) (-20,20). (See Fig. 4.) The center of the square will be the center of the screen (0,0). Notice that the program connects points in a clockwise manner, starting with point 1 and connecting it to point 2, then connecting point 2 to point 3, etc. Programs of this nature will always connect points in ascending order. The last step connects the last point (in this case No. 4) to the first point, thus completing the square.

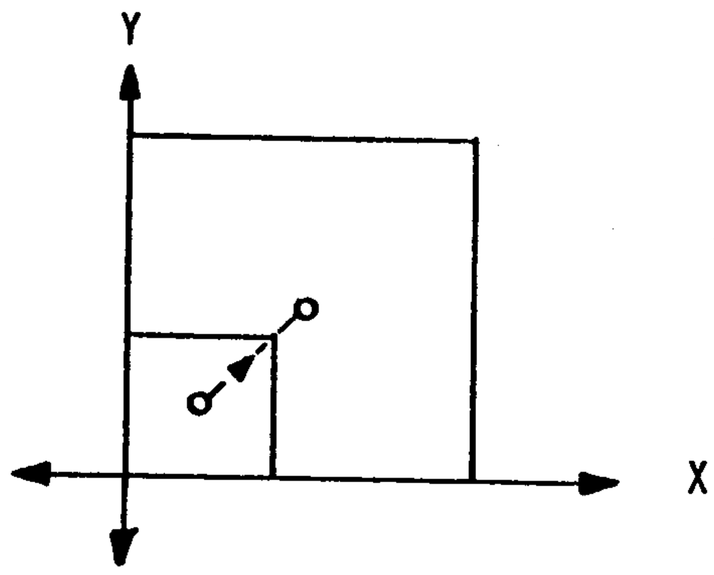
Press any key to return to the menu. This time select 2, for scaling shape. The program then asks you to enter an SF (scale factor). The size of the scale factor determines the size of the shape. For example, if you select SF =.5 (which is equal to the fraction ½), the new shape will be one half the length of the old. Thus the new shape will have coordinates (10,10) (10,-10) (-10,-10) (-10,10). Notice that the center is still at (0,0).

When the menu appears, select 1 to display the shape. A square will then be plotted in the center of the screen. Press any key to return to the main menu. Select 2 for scale shape again, and choose the SF of 3 this time. This will make the length of the new square three times that of the old square and 1.5 times the size of the original square. The new coordinates will be (30,30) (30,-30) (-30,-30) (-30,30) and the center will still be at (0,0). At the main menu select 1 to display the enlarged square.

As long as the center is at (0,0) before you scale the shape, the center will remain at (0,0). However, if the center of the square (or any shape, for that matter) is not at (0,0), the scaling transformation will move the center of the shape a distance proportional to SF.

For example, if the center of the square is at location (X,Y) as in this figure:

Fig. 1

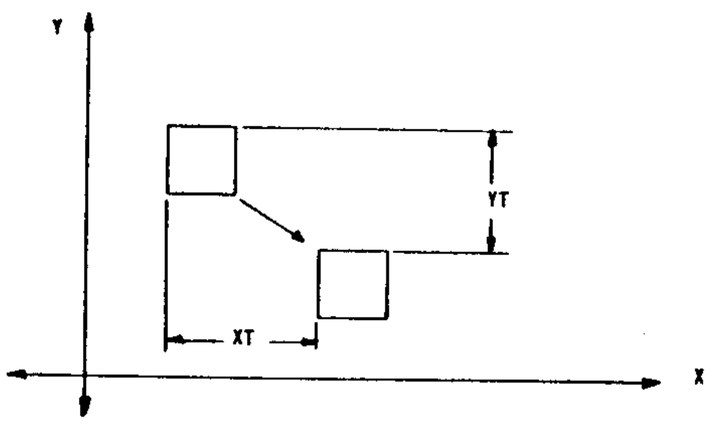


The new coordinate of X will be:
$X=(SF)*(X^2+Y^2)*ARCCOS(X/X^2+Y^2))$
and the new Y coordinate will be:
$Y=(SF)*(X^2+Y^2)*ARCSIN(Y/(X^2+Y^2))$

If you are familiar with trigonometry you can prove this to yourself, but you needn't to maintain continuity.

When you are at the main menu, select 2 and use a scale factor of .333. This will produce a square half the length of the original square. When the main menu reappears, select 3 to move shape. It will prompt you for two numbers, first XT and second YT. In Fig. 3, the square is going to be moved (translated) by the distance XT and YT.

Fig. 2



If XT is positive, the shape will move to the right. A negative XT will move the shape to the left.

A positive YT will move the shape up and a negative YT will move the shape down.

Remember that XT and YT are to be entered in number of pixels you wish to move the shape. Be careful to to exceed the dimensions of the screen.

When you return to the main menu, enter 1 to display the shape at its new position. You can keep moving the shape around the screen by selecting 3 to move followed by 1 to display as long as you like. You may even select 2 to scale the shape, but remember that the center will be translated if it is not at (0,0) to begin with.

When you tire of this, select 4 to quit. Then edit line 200 so that it will read

200 N = 3 !NUMBER OF DATAPOINTS

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DRAW AND MOVE A SQUARE

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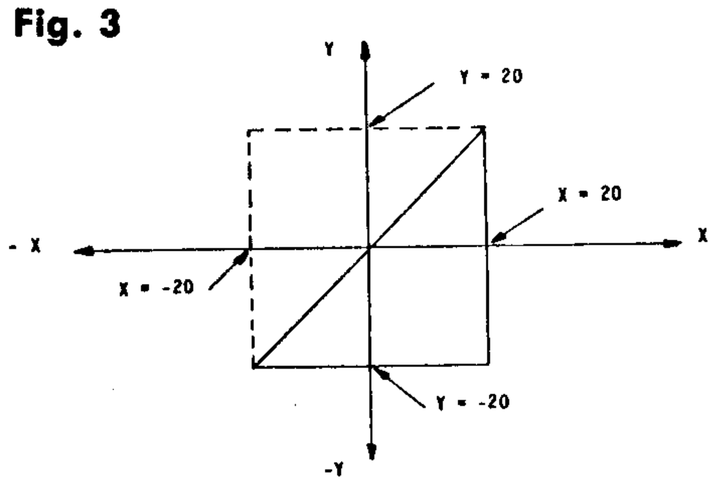
This effectively defines a triangle by eliminating the top left corner of the square. It will be a right triangle with two 45-degree angles. Run the program and select 1 to display the shape. You should recognize it to be the lower right of the square as illustrated in this figure:

Fig. 3



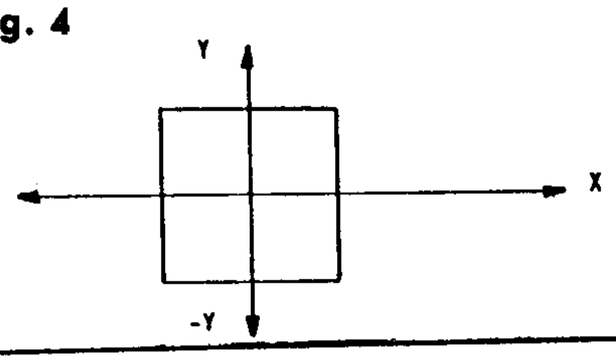
You may scale the triangle if you wish, and you may move it provided XT = YT.

Now for an explanation of the program. A copy of last month's article may be helpful here.

Line 140 dimensions the appropriate arrays for manipulation. These are the matrices discussed in the last article. You will notice that for the shapes used in this demonstration the matrices are not used exactly as they were introduced. Since this is a simplified application, you only need to use scalar multiplication and addition. A scalar is a number that is not included in a matrix; e.g. X is a scalar and X(Y) is a vector array. Technically, a scalar has no direction, whereas a vector does. Both have magnitudes. However, understanding of what a scalar is, is non-essential at this point.

Lines 200-240 establish the number of points and the coordinates of these points. Remember that (0,0) is the center of the screen. A(1,Z) is the X-coordinate and A(2,Z) is the Y-coordinate. Thus, the second point will be at (A(1,2),A(2,2)) and the third at (A(1,3),A(2,3)) and so forth. There are four points, and, if you take a second, might notice that a square is defined. To assist in your understanding, study this sketch:

Fig. 4



Lines 310-330 insert a dummy 1 into the datapoint array. This is not needed in this example, but will be used in more difficult things to come, so for now ignore it, but acknowledge its presence.

Lines 380-460 provide the title screen and the main menu.

It is important to take a second to consider how to handle the data. You could plot a line and store the values for the coordinates for each point on the line and then apply the transformations to each point every time you desire to alter the line or shape. Or, realizing that we need only define the endpoints of a line, and that most shapes without curves can be made by a series of lines, we can do transformations of the endpoints and connect a line between appropriate points using interpolations as discussed in the first article (June 1986).

Not only would this save some time from doing unnecessary calculations, it also produces smoother shapes since each point on the line is determined by approximation as to its closest point to a perfectly straight line drawn through the endpoints, whereas the other method merely transforms the points without regard to fitting them as closely as possible. If tis topic interests you, try various lines using both methods and prove it to yourself. However, we will limit our use to interpolation between transformed endpoints exclusively.

Lines 550-660 are used if the user selects to scale the shape. It prompts for a "scale factor" and then scales the shape in both the Y and X directions by the same scale factor. In other words, the shape is intact, but the size is changed. If you disired, you could prompt for two different scale factors,

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SX and SY, and multiply all the X coordinates by SX and all the Y coordinates by SY, thereby distorting the shape as well as changing the size, provided SY is not equal to SX. If you can program in BASIC, you should encounter minimal difficulty altering the program to do this.

After the scaling is done to the endpoints, the new coordinates are stored in the same matrix and control is given back to the main menu.

If the user chooses to translate the endpoints, lines 790-880 are executed. The user is prompted for the translation distances, XT and YT, and the program adds these to the coordinates of each datapoint. This is not a particularly difficult concept, so I will refer you to last months article and suggest that you study lines 840-870 very carefully. As the endpoint coordinates are translated, they are stored in the same position in the same array, and control is then passed back to the main menu.

If the hacker decides he or she would like to have the shape displayed on the screen, the subroutine at line 900 is called and bizzarre things begin to happen.

If you study this subroutine, you will notice that the algorithm for drawing a line. as discussed in article 1, is employed in several different forms. I am not going to explain this subroutine in depth at present since it is very confusing, but will give you an overview.

Basically, it connects the points starting with 1 to 2, then 2 to 3, 3 to 4 and finally 4 to 1. But when it is about to connect to points, it must determine which has greater values and sometimes switches them around (this is why it might start placing dots at 3 to connect to point 2) in order to fit a straight line. As it calculates the coordinates for each point, it calls the subprogram "PUTDOT" and plots that point on the screen, then it finds the next set of coordinates and plots them and so on.

If you are still fuzzy about what the program is doing, I would like to offer a suggestion that may assist you here as well as in understanding other programs.

Get a few sheets of quadrilateral (graph) paper and a few sheets of ordinary paper. On the graph paper, draw a vertical axis and a horizontal axis so that they meet in the center of the paper (this will be the center of your pre-1880 television). Now, on one other sheet of graph paper, list all of your variables across the top and space them equally. In this example, the top of your paper should have the following variables across the top:

A(1,1),A(2,1),A(1,2),A(2,2),A(1,3),A(2,3),A(1,4),A(2,4),XT,YT,S

Then draw vertical lines down to the bottom of the paper. Now you should have a column for each variable. Now place the current value of each variable in the top of the column. If there is no current value, use a zero. Now follow the logic of the program and with each step of the program use a calculator and determine what the new values of each variable will be. Enter these on the next horizontal row in the appropriate columns. If the program calls for a point to be plotted, use the graph paper with the coordinate axis and plot the points on it. By following the program like this, you should be able to grasp what is going on.

I find that this technique is very useful in writing as well as deciphering complicated algorithms, and I think you will find it a valuable tool as well.

ROTATION

Before we proceed, I would like to remind you that I am assuming that you have an elementary knowledge of geometry and can program somewhat in BASIC.

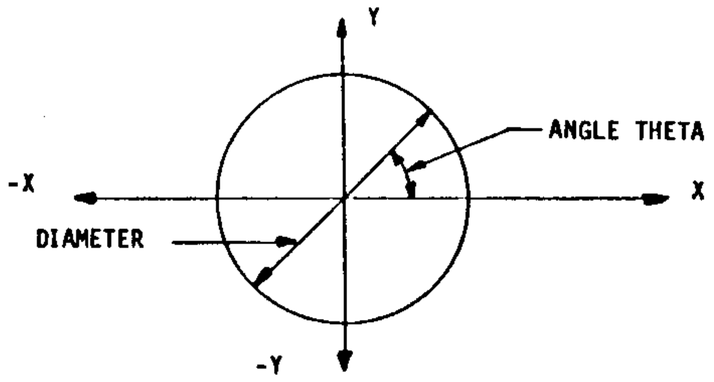
I also want to remind you that the 99/4A was not intended to be a CAD machine, and I am therefore limited as to what I can show you on this computer. My main purpose of this series is to illustrate *concepts* that will enable you to have a basic idea of how CAD works.

With this in mind, let us enter the realm of rotating a two-dimensional shape. As usual, we must review some math in order to use rotation.

Rotation is contingent on the sine and cosine trig functions. A simple understanding of these functions is necessaru for the remainder of the article, so a brief review follows:

Imagine a coordinate axis with circle of diameter *d* drawn around it. It would look something like this:

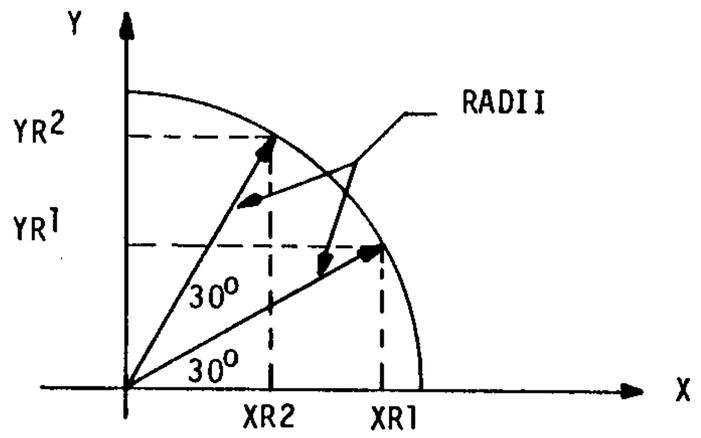
Fig. 5



Remember that the definition of the diameter of a circle is a straight line that connects two points on opposite ends of the circle and passes through the center of the circle. In a similar sense, a radius is a line that connects the center of a circle to any point on its circumference. The length of the radius is always half the length of the diameter and is always a constant for the same circle.

Now take a look at the top righthand corner of a cricle with two radii drawn at different angles from the X-axis.

Fig. 6



For the sake of argument, let us say that the length of the radii are one inch. So no matter where on the circle they are drawn, they will always be one inch long.

R1 is at 30 degrees from the X-axis and R2 is at 60 degrees from the X-axis. Exmaniation of the two radii yields that the coordinate distance of X is

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greater for R1 than for R2. Not surprisingly, the coordinate distance along the Y-axis is greater for R2 than for R1.

If you have read part one of this article, you may recall that, by pythagorean theorem,

$R^2 = X^2 + Y^2$

This means that for a given X, there can only be two values of Y that will give the coordinates of a point on the circle.

Both values of Y will be the same number, but one will be the negative of the other.

As you traverse the circle in a counterclockwise direction starting at the intersection with the positive X axis, a small table of what Y, X and the angle theta are doing:

As theta goes between 0 and 90 degrees, X is decreasing and Y is increasing.

As theta goes between 90 and 180 degrees, Y is decreasing and X is increasing in magnitude in the negative direction.

When theta is going from 180 to 270 degrees, X is increasing to zero (remember it is negative at 180 degrees) and Y is increasing in magnitude in the negative direction.

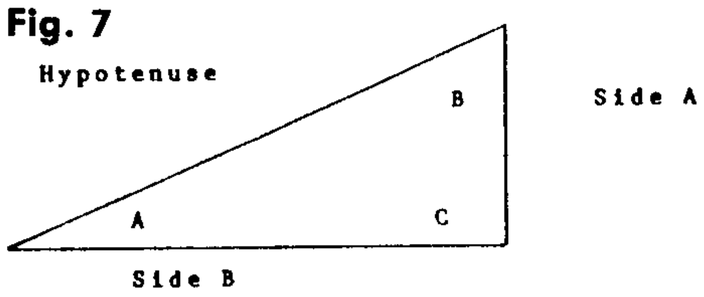
Finally, when the angle is going from 270 to 360 degrees, X is increasing to its maximum value and Y, since it is 0 at 270 degrees, is approaching zero.

You may realize that we need to determine the coordinate values of X and Y if we are to plot our point on the screen. Thus, we are attempting to determine the new values of X and Y for a given angle theta.

Fortunately, the trig functions of Sin and Cos do this with elegance.

Quick review of triangle terminology:

Fig. 7



The hypotenuse is the longest side of a triangle and is opposite of the largest angle. For our purposes, we need the definitions that follow.

SIN(A) is read as the sine of angle A and COS(A) is read as the cosine of angle A.

$$SIN(A) = \frac{\text{Length of Side A}}{\text{Length of Hypotenuse}}$$

$$COS(A(= \frac{\text{Length of Side B}}{\text{Length of Hypotenuse}}$$

Looking at the triangle, we will say that Side B is "Adjacent to the angle A" and Side A is "Opposite to the angle A." We will use the following abbreviations:

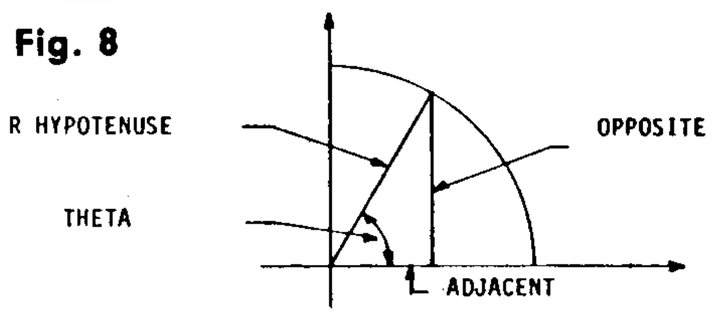
HYP = length of the hypotenuse
ADJ = length of the side adjacent to the angle
OPP = length of the side opposite to the angle

Thus $\frac{OPP}{HYP} = \frac{Y}{R}$ $SIN(A) =$

and $\frac{ADJ}{HYP} = \frac{}{R}$ $COS(A) =$

Before you panic about the Y/R and the X/R look at this illustration.

Fig. 8



Y is really the side opposite of the angle and X is adjacent to the angle. R is the radius and is the hypotenuse of the triangle.

As the angle theta increases, SIN(THETA) increases and Y becomes larger. This is obtained by rearranging the equation to give Y = R*SIN(THETA). Similarily, X = R*COS(THETA) and as theta increases, X decreases. Believe it or not, negative signs are taken care of and this is the foundation of

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our solution. If you have a calculator, plug some value into it using the Sin and Cos functions and see for yourself that this is true. You may use your 99/4A if you prefer, but remember to convert from degrees to radians before calling the SIN or COS function.

The circle routine in article one may aid in your understanding of this concept, but the best way is to play with some numbers and your computer (or calculator) and prove it.

The rotation procedure will then construct a temporary radius from the endpoint to the center of the screen and wil rotate this point on a circle with a radius equal to the distanc of the point from the center of the screen and then reverse the process a bit to find the new X and Y values for the rotated point.

Translation and Scaling

```
100 ! TRANSLATION AND SCALING
110 ! DARREN LEONARD
120 ! 10/17/86130 !
140 DIM A(3,15),TR(3,2),SC(2,2)
150 ! ****************************
160 ! THIS SECTION DEFINES THE
170 ! CORNERS OF A SQUARE.
180 ! CHANGE THE VALUES TO CHANGE
190 ! THE SHAPE OF THE SQUARE
200 N=4 !NUMBER OF DATAPOINTS
210 A(1,1)=20 :: A(2,1)=20
220 A(1,2)=20 :: A(2,2)=-20
230 A(1,3)=-20 :: A(2,3)=-20
240 A(1,4)=-20 :: A(2,4)=20
250 !****************************
260 !THIS SEGMENT PLACES A DUMMY
270 ! 1 IN THE 3RD ELEMENT OF A
280 ! MATRIX.
290 ! USING N AS THE # OF DATAPOINTS300 !
310 FOR PN=1 TO N !LOOP FOR EACH POINT
320 A(3,PN)=1
330 NEXT PN340 !
350 ! ****************************360 !
370 !REM CLEAR SCREEN AND GIVE OPTIONS
380 CALL CLEAR
390 PRINT "1-DISPLAY SHAPE"
400 PRINT "2-SCALE SHAPE"
410 PRINT "3-MOVE SHAPE"
420 PRINT "4-QUIT"
430 INPUT "ENTER YOUR CHOICE":C
440 IF C<1 OR C>4 THEN 380
450 ON C GOSUB 980,490,710,1400
460 GOTO 380
470 .! END OF MAIN PROGRAM
480 !****************************
490 ! SCALING SUBROUTINE
500 ! MATRIX A(2,N) CONTAINS THE CURRENT
510 ! N DATAPOINTS AND WILL BE SCALED
520 ! BY THE FACTOR OF S AND THE
530 ! NEW COORDINATES OF THE DATAPOINTS WIL
L
540 ! BE PUT BACK IN A()
550 CALL CLEAR
560 PRINT "ENTER SF"
570 PRINT "S<1 WILL DECREASE SIZE"
580 PRINT "S>1 WILL INCREASE SIZE"
590 PRINT "S=1 HAS NO EFFECT"
600 PRINT
610 INPUT "WHAT S?":S
620 FOR V=1 TO N
630 A(1,V)=A(1,V)*S
640 A(2,V)=A(2,V)*S
650 NEXT V
660 RETURN
670 !****************************680 !690 !
700 !
710 !****************************
720 ! TRANSLATION SUBROUTINE
730 ! TRANSLATES THE COORDINATES OF THE DAT
APOINTS
740 ! IN THE MATRIX A BY THE XT AND YT
750 ! AND PLACES THE NEW COORDINATES
760 ! BACK IN A770 !780 !
790 CALL CLEAR
800 PRINT "ENTER DT'S"810 !
820 INPUT "ENTER XT":XT
830 INPUT "ENTER YT":YT
840 FOR T=1 TO N
850 A(1,T)=A(1,T)+XT
860 A(2,T)=A(2,T)+YT
870 NEXT T
880 RETURN
890 !****************************
900 !SUBROUTINE TO PLOT THE CURRENT DATAPOI
NTS
910 ! PLOT THE N DATAPOINTS IN THE MATRIX A
920 ! AND CONSTRUCT A LINE TO CONNECT
930 ! SUCCESSIVE POINTS BY DETERMINING THE
940 !SLOPE AND INTERPOLATINNG
950 ! AS THE COORDINATES FOR EACH POINT ARE
 DETERMINED
960 ! THEY ARE PLOTTED ON THE SCREEN
970 !BY USING THE PUTDOT SUBROUTINE980 !
990 CALL CLEAR
1000 FOR P=1 TO N
1010 IF P=N THEN 1070
1020 Y1=A(2,P)
1030 Y2=A(2,P+1)
1040 X1=A(1,P)
1050 X2=A(1,P+1)
1060 GOTO 1110
1070 Y1=A(2,P)
1080 Y2=A(2,1)
1090 X1=A(1,P)
1100 X2=A(1,1)
1110 IF X1=X2 THEN 1220
1120 IF Y1=Y2 THEN 1290
1130 SLOPE=(Y2-Y1)/(X2-X1)
1140 B1=INT(MIN(X1,X2))
1150 B2=INT(MAX(X1,X2))
1160 FOR X=B1 TO B2
1170 Y=INT(SLOPE*X+.5)
1180 FJ=X :: GJ=Y
1190 CALL PUTDOT(FJ,GJ)
1200 NEXT X
1210 GOTO 1360
```

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TRANSLATION AND SCALING—

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```
1220 C1=INT(MIN(Y1,Y2))
1230 C2=INT(MAX(Y1,Y2))
1240 FOR ZZ=C1 TO C2
1250 Z=ZZ
1260 CALL PUTDOT(X1,Z)
1270 NEXT ZZ
1280 GOTO 1360
1290 D1=INT(MIN(X1,X2))
1300 D2=INT(MAX(X1,X2))
1310 FOR ZX=D1 TO D2
1320 OP=ZX
1330 YT=Y1
1340 CALL PUTDOT(OP,YT)
1350 NEXT ZX
1360 NEXT P
1370 CALL KEY(0,K,S):: IF S=0 THEN 1370
1380 RETURN
1390 STOP
1400 END
1410 SUB PUTDOT(V,Q)
1420 X=Q :: Y=V :: IF X<-125 OR X>125 THEN
1730
1430 IF Y<-95 OR Y>95 THEN 1730
1440 X=(95-X):: Y=INT(Y+125)
1450 IF C=0 THEN C=143
1460 W=INT((X-1)/8)+1 :: Z=INT((Y-1)/8)+1 :
: X1=X-((W-1)*8):: Y1=Y-((Z-1)*8):: CALL GC
HAR(W,Z,A):: A1=A :: IF A<32 THEN A=32 :: A
1=32
1470 CALL CHARPAT(A,A$):: P=X1*8-8+Y1 :: Q=
INT(P/4.06)+1 :: IF Y1>4 THEN Y1=Y1-4
1480 IF A<>32 THEN C=C+1 ELSE A=C :: IF C<3
4 THEN 1720
1490 B$=SEG$(A$,Q,1):: B=ASC(B$):: IF B<65
THEN B=B-47 ELSE B=B-54
1500 ON B GOSUB 1560,1570,1580,1590,1600,16
10,1620,1630,1640,1650,1660,1670,1680,1690,
1700,1710
1510 D$=SEG$(C$,Y1,1):: IF D$="1" THEN IF A
1=32 THEN 1730 ELSE 1720
1520 B=B+2^(ABS(Y1-4))
1530 ON B GOSUB 1560,1570,1580,1590,1600,16
10,1620,1630,1640,1650,1660,1670,1680,1690,
1700,1710
1540 A$=SEG$(A$,1,Q-1)&B$&SEG$(A$,Q+1,16-Q)
1550 CALL CHAR(A,A$):: CALL HCHAR(W,Z,A)::
GOTO 1720
1560 C$="0000" :: B$="0" :: RETURN
1570 C$="0001" :: B$="1" :: RETURN
1580 C$="0010" :: B$="2" :: RETURN
1590 C$="0011" :: B$="3" :: RETURN
1600 C$="0100" :: B$="4" :: RETURN
1610 C$="0101" :: B$="5" :: RETURN
1620 C$="0110" :: B$="6" :: RETURN
1630 C$="0111" :: B$="7" :: RETURN
1640 C$="1000" :: B$="8" :: RETURN
1650 C$="1001" :: B$="9" :: RETURN
1660 C$="1010" :: B$="A" :: RETURN
1670 C$="1011" :: B$="B" :: RETURN
1680 C$="1100" :: B$="C" :: RETURN
1690 C$="1101" :: B$="D" :: RETURN
1700 C$="1110" :: B$="E" :: RETURN
1710 C$="1111" :: B$="F" :: RETURN
1720 C=C-1 :: IF C=0 THEN C=1
1730 SUBEND
```

Submarine commander

A maritime challenge

By JOHN KOLOEN

As Submarine Commander it is your responsibility to guide your submarine under an ocean to seek out and destroy convoys of enemy ships. But don't think the enemy won't fight back, its convoys protected by destroyers just waiting to ram your submarine or send you to the bottom in a barrage of exploding depth charges.

This game was released for the TI about mid-year but has been available on other machines for a couple years. It combines colorful graphics and realistic sound into an entertaining strategy/action game that is filled with ups and downs, or submerging and surfacing. (Distributors include Tenex Computer Express and Arcade Hardware of Manchester, England.)

Performance: This game can take a long time to play—more than an hour is not unusual. Impatient types may find it frustrating. Despite this, a lengthy game is not necessarily indicative of a successful game. Scores are based on the amount of enemy tonnage sunk and whether you are able to sink all the convoys at the given skill level (there are three levels of play). Points are deducted depending on the number of torpedoes used (there is a finite number available), amount of fuel used (also finite), the amount of damage incurred (it can be repaired) and whether you are destroyed (which can be the result of running out of oxygen, being hit repeatedly by enemy depth charges or deck fire, having the hull crushed by descending to an excessive depth, etc.). There are actually a lot of ways to lose, and only one way to win—by sinking every enemy convoy.

Submarine Commander uses four screens or views: the main control panel, a sonar view, a view of the surface through a periscope and a map depicting your position relative to land and convoys. The main panel includes numerous readouts reporting depth, position, fuel and battery status, speed, etc. Damage indicators are used to gauge the condition of the hull, engines indicators, controls and instrumentation. In the sonar view, the screen is filled with a sonar screen that depicts the position of enemy ships relative to the submarine. The periscope view shows the ships on the surface. It can be used only at depths of less than 40 feet. The map is used as an aid in stalking or avoiding convoys, providing a long-range view of the battleground. One may toggle between these various screens often and rapidly.

Sound is used to good effect in simulating the sound of sonar, and depth charges. Not only do you hear the depth charges explode, but you hear them as they enter and descend through the water toward the submarine.

As commander of the submarine you control the speed of the vessel, its heading and depth. The longer you remain on the surface, the stronger your batteries become and the faster damage is repaired. While submerged you must keep a close eye on the amount of oxygen remaining, among other things.

Part of the reason I found the game to be engrossing is the wealth of details one has to keep aware of. It's not enough to track convoys, you have to chase them. Even then, they may seek refuge in a harbor and even trap you if you follow them in. Often, you will find yourself under fire from one vessel while attacking another, giving you just enough time to release one torpedo before crash-diving to avoid being sunk. If the enemy scores enough hits

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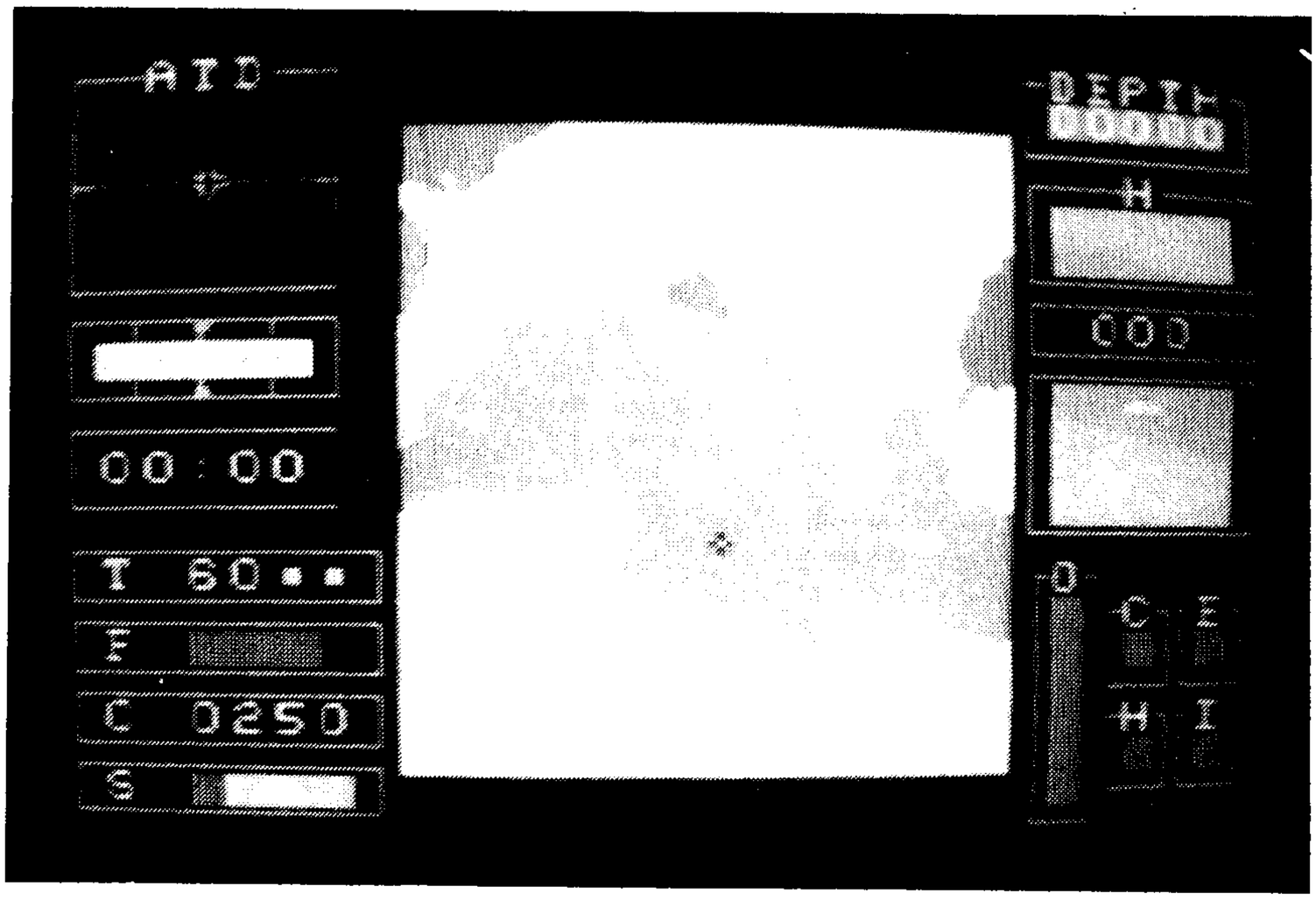
Review

Report Card

Performance	**A**
Ease of Use	**A**
Documentation	**B-**
Value	**A**
Final Grade	**A**

Cost: $29.95 (disk includes Submarine Commander, Computer War and River Rescue)
Manufacturer: Thorn EMI
Requirements: console, monitor or TV, memory expansion, disk system, Extended BASIC, Editor/Assembler or Mini-Memory, joystick optional



PEP

Transferring files to Brand X

By JOHN KOLOEN

The Printer Emulation Package (PEP) by Intelpro is not the type of software that one would buy without having a specific use for it. First of all, the user must have at least a PC clone and, preferably, another computer brand that does not use the same operating system as the PC, such as a TI99/4A. If you do not have these things, you would have no use for PEP. Having them, however, may well mean that you *must* have a PEP.

PEP's sole reason for existing is to support the transfer of data from one computer system to another. It may be from a PC to a TI99/4A, or vice versa. Or from some other computer brand to a PC. It doesn't matter, just as long as a PC is involved. (The PEP program is loaded into the PC running PC DOS 2.0 or higher.) What PEP does is make a PC look like a printer to the other computer.

There are many situations in which data transfer between otherwise incompatible microcomputers is useful. Suppose you use a PC at the office and a TI at home. Suppose you take some work home from the office, do it on the TI. What then? You could transfer it to the PC using a modem, or you could put a TI next to the PC, connect the two with a cable linking RS232 ports, and run the PEP program. This type of straight data transfer may also be done via modem, but PEP also allows you to design your own drivers to send selected data from, say a database.

Performance: I used PEP to send several databases from my TI to a PC clone. I sent one database without changes from the TI to the PC without incident. I also sent various other ASCII files generated by TI-Writer and Intelpro's other product, Companion.

Then I decided that since I was transferring a database to an entirely different system that I would change the order in which the data fields were displayed. To make things more productive, I decided not to utilize all the fields that were entered on my TI. I did this by writing a short driver in Extended BASIC, specifying the order in which I wanted the data to appear and then which fields I want to transfer. This all worked without a hitch, except for the time I spent debugging the driver.

I won't bother going into the mechanics of its operation, since it runs out of a PC. Suffice it to say that I found it so easy to use that I still wonder why Intelpro produced a 100+ page manual to describe it. At first I was intimidated by the manual, but putting it aside I was able to run the program simply by loading the program in the PC, connecting the cables and following the menu prompts. Intelpro's Companion is equally easy to figure out, though it too comes with a detailed and lengthy manual.

Ease of Use: After purchasing an RS232 cable I spent a few hours locating a gender changer so that I could plug one end into the TI and the other into the PC. Having set the manual aside, I loaded the program and started transferring data from the start. While the manual includes a section on PEP's use with the TI, I found it to include more information than I needed about cabling and such. As noted above, I bought an off-the-shelf cable and an off-the-shelf gender changer and had no problem in this area.

Documentation: The word "superb" comes up at this point. Allan Swett, author of PEP and Companion, produces virtually perfect manuals for his software. If you've got a question, the manual will have the answer, somewhere. Although there is no index in the PEP manual, there is a very good table of contents. The manual is professionally typeset and printed and is prepunched for a three-hole binder. It is conveniently sized—8.25 x 5.25 inches. If you read the entire manual you will no doubt learn a lot about data transfer, but the beauty of the program is that you don't have to read the manual to use it.

Value: I've had calls from readers of

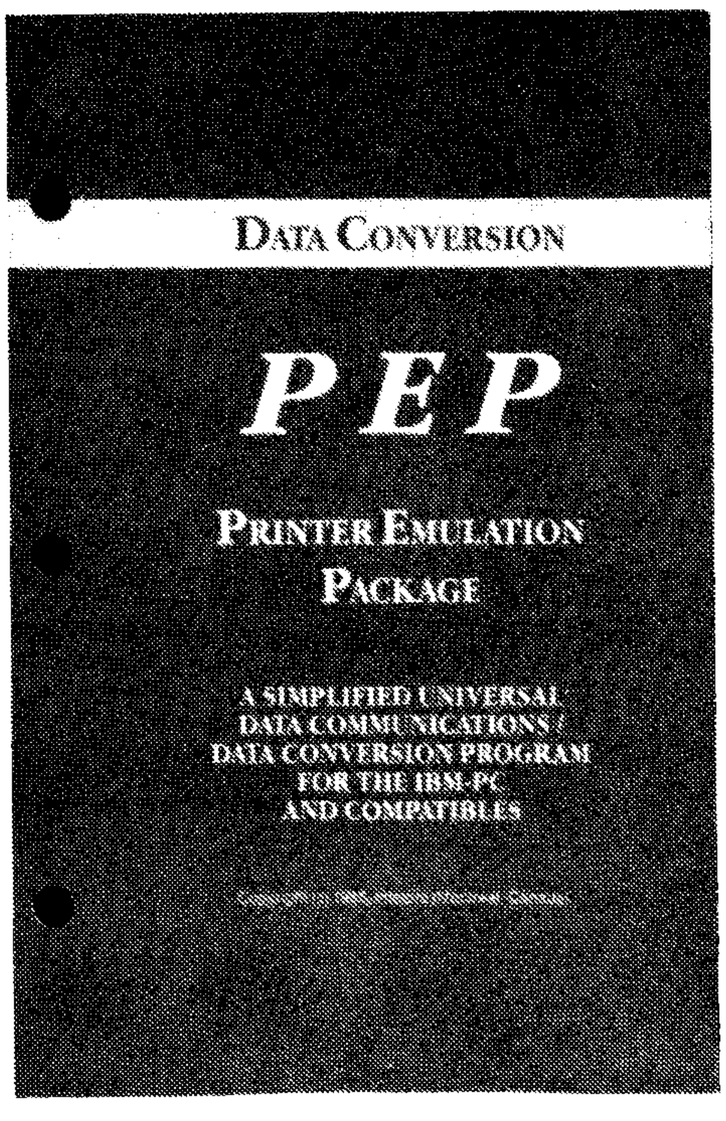
(See Page 47)

Review

Report Card

Performance	**A**
Ease of Use	**A**
Documentation	**A**
Value	**A**
Final Grade	**A**

Cost:$59.95 + $5 S&H
Manufacturer: Intelpro, 13 Saratoga Dr.; Kirkland, Quebec, Canada, H9H 3J9
Requirements: IBM-PC, XT or AT clone with RS232 port, RS232 interface cable, TI99/4A console, monitor or TV, expansion memory, disk system and RS232 interface



MAX-RLE

For downloading graphics

By ROBERT CARMANY

The first thought that went through my head when I heard of "MAX-RLE" was: 'What in the word is an RLE?' After reading the documentation that came with the program, I still don't really know except that it stands for "Run Length Encoded" which describes graphics files (or screens) that seems to be everywhere on electronic bulletin boards.

MAX-RLE is a VIDTEX terminal emulator that allows the user to display these impressive graphic files after they have been downloaded to disk. The pictures resemble the facsimile photos that appear in your newspaper, and are composed of a series of single pixel dots. The documentation warns that these files should be downloaded using the XMODEM protocol.

The program is very simple to operate and the instructions are equally easy to follow. The program loads from either Editor/Assembler Load and Run or the same option from the Funlwriter Utility menu. Simply type DSKn.MAX-RLE and you are in business.

You are then presented with the title screen from which there are three options. FCTN = will, of course, exit the program. If you type in DSKn., the program will catalog the appropriate disk drive (you return to the title screen by pressing enter.) Alternatively, you may display an RLE file by typing in the filename, such as DSK1.HORSE.

MAX-RLE will load and display files in any of four different formats: Display/Fixed 128 RLE files, Display/Variable 80 RLE files, screens created with GRAPHX and screens created with TI-ARTIST Version 2.0. It is not necessary to type in the "__P" or "__C" that are seen on the catalog with TI-ARTIST files—they are loaded automatically if they are present.

Now that you have the picture on the screen, what do you with it? If you press enter, you will be returned to the MAX-RLE title screen to load another picture. If you press "P," the default printer prompt for Epson/Gemini-type printers appears. If your printer doesn't fit these specifications, just enter your printer parameters at this point. Pressing enter then dumps the picture to your printer.

The last option is by far the most powerful. If you press "S" for save, you are presented with the choice of saving the picture *to any one of four formats*! The first choice is GRAPHX, the second TI-ARTIST, the other two are Display/Fixed 128 and Display/Variable 80 files. So, all you have to do is type in DSKn.FILENAME, and that's it.

This last option is of great significance because it gives you virtually unlimited access to graphics files. Those with GRAPHX can now convert TI-ARTIST files so that they can be displayed, altered or enhanced using GRAPHX. All you have to do is load the file in its TI-ARTIST format and save it in GRAPHX format. It works like a charm.

Review

Report Card

Performance ..... **A+**
Ease of Use ..... **A+**
Documentation ..... **A**
Value ..... **A+**
Final Grade ..... **A+**

Cost: Freeware (available as a public domain program on electronic bulletin boards and from user groups
Author: Tom Watford
Requirements: Console, monitor or television, disk system, memory expansion, Editor/Assembler or Funlwriter, printer optional but strongly recommended.

Brian Patrick Malverty

Age: 26
Born: June 3,1959
New York, NY
Height: 5'10"
Weight: 180 lbs
Build: Medium
Eyes: Brown
Race: White
Hair: Brown
Complexion: Med.
Nationality: AM.

Reportedly has appendectomy scar and has been known to wear an earring.

SUBMARINE—

(Continued from Page 44)

before you are able to submerge to the relative safety of the ocean's depths, you may find yourself in a waiting game, your engines and controls virtually unusable, your oxygen supply diminishing and the convoy hovering above you, visible as blips on the sonar screen.

Ease of Use: Rudder control, surfacing and diving may be controlled by a joystick or from the keyboard. All other functions are controlled by the number keys. The game comes with a keyboard template for reference. There is also a "pause" key for those times when you need a break from the tension of submarine warfare.

Documentation: The manual consists of two pages of compact print. It contains the essentials, and that is all. Much of what you need to know about playing the game, such as how to interpret the hydrophone chart, will come through trial and error.

Value: I enjoyed playing this game when I received it and continue to play it periodically. I am particularly enamored of the strategy that must be considered before launching an attack on an enemy convoy, the stalking that has to be done and the fact that patience may be your best ally.

What makes Submarine Commander a great deal for game players has nothing to do with the game itself. It's in the packaging. True, you get Submarine Commander, but included on the disk are Computer War and River Rescue, both of which are well-designed and entertaining games.

PEP—

(Continued from Page 45)

MICROpendium asking for advice on the cheapest way to transfer data from one computer to another. Most of this involves computers at work and in many cases the brands are not TI. In some cases, they quote prices of $1000 or more to have it done by a data conversion specialty firm. I see no reason why even a relatively casual hobbyist shouldn't be able to do much the same thing with PEP with most ASCII files. In this regard, planning how you want the data to appear after the transfer is important and is the reason creating a custom driver for the TI end of the transfer is important. For example, some database programs may require a linefeed, carriage return or other control character at the end of each field or record. This is best done during the transfer rather than after (which is why you should know what program will be using the data after the transfer and what its requirements are in terms of reading the transferred data). Whether additional massaging will be needed will depend on the destination program's ability to convert or utilize data produced by other programs. As a general rule, the more proprietary the destination program is the more likely that the data transfer/conversion process may bog down.

PEP isn't going to help much in terms of transferring programs from the TI to a PC. The various TI programming languages and operating system are so different from languages used on PCs and the PC DOS operating environment that it would be faster and easier to rewrite them from scratch than to attempt to transfer them. There may be exceptions to this, but I am not aware of them.

But for those whose data conversion requirements involve the transfer of files created by word processing, database and other applications software, PEP should fill the bill.

Fort's User Group meets in Indiana

The Fort's User Group of Fort Wayne, Indiana, formerly the Micro 99'ers User Group meets at 7:30 p.m. the second Sunday of each month in Fort Wayne's Shawnee Branch Library.

For further information, write the group at 5319 Twilight Lane, Fort Wayne, IN 46835.

Newsbytes

New England Faire set for second year

The second annual New England 99 Faire will be held April 4 in the Boston area.

Incentives will be offered for paid registration prior to Jan. 1, the organizers say.

The Faire is sponsored by 99 UNITED, an affiliation of six New England user groups totalling more than 1,000 members.

For further information, write the Boston Computer Society, TI99/4A User Group, One Center Plaza, Boston, MA 02108; call Peter Hoddie at (617) 861-8733 or Walt Howe at (617) 692-2702; or leave a message on CompuServe to 70277,3530, on GEnie to WALT.HOWE or on The Source to TI3854.

New Jersey TICOFF set for second year

The second annual Texas Instrument Computer Owners' Fun Fest is scheduled for March 28 at Roselle Park High School in Roselle Park, New Jersey.

Admission is $5 and a free disk of utility software is offered with advance ticket purchase.

Checks for advance sale tickets are payable to Roselle Park High School Student Council and should be mailed, along with a self-addressed stamped envelope, to Bob Guellnitz, 185 W. Webster Ave., Roselle Park, NJ 07204

Vendor tables are available for $50 for the first table and $35 for each additional table. Electricity is limited at the site, so priority will be given to early applications, according to Art Byers, TICOFF coordinator.

A 10 percent late charge will be added to vendor applications postmarked after Jan. 31.

An exhibit can be covered by proxy for vendors who are unable to attend in person. An additional charge will be made for this service.

Proceeds from the TICOFF go to the scholarship fund of the Roselle Park High School Student Council.

For further information, contact Byers at (914) 528-5402 or Guellnitz at (201) 382-5963; or call the TICOFF BBS at (201) 257-2607, CompuServe E-Mail 73547,2014 or GEnie Mail TICOFF.

Millers Graphics, MICROpendium cited

Millers Graphics and MICROpendium have been awarded the first two Front Range 99er Outstanding Support Awards.

The award was recently established by the officers' council of the users group, which is located in Colorado Springs.

Joe Nuvolini, president of the Front Range 99er Computer Club, said the awards are "to individuals, groups or companies which have provided outstanding support to the TI99/4A community."

The awards consist of engraved brass plaques mounted on wood.

In his letter to Millers Graphics, located in San Dimas, California, Nuvolini wrote, "Gram Kracker is an outstanding piece of hardware and your software contributions Advanced Diagnostics, Explorer, DISkASSEMBLER, and the like allow our orphaned computer to continue as a viable member of the home computer community."

His letter to MICROpendium called it "the best publication ever printed for our orphaned computer."

Fairsoft closes, but BasicSort available

Andreas Dessoff reports that "for various reasons of both a personal and a business nature I have decided to abandon the Fairsoft Inc. venture and the commercial distribution of the BasicSort program for the TI99/4A.

He says, however, that he will distribute the program "using a slightly modified Fairware concept.

He says he will send a copy of the program disk (containing the program and the documentation ready to be printed via TI-Writer/Formatter) to anyone who send him a check for $3 to pay for a disk, mailer and postage. He says he will not make copies on disks sent in or answer requests for the program not accompanied by a check.

Dessoff authorizes and encourages all individuals to obtain copies of the program from other persons. He also authorizes and encourages uploading to and downloading from any non-commercial bulletin board or communications system.

He maintains the copyright on the program and expressly denies permission in any manner that involves a commercial transaction or the charging of a fee for the program or its duplication. He says he does not authorize the uploading to or downloading from of the program from such networks as CompuServe, The Source or Delphi, and expressly deny such networks the right to make the program available for downloading by their users.

Dessoff makes the latter restriction because "in my opinion the Fairware concept should be of advantage to software authors and software users, but should not be a means for third parties to make money of an author's work without compensating the author."

He says he has returned all checks he has already received from potential purchasers of the program with a free copy of the program disk, and asks all satisfied users of the program to send him a check for $10.

For further information, contact Dessoff at 1041 Church Hill Road, Fairfield, CT 06432 or (203) 374-3379.

Tex-Comp announces Graphx upgrades

Tex-Comp announces that "by special arrangement with the Australian manufacturer," all Graphx programs sold by Tex-Comp after Oct. 15, 1986, will be equipped with a new high speed

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loader and a new Flip and Rotate command, which, according to Jerry Price, vice president of Tex-Comp, "greatly increases the flexibility and capability of this already great program.

Price says current Graphx owners can obtain this upgrade with documentation by sending the original disk (only) and $5 to Tex-Comp, P.O. Box 33084, Granada Hills, CA 91344.

Asgard releases Font Writer software for TI

Asgard Software announces a product it says is comparable to Printshop and Newsroom for Apple, Atari and Commodore computers and to Fontrix on the IBM PC.

Font Writer by J. Peter Hoddie, (author of Pre-Scan It! and system software for the Myarc Geneve computer) is said to combine any TI-Writer text files, TI-Artist or CSGD fonts and TI-Artist pictures the way the user desires.

Font Writer contains several programs. The first program in the package is Font Editor—a program said to allow the user to edit existing TI-Artist or CSGD fonts, or create new ones from scratch. Font Editor contains an editing window and menu-selectable utilities and supports user-defined macro drawing commands for drawing often-used figures with a single command, according to the manufacturer, who says it also allows the user to edit TI-Artist instances and slides.

The Text Formatter program accepts standard TI-Writer files with virtually every imbedded text formatting command supported by TI-Writer, along with many new such commands for graphics support, to allow the user to integrate text fully with graphics easily, according to the manufacturer. Text Formatter is said to accept new commands for printing text in different fonts, including pictures and other graphics, and more.

The last program in the Font Writer package is an organization tool for graphics files designed for ordering and maintaining TI-Artist fonts, slides, instances and pictures.

Font Writer requires Extended BASIC, 32K and a disk drive system. TI-Writer and TI-Artist are recommended.

Documentation by Walter Howe is included. Font Writer is available for a suggested price of $24.95 from official Asgard Software dealers, from Teledata*Guide on Compuserve (page TDG-4), by sending Source Mail to TI9720 on Source, or directly from Asgard Software, P.O. Box 10306, Rockville, MD 20850. All major credit cards are accepted.

CSGD III released

Character Sets and Graphic Designs III, by Dave Rose, has been released by Texaments.

According to the manufacturer, CGSD III offers four new graphic printing capabilities to the TI99/4A user.

Steve Lamberti of Texaments says a letterhead feature allows a user to create custom-designed letterheads and stationery, using the top and/or bottom of the page with various fonts and small graphics. Letterheads can be saved to disk for later use.

Custom-designed graphic labels can be created using different fonts, small graphics and borders, he says. He says any number of labels can be printed at the user's option and labels can be saved to disk.

Lamberti says signs, T-shirt transfers and "other message-oriented items" can be printed using various fonts and small graphics.

Another feature is Docuprinter, said to print TI-Writer generated files in any one of six full graphic character sets. The user is said to be able to choose between six and eight lines per inch vertically, to add page numbers, to print multiple file documents, to set top and bottom margins, to set tabs and to print in two-column format. The manufacturer says a special typewriter mode qllows a user to type a line of text in the specified character set one line at a time.

The three-disk package comes complete with 25 fonts, 40 small graphics and more than 24 pages of documentation for $17.95 plus $1.50 shipping. CSGD III requires a disk system, 32K memory expansion, TI Extended BASIC and either an Epson or Prowriter compatible printer (specify when ordering).

Lamberti says that since CSGD III is a continuation of the CSGD series, all previous fonts and small graphics are compatible with it.

Diagnostic software mailout limited

Part of information furnished by another TI spokesperson and published in the August MICROpendium was incorrect, according to Jeffrey Crump of TI.

Crump says that TI will not send the diagnostic software it has placed in the public domain to new users groups. He says TI sent out letters for confirmation to groups it had on its list and these groups are the only ones to receive the software. He says that the groups are encouraged to share the software with any newly formed groups.

He emphasizes that TI will not support the software now that it is in the public domain.

He says any new users groups can receive a start-up kit from TI. For further information, contact TI-Jeffrey Crump, P.O. Box 53, M/S 5828, Lubbock, TX 79408.

Flight simulator set for January release

Not-Polyoptics software company has announced the imminent release of a new, all machine language flight sim-

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ulation called "SPAD Flight Simulator."

The manufacturer says the program is set in World War I France and includes full-screen line graphic views in 3-D perspective, a 360-degree panorama of the area while in flight, mathematic algorithms of the physics of flight for complete acrobatic control of the plane and a battle mode for the expert pilot.

"SPAD" is scheduled for release Jan. 1, and will be available from Not-Polyoptics at a retail price of $29.95. The program requires a disk drive, the Editor/Assembler cartridge and a 32K memory expansion card.

For further information or to order, contact Not-Polyoptics, P.O. Box 4443, Woodbridge, VA 22191 or (703) 491-5543.

'Orphan' handbook

The "Orphan's Survival Handbook" by Ron Albright, described as "the one-stop information source for the TI user," has been published by Disk Only Software.

Albright is author of "The Orphan Chronicles," published by Millers Graphics, a history of the development and subsequent abandonment of the TI99/4A by Texas Instruments and events occurring afterwards.

The "Orphan's Survival Handbook" is described as an anthology of material gleaned from hundreds of user group newsletters and hundreds of hours of downloaded files from bulletin board systems.

The "Orphan's Survival Handbook" contains more than 200 pages of TI material, including schematics, hardware hacks, programs, tips, and tutorials from across the country, as well as original material from numerous sources. The manual is looseleaf and three-hole punched for placement in a binder, and allows for insertion of updates planned for registered owners.

For further information, contact Disk Only Software (DOS), P.O. Box 4170, Rockville, MD 20850; (301) 369-1339) or 1-800-446-462 plus 897335 at the tone (touch tone required). Projected retail price is $16.95.

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

MDMS Level III gets better

Dr. Eric W. Bray, of Philadelphia, PA, writes:

There are several disk managers available for the TI99/4A. One of the best is Myarc Disk Manager Supreme Level III. This program allows you to format your disks in 9, 16 or 18 sector formats. However, it doesn't have one needed feature: being able to do box formatting. (DM1000 has box formatting but not 18 sector formatting.)

I've come up with a solution to the problem of box formatting disks in the 18 sector format using the Myarc manager. The method is very simple. All you need is the Masscopy program and then do the following procedure:

Format your disk using the Myarc manager. Then leave the manager using the Load/Run option to run Masscopy. You can now format the rest of your disks by having Masscopy to copy your recently formatted disk. Masscopy will copy only about seven sectors and be ready for the next disk. You can do an entire box in very little time using this method.

Mini-Memory tape copies easy to do

Making copies of Mini-Memory cassettes is a snap, according to Robert C. Woitkowski. Writing in TRACE, the newsletter of MAGNETIC, a Massachusetts user group. He writes:

Last year a question was asked by a member about how to make copies of Mini-Memory cassettes without using two cassette recorders. There is a simple way of doing this.

First, select '3' for Mini-Memory and press 3 again to reinitialize the module. Next, press FCTN= to quit and select '2' for Easybug. Press any key to erase the command screen. A question mark should appear. Type S7000 and hit enter. The prompt "TO?" should appear. Enter 7FFF. Now follow the instructions on the screen for using a cassette recorder. When the tape is complete, you will have a copy of the original tape.

The same process applies to copying disks to cassette except that you must select option 1, Load and Run, to load the original program. Then press FCTN= to quit and follow the instructions above.

Fast-Term "fix" improves downloads

Joe Nuvolini, Sysop of the Villa...TI electronic bulletin board (303-574-2567) in Colorado Springs, Colorado, offers the following suggestions for users of Paul Charlton's Fast-Term:

From time to time people have had difficulty during disk access on certain BBS's during 300 baud XMODEM downloads with Fast-Term. I know the problem arises sometimes on my Techie board. Paul Charlton made a patch to correct the problem and I finally located a copy of it. The only problem I encounted in making the correction is that I found the bytes that needed changing in the same sector but

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User Notes

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at a different address. Additionally, the original code was slightly different. In mine I had to change bytes 82 through 99. The original version is printed first, followed by my version.

Implementing this patch to Fast-Term V1.16 (and perhaps other versions if the problem is present) will allow users to download files longer than 40 records from BBS's. Edit the second program image file (UTIL2 for most users), sector No. 22 (21 if you start from 0), starting at byte 74.

Version 1

addr	should have	change to
74	C020	0221
76	CCCE	FF00
78	1303	9801
7A	0201	D0B3
7C	CFDA	1603
7E	10E1	0620
80	0221	D0B2
82	FF00	1003
84	9801	0201
86	D0B3	CFDA
88	16F8	10DC
8A	0202	0202

Version 2

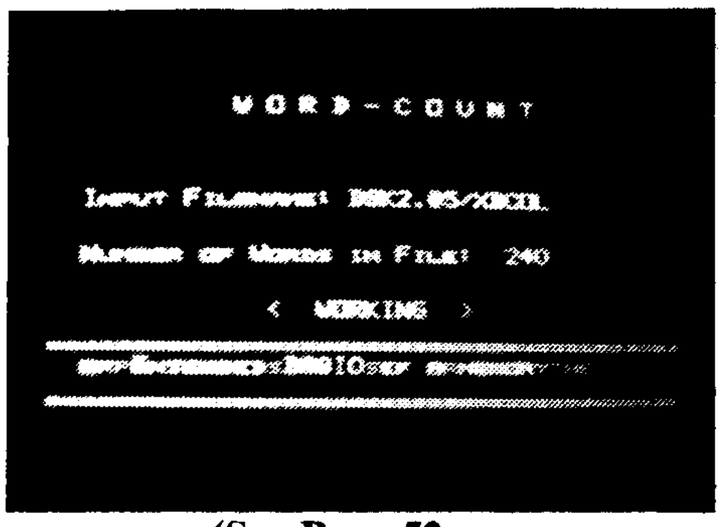
addr	had	change to
82	C020	0221
84	CCD0	FF00
86	1303	9801
88	0201	D0B3
8A	CFDA	1603
8C	10E1	0620
8E	0221	D0B2
90	FF00	1003
92	9801	0201
94	D0B5	CFDA
96	16FB	10DC
98	0202	0202

Do not make these corrections to your original Fast-Term disk. Copy the UTIL2 file to a newly initialized disk and make the changes using your favorite sector editor. Copy the remaining Fast-Term file to this disk and try to download with it before copying the corrected file to your working copy of Fast-Term. I tried my modified version at both 300 and 1200 baud on a file that was 64 sectors long and it worked just fine.

Wordcount II is very fast

Jim H. Jagielski, of Sanbornville, New Hampshire, has created a word counting program for use with TI-Writer text files that operates at nearly blinding speeds. To prove it, the text scans across the screen as the words are counted. But it's just a blur. It counted a 33-sector file, containing some 1100 words, in seconds. The previous version of Wordcount would have taken five minutes to perform the same task.

Jagielski's program is of his own design. He writes:



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WORD-COUNT II

```
10 ! ********************
15 ! *   WORD-COUNT     *
20 ! * BY JIM JAGIELSKI *
25 ! *                  *
30 ! *NH99ERS USER GROUP*
31 ! *P.O. BOX 5991     *
32 ! *MANCHESTER,NH03108*
33 ! ********************
35 GOTO 40 :: CALL INIT :: CALL LOAD(:: CALL LINK
40 !@P-
45 CALL INIT
50 CALL LOAD(16376,83,84,65,82,84,32,36,244)
55 CALL LOAD(8194,43,80,63,248)
60 CALL LOAD(9460,2,224,131,0,6,160,37,48,6,160,37,28,6,160,37,74,6,160,37,200,6,160)
65 CALL LOAD(9482,37,222,6,160,38,234,6,160,39,154,6,160,39,236,6,160,38,162,4,192,2,1)
70 CALL LOAD(9504,128,0,4,32,32,32,5,128,2,128,3,192,22,250,4,91,2,0,240,0,216,0)
75 CALL LOAD(9526,131,212,2,0,1,240,4,32,32,48,2,0,7,241,4,32,32,48,4,91,2,0)
80 CALL LOAD(9548,0,131,2,1,42,92,2,2,0,19,4,32,32,36,2,0,0,215,2,1,42,112)
85 CALL LOAD(9570,2,2,0,11,4,32,32,36,2,0,1,119,2,1,42,124,4,32,32,36,2,0)
90 CALL LOAD(9592,1,158,2,1,42,136,2,2,0,13,4,32,32,36,2,0,1,236,2,1,42,150)
95 CALL LOAD(9614,2,2,0,17,4,32,32,36,2,0,2,17,2,1,42,168,2,2,0,23,4,32)
100 CALL LOAD(9636,32,36,2,0,2,62,2,1,42,192,2,2,0,13,4,32,32,36,2,0,3,80)
105 CALL LOAD(9658,2,1,42,206,2,2,0,25,4,32,32,36,4,91,4,192,216,0,131,116,4,32)
110 CALL LOAD(9680,32,28,192,32,131,124,32,32,41,176,22,249,4,91,6,160,37,28,2,0,0,131)
115 CALL LOAD(9702,2,1,42,92,2,2,0,19,4,32,32,36,2,0,1,66,2,1,42,232,2,2)
120 CALL LOAD(9724,0,16,4,32,32,36,2,0,1,186,2,1,42,250,2,2,0,25,4,32,32,36)
125 CALL LOAD(9746,2,0,2,128,2,1,157,0,4,32,32,32,5,128,2,128,2,168,22,250,2,0)
130 CALL LOAD(9768,2,248,4,32,32,32,5,128,2,128,3,32,22,250,4,96,37,12,2,0,0,4)
135 CALL LOAD(9790,2,1,41,178,2,2,41,170,193,8,4,195,60,241,10,131,2,35,48,0,220,131)
140 CALL LOAD(9812,6,0,22,248,10,132,2,36,48,0,220,132,2,1,32,0,212,129,2,0,48,0)
145 CALL LOAD(9834,2,3,41,170,144,19,22,2,220,193,16,252,144,83,19,1,16,2,6,3,212,192)
150 CALL LOAD(9856,2,0,41,170,2,1,96,0,188,1,2,128,41,176,22,252,2,0,1,210,2,1)
155 CALL LOAD(9878,41,170,2,2,0,6,4,32,32,36,4,91,2,0,3,83,2,1,43,62,2,2)
160 CALL LOAD(9900,0,17,4,32,32,36,4,192,216,0,131,116,4,32,32,28,192,32,131,124,32,32)
165 CALL LOAD(9922,41,176,22,249,2,1,89,0,208,32,131,117,144,64,19,134,2,1,78,0,208,32)
170 CALL LOAD(9944,131,117,144,64,22,237,3,0,0,2,2,224,131,224,4,32,0,0,2,0,1,82)
175 CALL LOAD(9966,2,2,13,0,2,3,32,0,2,4,1,97,2,5,8,0,4,198,216,6,131,116)
180 CALL LOAD(9988,2,1,126,0,2,7,0,128,4,32,32,32,4,32,32,28,209,160,131,124,33,131)
185 CALL LOAD(10010,19,17,6,7,22,246,2,1,128,0,2,7,0,128,4,32,32,32,4,32,32,28)
190 CALL LOAD(10032,209,160,131,124,33,131,19,3,6,7,22,246,16,227,2,1,128,0,4,32,32,32)
195 CALL LOAD(10054,208,96,131,117,144,129,19,16,145,65,22,5,2,128,1,82,19,214,6,0,16,212)
```

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It's a machine language program that has been converted to CALL LOADs for the Extended BASIC enthusiast. It's a very fast program that will ignore control codes that are embedded in TI-Writer files saved using the SF option. My Wordcount program ignores these control codes so that they will not affect the total count. Also, a window is displayed which shows the line that is being worked on, but the program works so fast that you probably won't be able to read it anyway.

Entering the program is something of a chore, consisting as it does of little more than CALL LOAD statements. We proofed it twice to eliminate typing errors. While it is a time-consuming task, we think you'll find the program to be well worth the effort.

Operation of the program is simple. Simply RUN the program and you will be prompted for a filename (include the disk drive name, too). The program then races through the file, providing a readout on the number of words counted as it operates. When finished, it prompts you for additional files. If you are finished you simply respond with an "N" and it resets the computer to the title screen. The program requires Extended BASIC, expansion memory and a disk system.

Direct sound control demo

The program listing at right appeared in TINS in Nova Scotia and in the newsletter of the Winnipeg (Manitoba) 99/4 Users Group. Created by Tim MacEachern of Dartmouth, Nova Scotia, the program demonstrates the sound capabilities of the 99/4A. The program runs through a series of demonstrations involving attenuation, countdown rate and noise. The program requires Extended BASIC and a memory expansion. Although it's not the type of program

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```
200 CALL LOAD(10076,6,193,2,33,0,96,6,193,4,32,32,32,5,128,129,0,22,203,2,1,1,82)
205 CALL LOAD(10098,96,1,200,0,41,194,2,0,1,82,2,1,41,196,2,2,0,15,4,32,32,44)
210 CALL LOAD(10120,2,0,41,196,2,1,96,0,124,1,2,128,41,211,22,252,4,91,2,0,15,128)
215 CALL LOAD(10142,2,1,41,186,2,2,0,25,4,32,32,36,2,6,15,137,200,6,131,86,4,32)
220 CALL LOAD(10164,40,192,0,8,22,10,2,0,2,61,2,1,43,48,2,2,0,13,4,32,32,36)
225 CALL LOAD(10186,4,96,38,162,208,96,41,212,2,0,15,128,4,32,32,32,2,0,2,61,2,1)
230 CALL LOAD(10208,43,34,2,2,0,13,4,32,32,36,4,91,195,203,4,200,2,0,16,0,2,1)
235 CALL LOAD(10230,32,32,4,32,32,32,5,128,2,128,16,80,22,250,200,6,131,86,4,192,4,32)
240 CALL LOAD(10252,40,192,0,8,4,193,144,64,22,52,2,0,16,0,2,1,42,12,2,2,0,80)
245 CALL LOAD(10274,4,32,32,44,2,0,42,12,2,1,96,0,188,1,2,128,42,92,22,252,2,0)
250 CALL LOAD(10296,2,168,2,1,42,12,2,2,0,80,4,32,32,36,2,5,42,11,2,9,128,0)
255 CALL LOAD(10318,2,7,222,0,2,10,142,0,5,133,2,133,42,92,19,201,145,213,27,250,146,85)
260 CALL LOAD(10340,18,248,146,149,19,195,5,136,6,160,38,58,5,133,2,133,42,92,19,188,146,85)
265 CALL LOAD(10362,22,250,16,236,2,1,5,0,144,64,19,20,2,0,2,61,2,1,43,48,2,2)
270 CALL LOAD(10384,0,13,4,32,32,36,208,96,41,213,2,0,15,128,4,32,32,32,200,6,131,86)
275 CALL LOAD(10406,4,32,40,192,0,8,4,95,2,0,2,61,2,1,43,20,2,2,0,13,4,32)
280 CALL LOAD(10428,32,36,4,95,41,224,40,196,193,126,83,224,42,8,192,32,131,86,194,64,2,41)
285 CALL LOAD(10450,255,248,4,32,32,40,208,193,9,131,7,4,2,2,42,0,5,128,5,132,128,196)
290 CALL LOAD(10472,19,6,4,32,32,40,220,129,152,1,42,10,22,246,193,4,19,82,2,132,0,7)
295 CALL LOAD(10494,21,79,4,224,131,208,200,4,131,84,200,4,41,218,5,132,168,4,131,86,200,32)
300 CALL LOAD(10516,131,86,41,220,2,224,131,224,4,193,2,12,15,0,195,12,19,1,30,0,2,44)
305 CALL LOAD(10538,1,0,4,224,131,208,2,140,32,0,19,50,200,12,131,208,29,0,2,2,64,0)
310 CALL LOAD(10560,152,18,42,11,22,238,160,160,41,234,16,3,192,160,131,210,29,0,192,146,19,230)
315 CALL LOAD(10582,200,2,131,210,5,194,194,114,209,96,131,85,19,9,156,133,22,242,9,133,2,6)
320 CALL LOAD(10604,42,0,156,182,22,237,6,5,22,252,5,129,200,1,41,222,200,9,41,216,200,12)
325 CALL LOAD(10626,41,214,6,153,16,226,30,0,2,224,41,224,192,9,4,32,32,40,9,209,22,4)
330 CALL LOAD(10648,3,128,2,224,41,224,4,193,6,193,215,65,243,224,42,8,3,128,128,145,147,145)
335 CALL LOAD(10670,149,128,32,0,39,16,3,232,0,100,0,10,0,20,16,0,80,0,0,0,0,0)
340 CALL LOAD(10692,68,83,75,50,46,88,66,87,79,82,68,32,32,32,32,100,2,1,0,0,0,0)
345 CALL LOAD(10714,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0)
350 CALL LOAD(10736,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0)
355 CALL LOAD(10758,0,0,32,0,46,170,128,128,128,128,128,128,128,128,128,128,128,128,128,128,
128)
360 CALL LOAD(10780,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,
128,128,128)
365 CALL LOAD(10802,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,
128,128,128)
370 CALL LOAD(10824,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,128,
128,183,128)
375 CALL LOAD(10846,175,128,178,128,164,128,141,128,163,128,175,128,181,128,174,128,180,128,182,
197,210,211)
380 CALL LOAD(10868,201,207,206,128,145,142,144,128,183,210,201,212,212,197,206,128,128,162,217,
128,170,201)
385 CALL LOAD(10890,205,128,170,193,199,201,197,204,211,203,201,128,178,207,213,212,197,128,145,
140,128,128)
390 CALL LOAD(10912,162,207,216,128,152,146,167,128,179,193,206,194,207,210,206,214,201,204,204,
197,140,128)
395 CALL LOAD(10934,128,174,168,128,144,147,152,151,146,128,136,150,144,147,137,149,146,146,141,
152,153,149)
400 CALL LOAD(10956,146,128,176,210,197,211,211,128,161,206,217,128,171,197,217,128,212,207,128,
163,207,206)
405 CALL LOAD(10978,212,201,206,213,197,128,169,206,208,213,212,128,166,201,204,197,206,193,205,
197,154,128)
410 CALL LOAD(11000,128,128,174,213,205,194,197,210,128,207,198,128,183,207,210,196,211,128,201,
206,128,166)
415 CALL LOAD(11022,201,204,197,154,128,128,158,128,163,175,173,176,172,165,180,165,164,128,156,
128,156,128)
420 CALL LOAD(11044,128,183,175,178,171,169,174,167,128,128,158,128,138,166,169,172,165,128,128,
165,178,178)
425 CALL LOAD(11066,175,178,138,128,161,206,207,212,200,197,210,128,166,201,204,197,159,128,185,
143,174,128)
430 CALL LOAD(11088,22,27)
435 CALL LINK("START")
```

User Notes

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you're going to run over and over, it may serve as a source of ideas for incorporating unique sounds into user-written programs.

Screen-text dump subprogram

Jiri Svoboda, of Toronto, Ontario, provides a versatile screen-text dump program. It requires Extended BASIC, two disk drives and an expansion memory.

The SCRTXTDUMP subprogram should be saved as listed with the SAVE command using the MERGE option. There is no need to rename the variables; a potential name conflict doesn't exist in this subprogram architecture.

To dump the screens of an Extended BASIC program to a printer, load a program, merge the SCRTXTDUMP subprogram into this program and place the CALL STD statements in all locations of the loaded program, in which you wish to dump the screen content.

When running the modified Extended BASIC program, selected screens (32 characters in width) will be dumped to the SCRTXTDATA TI-Writer compatible file in disk drive 2.

The SCRTXTDUMP subprogram offers the following options:

•Screen width SW = 1 to 40 (limited by a maximum number of screen columns used—usually 32 or 40) may be changed on line 30030.

•Disk drive number DSKx for a storage of the dumped screen datafile may be changed in the OPEN statement on line 30035.

•In case, the screen dumps will not interfere with an outputting of the program data to a printer, an immediate screen dump mode may be set by deleting the exclamation mark on line 30040 and deleting all three lines with odd numbers.

The SCRTXTDATA file should be given a new specific name or it can be

(See Page 54)

```
100 ! DIRECT SOUND CONTROL
110 ! DEMO PROGRAM
120 ! BY Tim MacEachern
130 !
140 ! DARTMOUTH, NOVA SCOTIA
150 !
160 !
170 S=-31744 !ADDRESS OF SOUND CHIP >8400
180 V1=0 ! VOICE 1 FLAG
190 V2=32 ! VOICE 2 FLAG
200 V3=64 ! VOICE 3 FLAG
210 N=96 ! NOISE FLAG
220 C=128 ! COMMAND FLAG
230 F=0 ! FREQUENCY FLAG
240 A=16 ! ATTENUATION FLAG
250 WHITE=0 ! WHITE NOISE FLAG
260 PERIODC=4 ! PERIODIC NOISE FLAG
270 CALL INIT :: CALL CLEAR
280 ! DEMO--START VOICE ONE
290 PRINT "SET VOICE 1 IN THREE LOADS"
300 CALL LOAD(S,C+V1+A+0)! SET ATTENUATION TO 0
310 CALL LOAD(S,C+V1+F+0)! SET BOTTOM FOUR BETS OF COUNTDOWN RATE TO 0
320 CALL LOAD(S,33)! SET TOP 6 BITS OF COUNTDOWN RATE
330 GOSUB 820
340 PRINT :"SET VOICE 1 IN A SINGLE LOAD"
350 CALL LOAD(S,C+V1+A+6,0,C+V1+F+0,0,22)
360 GOSUB 820
370 PRINT :"ATTENUATION DEMO"
380 CALL LOAD(S,C+V1+A+6,0,C+V1+F+0,0,56)! START VOICE ONE AS A REFERENCE (VERY
QUIET)
390 CALL LOAD(S,C+V2+A+15,0,C+V2+F+0,0,48)! TURN V2 OFF BUT PRESET TO ONE
400 FOR I=1 TO 5
410 FOR ATTEN=15 TO 0 STEP -1
420 CALL LOAD(S,C+V2+A+ATTEN)
430 FOR DELAY=1 TO 40 :: NEXT DELAY
440 NEXT ATTEN
450 NEXT I
460 GOSUB 820
470 PRINT :"COUNTDOWN RATE DEMO"
480 CALL LOAD(S,C+V1+A+1)! SET V1 ATTENUATION
490 FOR RATE=0 TO 1028 STEP 16
500 FOR BOTTOM4BITS=0 TO 15
510 CALL LOAD(S,C+V1+F+BOTTOM4BITS,0,RATE/16)
520 NEXT BOTTOM4BITS
530 NEXT RATE
540 GOSUB 820
550 PRINT :"CALCULATION OF RATE FOR MIDDLE C(FREQUENCY 261.63)"
560 FREQ=261.63
570 RATE=111860.8/FREQ
580 CALL LOAD(S,C+V1+A+0,0,C+V1+F+(RATE AND 15),0,RATE/16)
590 GOSUB 820
600 PRINT :"NOISE CONTROL OPTIONS"
610 PRINT : :"WHITE NOISE TYPE 0"
620 CALL LOAD(S,C+N+A+0,0,C+N+F+WHITE+0)
630 GOSUB 820
640 PRINT :"WHITE NOISE TYPE 1"
650 CALL LOAD(S,C+N+A+0,0,C+N+F+WHITE+1)
660 GOSUB 820
670 PRINT :"WHITE NOISE TYPE 2"
680 CALL LOAD(S,C+N+A+0,0,C+N+F+WHITE+2)
690 GOSUB 820
700 PRINT :"WHITE NOISE TYPE 3"
710 CALL LOAD(S,C+N+A+0,0,C+N+F+WHITE+3)
720 FOR DELAY=1 TO 500 :: NEXT DELAY
730 PRINT : :"CONTROL NOISE TYPE 3 THROUGH FREQUENCY OF VOICE"
740 FOR I=1 TO 10
750 RATE=RND23
760 CALL LOAD(S,C+V4+A+15,0,C+V3+F+(RATE AND 15),0,RATE/16,0,C+N+F+WHITE+3)
770 FOR DELAY=1 TO 300 :: NEXT DELAY
780 NEXT I
790 GOSUB 820
800 STOP
810 !TURN OFF ALL VOICES
820 FOR I=1 TO 500 :: NEXT I
830 PRINT : :"TURN OFF ALL VOICES"
840 CALL LOAD(S,C+V1+A+15)
850 CALL LOAD(S,C+V2+A+15)
860 CALL LOAD(S,C+V3+A+15)
870 CALL LOAD(S,C+N+A+15)
880 RETURN
```

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directly incorporated into a Text Formatter file, e.g. into a program manual description. The special characters & and @ (if present on the dumped screens) must be doubled in the Text Formatter before outputting of the formatted datafile to a printer (unless a provision for these characters was made—see MICROpendium of September 1986, page 44).

At the end of a session with TI-Writer, the SCRTXTDATA file should be deleted. Otherwise, new screen dumps will be appended to this file.

```
30000 REM SCRTXTDUMP (MERGE)
30010 REM by Jiri Svoboda
30020 REM Toronto, Ontario
30030 SUB STD :: SW=32
30035 OPEN #9:"DSK2.SCRTXTDA
TA",APPEND
30040 ! OPEN #9:"PIO",OUTPUT
30050 BL$=RPT$(" ",(76-SW)/2
):: CR$=CHR$(13):: X1$=BL$&R
PT$("*",SW+4)&CR$ :: X2$=BL$
&"*"&RPT$(" ",SW+2)&"*"&CR$
30055 PRINT #9:".CO SCRTXTDA
TA (Screen Text Data Dump)";
CR$:".SP 2";CR$:".NF";CR$
30060 PRINT #9:X1$:X2$ :: FO
R R=1 TO 24 :: PRINT #9:BL$;
"* ";:: FOR C=1 TO SW :: CAL
L GCHAR(R,C,K):: IF (K<32)+(
K>126)THEN K=32
30070 PRINT #9:CHR$(K);:: NE
XT C :: PRINT #9:" *";CR$ ::
 NEXT R :: PRINT #9:X2$:X1$:
CR$
30075 PRINT #9:RPT$(" ",35);
"Figure X.";CR$:".FI";CR$:".
SP 2";CR$
30080 CLOSE #9 :: SUBEND
```

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.

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Software

E/A MODULE OWNERS

Our world famous "Bells, Bars, and Ratchets" is now available on diskette with speed critical routines written in assembly language. Enjoy our standard three-reel machine and our new four-reel machine—all in one complete package for $12.95 plus $1.50 for P&H. We use large, colorful figures and a beautifully engineered spinning motion—so realistic you will wonder where the coin slot is on your monitor. E/A module required. Gembar Graphics, 455 Amherst Circle East, Satellite Beach, Florida 32934. Florida Residents, please add 5%. Not just another slot machine program. *WARNING:* We are not responsible if you stay up all night playing this machine. v3,n10

BIRDSTRIKE

Jackson Software has introduced a new action game for the TI99/4A which makes the most of the computer's capabilities for color, graphics, animation, and music. BIRDSTRIKE is a different kind of game with many clever touches, stunning graphics, and a bit of humor. It requires Extended BASIC, and optionally utilizes joysticks and speech synthesizer. Take off from the city airport and immediately encounter a flock of birds. If unsuccessful at maneuvering through the flock, the plane enters a spin and plummets to the ground. Try again and there's no telling what you'll encounter—traffic 'copters, biplanes, jet trainers. Price is $15.00 for disk; $8.00 for cassette. Jackson Software, P.O. Box 2171, Attleboro MA 02703. v3,n10

ARTIST COMPANION #3

In the continuing series of supplemental graphic packages for TI Artist (version 2.0x), Artist's Companion #3 keeps the spirit alive! Included in the two disk package are 16 new and original fonts, plus 66 small instances. The fonts are simply awesome, and the instances are incredible. Only $9.95 (plus $1.50 shipping). Call or write for additional information and printed samples. Texaments, 53 Center Street, Patchogue, NY 11772, (516) 475-3480. v3,n10

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The only turbo copier specifically designed for the Myarc, CorComp and TI disk controller. Its longest copy time, with formatting, is 1 minute 17 seconds for a DS/DD 18 sector/track disk! Super fast, fully menu driven! Endorsed by Myarc for use with their disk controller card. Only $14.95. Requires 32K and disk system. Add $1.50 shipping. Texaments, 53 Center Street, Patchogue, NY 11772, (516) 475-3480. v3,n10

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