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MICROpendium

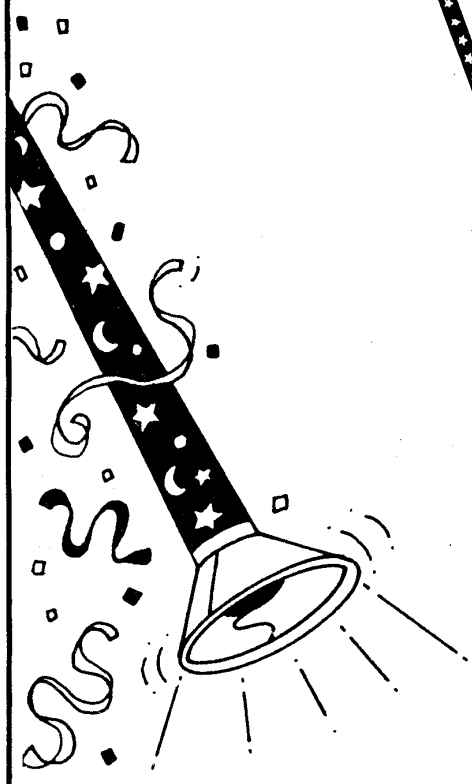
Volume 3 Number 12 January 1987 $1.50

INSIDE

CES in Germany
3D graphics
Mechatronics 80-column system
Rock Hopper game

REVIEWS

Myarc XBII
MG DISkASSEMBLER



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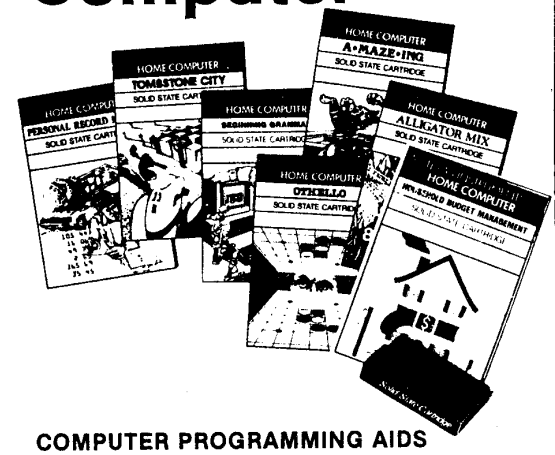

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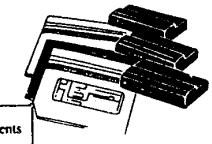

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Laura Burns.....**Editor**
Mack McCormick....**Technical Editor**

Coming next month

— Programming with a word processor
— TI Logo and turtle graphics
— Review of the Mechantronic TI-Mouse

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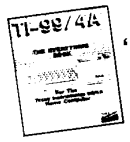

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Comments

The why of color, and a new year

As you see, we have color again this issue. We've received a fair number of compliments on it, but Merle Vogt of Von Ormy, Texas, wrote in to suggest that two more pages of User Notes would be preferable to color.

However, that isn't how the economics of publishing works. The color on the cover reflects the color in an ad or ads, for which an advertiser pays extra. Our first try with color was at the request (and expense) of Tex-Comp. This time it is courtesy of Myarc. (This is true of glossy full-color magazines you receive, also. Not all those pages will have the color illustrations. The art director has to plan it so that those pretty color photos of Madonna or the koala in its native habitat or whatever fall on what is known as the same "signature" as a color advertisement.)

Adding pages is another matter. Our printing process requires that we add eight at a time. This adds both printing and postage expense, so the last time we went as high as 56 pages was November, when we got a lot of pre-Christmas advertising.

FREEWARE LISTING GROWS

Printing and postage expense has gone up for our freeware list as well—one little page more, but it's put us "over the edge" as far as what we'll have to charge for it, so it is now available for $1.50 (Texas residents add 6.25% sales tax). The old price held for all last year and we hope this one can make it through another year. Additions continue to come in faster than deletions.

THIS COULD BE A GREAT YEAR

A number of exciting hardware innovations are expected to tug at the purse strings of TI users in 1987. Among these are Myarc's 9640 computer, MG's so-called PC card (a device that promises to turn the TI system into a PC) and Mechatronic's 80-column system. Big things may also happen with software. A number of companies have been working for months on software for the 9640, and if it takes off the support may well do the same. Little is known about the PC card but there's no shortage of PC software, at a price. And the 80-column system also promises advantages to TI users who'd like to see more of their spreadsheets, etc. on the monitor.

Here is is, more than three years since TI left the home computer market and the 99/4A is still going strong.

ON PROJECT KITS

The User Notes section includes information from Harold May about where to order boards for Mack McCormick's projects. While the boards are not made to order for the TI, they can be modified to suit a particular purpose. Which brings us to a suggestion from Mr. May about obtaining boards made to order for these projects. If there is enough interest, and agreement can be reached on which board design would be the most acceptable, MICROpendium would act as a conduit to have these boards designed and distributed to readers. Pricing, etc. would depend on the supplier. Let us know what specs a general purpose board should have and we'll take it from there.

WELCOME, REGENA

With this issue we welcome Regena as our new BASIC columnist. We're looking forward to every column. Let us know what direction you'd like to see her take.

TIDBITS, RUMORS AND GOSSIP

— For one large vendor, the top selling Christmas software was TI-Flyer and Typing Tutor. Pac Man and Donkey Kong also did well.

— Apparently, there is a version of Turbo Pascal for the TI, written by a European programmer. It is supposed to run with a standard TI system that includes a memory expansion. No P-code card needed. Unfortunately, as the story goes, the programmer is so concerned about piracy that it may never be marketed in this country.

— Not-Polyoptics says it will have its assembly language flight simulator program on the market by Feb. 1.

—JK

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
November: Submarine Commander, PEP, MAX-RLE
December: GK Utility I and II and GRAM Packer, X-10 Powerhouse, RAVE 99/101.

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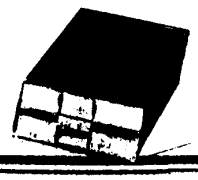

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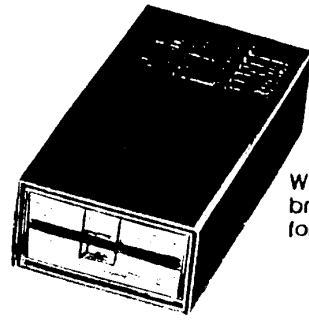

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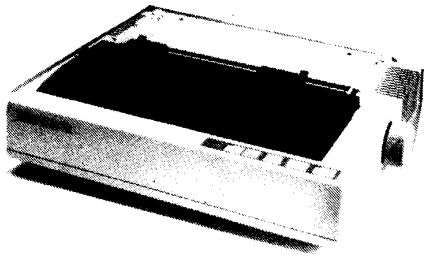

star NX-10

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Feedback

Once more, TI cares

One of our members, Marc Moyantcheff, who is handicapped to the extent that he must use his nose to operate the keyboard, is an active member of our Miami Users Group. Recently, TI in Lubbock has remodeled his console, so that the CTRL and FUNCTION keys have a lock, such as the Alpha Lock. All this work and the transportation, via air mail, was at TI's expense.

Burt Schreiber, Secretary
Miami Users Group
North Miami Beach, Florida

Problems in loading programs from tape

It has been a number of years since I added the first disk system to my 99/4 computer but I did experience similar problems to the letter in your November issue concerning loading programs from tape. After some playing with the system I found some things that work for me.

First, it seems that the first byte of a BASIC program on tape has the size of the program. At this point the computer determines whether it has capacity to load the program and immediately discontinues with an error message as described when the space is not available. Actually this is a real time saver when loading large programs from tape.

I found two options to this problem. The first is preferable since it is really quite convenient. The computer assigns 534 bytes to the disk operating system and 518 bytes of buffer for each file available to the system. There can be any number of files available from 1 to 9. The default number of files available is 3. Generally, typing "CALL FILES(1)" and then loading the program from tape will handle the problem. The extra 1K of RAM generally will do the trick.

Should this not work, the second option is to disconnect the disk system and load the program, then delete approximately 2K of program from the bottom end of the program and save on a separate tape. Then reload the program and delete about 2K from the front end of the program and save that back to tape. Next, reinstall the disk system and load the two reduced files, saving the first in merge format on the disk and then merging back to the other after loading. This is much more tedious, but when the option is to retype the program it doesn't seem so bad.

The other problem with disk file names with quotes involved has also occurred. I had the problem with trailing quotes only. What I did was to go to the disk manager and rename the file to eliminate these characters in the name. Then the files worked fine.

E.H. Dierks Jr.
Colbert, Washington

Wants digitizing card

Seems like in the last few issues I keep seeing a "wish list." Well, I'll tell you what's on my wish list for this machine, a digitizing card.

With all the neat graphic software coming out, Graphx and now MAX-RLE, I would sure like to plut a cheap little B/W TV camera into my TI and digitize a picture! So while MG is working on its TIPC9-Clone + 640toA-meg/slightlyBLUE machine, I think someone could come up with a digitizing board to stick in the P-box.

Also a word on pay services, you know the Source, CompuServe—well, I played on DELPHI for a while, but I think the best TI Roundtable right now is on GEnie. This board seems to get better every month. The TI files section now has some 500 downloads for the 99. If you want the latest version of FunlWriter or DM1000 or whatever, this is the board to get on.

And one last note, in your feedback section (Nov. '86), Mr. Dubeau has a real problem! I tried to save a file as DSK1."FILE-NAME". Error 67 won't let me do it, too many characters in the name. How in the world did he do it?

P.S., the little program I had in your magazine a few months back, to TOTAL a column in a TI-Writer document—well, I put the latest version on GEnie for anybody who wants it.

K.D. Wentzel
Charlotte, North Carolina

Read the manual

I find myself not able to go beyo- the "Comments" section of the December 1986 issue, as I see there is again a case of "NOT READING THE DOCUMENTATION" apparent with the reader who would like to do "column editing" with a word processor.

The answer is found on page 87 of the TI-Writer Manual. Simply, typing the column number of the first column in the range, a space, the last column in the range, another space and the "normal text commands will accomplish the desired effect (keeping in mind the "old" and "new" text should be enclosed in slashes "/").

A sample of deleting an entire column of information would be:

Position the cursor on the line before the line you wish to start correcting on, enter the Replace String function and type:

10 10 /Q//

This would look for all occurrences of "Q" in column 10 of each line in the document past the point of your cursor. Next, it would substitute the null-string (//) for each one. This could be changed by selecting a character to replace the "Q" instead of just deleting it. I might add that it is just as easy to delete a phrase, either in columns or rows throughout the document, by specifying the "//" (null-string) as a replacement for several words.

This will not look across paragraphs or forced page breaks (makes sense, the NewParagraph or NewPage character would be in the middle of the string).

It's just as easy to reduce a word to an abbreviation or synonym. Just enter the replace string as normal. Example: Replace "You" with "Me" be-

(Please turn to Page 10)

Feedback

(Continued from Page 8)

tween columns 10 and 12 is entered as RS 10 12 /You/Me/

I hope this helps your reader. He might check out some of the back issues of the W.W. 99'ers Newsletter, as I had a more complete write-up of TIW tips, etc., published there.

Our BBS number is 217-359-3431 24 hours 8 bit No parity 1 stop bit, 300-1200 Baud.

Jim Lewis
Champaign, Illinois

More on saving tape programs to disk

In response to the question of saving long tape programs to disk I have used a different method than what has been suggested which seems to work very well.

The problem seems to be in that when the drives are connected to the computer you lose about 3D of console memory. Cassette programs which are close to filling up the 16K console memory anyway will then not load into the computer because the computer does not think it has enough room even though you may have 32K. This is because programs which exceed the 16K console memory are saved in a different format (INT/VAR 254 instead of program format) and must be in INT/VAR 254 format in order to load them into the computer again when console memory is exceeded.

So let's say you have a cassette program which takes up almost all the 16K but will load with the disk drives off but not when they are on. To get that program onto disk and in the correct format so that you will not have any trouble loading it again you must do the following:

1. Type CALL FILES(1) and NEW. This frees up about 2K memory taken by the disk drives.

2. Now load your cassette program into memory while in XB.

3. Type SAVE DSK1.PROGRAM and your program will now be saved to disk. However, every time you need to load it you must repeat step 1 as the computer saved the file to disk in PROGRAM format thinking that you have enough console memory and that the 32K is not needed to hold the program when actually 32K is needed because you are cheating by using step 1. So you need that program saved to disk in INT/VAR 254 format (32K format, as I call it) so it can be loaded without the use of the CALL FILES.

4. With the CALL FILES still in effect (it stays in effect until you go back to the title screen or turn off the system) and with your program still in memory, type SAVE DSK1.PROGRAM,MERGE which erases your previous save and now saves your program in merge format.

5. Go back to the title screen and reenter XB (this clears your CALL FILES command). Now type MERGE DSK1.PROGRAM (this will take a while). When completed your program is now in memory without having to use CALL FILES and without having your disk drives turned off!

6. Save your program to disk once again by typing SAVE DSK1.PROGRAM which erases the program on disk in merge format and replaces it with a program in 32K format.

Now if you try to put this program back on cassette tape the computer will not allow you to do so as INF/VAR 254 files cannot be saved to cassette. So what you will have to do is type CALL FILES(1) and NEW then load your program off of disk and then save it to cassette. This way you again released 2K of memory so the computer does not think it needs 32K, so it will save your program back to cassette in its original format.

Keep in mind that anything exceeding console memory cannot be saved to cassette even though you may have 32K so if you modify your program (add lines) you may not be able to put that program onto cassette tape again.

This method has worked on all but one cassette program that I have, in which freeing up 2K was not enough for it to load as 1K is still used by the disk drives even though I used the CALL FILES, as that program took nearly every byte of the 16K memory. In this case Jerry Keisler's method in the December Feedback will have to be used.

Gary Cox
Memphis, Tennessee

Hardware aid sought

I have an interesting "problem" for one of the hardware hackers out there.

My disk system currently consists of one of the PHP 1800 (standalone) disk controllers and two SSSD drives.

Being a little bit "greedy," I would like to expand the system to DSDD. The problem is that the PHP 1800 will not support double-sided drives.

Correspondence with TI has led virtually nowhere. They could not (or would not) provide any information as to whether the controller could be sucessfully modified to support double-sided drives. I am hoping that some ingenious soul has been able to convert the PHP 1800 controller to function as a double-sided controller.

I have been able to determine from what sketchy information I could gather that the problem is not in the controller chip that was used in the drive but rather in the DSR ROM which was written to support only SSSD drives. Has anyone been able to make a "ROM transplant" to overcome the SSSD limitation?

Robert Carmany
Greensboro, North Carolina

Readers with information regarding this type of expansion are invited to write in with suggestions.—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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BASIC/XBASIC

Beginning hints and tips for programming in BASIC

By REGENA

I am honored to be asked to write this monthly column on TI BASIC and TI Extended BASIC. I got my first TI99/4A for Christmas of 1980, and it is still in use (right next to my newer TI99/4A models).

Many of you will remember I got my start in the computer world by writing for the 99'er Magazine, and I was their program editor for the first six issues. In 1982 I started writing for COMPUTE! Publications and wrote a monthly column on the TI until the October 1986 issue.

In 1983 I wrote *Programmer's Reference Guite to the TI-99/4A* (Compute! Books, 358 pages), in which I included about 40 of my programs in TI BASIC. I also edited COMPUTE!'s *First Book of TI Games*, which contains 29 games in BASIC and Extended BASIC.

While many of you TI owners expanded your TI system and went on to more hardware and more advanced computer languages, I stayed with BASIC. I acquired different brands of computers and wrote programs in their versions of BASIC and had articles published in several other magazines plus wrote several more books. My latest computers are the Amiga and the Atari ST, and I have written books on BASIC for those two computers.

The TI99/4 was my first microcomputer and is much like a "first love." I still enjoy programming on it, and often when I need a quick program I will go to this old favorite rather than one of the more expensive, newer computers. I have enjoyed visiting TI user groups and conventions and meeting many of you. I'm looking forward to writing for MICROpendium and keeping in touch with the TI world.

For this first column I'm just going to mention some beginning hints and tips for programming in BASIC. Many of them might be reminders to you experienced programmers, but I find that many of the TI users are first-time computer owners who are beginners.

First—always keep the Alpha-Lock key depressed when you are programming or running BASIC programs. The exceptions are when you are typing lowercase letters within quotes or when you are using joysticks. (If you have trouble moving "up" with joysticks, the Alpha-Lock key must be released.) BASIC commands need to be in capital letters.

When you type the + mark always use the left SHIFT key. If you use the right SHIFT key there is a possibility you could touch the FCTN key and QUIT.

While you are programming or typing in a program for a publication, SAVE the program every half hour or so. An unexpected power failure could cause a loss of lots of work. In Extended BASIC you should SAVE even more often because some of the TI Extended BASIC modules have a tendency to "lock up" easily. It is also a good idea to save your work on two separate cassettes or diskettes—just in case the power failure occurs while you are saving a program (in which case you would have part of a program saved on top of your back-up copy and neither one would load).

If you have the disk drive system and are not using file processing (other than saving or retrieving programs), gain more memory with

CALL FILES (1) (Press ENTER)
NEW (Press ENTER)

before you start programming or loading a program. If you have a program that doesn't want to load, it may be nearly full memory. This procedure may clear up enough memory to load the program. All of the programs I have written and published since 1982 will fit on disk but many do require this CALL FILES(1) procedure. One of the more common questions I get asked is why Type-Ette 2 (for example) won't run properly. There is a MEMORY FULL error. This CALL FILES(1) procedure will take care of that problem.

Take advantage of the RESequence command to renumber all the lines in the program plus any line referenced within a statement. If you are making a lot of program changes and need to insert lines, you might RES 100,50 to number your program lines starting with Line 100 and incrementing by 50. When you are all finished, you can make your program lines look nicely numbered again by 10s with RES.

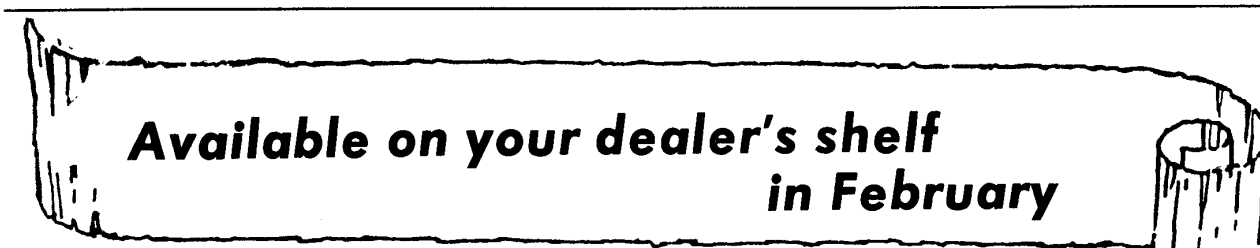
While you are entering programs or copying programs from publications, use the NUM command to number your lines automatically. Every time you press ENTER at the end of a line, that line is entered, then the next line number is printed automatically. To get out of the automatic numbering, simply press ENTER again. To start automatic numbering again at, for example, Line 860, use NUM 860.

The automatic numbering feature helps you avoid problems with run-together lines, such as when one line is exactly 28 characters and you think you have pressed ENTER because the cursor is at the next line. With automatic numbering you still need to press ENTER; then there will be a blank line, then a line with the number printed.

In TI BASIC the spaces are required between BASIC words. (Many versions of BASIC do not require the spaces.)

In TI BASIC each command must have its own line number. In TI Extended BASIC you may separate commands on one line with the double colon.

(See Page 14)



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BASIC/XBASIC—

(Continued from Page 12)

In TI BASIC printing statements, use the colon to go to the next line, and use multiple colons to print blank lines. Rather than saying PRINT several times, or using a FOR-NEXT loop such as

120 FOR P=1 TO 5
130 PRINT
140 NEXT P

you may use PRINT :::::"HELLO". In Extended BASIC use colons with spaces between them.

You cannot always run console BASIC programs in Extended BASIC. The main reasons they won't run are using graphics characters in Sets 15 and 16 (which are unavailable in Extended BASIC), using multiple colons in PRINT statements (the double colon indicates command delimiters in Extended BASIC), and not having enough memory (TI Extended BASIC does not have as much available memory but you can save memory by combining lines). The reason that most of my published programs are not in Extended BASIC is that the letters I get indicate 90 percent of the people reading my columns do not have Extended BASIC. I believe more MICROpendium readers may have it.

In future columns I will include actual programs with explanations of the programming techniques involved. I welcome mail with suggestions for topics for this column (Regena, P.O. Box 1502, Cedar City, Utah 84720). Although I am happy to help if you have questions on any of my programs, I do not have the time to review or debug your own programs or programs published by other authors.

This month I am including a short Extended BASIC program—just a little advertisement. Line 140 defines a function RS as a random number which will later be used in CALL SOUND statements to produce random tones. The longer CALL CHAR statements are defining four characters in one statement. X and Y are coordinates near the center of the screen for the starting point for the sprites. The last two numbers in the CALL SPRITE statements are velocities that move the character a certain direction. The second number in parentheses is a character number, which in this program is a letter of the alphabet. The FOR-NEXT loops are delay loops used in timing for the sprites. Lines 1190-1230 wait for you to press ENTER or the space bar to end the program.

ADVERTISING PROGRAM

```
100 REM XMICRO
110 REM TI EXTENDED BASIC
120 REM BY REGENA
130 CALL CLEAR
140 DEF RS=INT(1000*RND+262)
150 X=96 :: Y=128
160 ROW=3
170 RANDOMIZE
180 CALL SPRITE(#1,77,2,X,Y,-38,-35)
190 CALL CHAR(96,"FB848484848484C4C4C4C4C
4C4000000E0202020202020202020202020202")
200 FOR D=1 TO 60 :: NEXT D
210 CALL HCHAR(ROW,8,96)
220 CALL HCHAR(ROW,9,98)
230 CALL HCHAR(ROW+1,8,97)
240 CALL HCHAR(ROW+1,9,99)
250 CALL SOUND(100,RS,2)
260 CALL SPRITE(#1,73,2,X,Y,-38,-30)
270 CALL CHAR(100,"0000000000000008")
280 CALL CHAR(101,"808080808")
290 FOR D=1 TO 80 :: NEXT D
300 CALL HCHAR(ROW,10,100)
310 CALL HCHAR(ROW+1,10,101)
320 CALL CHAR(98,"E1212121212121")
330 CALL CHAR(99,"2121212121")
340 CALL SOUND(100,RS,2)
350 CALL SPRITE(#1,67,2,X,Y,-38,-23)
360 CALL CHAR(102,"FC0C")
370 CALL CHAR(103,"00000404FC")
380 FOR D=1 TO 90 :: NEXT D
390 CALL CHAR(100,"0704040404040484")
400 CALL HCHAR(ROW,11,102)
410 CALL CHAR(101,"8484848487")
420 CALL HCHAR(ROW+1,11,103)
430 CALL SOUND(100,RS,2)
440 CALL SPRITE(#1,82,2,X,Y,-35,-17)
450 CALL CHAR(104,"3F20202020203F30303030
3030000000E0202020202F010101010101")
460 FOR D=1 TO 90 :: NEXT D
470 CALL HCHAR(ROW,12,104)
480 CALL HCHAR(ROW,13,106)
490 CALL HCHAR(ROW+1,12,105)
500 CALL HCHAR(ROW+1,13,107)
510 CALL SOUND(100,RS,2)
520 CALL SPRITE(#1,79,2,X,Y,-30,-9)
530 CALL CHAR(108,"FF8080808080C0C0C0C0
C0FF000000C0404040404040404040404040C")
540 FOR D=1 TO 90 :: NEXT D
550 CALL HCHAR(ROW,14,108)
560 CALL HCHAR(ROW,15,110)
570 CALL HCHAR(ROW+1,14,109)
580 CALL HCHAR(ROW+1,15,111)
590 CALL SOUND(100,RS,2)
600 CALL SPRITE(#1,80,2,X,Y,-30,-4)
610 CALL CHAR(126,"0303")
620 CALL CHAR(112,"0000000000F80808")
630 CALL CHAR(113,"08080808F8")
640 FOR D=1 TO 90 :: NEXT D
650 CALL HCHAR(ROW,16,112)
660 CALL CHAR(110,"C040404040434242")
670 CALL CHAR(111,"4242424203030303")
680 CALL HCHAR(ROW+1,16,113)
690 CALL HCHAR(ROW+2,15,126)
700 CALL SOUND(100,RS,2)
710 CALL SPRITE(#1,69,2,X,Y,-30,2)
```

(See Page 16)

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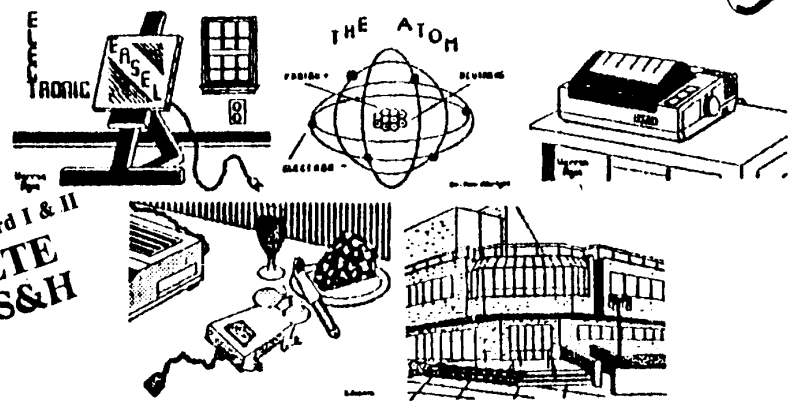

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ADVERTISING—

(Continued from Page 14)

```
720 CALL CHAR(114,"00000000007F6161")
730 CALL CHAR(115,"7F6060617F")
740 FOR D=1 TO 120 :: NEXT D
750 CALL HCHAR(ROW,17,114)
760 CALL HCHAR(ROW+1,17,115)
770 CALL SOUND(100,RS,2)
780 CALL SPRITE(#1,78,2,X,Y,-30,5)
790 CALL CHAR(116,"00000000000F08080C0C0C
0C0C000000000000000E02020202020202")
800 FOR D=1 TO 80 :: NEXT D
810 CALL HCHAR(ROW,18,116)
820 CALL HCHAR(ROW,19,118)
830 CALL HCHAR(ROW+1,18,117)
840 CALL HCHAR(ROW+1,19,119)
850 CALL SOUND(100,RS,2)
860 CALL SPRITE(#1,68,2,X,Y,-30,9)
870 CALL CHAR(120,"0404040404FC8484848484
84FC000000002000000020202030303030303")
880 FOR D=1 TO 100 :: NEXT D
890 CALL HCHAR(ROW,20,120)
900 CALL HCHAR(ROW+1,20,121)
910 CALL CHAR(118,"0000000000E12121")
920 CALL CHAR(119,"2121212121")
930 CALL SOUND(100,RS,2)
940 CALL SPRITE(#1,73,2,X,Y,-35,15)
950 FOR D=1 TO 170 :: NEXT D
960 CALL HCHAR(ROW,21,122)
970 CALL HCHAR(ROW+1,21,123)
980 CALL SOUND(100,RS,2)
990 CALL SPRITE(#1,85,2,X,Y,-38,20)
1000 CALL CHAR(124,"0000000000828282")
1010 CALL CHAR(125,"C2C2C2C2FE")
1020 FOR D=1 TO 100 :: NEXT D
1030 CALL HCHAR(ROW,22,124)
1040 CALL HCHAR(ROW+1,22,125)
1050 CALL SOUND(100,RS,2)
1060 CALL SPRITE(#1,77,2,X,Y,-38,25)
1070 CALL CHAR(128,"00000000001F111119191
919190000000000000000F01010101010101")
1080 FOR D=1 TO 70 :: NEXT D
1090 CALL HCHAR(ROW,23,128)
1100 CALL HCHAR(ROW,24,130)
1110 CALL HCHAR(ROW+1,23,129)
1120 CALL HCHAR(ROW+1,24,131)
1130 CALL SOUND(100,RS,2)
1140 CALL DELSPRITE(#1)
1150 DISPLAY AT(8,6):"P. O. BOX 1343"
1160 DISPLAY AT(10,6):"ROUND ROCK, TX  78
680"
1170 DISPLAY AT(20,6):"SUBSCRIPTION:"
1180 DISPLAY AT(22,6):"$17 FOR 12 ISSUES"
1190 CALL KEY(0,K,S)
1200 IF (K<>13)*(K<>32)THEN 1190
1210 CALL HCHAR(ROW,1,32,96)
1220 DISPLAY AT(5,6):"MICROpendium"
1230 END
```

—Part II of a series—

Creating SYLK files in BASIC

Multiplan machinations

By BILL HARMS

This is the second of two articles describing how to to use BASIC programs to create Symbolic Link (SYLK) files to load data in Microsoft Multiplan—Ed.

More on BASIC programs that create Symbolic Link (SYLK) files to load data into Microsoft's Multiplan.

The first article showed how to create a Multiplan SYLK file for one cell. It described only a few of the many SYLK symbols. (See pages 205-208 of the Multiplan manual for a complete list.)

The most significant change in this month's program is that it can create a file with many cells—a couple of columns of data.

After using this program, you could load the file into Multiplan and save it as a *Normal* file. Then you could *eXternal Copy* it or parts of it into another spreadsheet that has formulas and other data. You might load a month's worth of information into a sheet that has many months of data, plus formulas for calculating Year-to-Date, Average, Units per Time Period, etc.

As I mentioned last month, the BASIC program must write a Display Fixed 128 file. The File Descriptor Record (FDR), or header, must be changed to make it look as if the file is Internal Fixed 128. Otherwise, Multiplan cannot read it. The only trick is to find the FDR!

This is not an insurmountable problem, however, as it is easy to change the FDR with a sector editor. Change byte 12 of the FDR for your SYLK file from Hex 0002 to Hex 0202. The FDR's are in Sectors 2 through 32.

Each SYLK record (files are made up of records) can include cell content (text, numeric value or formula), row and/or column numbers, and many other symbols to describe windows, sheet boundaries, formatting of sheet and individual cells, sheet links and more. In fact, just about everything may be included, except Multiplan commands such as *COPY* and *DELETE*.

Your cell content data may be split into more than one record. You just keep on creating 128 character records of SYLK symbols and data until you run out of information that you want put into the SYLK file. Then you fill the last record in the SYLK file with nulls—CHR$(0)—so that it is 128 characters long.

Last month's program had 27 nulls, which made it a 73-byte record. I couldn't get it to load using a larger number of nulls (such as 123). I found the key in Richard Mitchell's program, published in the May, June and August, 1985 Super 99 Monthly.

You continue building a string (numerics are included via STR$(xx)), using the ampersand to concatenate each new symbol or data item onto the string as you go until the LENgth of the string exceeds 128. Then you print the first 128 characters of the string into your disk SYLK file. Right after printing you move any characters in your string beyond 128 to a temporary variable.

Then you move the remaining characters back into your main string and continue building until it has more than 128 characters again, and you do another print to disk of another SYLK record.

There are two types of SYLK symbols: Record Type Descriptors (RTD) of 1 or 2 characters; and Field Type Descriptors (FTD) which are preceded by a semicolon. These need to be surrounded by double quote marks (not mentioned in the Multiplan manual). Carriage returns and linefeeds are used to separate SYLK record types—a Record Type or RTD is a SYLK symbol while a record is part of a file; records contain record types.

Lets look at a sample: "C;K". This is an RTD C, which means that it is a data point. The FTD ;K means that the value of the data point follows. Once you set a row or column number with the RTD C and FTD of, say, ;Y (for row), all the remaining data points (;K or ;E) are put at that row. You only need give another "C;X" or "C;Y" when changing the row (;Y) or column (;X) of the data point.

One of the fastest ways to learn the correct formatting of SYLK records is to enter some stuff into Multiplan and save the sheet in Symbolic format. Then you can look at the file with a sector editor.

The following program creates a SYLK file of 2 columns with 4 rows of values and a formula for the sum of the second column. The second column is *NAMEd* per your choice.

NAMEing is a Multiplan technique. It is quite helpful, since a name of a cell or a range of cells can be used in a formula; to wit, SALES-COST (SALES minus COST). You would have NAMEd some cells "SALES" and some others "COST," so the cell with this formula yields the profit. It could be named "PROFIT."

A normal formula might look like R4C6-R9C6. For a bunch of stuff you might use SUM(R1:40C3)+SUM(R90 C4:5). Relative references (relative to the cell that has the formula), as in my program, look like SUM(R[-5]C:R[-2]C).

The whole sheet looks like this when loaded into Multiplan:

(See Page 20)

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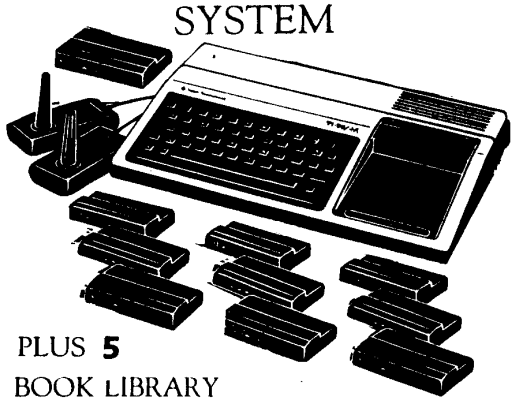

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MULTIPLAN MACHINATIONS—

(Continued from Page 18)

```
column >> 1              2
   1 18          15
   2 1           75
r  3 33          199
o  4 400         77
w  5             ------
   6             366
```

The value in R6C2 (366) is from the formula SUM(R[-5]C:R[-2]C).

Using a sector editor, we can see the whole sheet!

```
I D ; P M P * * F ; W 1   2
  6 * * F ; D G 2 G 8 * * B
; Y 7 ; X 3 * * N N ; N W H
H ; E R 1 : 6 C 2 * * C ; Y
6 ; X 2 ; E S U M ( R [ - 5
] C : R [ - 2 ] C ) * * C ;
X 1 C ; Y 1 ; K 1 8 * * C ;
Y 2 ; K 1 * * C ; Y 3 ; K 3
3 * * C ; Y 4 ; K 4 0 0 * *
C ; X 2 C ; Y 1 ; K 1 5 * *
C ; Y 2 ; K 7 5 * * C ; Y 3
; K 1 9 9 * * C ; Y 4 ; K 7
7 * * C ; Y 5 ; K " - - - -
- - " * * W ; N 1 ; A 1   1
* * E * * * * * * * * * * *
```

The 128 Character SYLK record ends after the fourth character in the 15th line. This is also the end of the SYLK file.

Mitchell's program reads a Display Variable 80 file and writes the data into a SYLK file that Multiplan can read. It has one word processor line on each row with five nice columns. You could adapt it to several uses.

Multiplan has a 255-row and 64-column limit. I have found that about 23 columns and 40 rows of formulas, data and labels (text) is about all that the 4A's RAM can hold.

The program I wrote, which is based on Mitchell's, follows. These comments may help you understand it.

Line 300 adds sheet identification, windows, format and bounds.

Line 310 adds the name you inputted in line 280 and the range for that name (R1:6C2).

Line 320 adds the formula for R6C2.

Line 400 adds the cell content as numerics (here taken from the array AMT).

Lines 370, 450 and 470 work together to ensure that each record is 128 characters long.

(See Page 22)

SYLK SPREADSHEET

```
50 ! ON DISK: SYLK *11/24
100 DISPLAY AT(1,5)ERASE ALL:"A SMALL SPREADSHEET"
110 ! data input section ********
114 OPTION BASE 1
115 DIM AMT(4,2)! array for input data *****
120 DATA 18,15
121 DATA 1,75
122 DATA 33,199
123 DATA 400,77
125 FOR A=1 TO 4 ! rows
126 FOR B=1 TO 2 ! columns
128 READ AMT(A,B)
129 NEXT B :: NEXT A
130 ! end of input routine ***********
131 !
190 DISPLAY AT(6,1):"ENTER DESIRED SYLK FILE NAME  DSK"
200 ACCEPT AT(7,4)BEEP SIZE(-15):FILE2$ :: IF FILE2$="" TH
EN 200
210 OPEN #2:FILE2$,DISPLAY ,FIXED 128,OUTPUT
215 DISPLAY AT(9,1):"Enter DESIRED name for 2nd column. "
 :: ACCEPT AT(10,10)SIZE(10)VALIDATE(UALPHA):NAME$ :: IF N
AME$="" THEN 215
220 R$=CHR$(13)&CHR$(10)
230 T$="ID;PMP"&R$&"F;W1 2 6"&R$&"F;DG2G8"&R$&"B;Y"&STR$(A
+2)&";X"&STR$(B)&R$
231 T$=T$&"NN;N"&NAME$&";ER1:6C2"&R$
232 T$=T$&"C;Y6;X2"&";ESUM(R[-5]C:R[-2]C)"&R$
233 !
250 FOR COL=1 TO 2
260 T$=T$&"C;X"&STR$(COL)
270 FOR ROW=1 TO A-1
280 IF LEN(T$)>128 THEN CALL WRITE(T$,T1$):: T$=T1$
290 T$=T$&"C"
300 T$=T$&";Y"&STR$(ROW)
305 T$=T$&";K"&STR$(AMT(ROW,COL))&R$
310 NEXT ROW
320 NEXT COL
321 !
325 T$=T$&"C;Y"&STR$(ROW)&";K"&CHR$(34)&"------"&CHR$(34)&
R$
330 IF LEN(T$)>128 THEN CALL WRITE(T$,T1$):: T$=T1$
350 T$=T$&"W;N1;A1 1"&R$&"E"&R$
360 IF LEN(T$)>128 THEN CALL WRITE(T$,T1$):: T$=T1$
370 PRINT #2:T$&RPT$(CHR$(0),128-LEN(T$))
380 CLOSE #2
390 SUB WRITE(T$,T1$)
400 PRINT #2:SEG$(T$,1,128)
410 T1$=SEG$(T$,129,LEN(T$)-128)
420 SUBEND
```

Number 1 McCann Software News January 1987

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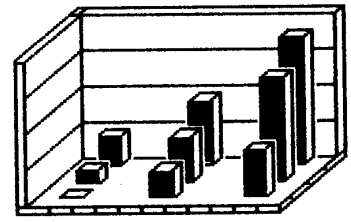

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One advantage of GPL is easy access to your peripherals

By DALE FOOTE
and JOHN CLULOW

One of the advantages offered by GPL (Graphics Programming Language) is easy access to routines built into the console. In the process of learning GPL, we decided to try accessing the disk drive and printer with these routines. It turned out to be pretty easy to do, and we want to share the method with others who are learning GPL.

Using the *TI99/4A Intern* book we found the routine at H03D9 (page 102). With the comments provided in the book, we figured out what inut the routine required. Use of the routine is similar to use of the DSRLNK routine in assembly language.

A PAB (Peripheral Access Block) is written to VDP RAM just as in assembly language programs (see pages 291-304 of the TI Editor/Assembler manual). H8356 must contain the VDP address of the file name length in the PAB. Then the GPL DSRLNK is access using a CALL statement followed by a BYTE 8 statement. This takes the place of DATA 8 used in the assembly DSRLNK.

The CALL statement uses an entry in the "jump table" beginning at H0010 (GROM 0). The jump table is just a series of Branch if Reset (BR) statements to various routines. The first entry is the one for the GPL DSRLNK routine (Intern page 97). It is a good idea to use the jump table rather than the H03D9 address because TI changed the GROM contents in different versions of the console. The jump table will always contain the correct starting address for the DSRLNK and other routines in GROM.

The sample program illustrates use of the GPL DSRLNK. The program opens the DIS/VAR 80 file "DSK1.X", writes a test record to it, and then closes the file.

```
0001  * DEMO GPL PROGRAM - USE OF GPL DSRLNK
0002          DATA >AA01 * STANDARD GROM HEADER
0003          DATA 0     * ALWAYS ZERO
0004          DATA 0     * POWER-UP HEADER
0005          DATA LIST  * USER PROGRAM HEADER
0006          DATA 0     * DSR HEADER
0007          DATA 0     * SUBROUTINE LINK HEADER
0008          DATA 0     * INTERRUPT LINK HEADER
0009          DATA 0     * BASIC SUBROUTINE HEADER
0010  LIST    DATA 0     * NEXT ENTRY. 0 MEANS LAST ONE.
0011          DATA OPEN  * PROGRAM BEGINS AT 'OPEN'
0012          STRI 'DSR' * NAME ON MENU SCREEN
0013  * LABELS & PROGRAM DATA
0014  DSRLNK EQU  >0010 * SUBROUTINE DSRLNK ADDRESS
0015  PAB    EQU  >0FE0 * VDP ADDRESS OF THE PAB
0016  LENGTH EQU  >8356 * ADDRESS LENGTH BYTE POINTER
0017  BUF    EQU  >1000 * BUFFER FOR RECORD DATA
0018  WRITE  EQU  >03   * OPCODE FOR WRITE
0019  CLOSE  EQU  >01   * OPCODE FOR CLOSE
0020  REC    TEXT 'THIS IS A TEST RECORD' * 21 BYTES
0021  PDATA  DATA >0010,>1000,>5050,0 * 1ST 8 BYTES PAB
0022         DATA >0006                * NAME IS 6 BYTES
0023         TEXT 'DSK1.X'             * FILENAME
0024  *
0025  * OPEN THE FILE "DSK1.X"
0026  *
0027  OPEN   MOVE 16,G@PDATA,V@PAB * WRITE PAB TO VDPRAM
0028         DST  PAB+9,@LENGTH    * POINTER TO NAME LENGTH
0029         CALL DSRLNK           * RUN THE SUBROUTINE
0030         BYTE 8                * LIKE 'DATA 8' IN ASSM
0031  * WRITE TEST RECORD TO THE FILE
0032         MOVE 21,G@REC,V@BUF * SET UP VDPRAM BUF
0033         ST   WRITE,V@PAB    * DSRLNK WRITE OPCODE
0034         ST   21,V@PAB+5     * CHARACTER COUNT
0035         DST  PAB+9,@LENGTH  * POINTER TO NAME LENGTH
0036         CALL DSRLNK         * RUN THE SUBROUTINE
0037         BYTE 8              * LIKE 'DATA 8' IN ASSM
0038  * CLOSE THE "DSK1.X" FILE
0039         ST   CLOSE,V@PAB    * DSRLNK CLOSE OPCODE
0040         DST  PAB+9,@LENGTH  * POINTER TO NAME LENGTH
0041         CALL DSRLNK         * RUN THE SUBROUTINE
0042         BYTE 8              * LIKE 'DATA 8' IN ASSM
0043         RTN                 * RETURN TO CALLING PGM
0044         END                 * STOP ASSEMBLY
```

MULTIPLAN MACHINATIONS—

(Continued from Page 20)

Lines 510 through 540 write the SYLK records to disk.

Rather than using DATA statements you may decide to use a file INPUT statement, in which case you wouldn't use the READ statement in line 210.

Remember, that after running this program, you will need to change the FDR to 0202. And, before you attempt to load this SYLK file into Multiplan, make sure to select the Symbolic option from the Multiplan (T)ransfer menu.

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— Part IV of a 4-part series —

3D graphics for the TI

By DARREN LEONARD

As the doldrums of January set in, what could be more exciting than graphics on the TI?

I left off (Nov. '86) discussing how a point should be rotated about the origin (0,0) of the coordinate axis. As given in a previous example, the most efficient method of doing this is to rotate just the endpoints of the shape about the coordinate axis, then to connect the points with a line-drawing subroutine.

As president of the Pittsburgh Users Group, I have had some input from the members about the previous three articles. Most people have found them interesting, but I find that there are two groups of people: those who are great with mathematics, and those who aren't.

In order to please both groups, I am going to cater to the nonmathematicians at first; then, after a concept is introduced, I will give a short explanation of an idea that may be used to do more complicated things for those who have no difficulty in matrix algebra.

If you look at Fig. 1, you will see a point at five possible locations. Both are the same distance from the center of the coordinates. If you construct a circle (dotted in the figure) that has its radius the same length as the distance of the point from the center, you will notice that the point is moving on the circle as it rotates about the origin. Its distance will always be the same and equal to the radius of the circle.

Now, let us examine closely what is happening as the point rotates the angle theta (θ) about the origin. We will start at point 1 in Fig. 2, and end at point 2.

The coordinates of point 1 are:
Y$ = L*Sin(θ) and X1 = L*Cos(θ)
Where L is the distance of the point from the origin.

The coordinates of point 2 are:

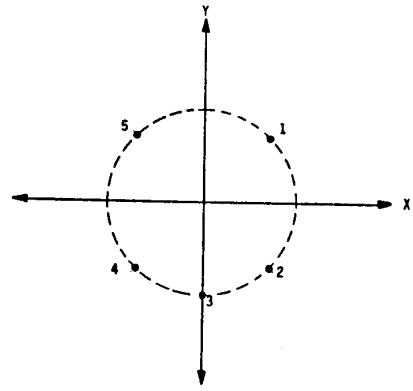

Fig. 1

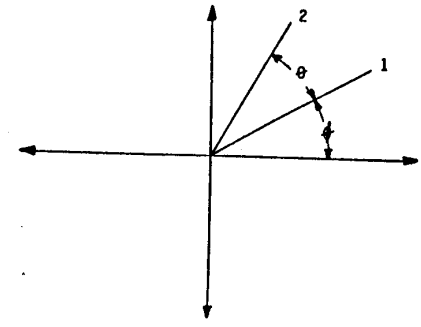

Fig. 2

$Y1 = L*Sin(\theta + \theta)$ and
$X2 = L*Cos(\theta + \theta)$

Using the double angle theorem from any trigonometry book, these equations lead to:

Equation a:
$Y2 = X1*Sin(\theta) + Y1*Cos(\theta)$
and
Equation b:
$X2 = X1*Cos(\theta) - Y1*Sin(\theta)$

These equations are for counterclockwise rotation. If you would rather rotate in the clockwise direction just multiply the Sin terms in both equations by -1.

Remember that theta must be in radians. Now all you need do is to have a small subroutine added to the programs in the last article in this series to "rotate" each endpoint of the shape. Once each endpoint is rotated, then all of the new endpoints are connected using the same technique as in last month's program.

For those of you able to work with arrays, the matrix notation of the rotation transformation is

$$\begin{pmatrix} X2 \\ Y2 \end{pmatrix} = \begin{bmatrix} Cos(\theta) & -Sin(\theta) \\ Sin(\theta) & Cos(\theta) \end{bmatrix} \begin{pmatrix} X1 \\ Y1 \end{pmatrix}$$

Enough for 2D rotation. There is one more quick 2D transformation I would like to mention. If you have worked with any of the fantastic graphics programs such as TI-Artist, you will have noticed a Mirror function. A mirror function "reflects" a point about either the X-axis or Y-axis. If your point is at (X1,Y1) and you want to reflect it about the X-axis, just multiply Y1 by -1. On the other hand, if you would like to reflect it about the Y-axis, multiply X1 by -1. A quick glimpse at Fig. 3 should be enough to give you the idea. This is by far the

(See Page 26)

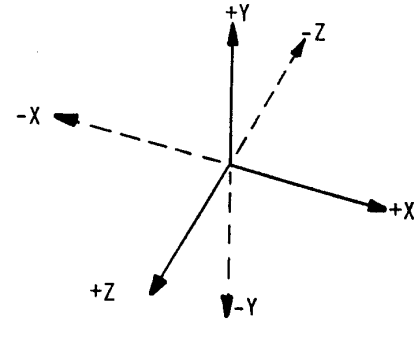

Fig. 3

3D GRAPHICS FOR THE TI—

(Continued from Page 24)

easiest of the transformations and you should encounter little difficulty incorporating it as a subroutine in a program like that printed in the November CAD article.

Well, here is the moment you have been waiting for; yes, I am now going to start on 3D graphics.

First of all, we must establish a convention for 3D space. In 2D space, we use the X axis to give relative horizontal distance and the Y axis to give relative vertical distance. What the previous 2D examples are missing is depth. If we introduce a Z axis that is positive coming directly at you and negative going away from you, we have a way of expressing depth. The Z axis intersects the X and Y axis at right angles and looks like Fig. 3.

Imagine that you are holding a cube (such as Rubik's) and are looking at one of the corners. You can give the position of any particular colored square by indicating how many squares you would have to move in each of the three possible directions to get to it. Take a quick look at Fig. 4.

Imagine trying to explain the position of the striped square to someone holding the cube with a blindfold on. You could tell that person it is at 1 space in the X, Y and Z directions. Similarly, the checkerboard square is 1 in the X direction, 3 in the Y direction and 2 in the Z direction. Just to make sure you are following me, the diagonally striped cube is at X=3, Y=3 and Z=3.

You would have an idea of a three-dimensional cartesian coordinate system. Let's proceed.

If you are holding that same cube at arm's length, you can see several different views (perspectives) by rotating the block about either the X, Y or Z axis.

Rotating about the X-axis allows you to see the top or bottom. Rotating about the Y-axis enables the left or right sides of the cube. Rotating about the Z-axis is the same as 2D rotation described before; it rotates the front view about the origin.

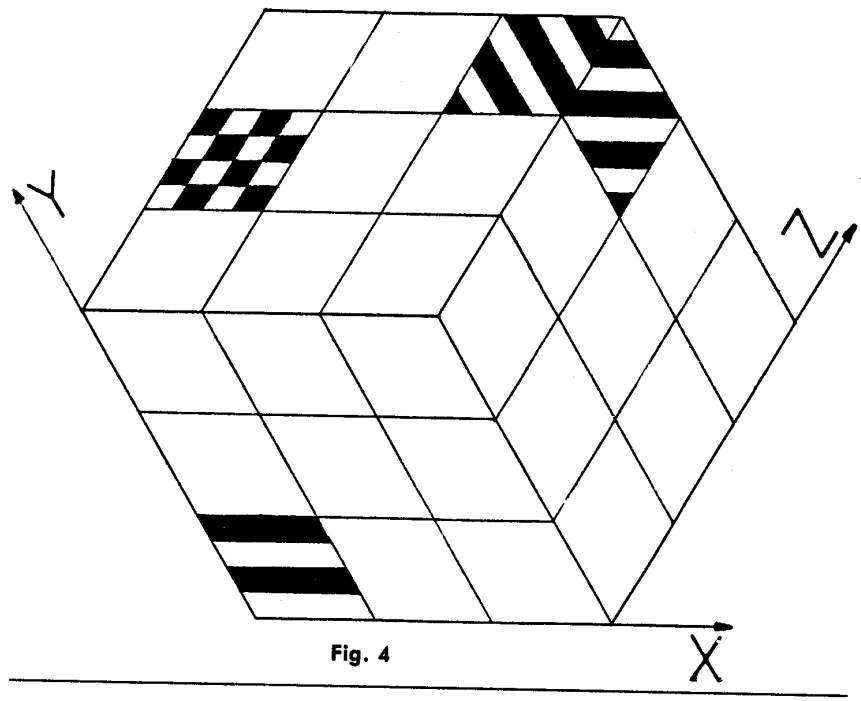

Fig. 4

It is important to remember that if you want to rotate the shape and not move it, you must have the shape positioned about the origin. In Fig. 5A, the square is rotated 45 degrees about the origin, which is at its center, so that the square is only rotated. In Fig. 5B, the square is not at the center, so that, as the square is rotated 45 degrees, it moves. This is an important consideration.

If you wish to rotate a shape about its center without moving it, determine the offset distance of its center from the origin and subtract the offset in the X direction to the X-coordinate of the endpoints, and then subtract the Y-offset from the Y-coordinate of each point. Then rotate the shape, but before you store the data for the coordinates, add the offset to obtain the position of the rotated shape.

Graphically, this operation looks like Figs. 6A and 6B.

In 6A, the original shape at one is moved (translated) to the origin and is now at point 2. Now in Fig. 6B the

(See Page 28)

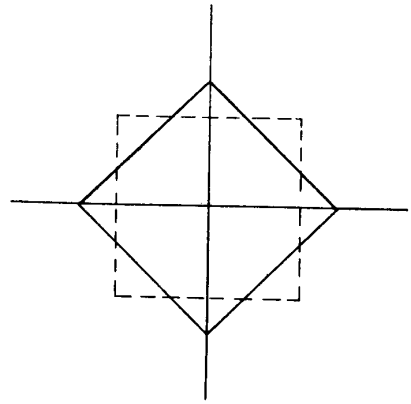

Fig. 5A

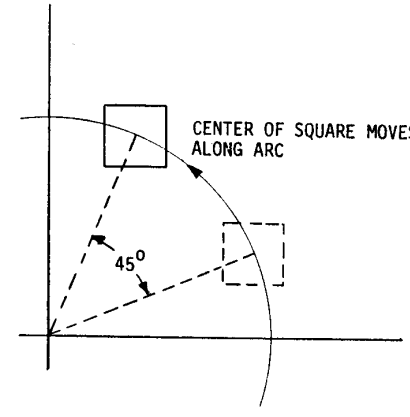

Fig. 5B

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CorComp 256K Stand Alone	249.95
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NEW Triple Tech P-Box Card (Clock/Buffer)	109.95
NEW 9900 Clock Stand Alone	69.95
"Grom Buster" (for 1983 Consoles)	24.95
Load Interupt Switch (with **FREE** Screen Dump Program)	19.95
NEW PDI Diagnostic Module	24.95
Also available from TEX-COMP	
TI-99/4A Console w/1-year warranty (Black & Silver model)	79.95
NEW Star NX-10 (Fully TI Compatible). Replaces SG-10 solid state dipswitch selection—Free Cleaning Kit	New Lower Price **239.95**
½-Height DS/DD Disk Drive (2 will fit in P-Box)	99.95
Full Size SS/SD Disk Drive (exact replacement for TI 1250)	79.95
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Drive Enclosure with Regulated Power Supply for 2 ½-height or 1 full Drive	59.95
Cable Kit for 2 ½-height Drives (for installation in P-Box)	29.95
Cable Kit for Stand-Alone Drives (specify TI or CorComp system)	29.95
RS2323 Y-Cable	10.95

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3D GRAPHICS FOR THE TI—

(Continued from Page 26)

shape is rotated about the origin and is now at position 3; finally, the shape is moved back to position 4 and is what the square at point 1 would be when rotated about its center.

The derivations of three-dimensional rotations are somewhat involved and difficult to follow, so I will just give you the necessary formulas to accomplish this.

Just to satisfy any curiosity, the concept is to determine the projection of the point on the X-Y plane (i.e., the screen).

Starting off with a point at X1,Y1,Z1 and rotation about the Y-axis, the equations are:

$X2 = X1*\cos(\theta) - Z1*\sin(\theta)$

$Y2 = Y1$

$Z2 = X1*\sin(\theta) + Z1*\cos(\theta)$

where 0 is the angle of rotation about the Y-axis.

In matrix form, this is given as

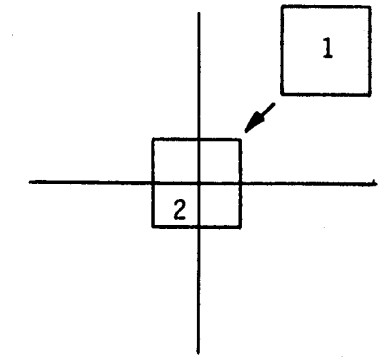

Fig. 6A

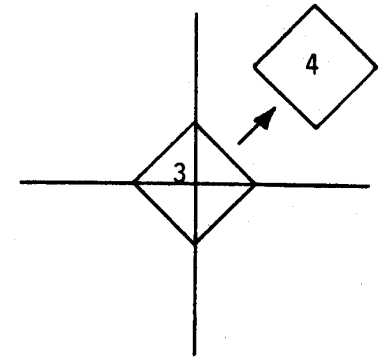

Fig. 6B

$$\begin{pmatrix} X2 \\ Y2 \\ Z2 \\ 1 \end{pmatrix} = \begin{bmatrix} \cos(\theta) & 0 & -\sin(\theta) & 0 \\ 0 & 1 & 0 & 0 \\ \sin(\theta) & 0 & \cos(\theta) & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} \begin{pmatrix} X1 \\ Y1 \\ Z1 \\ 1 \end{pmatrix}$$

The ones are dummy values that are needed for matrix multiplication.

For rotation about the X-axis the equations are:

$X2 = X1$

$Y2 = Y1*\cos(\theta) - Z1*\sin(\theta)$

where 0 is the angle of rotation about the X-axis.

This rotation in matrix form is

$$\begin{pmatrix} X2 \\ Y2 \\ Z2 \\ 1 \end{pmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & \cos(\theta) & -\sin(\theta) & 0 \\ 0 & \sin(\theta) & \cos(\theta) & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{pmatrix} X1 \\ Y1 \\ Z1 \\ 1 \end{pmatrix}$$

And for rotation about the Z-axis, the equations are:

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3D GRAPHICS FOR THE TI—

(Continued from Page 28)

$X2 = X1*\cos(\theta) - Y1*\sin(\theta)$
$Y2 = X1*\sin(\theta) + Y1*\cos(\theta)$
$Z2 = Z1$

where 0 is the angle of rotation about the Z-axis.

The matrix notation for this is:

$$\begin{pmatrix} X2 \\ Y2 \\ Z2 \\ 1 \end{pmatrix} = \begin{bmatrix} \cos(\theta) & -\sin(\theta) & 0 & 0 \\ \sin(\theta) & \cos(\theta) & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{pmatrix} X1 \\ Y1 \\ Z1 \\ 1 \end{pmatrix}$$

If you want to rotate about more than one axis, you must use more than one set of equations. For example, if you wish to rotate about the X and Y axis, you must first rotate the shape about the X-axis, then rotate it about the Y-axis. In other words, this is not a one-step transformation.

It is important to realize that the matrices are the best way of handling this type of operation, but when a number of points are to be rotated to redefine a shape, be patient, as your computer is required to do a lot of number crunching and may take a few minutes to do this.

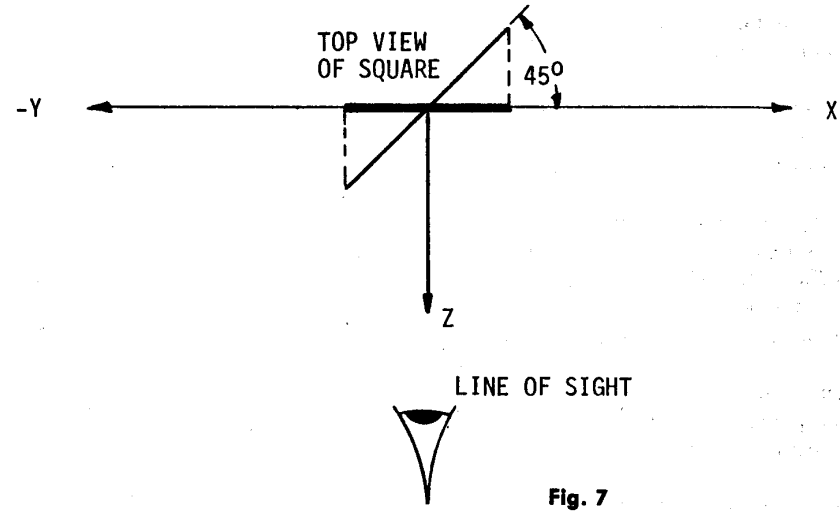


Fig. 7

By now, you might be wondering how you can plot a point that has three coordinates on a two-dimensional screen. It sounds really difficult, but in fact, it is so easy that it is hard to believe that it works.

Remember I said that the Z-axis is coming right out of your screen at you. Thus you are viewing what is on the

(See Page 30)

3D GRAPHICS FOR THE TI—

(Continued from Page 29)

X-Y plane. Rotation merely changes the perspective of the viewer. So all you need to do is project the image on your screen to get a 3D effect. Examine Fig. 7 for a minute.

X1,Z1 are the coordinates of the screen with Z1 pointed right at you. Thus you are looking at the shape down the Z1-axis. The axis is coming out of the paper.

For simplicity, this shape has been rotated about the Y1-axis only; therefore, only the X and Z values change. If the shape is a square, rotated 45 degrees about the Y1-axis, try to imagine what you would see looking along the Z1 axis. What you would see is the "projected" line on the X-axis, the thick line in the picture.

After a few minutes thought, it can be deduced that, since the rotation is relative to X1,Y1,Z1 and the screen is always X1,Y1, all you need to plot the point are the X and Y coordinates! The Z values are needed for the equations to determine the proper rotations, but you do not need to use them for your plotting.

Since this is the case, you can use the PUTDOT subroutine to plot your point.

But what about a shape? The first thing to do if you are going to plot a shape is to draw a rough sketch of it and determine the coordinates of each point in terms of the three axes. Then determine which points are to be connected. Keep track of this in your program. Now enter the coordinates of the endpoints into an array, and keep track of them using another array to control which points are to be connected.

It is simplest to write three independent subroutines for rotation about each of the three axes. Rotate each of the endpoints using the equations (or matrices) given previously and store the new values in another array. Now connect the points that are to be connected using the line subroutine included in previous articles. Remember that only the X and Y coordinates are used to plot the shape!

Other transformations such as translation, scaling and reflection are used in the same manner as in 2D. Just keep track of which direction you are working in.

A few pointers that may help you out:

Do keep track on paper of what you are trying to do.

Don't try to work with large shapes, since they may exceed the capacity of the PUTDOT, and larger shapes take a long time to plot.

Don't try to use complex shapes until you are very sure of yourself, as they can be very frustrating.

Do use a cube as your first shape.

Do be patient.

I have provided you with the concepts that will enable you to plot and manipulate simple shapes. If you can program with arrays in BASIC, you should be able to use these ideas in your own programs.

Tax form generation disk package for Multiplan

Bill Chauvanne is offering a tax form generation package for the TI99/4A, which he says creates forms usable for the Internal Revenue Service.

He says the Multiplan program can link to other Multiplan records and is approved by the IRS. This is his fourth year to use the program, he says.

Forms available are 1040A, 1040EZ, W4 page 3, 1040X, 2106, 2441, 3903, 6251 and Schedules 1, G, A, B, D, E and W.

The program requires Multiplan, 32K expansion memory, disk system and a printer which prints 17 characters per inch.

Chauvanne says the basic long form disk is $9.95 and three other disks are $19.95 each. These are the assemblage of short forms, the disk with special schedules and the disk with other forms.

For further information write Chauvanne at 4549 English Ave., Fort Mead MD 20755 or phone (301) 672-1980.

Rock Hopper

Hop the rocks and save Shari

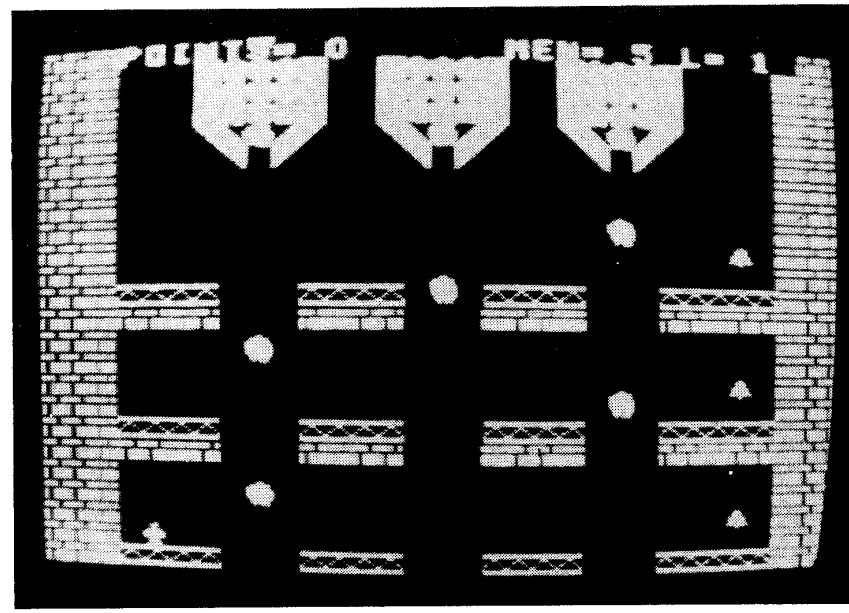
Rock Hopper, by David Mennenoh of Grand View, Wisconsin, is a colorful, arcade-style game in the mold of Donkey Kong. Similarly, the object of Rock Hopper is to rescue a maiden, Shari, who was kidnapped by Edweird von Leustek. To do this, one must move a character, Freddie the Carpenter, through an abandoned rock mining station. This includes two screens, and requires a lot of jumping and dodging of falling and rolling rocks. After successfully completing the two screens and rescuing Shari, Freddie is returned to the bottom of the mining station to rescue Shari again. The second and subsequent rounds get harder as the rocks move faster than in the previous round. According to the program's author, the all-time high score is 13,280.

The game requires Extended BASIC and a joystick and is ideally suited to a color monitor or television. While the program may be loaded into console memory from a disk drive, it requires a memory expansion to run. (Those without a memory expansion may be able to run Rock Hopper by deleting several program lines.) Otherwise the program must be saved and loaded using a cassette.

At the start of the game the player has five men. Scoring depends on the level. For example, reaching the end of the first floor on level 1 is worth 280 points. This total for screen one is increased by 20 points at each successive level. Screen two is worth 500 points regardless of the level.

The current score, number of men remaining and the level are displayed at the top of the screen throughout the game. At the end, the high score and most recent score are displayed.

Included with the program is a program explanation.



PROGRAM EXPLANATION FOR ROCK-HOPPER

LINE NOS.	EXPLANATION
10-70	Title screen
80-90	Clear screen, set game variables
100-130	Character definitions
140-150	Set colors
160-270	Build screen one
290-320	Put the sprites on the screen
330	Display game status
340-370	Find man's position
380-470	Read joystick, move man, check for jump
480-510	Jump man, check for coinc
520	Check for coinc
530-570	Die routine for screen one
580-610	Move up a floor on screen one
620	Made it to screen two, display status
630-660	Set start row, call sounds, set colors
670-710	Character definitions
720	Set colors
730-890	Build screen two
900	Character definition
910	Display men remaining
920-930	Put sprites on screen
940-960	Put man on screen
970-980	Find man's position
990-1040	Move man, check for jump
1050-1090	Jump man
1100	Check for coinc
1110-1170	Die routine for screen two
1180-1210	Super spring routine
1220-1250	Erase rocks and hoppers, start hook moving
1260-1270	Wait for jump
1280-1290	Jump man
1300	Check for catch on hook
1310-1360	Caught hook, wait for release
1370-1390	Drop man to ladder platform
1400-1440	Check man's position, move man
1450-1490	Move man on ladder

(See Page 32)

Rock Hopper

```
10 CALL CLEAR :: CALL SCREEN(2):: FOR T=1 T
O 13 :: CALL COLOR(T,16,2):: NEXT T
20 CALL COLOR(1,5,2):: CALL COLOR(13,7,16):
: CALL CHAR(128,"00003C3C3C3C0000"):: CALL
HCHAR(5,3,128,27)
30 CALL HCHAR(19,3,128,27):: CALL VCHAR(5,3
,128,14):: CALL VCHAR(5,30,128,15)
40 DISPLAY AT(9,3)SIZE(24):"R O C K  -  H O
 P P E R" :: DISPLAY AT(15,3)SIZE(24):"PRES
S THE b KEY TO BEGIN"
50 CALL KEY(5,K,S):: IF K=98 THEN 80
60 IF S<>0 AND K<>98 THEN CALL SOUND(100,11
0,0)
70 RANDOMIZE :: B=INT(16*RND)+1 :: F=INT(16
*RND)+1 :: CALL COLOR(13,F,B):: GOTO 50
80 CALL CLEAR :: CALL CHARSET
90 CALL MAGNIFY(1):: LEV=1 :: PO=0 :: HO=8
:: SR=177 :: MEN=5 :: R1=8 :: R2=9 :: R3=7
100 CALL CHAR(34,"18003C5A5A18181C",35,"180
33CD819FF8000",36,"180038585C181422")110 CA
LL CHAR(33,"FFFF18244281FFFF",136,"FFFFFFFF
FFFFFFFF",137,"80C0E0F0F8FCFEFF",138,"01030
70F1F3F7FFF")
120 CALL CHAR(40,"187EAEFBDF777E2E",128,"00
FBFB00DFDFDFDF",139,"FF7F3F1F0F070301",140,
"FFFEFCF8F0E0C080")
130 CALL CHAR(41,"001038387C7CFE10")
140 CALL COLOR(1,7,2,14,11,1,13,5,2,2,15,2)
150 FOR T=3 TO 8 :: CALL COLOR(T,16,2):: NE
XT T
160 CALL VCHAR(1,30,128,144)
170 CALL HCHAR(12,4,33,26):: CALL HCHAR(18,
4,33,26):: CALL HCHAR(24,4,33,26)
180 CALL HCHAR(13,4,128,26):: CALL HCHAR(19
,4,128,26)
190 CALL VCHAR(2,7,136,3):: CALL VCHAR(2,11
,136,3):: CALL VCHAR(2,14,136,3):: CALL VCH
AR(2,18,136,3):: CALL VCHAR(2,21,136,3)
200 CALL VCHAR(2,25,136,3)
210 CALL HCHAR(5,7,139):: CALL HCHAR(5,8,13
7):: CALL HCHAR(6,8,139):: CALL HCHAR(5,11,
140):: CALL HCHAR(5,10,138):: CALL HCHAR(6,
10,140)
220 CALL HCHAR(5,14,139):: CALL HCHAR(5,15,
137):: CALL HCHAR(6,15,139):: CALL HCHAR(5,
17,138):: CALL HCHAR(5,18,140):: CALL HCHAR
(6,17,140)
230 CALL HCHAR(5,21,139):: CALL HCHAR(5,22,
137):: CALL HCHAR(6,22,139):: CALL HCHAR(5,
24,138):: CALL HCHAR(5,25,140):: CALL HCHAR
(6,24,140)
240 FOR T=2 TO 4 :: CALL HCHAR(T,8,40,3)::
CALL HCHAR(T,15,40,3):: CALL HCHAR(T,22,40,
3):: NEXT T
250 CALL HCHAR(5,9,40):: CALL HCHAR(5,16,40
):: CALL HCHAR(5,23,40)
260 FOR T=8 TO 10 :: CALL VCHAR(12,T,32,13)
:: NEXT T :: FOR T=15 TO 17 :: CALL VCHAR(1
2,T,32,13):: NEXT T
270 FOR T=22 TO 24 :: CALL VCHAR(12,T,32,13
):: NEXT T
280 CALL HCHAR(22,28,41):: CALL HCHAR(16,28
,41):: CALL HCHAR(10,28,41)
290 CALL SPRITE(#2,40,15,40,65,R1,0,#3,40,1
5,40,121,R2,0,#4,40,15,40,177,R3,0)
300 CALL SPRITE(#5,40,15,96,65,R1,0,#6,40,1
5,96,121,R2,0,#7,40,15,96,177,R3,0)
310 CALL SPRITE(#8,40,15,160,65,R1,0,#9,40,
15,160,121,R2,0,#10,40,15,160,177,R3,0)
320 CALL SPRITE(#1,34,16,SR,32)
330 DISPLAY AT(1,2):"POINTS=";PO :: DISPLAY
 AT(1,17):"MEN=";MEN :: DISPLAY AT(1,24):"L
=";LEV
340 CALL PATTERN(#1,34):: CALL MOTION(#1,0,
0)
350 CALL POSITION(#1,A,B):: IF (B>51 AND B<
78)OR(B>109 AND B<134)OR(B>164 AND B<190)TH
EN 530
360 IF B>209 THEN 580
370 IF B<24 THEN CALL SOUND(10,110,1):: CAL
L LOCATE(#1,SR,40)
380 CALL JOYST(1,X,Y):: IF X=0 AND Y=0 THEN
 340
390 CALL PATTERN(#1,34)
400 CALL KEY(1,K,S):: IF K=18 THEN 480
410 CALL POSITION(#1,A,B)
420 IF (B>51 AND B<78)OR(B>109 AND B<134)OR
(B>164 AND B<190)THEN 530
430 IF B>209 THEN 580
440 CALL PATTERN(#1,36)
450 IF B<24 THEN CALL SOUND(10,110,1):: CAL
L LOCATE(#1,SR,40):: GOTO 380
460 CALL MOTION(#1,0,X*2)
470 GOTO 380
```

PROGRAM EXPLANATION—

(Continued from Page 31)

LINE NOS.	EXPLANATION
1500-1560	Man is on top, put rocks and girl on
1570-1660	Move man, check for jump and position
1670-1700	Man made it to spring, spring him to girl
1710-1720	Award points, sound
1730	Add motions, add a level, start at screen one
1740-1760	Jump man on top level
1770	Check for coinc with rock
1780-1800	Die routine
1810-1830	Falling die routine
1840-1850	Reset spring, put man back at start
1860-1950	Game over, display scores, play again option

(See Page 33)

ROCK HOPPER—

(Continued from Page 32)

```
480 CALL POSITION(#1,A,B):: IF (B>53 AND B<
78)OR(B>109 AND B<134)OR(B>164 AND B<190)TH
EN 530 ELSE CALL SOUND(50,880,1):: CALL PAT
TERN(#1,35)
490 FOR T=-7 TO 7 :: CALL MOTION(#1,T,7)::
CALL PEEK(-31877,Q):: GOSUB 520 :: NEXT T
500 CALL MOTION(#1,0,0):: CALL POSITION(#1,
A,B)
510 CALL LOCATE(#1,SR,B):: GOTO 340
520 IF Q AND 32 THEN 530 :: RETURN
530 CALL COLOR(#1,7):: CALL POSITION(#1,QW,
QX):: R=INT((QW+7)/8):: C=INT((QX+7)/8)
540 FOR HJ=R TO 24 :: CALL MOTION(#1,17,0):
: CALL SOUND(100,400-HJ,HJ-5):: NEXT HJ ::
CALL SOUND(100,110,1,-5,1)
550 CALL DELSPRITE(#1)
560 MEN=MEN-1 :: IF MEN<1 THEN 1860
570 GOTO 320
580 SR=SR-48 :: CALL MOTION(#1,0,0):: CALL
SOUND(100,700,1,800,1,600,1):: CALL SOUND(2
00,500,1,800,1,700,1)
590 CALL SOUND(100,500,1,800,1,900,1):: PO=
PO+200+(R1*6)
600 IF SR=33 THEN 620
610 GOTO 320
620 DISPLAY AT(1,2):"POINTS=";PO :: DISPLAY
 AT(1,17)SIZE(6):"MEN=";MEN :: CALL DELSPRI
TE(ALL):: FOR T=1 TO 300 :: NEXT T
630 SRO=161 :: CALL CLEAR :: CALL SOUND(100
,600,1,500,1):: CALL SOUND(100,800,1,700,1)
640 FOR T=3 TO 8 :: CALL COLOR(T,16,2):: NE
XT T
650 CALL SOUND(100,600,1,500,1):: CALL SOUN
D(100,800,1,700,1,600,1)
660 CALL COLOR(11,5,1,12,16,5)
670 CALL CHAR(37,"8142241818244281",38,"380
8080808484830",112,"FFFFFFFFFFFFFFFF")
680 CALL CHAR(88,"2030181C3E7F7FFF",89,"002
010383C3F7FFF",90,"0183C6666773FFFF",91,"10
08080C1E7FFFFF")
690 CALL CHAR(92,"0C181831323A3FFF",104,"FF
FFF7F7E7E3D999",105,"FFFEFFFFEFCF87A3",106,
"FFFF77B9BE1E5E4E")
700 CALL CHAR(107,"FFFFFCFDFDF97032",108,"F
FFFFFF7E7EFEFC3")
710 CALL CHAR(120,"000000FFFF000000",96,"42
42FF424242FF42"):: CALL COLOR(9,16,2)720 CA
LL COLOR(8,7,2,10,7,11)
730 CALL HCHAR(22,1,33,5)
740 CALL HCHAR(7,1,128,32):: CALL VCHAR(23,
1,128,2):: FOR T=23 TO 24 :: CALL HCHAR(T,9
, 28,5):: NEXT T :: CALL HCHAR(22,9,33,5)
750 CALL HCHAR(7,13,33,3)
```

(See Page 34)

ROCK HOPPER—

(Continued from Page 33)

```
760 CALL HCHAR(12,15,33,3):: CALL HCHAR(12,
21,33,2):: CALL HCHAR(12,28,33,5)
770 FOR T=20 TO 24 :: CALL HCHAR(T,21,112,1
2):: NEXT T :: CALL HCHAR(22,21,120,12):: C
ALL HCHAR(23,21,120,12)
780 CALL VCHAR(1,5,136,6):: CALL VCHAR(1,9,
136,6):: CALL VCHAR(1,17,136,6):: CALL VCHA
R(1,21,136,6)
790 CALL HCHAR(24,1,128,32)
800 CALL VCHAR(8,5,136,2):: CALL VCHAR(8,9,
136,2):: CALL HCHAR(10,5,139):: CALL HCHAR(
10,6,137):: CALL HCHAR(11,6,139)
810 CALL HCHAR(10,9,140):: CALL HCHAR(10,8,
138):: CALL HCHAR(11,8,140):: CALL HCHAR(8,
17,139):: CALL HCHAR(8,18,137)
820 CALL HCHAR(9,18,139):: CALL HCHAR(8,20,
138):: CALL HCHAR(8,21,140):: CALL HCHAR(9,
20,140)
830 CALL VCHAR(7,31,96,5):: FOR T=6 TO 8 ::
 CALL VCHAR(1,T,40,6):: NEXT T :: FOR T=18
TO 20 :: CALL VCHAR(1,T,40,6):: NEXT T
840 FOR T=8 TO 9 :: CALL HCHAR(T,6,40,3)::
NEXT T :: CALL HCHAR(10,7,40):: CALL HCHAR(
8,19,40)
850 CALL HCHAR(19,22,104):: CALL HCHAR(19,2
3,105):: CALL HCHAR(19,24,106):: CALL HCHAR
(19,25,107):: CALL HCHAR(19,26,108)
860 CALL HCHAR(19,27,104):: CALL HCHAR(19,2
8,105):: CALL HCHAR(19,29,106):: CALL HCHAR
(19,30,107):: CALL HCHAR(19,31,108)
870 CALL HCHAR(18,22,88):: CALL HCHAR(18,23
,89):: CALL HCHAR(18,24,90):: CALL HCHAR(18
,25,91):: CALL HCHAR(18,26,92)
880 CALL HCHAR(18,27,88):: CALL HCHAR(18,28
,89):: CALL HCHAR(18,29,90):: CALL HCHAR(18
,30,91):: CALL HCHAR(18,31,92)
890 CALL CHAR(34,"18003C5A5A18181C")
900 CALL HCHAR(19,32,91):: CALL HCHAR(19,21
,89)
910 DISPLAY AT(21,20)SIZE(6):"MEN=";MEN
920 CALL SPRITE(#2,40,15,80,49,R2,0,#3,40,1
5,160,49,R2,0,#4,40,15,16,49,R2,0)
930 CALL SPRITE(#5,40,15,64,145,R1,0,#6,40,
15,144,145,R1,0,#7,40,15,10,145,R1,0)940 CA
LL DELSPRITE(#8)
950 CALL SPRITE(#1,34,16,SR0,25)
960 CALL PATTERN(#1,34):: CALL MOTION(#1,0,
0)
970 CALL POSITION(#1,A,B):: IF (B>36 AND B<
63)OR(B>132 AND B<159)OR(B<108 AND B>90)THE
N 1110
980 IF B<15 THEN CALL LOCATE(#1,161,25)
990 CALL JOYST(1,X,Y):: IF X=0 AND Y=0 THEN
 960
1000 CALL KEY(1,K,S):: IF K=18 THEN 1050
1010 CALL MOTION(#1,0,X*2)
1020 CALL POSITION(#1,A,B):: IF (B>40 AND B
<63)OR(B>136 AND B<159)OR(B<112 AND B>90)TH
EN 1110
1030 IF B<15 THEN CALL LOCATE(#1,161,25)::
GOTO 990
1040 GOTO 990
1050 CALL PATTERN(#1,35):: CALL SOUND(10,88
0,1)
1060 FOR T=-8 TO 8 :: CALL MOTION(#1,T,8)::
 CALL PEEK(-31877,Q):: GOSUB 1100 :: NEXT T
1070 CALL MOTION(#1,0,0):: CALL POSITION(#1
,A,B):: CALL LOCATE(#1,SR0,B):: IF B>60 AND
 B<104 THEN 1180
1080 IF B>157 AND B<185 THEN 1220
1090 GOTO 960
1100 IF Q AND 32 THEN 1110 :: RETURN
1110 CALL COLOR(#1,7):: SR0=161 :: CALL POS
ITION(#1,QW,QX):: R=INT((QW+7)/8):: C=INT((
QX+7)/8)
1120 FOR HJ=R TO 24 :: CALL MOTION(#1,17,0)
:: CALL SOUND(100,400-HJ,HJ-5):: NEXT HJ ::
 CALL SOUND(100,110,1,-5,1)
1130 CALL DELSPRITE(#1)
1140 CALL HCHAR(16,9,32,5):: CALL VCHAR(16,
11,32,7):: CALL HCHAR(22,9,33,5)
1150 MEN=MEN-1 :: IF MEN<1 THEN 1860
1160 DISPLAY AT(21,20)SIZE(6):"MEN=";MEN
1170 GOTO 950
1180 CALL PATTERN(#1,34):: CALL LOCATE(#1,1
61,81):: CALL SOUND(100,-1,1,110,1)
1190 CALL HCHAR(22,9,32,5):: CALL HCHAR(16,
9,33,5):: CALL LOCATE(#1,113,81):: CALL VCH
AR(17,11,37,6)
1200 FOR T=-25 TO 12 :: CALL MOTION(#1,T,7)
:: NEXT T :: CALL MOTION(#1,0,0):: CALL LOC
ATE(#1,81,120)
1210 SR0=81 :: GOTO 960
1220 CALL PATTERN(#1,34):: FOR T=2 TO 7 ::
CALL DELSPRITE(#T):: NEXT T :: CALL SPRITE(
#2,38,7,56,209,0,H0)
1230 FOR T=4 TO 24 :: CALL VCHAR(1,T,32,6):
: NEXT T :: FOR T=8 TO 11 :: CALL HCHAR(T,1
,32,23):: NEXT T
1240 CALL LOCATE(#1,81,166)
1250 CALL PATTERN(#1,34)
1260 CALL KEY(1,K,S):: IF K=18 THEN 1280
1270 GOTO 1260
1280 FOR T=-14 TO 14 :: CALL MOTION(#1,T,0)
:: CALL PEEK(-31877,Q):: GOSUB 1300 :: NEXT
 T
1290 CALL MOTION(#1,0,0):: CALL LOCATE(#1,8
1,166):: GOTO 1260
```

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ROCK HOPPER—

(Continued from Page 34)

```
1300 IF Q AND 32 THEN 1310 :: RETURN
1310 CALL MOTION(#1,0,HO)
1320 CALL POSITION(#1,A,B):: IF B>245 THEN
1810
1330 CALL KEY(1,K,S):: IF K=18 THEN 1370
1340 CALL POSITION(#1,A,B)
1350 IF B>240 THEN 1810
1360 GOTO 1330
1370 CALL POSITION(#1,A,B):: IF B<211 THEN
1810
1380 FOR T=1 TO 14 :: CALL MOTION(#1,10,0):
: NEXT T :: CALL MOTION(#1,0,0):: CALL LOCA
TE(#1,81,B)
1390 CALL DELSPRITE(#2)
1400 CALL POSITION(#1,A,B)
1410 IF B<214 THEN CALL DELSPRITE(#2):: GOT
O 1810
1420 IF B>240 THEN CALL MOTION(#1,0,0):: CA
LL LOCATE(#1,75,241):: GOTO 1450
1430 CALL JOYST(1,X,Y):: IF X=0 AND Y=0 THE
N CALL MOTION(#1,0,0):: GOTO 1430
1440 CALL MOTION(#1,0,X*2):: GOTO 1400
1450 CALL JOYST(1,X,Y):: IF X=0 AND Y=0 THE
N CALL MOTION(#1,0,0):: GOTO 1450
1460 CALL POSITION(#1,A,B):: IF A<52 THEN 1
500
1470 IF A>81 THEN CALL LOCATE(#1,75,241)::
GOTO 1450
1480 CALL MOTION(#1,-Y*2,0)
1490 GOTO 1450
1500 CALL MOTION(#1,0,0):: CALL LOCATE(#1,4
1,225)
1510 CALL CHAR(39,"183C644040C0E0C0",129,"0
00018323E3C1010",130,"393D7E7C7C7EFEFF",131
,"1010101C")
1520 CALL SPRITE(#5,39,12,5,49,#6,129,7,5,4
9,#7,130,6,13,49,#8,131,16,21,49)
1530 CALL HCHAR(4,5,33,5):: CALL VCHAR(5,7,
128,2):: CALL HCHAR(7,13,33,3)
1540 CALL SPRITE(#2,40,15,41,10,0,9,#3,40,1
5,41,96,0,9)
1550 CALL LOCATE(#1,41,225)
1560 CALL CHAR(34,"18003C5A5A181838",36,"18
001C1A3A184844")
1570 CALL PATTERN(#1,34)
1580 CALL PEEK(-31877,Q):: IF Q AND 32 THEN
 1780
1590 CALL JOYST(1,X,Y):: IF X=0 AND Y=0 THE
N CALL MOTION(#1,0,0):: GOTO 1570
1600 CALL KEY(1,K,S):: IF K=18 THEN 1740
1610 CALL PATTERN(#1,36)
1620 CALL MOTION(#1,0,X*2):: CALL POSITION(
#1,A,B)
1630 IF B<125 THEN 1670
1640 IF B>235 THEN CALL LOCATE(#1,41,224)::
 GOTO 1590
1650 CALL PEEK(-31877,Q):: IF Q AND 32 THEN
 1780
1660 CALL PATTERN(#1,34):: GOTO 1590
1670 CALL DELSPRITE(#2,#3):: CALL LOCATE(#1
,41,105):: CALL SOUND(100,500,1,600,1)
1680 CALL HCHAR(5,13,33,3):: CALL LOCATE(#1
,17,105):: CALL VCHAR(6,14,37):: CALL MOTIO
N(#1,0,0)
1690 FOR T=-11 TO 12 :: CALL MOTION(#1,T,-1
2):: NEXT T :: CALL MOTION(#1,0,0):: CALL L
OCATE(#1,17,57)
1700 CALL PATTERN(#1,34)
1710 CALL SOUND(100,500,1,700,1,600,1):: CA
LL SOUND(100,800,1,600,1,700,1):: CALL SOUN
D(100,700,1,800,1,600,1)
1720 CALL SOUND(100,500,1,800,1,700,1):: CA
LL SOUND(100,800,1,700,1,600,1):: PO=PO+500
1730 LEV=LEV+1 :: SR=177 :: R1=R1+2 :: R2=R
2+2 :: R3=R3+2 :: HO=HO+2 :: CALL CLEAR ::
CALL DELSPRITE(ALL):: GOTO 100
1740 CALL SOUND(10,880,1):: FOR T=-10 TO 10
 :: CALL MOTION(#1,T,-3):: CALL PEEK(-31877
```

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European users use ingenuity to cope with shortages, high equipment costs

By CHUCK KURZHAL

When I first heard word of the Consumer Electronics Show in Cologne, West Germany, I though it would cover numerous brands of computers. For this reason, I took along a couple of friends, one a C-128 owner and the other an Atari 1040ST owner. The three of us were surprised when the show turned out to be for the TI99/4A only, but I was elated in that I would get a chance to expose them to the TI and its great capabilites. By the end of the show, neither of them was bored.

Upon arrival at the Chorweiler Gymnasium in the northern part of the city and entering the building, I had a slight sinking feeling. Only a few people were waiting in line to get into the room in which the show was being held.

My first assumption was that the TI99/4A was becoming less popular than I had heard. Upon further investigation, I found that the showroom was actually packed to the maximum with people. We had arrived an hour early and the morning had been reserved for system set-up and for the students at the school to get some time on the machines.

I asked to see Mack McCormick and was happily steered to his location. I had never met Mack but we had talked on the phone and written back and forth, so it was quite a pleasure finally to meet him. Mack, in turn, introduced me to Lou Phillips, Paul Charlton, Heiner Martin (editor of the German publication TI Revue and also the head programmer for Mechatronics) and Karl Trissl, the right-hand man to Lou Phillips. I had just met some of the great names in the TI community and was fully impressed by each one of them!

After I asked Lou about the new 9640 computer, he, with a beaming smile, handed me a card and pointed out the chip he had waited for and finally received from Japan. As I watched, the card was inserted into an expansion box and Trissl ran it through its paces, using a short graphics routine. Through use of a mouse, he selected a color, plus a point on the screen, and drew squares and circles with amazing precision. Following this he loaded another program which randomly displayed a multitude of colored shapes on the screen, creating a kaleidoscope pattern running at blinding speed. Impressive? Yes!

Though the new computer was the main star of the show, a great deal of credit for the success of the TI99/4A must go to the TI users in Germany, Holland and Belgium. Europe is greatly lacking in available hardware and software, and that which is available is extremely expensive in comparison to U.S. prices. Much of what the European users need could be obtained through mail order from the U.S., but the costs of shipping, tax and customs makes this route expensive also. A good example is the price of used cartridge software I saw being sold at one of the booths. Cost per cartridge averaged 40 DM (German Marks) to 95 DM; even at a rate of 2 DM per U.S. dollar, this means that they cost $20 to $45 each! The costs are equivalent for

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```
,Q):: GOSUB 1770 :: NEXT T :: CALL MOTION(#
1,0,0)
1750 CALL POSITION(#1,A,B):: CALL LOCATE(#1
,41,B):: CALL PEEK(-31877,Q):: IF Q AND 32
THEN 1780
1760 GOTO 1590
1770 IF Q AND 32 THEN 1780 :: RETURN
1780 CALL MOTION(#1,0,0):: CALL COLOR(#1,7)
:: FOR T=300 TO 110 STEP -10 :: CALL SOUND(
100,T,1):: NEXT T
1790 MEN=MEN-1 :: IF MEN<1 THEN 1860 :: DIS
PLAY AT(21,20)SIZE(6):"MEN=";MEN :: SRO=161
1800 CALL HCHAR(16,9,32,5):: CALL VCHAR(17,
11,32,6):: GOTO 730
1810 FOR T=1 TO 20 :: CALL MOTION(#1,10,0):
: CALL SOUND(100,600+(T*10),T):: NEXT T ::
CALL DELSPRITE(#1)
1820 MEN=MEN-1 :: IF MEN<1 THEN 1860
1830 SRO=161 :: CALL HCHAR(16,9,32,5):: CAL
L VCHAR(17,11,32,6):: GOTO 730
1840 DISPLAY AT(21,20)SIZE(6):"MEN=";MEN
1850 SRO=161 :: CALL HCHAR(16,9,32,5):: CAL
L VCHAR(17,11,32,6):: GOTO 730
1860 CALL CHARSET :: CALL DELSPRITE(ALL)::
CALL CLEAR :: CALL SOUND(100,500,1,800,1,70
0,1):: CALL SOUND(100,600,1,600,1,800,1)
1870 FOR T=1 TO 8 :: CALL COLOR(T,16,2):: N
EXT T :: CALL SCREEN(2)
1880 IF PO>HS THEN HS=PO
1890 DISPLAY AT(5,6):"G A M E    O V E R" :
: DISPLAY AT(10,9):"SCORE=";PO :: DISPLAY A
T(12,7):"HIGH SCORE=";HS
1900 DISPLAY AT(24,5):"PLAY AGAIN (Y/N)"
1910 CALL KEY(5,K,S):: IF S=0 THEN 1910
1920 IF K=89 OR K=121 THEN CALL CLEAR :: GO
TO 90
1930 IF K=78 OR K=110 THEN 1950
1940 CALL SOUND(100,152,1,154,1,156,1):: GO
TO 1910
1950 CALL CLEAR :: END
```

Myarc XBII

Power, speed at your fingertips

By JOHN KOLOEN

Imagine a fast-running BASIC program.

Hard to do, isn't it? Fast and BASIC seem to be mutually exclusive terms. Yet, it is possible to run even simple programs several times faster than you've ever seen them run. And it isn't necessarily going to cost you an arm and a leg to do it. If you already own Myarc's RAMdisk (or a Foundation Computing 128K card) you have most of the expense behind you. For another $70 investment in Myarc's Extended BASIC II you can turn your machine into a speed demon and never have to look back. With XBII, they may never be gaining on you.

Extended BASIC II has been on the market since early last year, but it wasn't until version 2.11 of the disk-based operating system was issued last fall that Myarc got most of the bugs worked out of its Extended BASIC. It's difficult to say whether it has been worth the wait for everyone, but from my point of view it definitely is worth the price.

I purchased my XBII when it first came on the market. I plugged it in a couple of times, found that it crashed whenever it hit a DEF statement and set it aside. The trouble was that most of the Extended BASIC programs I use include the DEF statement. No DEF, no program.

Not supporting DEF wasn't the only problem with the initial issue of XBII. There were other bugs, though most appear to have been solved by fixes to the disk-based operating system. (The XBII cartridge never had a problem. All along Myarc said that it expected users to discover bugs in the initial release of the XBII operating system, and that was why much of it was loaded from disk rather than being burned into an PROM in the cartridge. It's a lot easier, not to mention cheaper, to send out replacement disks than replacement PROMs.)

Performance: Myarc describes XBII as "totally upward compatible with TI Extended BASIC commands, statements, and functions...." I have found this to be true with all BASIC and Extended BASIC programs that I have run using XBII.

The only difficulties I have encountered have to do with programs that rely on assembly language loading routines, such as Funlwriter and DM-1000, and an apparent glitch in the way XBII reacts to nested-loop errors.

In terms of Funlwriter, while the program loaded into XBII through the normal procedure, the screen went black. I was able to execute Funlwriter commands, but I couldn't see anything on the screen. This type of problem should be correctable through modifications to Funlwriter.

As for the nested-loop error detection, XBII designates a non-existent line number as the location of the problem when displaying FOR-NEXT NESTING error messages. (According to Myarc, this problem in its disk-based operating system has been corrected with the newly released Version 2.12.)

I did not have any problem loading most assembly language programs, including BA-Writer, GRAPHX, TI-Artist, Joypaint, PTERM, Fast-Term, Floppy Copy. It was through XBII that I used BA-Writer to load the TI-Writer files to write this review.

FULL SCREEN EDITING

The biggest drawback of TI's Ex-

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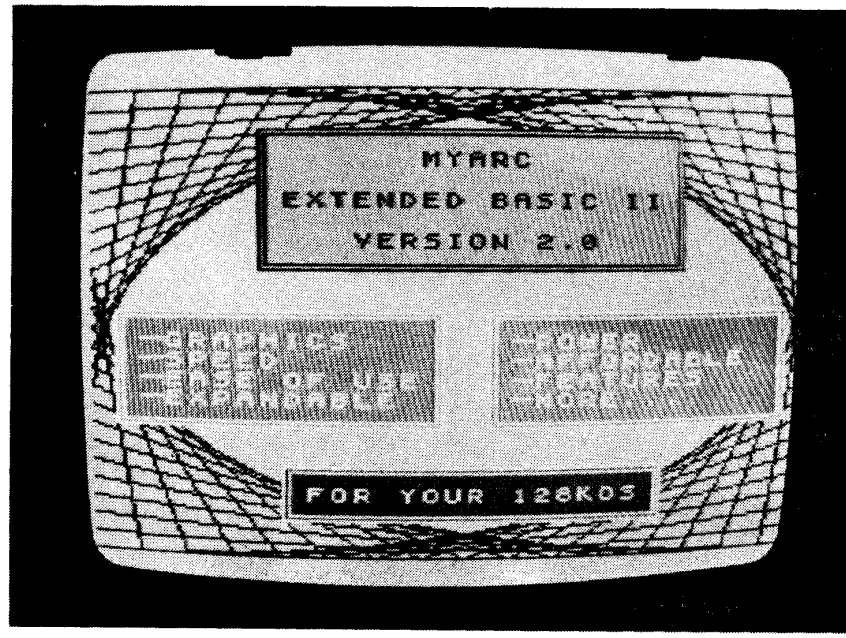
Review

Report Card

Performance.....A-
Ease of Use.....A
Documentation.....A
Value.....A
Final Grade.....A

Cost: $70 (diskette, manual and cartridge, EPROMs.
Manufacturer: Myarc Inc, 241 Madisonville Rd., Basking Ridge, NJ 07920.
Requirements: console, TV or monitor, disk system, Myarc RAMdisk (minimum 128K) or Foundation Computing 128K card.



MYARC XBII—

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tended BASIC is the clumsy manner in which program lines are edited. One has to cursor through an entire program line, character by character, to make a change. Though the autorepeat capability speeds this process up somewhat, it is still tedious work. Myarc's Extended BASIC II, however, provides the editor that TI Extended BASIC should have had. With XBII, you can go from any point in a program line to any other point simply by moving the cursor there. No need to cursor-through every character in a line. As far as line editing goes, the XBII editor functions just like the editor in TI-Writer. For anyone who programs in Extended BASIC, this feature alone is worth $70.

Another improvement for XB programmers is the much faster execution of LIST commands. When you LIST a program in TI Extended BASIC, each line scrolls across the screen at an easy to follow but slow rate. In XBII, LISTing a program results in the program scrolling across the screen several times faster.

The XBII LIST command is identical in most respects to the XB version. The only difference occurs when LISTing ranges of program lines. Although the documentation for the XBII LIST command indicates that the process is identical to Extended BASIC, I found that this is not true. It is easier. To list a range of program lines from 100 to 200 in Extended BASIC, one would enter LIST 100-200. In XBII, one would enter LIST 100 200, with only a space between the line number parameters. For an open ended listing, one enters LIST 100- in Extended BASIC. In XBII, one enters LIST 100 -, with a space between the number and the hyphen.

Compatibility between XB and XBII appears to be complete. Of the scores of Extended BASIC programs I tried, I could not find one that would not operate properly. Most ran considerably faster, but in no case did this create a problem. This simply resulted in faster prescanning and initialization and quicker execution of commands. Programs such as Database 500, which I have previously faulted for its lack of speed, look a lot better when run with XBII. By the same token, I could not find one program that I tried that did not run faster under XBII than it did under XB.

NEW COMMANDS

XBII offers a variety of new commands, some of which are available with such programs as Extended BASIC Plus by Mechatronics. Among these are routines providing improved support for graphics. In addition to the standard XB graphics commands, XBII provides the following CALLs:

DRAW — draws, erases or inverts a line from one point to another;

DRAWTO — draws, erases or inverts a line from the last point drawn to another point;

CIRCLE — draws, erases or inverts a circle around a specified point;

POINT — draws, erases or inverts a pixel;

RECTANGLE — draws, erases or inverts squares or rectangles;

FILL — fills in a shape of any dimension;

GCHAR — returns a value indicating whether the point specified was turned on or off;

WRITE — allows text and predefined characters to be placed at a specified point;

DCOLOR — defines the foreground and background colors in the high resolution graphics mode;

GRAPHIC — allows access to and from the three graphic modes.

Okay, what are the three graphic modes? Here they are:

1. Standard — 28/32-column by 24 row screen display. Includes sprites and color sets as per XB.

2. Text — 40 columns by 24 rows. All 40 columns are visible.

3. High-Resolution — bit map mode, allowing control of individual pixels. Screen display consists of 256 columns by 192 rows. Includes sprites.

Complementing the graphic support noted above, other enhancements of XBII include an enlarged character set (256 predefined and user-defined characters), 33 color sets as compared to 15 for XB, 32 sprites versus 28 for XB and faster execution of such commands as CALL COINC, POSITION AND DISTANCE.

How difficult are all these extra graphics commands to use? Well, it's not enough just to enter CALL RECTANGLE to see a rectangle drawn on the screen, though it doesn't take a lot more. Coordinates are based on pixil row and column designations. Here is a routine that produces a rectangle:

```
100 CALL GRAPHICS(3)
110 CALL RECTANGLE(1,8,80,8,
175,134,80)
120 GOTO 110
```

Note, too, that CALL RECTANGLE can be executed only from the high resolution graphics mode. The same goes for all of the new graphics commands supported by XBII. But I don't want to leave a mistaken impression, once you get accustomed to using bit-map coordinates, these graphics commands are not difficult to use.

HARDWARE COMPATIBILITY

Although this is far from an exhaustive list of devices, XBII worked properly with a TI, CorComp and Myarc disk controller, GRAM Kracker, TI RS232 card, CorComp Triple Tech and TI Speech Synthesizer. It requires a Myarc RAMdisk with at least 128K of memory (which means it is not compatible with any other expansion memory, including the TI 32K card). Note, too, that XBII requires replacement of a couple of chips on the Myarc RAMdisk to insure compatibility. Initial purchasers of XBII were required to obtain their EPROMs directly from Myarc. However, the EPROMs are now available from dealers, according to Myarc.

Ironically, the only device that I own that XBII wouldn't operate with is a Myarc WDS/100 Winchester disk. The Winchester kept knocking out the Myarc RAMdisk. This occurred anytime I tried to use the two together, with or without XBII. I switched

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MYARC XBII—

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several chip sets on the RAMdisk in an attempt to achieve compatibility, but met with no success. Myarc tells me that this is an unusual situation and that other users with Winchesters have had no trouble pairing them with a Myarc RAMdisk. I might add that it is a relatively ancient Winchester.

DRAWBACKS

If there is a drawback to XBII it is in the fact that you have to reload the entire program (it consists of six files) every time you want to use it. Typically, I loaded XBII, used it to load BA-Writer, finished with BA-Writer, exited and then had to reload XBII. (It takes about a half-minute to get XBII booted.)

The other drawback has to do with the way it loads programs that rely on CALL LOADs to load. There are some funky loaders out there, and it will take some trial and error to set all of them up so that they will work with XBII. As long as these programs can be modified, users should be able to adapt them for use with XBII. Of course, those that are incompatible with the Myarc RAMdisk in the first place aren't going to get better via XBII.

Documentation: Perhaps to emphasize the similarity between XBII and XB, the XBII manual is virtually identical to the XB manual. The two manuals include identical appendices and list all commands and statements in alphabetical order. While the 242-page XBII manual isn't professionally typeset, it is punched for a small, three-hole binder (unfortunately, the holes in my copy did not match the holes in the binder I'd purchased, so it remains loose-leaf).

Of course, the Myarc XBII manual is larger than the TI XB manual. Using the TI manual format, the XBII documentation includes explanations and of each new command as well as programming samples.

Given the sheer volume of the manual, it is difficult for me to see how Myarc can make any money selling XBII for $70. The manual is definitely more than one expects to get with a $70 piece of software.

Ease of Use: Anyone familiar with TI's Extended BASIC should have no trouble adapting to the more powerful Extended BASIC II. Adjusting to a disk-based operating system should pose no dilemmas. Installing the EPROMs in the RAMdisk was perhaps the most difficult aspect of installing the XBII system, but a share of the difficulties I had can be blamed directly on my Winchester hard disk and not the XBII system. The EPROMs are shipped with the documentation required to install them. The procedure is simple: open the RAMdisk clamshell, locate the existing EPROMs, gently pry them out, replace them with the new EPROMs, close the clamshell and insert the card into the PEB. (Incidentally, to help keep the cost of XBII down, Myarc asks that the old EPROMs be shipped to the company for reprogramming and reuse by other purchasers of XBII.)

Value: As mentioned above, XBII is a great value for anyone who regularly uses Extended BASIC programs. It provides a number of commands not available in TI Extended BASIC and is several times faster. It's editor alone is worth the price.

However, the price of admission is not just the cost of the XBII package, which includes a cartridge, disk-based operating system, manual and EPROMs. Users must also have a Myarc RAMdisk, or a Foundation Computing 128K card. (Myarc provides EPROMs for the Foundation card at a nominal charge. The charge is necessary because the Foundation EPROMs cannot be reused by Myarc.) Assuming the purchase of a Myarc RAMdisk, since the Foundation card is no longer being produced, the price for an XBII system shoots up to about $250.

Is the speed and ease of handling, so to speak, worth $250? That's a question that I can't answer, having already had a Myarc RAMdisk before XBII hit the market. If you own a Myarc RAMdisk or Foundation 128K card and use Extended BASIC often, XBII could be justified on several grounds. One, it takes advantage of the RAMdisks in a unique way, two, it definitely will increase the speed of Extended BASIC programming and programs.

For those who are intrigued by XBII but do not have a RAMdisk, there are several considerations. Do you want or need a RAMdisk? If not, then XBII isn't for you.

Those who are considering the purchase of a RAMdisk may want to give some thought to how the RAMdisk will be used. Those in the market for a RAMdisk who spend most of their computing-time using Extended BASIC would do well to consider the advantages of a truly enhanced version of Extended BASIC. Those who use their computers for other tasks — word processing, Multiplan, assembly language, Forth, etc. — aren't going to find much benefit, if any, from an enhanced version of Extended BASIC regardless of the manufacturer of the RAMdisk they select.

For my money, XBII pretty much justifies the earlier purchase of a RAMdisk.

Myarc releases new 2.12 version of XBII

Myarc has released Version 2.12 of its Extended BASIC II program, according to Lou Phillips of Myarc, which "fixed about five things over Version 2.11."

He says the program now has "no known bugs, although there may be some because of the magnitude and complexity of the program."

The company is also "about ready to release its Winchester disk controller." The new controller incorporates the personality card and the Western Digital card into one and will control up to 60 megabytes.

Gate arrays have been received for the company's 9640 computer now in production, and Phillips says he has been showing prototypes of the new machine to various users groups.

For further information, contact Myarc Inc., P.O. Box 140, Basking Ridge, NJ 07920 or (201) 766-1700.

MG DISkASSEMBLER

A disassembler that does it all

BY J. PETER HODDIE

Recently Millers Graphics, now called MG, has released some of the most advanced products ever created for the TI99/4A, including Advanced Diagnostics, Explorer and GRAM Kracker. MG's latest entry, DISkASSEMBLER, continues this fine tradition.

DISkASSEMBLER, by Thomas Freeman, is an assembly language disassembler. What this means is that it takes the mess of numbers that the Assembler creates from assembly source code and turns it back into code that is (more or less) readable by humans. The usual reasons for disassembling a program are to make modifications to the program and to learn how the program works. Therefore, a disassembler's performance must be judged on how easily the code it creates can be understood, modified, and re-assembled to yield a runnable program.

There are dozens of disassemblers available, most in the public domain. What makes DISkASSEMBLER worth the $20 price tag? One of the most unusual features is that you can disassemble a program that is in memory or on disk. This means that virtually any program can be disassembled. Most other disassemblers only work on a program in memory. This severely restricts what can be disassembled because both the disassembler and the program to be disassembled must reside in memory together, and often there is not enough room.

Next, DISkASSEMBLER adds labels to the disassembled code. This is also a rare feature and helps to make disassembled code easier to read and modify. DISkASSEMBLER also allows you to define where in the code there are blocks of text and data that should not be disassembled as code.

Another exceptional feature is the ability to define the number of data words following a BLWP statement. This can be very useful particularly when taking apart code written by Texas Instruments.

DISkASSEMBLER allows you to disassemble the code in the expansion box cards. Output of the disassembly is sent to screen and optionally to disk or printer. The speed at which the disassembly scrolls by on the screen is user-controlled, as are the screen and text colors. Most importantly, the output that DISkASSEMBLER creates can be re-assembled almost immediately to provide a runnable program. No other disassembler can make this claim. Random tests of DISkASSEMBLER on many assembly programs produced flawless results.

DISkASSEMBLER breaks all output into 65-sector files for ease in later editing. It also puts the filename as the first line of each file to let you know what file you are editing. It will also warn you if you are out of disk space so you can change diskettes. This feature saves the loss of long disassemblies because of lack of disk space. DISkASSEMBLER is the first MG product to be fully compatible with all disk controllers, RAM Disks, and hard disks.

However, as with almost any product, there are a few problems. Fortunately all of them are minor. First, the program is on a copy-protected disk. This means that you can not make a back up or install it on a utility disk.

It would be nice if the program would resolve references to standard system addresses like FAC and utilities like VMBW when disassembling. The manual provides information on how to do this yourself, but it seems that the program should be able to handle this, considering how much else it is capable of.

Please note that the reason this program recieved only a B+ for *Ease of Use* is because disassemblers are in general not very easy to use effectively. However, among disassemblers, DISkASSEMBLER is certainly the easiest.

As with all MG programs, the manual alone is worth the purchase price. DISkASSEMBLER's is 56 pages long. In addition to a comprehensive description of DISkASSEMBLER's many features, there is an 8-page tutorial on using DISkASSEMBLER to take apart the SAVE utility on Editor/Assembler disk B. There is a brief tutorial on how to split a long program image file into smaller pieces, as DISkASSEMBLER can only handle a 48-sector PROGRAM file (but any length DIS/FIX 80 file). There are also 10 pages of memory maps which include the CRU base addresses for all peripherals and the addresses of the system utilities for Mini-Mem, Editor/Assembler, and Extended BASIC. The manual also contains a complete description of how the Editor/Assembler Option 3 loader actually "links" programs together while loading.

If you have never used a disassembler before or are just starting, DISkASSEMBLER is ideal as the manual carefully walks you through all the neccesary steps. If you are familiar with disassemblers, then you'll appreciate the incredible amount of power, flexibility and reliability that DISkASSEMBLER provides.

Review

Report Card

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

Cost: $19.95
Manufacturer: MG, 1475 W. Cypress Ave., San Dimas, CA 91773, (714-599-1431)
Requirements: Console, disk system, memory expansion.

80-column system is released

Mechatronic has released its 80-column expansion system for the TI99/4A, enabling an 80-column, 26-line display, according to Franz Wagenbach of T.A.P.E. Ltd., Ontario, California, which distributes Mechatronic products in North America. The card retails for $219.

The 80-column system is designed to show 256 by 212 pixels in 256 colors or 512 by 212 pixels in 16 colors with certain software, he says.

He says that the 80-column expansion is plugged into the console's I/O port. To do this, it is necessary to remove the old video chip from the TI and replace it with a flat ribbon cable.

"It sounds very difficult, but it is not," Wagenbach says. "The manual will show you how to do it."

This done, the videoprocessor is outside the comuter with a 192 Kbyte RAM as VDP memory, he says.

He says the 80-column expansion has a RGB output and a TTL sync, a combination with which most color monitors are adaptable. A special cable for black-and-white monitors produces the necessary SW-composite signal, he says.

He says a modulator is available for the color-composite monitor or TV. The latter is not recommended for use in the 80-column mode, he notes.

Wagenbach says that all program modules including BASIC, Extended BASIC, Editor/Assembler and TI-Writer run with the 80-column expansion.

He also notes that the expansion is compatible with the Myarc 9640 computer.

In the expansion's built-in software is an 80-column high resolution graphic driver, he says. The 80-column expansion is handled like a printer with its commands, he says. An open command will activate the 80 columns from BASIC or any other module.

For instance, he says, from Extended BASIC, the user can open with:
OPEN TEXT80.0000E0002000

In a file opened with this command, Wagenbach says, the screen will be set for 80 columns. The user can now command the expansion to start the cursor any place on the screen, with the option of having the cursor blinking for one full line or for individual letters.

The blinking frequency can be controlled by certain commands, he notes.

Users can write directly to the screen with the commands LINPUT or INPUT, he says, while with the command DEFCOL (color definition) all 16 colors can be redefined. For instance, the black screen with white letters is defined by:
PRINT #:"17777000"

The color black has the number 1xxx and light blue 7xxx. The xxx denotes the color parts of the basic colors yellow, red and blue. The intensity is determined by the numbers 0 to 7. With this combination and the 80-column expansion, the user can change the basic 15 colors from the TI99/4A into 512 different color shades, Wagenbach notes.

There are three banks of dipswitches in the expansion, he says. Bank 1 allows the user to control the positioning of the screen, Bank 2 allows him to select ACSII U.S. or German. The other switches select NTSC-NORM or the European PAL-Version. Bank 3 is for CRU addresses.

Wagenbach says Monty Schmidt is working on different software programs for the 80-column expansion, to be available through T.A.P.E. Ltd.

Wagenbach says T.A.P.E. has disk drives for the TI CC40 and the new TI 74 computer.

For further information, contact T.A.P.E. Ltd., 1439 Solano Pl., Ontario, CA 91764.

GERMAN CES—

(Continued from Page 36)

Holland and Belgium, too, so it does no good to try another country in Europe.

The Europeans have found an alternative route, in that they have literally taken TI99/4A consoles and peripherals apart, studied the workings of the system and built what they needed at a fraction of their retail cost. Observing some of the setups, I saw "home made" plotters, PEBs, disk drive cases with 3½-inch disks, hard disks, GRAM cartridges, RAMdisk expansion cards and IBM peripheral expansion cases converted to TI PEBs. Mind you, these were not "off-the-shelf" pieces of equipment (other than the empty IBM cases) but were built through the ingenuity and expertise of the German, Belgian and Dutch users. I spent the remainder of the afternoon trying to avoid stepping on my lower jaw each time I went from one display to another.

The two persons who accompanied me, and who own the "other" brands of home computers, were equally amazed that there was still such a following for the TI99/4A. Even though I apologized for dragging them along under what they considered false pretenses, I was glad they came along and saw what is in the near future for our "little orphan."

The TI-Faire at Cologne (in German, Koln) was organized by Mike Heuser of the TI99ers Workshop, Rheinland, and I feel that he deserves a huge round of applause for the great success of the show. For those of us stationed in Europe, this type of function proves that we are not out of touch with what is happening with the TI99/4A but are, in fact, a part of the whole process.

(I did not get to see the demonstration of the Geneve computer during the high point of the show—there just wasn't room enough to get close!)

Newsbytes

Vendors sought for New Jersey TICOFF

Vendors for the second annual Texas Instruments Computer Owners' Fun Fest may reserve tables now for the event, set for March 28 at Roselle Park High School in Roselle Park, New Jersey, according to Art Byers, coordinator.

The first table per vendor is $50; each additional table is $35. Tables are assigned on a first come, first served basis. Electricity is limited. A 10 percent late charge will be added for applications received after Feb. 1.

TICOFF '86, attended by approximately 600 persons, received a "Top Ten" award from the state of New Jersey for activity by a student council. Proceeds go to the Roselle Park High School Student Council scholarship fund.

Tickets to TICOFF are $5 each. A free disk of utility software is offered on advance ticket sales. Checks for advance tickets are payable to the Roselle Park High School Student Council and may be mailed to the high school to the attention of Bob Guelinitz at 185 W. Webster Ave., Roselle Park, NJ 07204. Organizers ask that a self-addressed, stamped envelope be included.

Travel and accomodation assistance is available, Byers says.

For further information, contact Byers at (914) 528-5402; or Guelinitz evenings and weekends at (201) 382-5963 or weekdays at (201) 241-8902 or 241-4450; or telecommunicate via GEnie mail name TICOFF, Compuserve E-mail ID No. 73547,2014 or Delphi TIIN ART-BYERS.

Awards to CorComp Funlwriter authors

The Front Range Computer Club of Colorado Springs, Colorado has given its second set of Outstanding Support Awards to CorComp Inc. of Anaheim, California, and to Will and Tony McGovern of Australia, authors of the freeware program Funlwriter.

Announcing the awards, Joe Nuvolini, president of the group, said that CorComp award was "not only for their outstanding products, but for the help they have been to the members of our users group whenever they have encountered a problem."

Nuvolini said that the Funlwriter program "has provided users the capability of having a multitude of programs available at their fingertips."

Asgard releases new T.O.D. Editor version

Asgard Software announces Version 3.0 of its T.O.D. Editor.

The latest version of this program, designed for use with Tunnels of Doom, corrects a number of reported bugs in Version 2.1, according to Chris Bobbitt of Asgard, as well as providing "a new enhancement that makes the program more versatile and even easier to use."

He says the T.O.D. Editor now functions with most versions of the Myarc Disk Controller. Now users can alter Wand #3 in edited games. Users may also edit all 55 monsters in a game (the maximum allowed by the module) and not just the 51 allowed by Version 2.1, he notes. Additionally, he says, errors in the sample games have been corrected.

Bobbitt says the enhancements include additions to the graphics editor that allow the user to save favorite monster graphics in a separate file on disk for inclusion in other T.O.D. adventures. He says dozens of such monsters are provided on the new program disks. Also, he says, T.O.D. Editor includes a built-in disk catologer.

Owners of previous versions of T.O.D. Editor may obtain the newest version by returning the original program disk to Asgard Software. The update fee is $2.50 for registered owners (those who returned their warranty card) and $5 for nonregistered owners. Send the program disk and check or money order to Asgard Software, User Services Dept., P.O. Box 10306, Rockville, MD 20850.

BBS for disabled

The Center for Computer Assistance to the Disabled has a bulletin board on line in the west end of the Dallas-Fort Worth Metroplex with a metro number, evenings and weekends.

Calls are welcome from everywhere else, also, according to sysop Larry Muller. The phone number is (817) 640-6680.

C-CAD Expo '87 "High Time for High Tech for the Disabled and the Elderly" is scheduled for April 2-4 at the Infomart in Dallas, Texas. For further information about this event, call (214) 255-1213 or (817) 640-6613. Prospective exhibitors may call Kerry Kirschbraun at 1-800-367-7100.

Mailing address for C-CAD is 2501 Avenue J, #100, Arlington, TX 76006.

Risky Business on-line

Beery Miller, sysop, announces a new BBS "up and running" in Memphis, Tennessee, using the capabilities of Myarc Extended BASIC 2.10.

The board is a modified version of the Pro-99 board that has an online capability of 1.7 megabytes with three DS/DD drives, a 512K Myarc RAMdisk and the 180K New Horizons RAMdisk, according to Miller.

He says that message bases and all user files are stored on the RAMdisks for "near assembly speed use." Future plans include the addition of a hard drive for a further expanded message base and XModem downloads.

The board, Risky Buisiness can be reached at (901) 726-5623 at 300/1200 baud, seven data bits, even parity and one stop bit. Assistant sysop is Rick Glisson.

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.

User Notes

From tape to disk

Ray Kazmer, of KAZCO International, Sylmar, California, provides a User Note which, he writes, "will put to rest forever the continuing problem of how to transfer an over-sized file from tape to disk (and vice versa). The method described by Jerry Keisler in your Dec. 86 Feedback is one way to do it, but if you're as fumble-fingered and impatient as I am, I think you'll prefer this method.

To transfer an over-sized file from tape to disk:
1. In command mode, enter CALL FILES(1);
2. Load the program from tape;
3. After loading, enter CALL FILES(3);
4. Save the file to disk. It will be in I/V254 format and will run.

To transfer an over-sized file from disk to tape:
1. Load the I/V254 file from disk;
2. In command mode, enter CALL FILES(1);
3. Save the file (now in "Program" format) to tape.

Loose ends

In some copies of the December 1986 issue, two lines of the "Tic-Tac-Toe" game did not print clearly:

The lines are:
3260 GOTO 3280
3270 DISPLAY AT(22,1)BEEP:"VER Y GOOD!"

Also, we inadvertently left out Jim Swedlow's address for his Side*Print program. It is 7301 Kirby Way, Stanton CA 90680.

E/A CALL LOAD

Aaron W. West, of the Boston Computer Society TI99 User Group, has a CALL LOAD that may come in handy for those who use Editor/Assembler.

He wrote: Has your computer ever locked up while saving an Editor/Assembler file? (Ours did when I turned off a light with our Percom Data drive running.) If your computer locks up, type in CALL LOAD(-31860,96,41) in BASIC to return to E/A without reinitializing the memory expansion. You can also use this to rerun a program that you loaded in E/A.

According to J. Peter Hoddie, this will work only with an E/A cartridge located at GROM address 6000, and not with a moved E/A using a GRAM Kracker or similar device.

Wordcount II has minor bug

The Wordcount II program by Jim Jagielski that was published in the November 1986 MICROpendium contained one small error in line 35. A parenthesis was inadvertently entered after CALL LOAD. The parenthesis should be dropped from the line. The error did not appear to have any effect on the operation of the program.

Converting Myarc to CorComp files

The following program by Sid Smart and Jim Lohmeyer is designed to allow a CorComp disk controller read disks formatted using a Myarc disk controller. As you know, both controllers will format double-sided, double-density floppy diskettes. However, the CorComp controller formats diskettes with 18 sectors per track while the Myarc controller uses 16 sectors per track. Hence, Myarc-formatted diskette can't be read by a CorComp disk controller, and vice versa. This disk conversion program, with the help of Miller Graphics' Advanced Diagnostics program, changes all that.

The program and following text was written by the two programmers and appeared in the TopIcs newsletter of the Los Angeles 99ers Computer Group. Here is the article:

"We returned from the Chicago TI Faire with some swapped disks that couldn't be read with a CorComp disk controller without errors of one kind or another. Some would catalog (showing 1280 total sectors) and some wouldn't. Reading sectors with Miller Graphics' Advanced Diagnostics revealed a pattern of 16 good sectors followed by two "bad" sectors. Of course, we had Myarc DSDD disks with 16 sectors per track, and a CorComp controller expecting 18 sectors per track.

"The Myarc controller that wrote the 17th and 18th sectors on the disk thought they should be the first two on the second track. The CorComp controller reading the disk thought that the 17th and 18th sectors should be at the end of the first track! So, all we had to do was move them: read 16 sectors, write 16, skip 2; read 16, write 16, skip 2, etc. Advanced Diagnostics will handle it, but that's too much typing to enter in immediate mode for even one such disk!

"Fortunately, Advanced Diagnostics can be driven with a command file, and the commands required are repetitive enough that they can be generated from a relatively simply BASIC program. The necessary commands won't fit in one 2K command file, so the program below creates two, and the first invokes the second. Both the command file generator program below and the command files themselves provide instructions for their use.

After running this program, you will be prompted to load Advanced Diagnostics.

```
100 REM ******************
110 REM ** MYARC DS/DD  **
120 REM **       TO     **
130 REM ** CORCOMP DS/DD**
140 REM ** CF GENERATOR **
150 REM **   11/3/86    **
160 REM **   SID SMART  **
170 REM **      AND     **
180 REM ** JIM LOHMEYER **
190 REM **  LEROY, ILL. **
200 REM ******************
210 CALL CLEAR
220 PRINT "THIS PROGRAM GENE
RATES TWO ";"COMMAND FILES F
OR USE WITH ";"MILLERS GRAPH
ICS ADVANCED   ";"DIAGNOSTIC
S. WHEN INVOKED "
230 PRINT "(WITH A CORCOMP C
ONTROLLER) ";"THEY CONVERT A
```

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User Notes

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```
 16 SECTOR PER";"TRACK MYARC
 DSDD DISK TO A";"CORCOMP 18
 TRACK PER SECTOR "
240 PRINT "DSDD DISK.
          ";"THE FIRST COMM
AND FILE IS ";"'MYARC/CC' AN
D IS TO BE   ";"INVOKED BY T
HE USER.  THE "
250 PRINT "SECOND IS 'MYARC/
CC2'.  ";"IT IS INVOKED BY T
HE FIRST";"COMMAND FILE."
260 PRINT : : : "PRESS ANY K
EY TO CONTINUE"
270 CALL KEY(0,K,S) :: IF S=
0 THEN GOTO 270
280 CALL CLEAR
290 FILE$(1)="DSK1.MYARC/CC"
300 FILE$(2)="DSK1.MYARC/CC2
"
310 T1$="SD 1 CR "
320 T2$=" 16 SD 2 CW "
330 T3$=" 16 [13]"
340 T4$(1)=" [7] PA CF DSK1.
MYARC/CC2 [13] []"
350 T4$(2)=" []"
360 MH1$="[255][7]CC 2 8 7 1
3     [13][7]"
370 MH2$="[253][253][253][25
3][253][253][253][253][253][
253][7]PA[13][7]"
380 M$(1)="[7]BEEP[13][7]Pla
ce Myarc disk in drive[32]on
e and press a key"
390 M$(2)="[7]BEEP[13][7]Pla
ce CorComp disk in dr.[32] t
wo and press a key"
400 M$(3)="[7]BEEP[13][7]Pla
ce *CF*  disk in drive[32]on
e and press a key"
410 M$(4)="[7]BEEP[13]CONVER
SION COMPLETE "
420 DISPLAY AT(12,1) : "PLAC
E DISK FOR COMMAND FILES"
430 DISPLAY AT(14,9) : "IN D
RIVE ONE"
440 DISPLAY AT(16,6) : "AND
PRESS ANY KEY"
450 CALL KEY(0,K,S) :: IF S=
0 THEN GOTO 450
460 FOR L=1 TO 2
470 DISPLAY AT(19+L*2,3) : "
CREATING ";FILE$(L)
480 OPEN #1: FILE$(L), DISPL
AY ,VARIABLE 80
490 PRINT #1: MH1$
500 PRINT #1: M$(1)
510 PRINT #1: MH2$
520 PRINT #1: M$(2)
530 PRINT #1: MH2$
```

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User Notes

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```
540 FOR I=I+1 TO I+48
550 R=(I-1)*18 :: W=(I-1)*16
560 L$=T1$&STR$(R)&T2$&STR$(
W)&T3$
570 PRINT #1: L$
580 NEXT I
590 IF L=2 THEN 700
600 PRINT #1: M$(3)
610 PRINT #1: MH2$
620 PRINT #1: T4$(L)
630 CLOSE #1
640 I=I-1
650 NEXT L
660 CALL CLEAR
670 PRINT "LOAD ADVANCED DIA
GNOSTICS,  ";"PUT COMMAND FI
LES IN DISK1 ";"AND ENTER TH
E COMMAND:      "
680 PRINT : : "CF DSK1.MYARC
/CC": : : : : :
690 STOP
700 PRINT #1: M$(4)
710 PRINT #1: MH2$
720 GOTO 620
730 END
```

CALL FILES memory saver

According to TIPS 99, the newsletter of the Puget Sound 99ers, Lynwood, Washington, here's how much console memory you can expect to have after using one of the four CALL FILES commands:

CALL FILES(1).....12,876 bytes
CALL FILES(2).....12,358 bytes
CALL FILES(3).....11,840 bytes
CALL FILES(4).....11,322 bytes

Obviously, if you need only one open file, you'll have more memory available for programming.

Blinking in XB

Here's a little tip that appeared in Bill Gaskill's *Odds and Ends* column in the Front Ranger, the newsletter of the Front Range 99er Computer Club of Colorado Springs, Colorado. It's a simple routine designed to cause text displayed on screen to blink rapidly when using a CALL KEY statement. The use of a DISPLAY AT statement within the CALL KEY loop does the trick.

Here's the routine:

```
8 CALL CLEAR
10 CALL KEY(0,K,S):: DISPLAY
 AT(12,2):"THIS IS THE MESSA
GE" :: DISPLAY AT(12,2):" "
:: IF S=0 THEN 10
```

Print files from Extended BASIC

The Nor-Cal News, the newsletter of the Nor-Cal TI Users Group of Occidental, California, recently carried a short program called PRINTCOPY by Bob Sims. The program is used to output a display-type file directly from disk to printer. It is the equivalent of printing a file using the TI-Writer editor. Change the LINPUT in line 130 to INPUT for use with internal-type files.

The program requires Extended BASIC.

```
80 ! PRINTCOPY
90 ! BY BOB SIMS
100 INPUT "PRG NAME": PR$
110 OPEN #3: "PIO"
120 OPEN #1: PR$
130 LINPUT #1: A$
140 PRINT #3: A$
150 IF EOF(1) THEN 170
160 GOTO 130
170 CLOSE #1 :: CLOSE #3
```

What's in a NAME?

David V. Erickson, of San Jose, California, writes:

Multiplan's powerful NAME feature can be used with very descriptive and elaborate names. The difficulty comes when you need to use those names frequently to move the cursor. This can be speeded up by using single-letter names. The program also recognizes lowercase entries equally with uppercase entries, so it isn't necessary to use the shift or alpha lock keys.

In order to have the effect of a carriage return key when making serial entries in your spreadsheet, use the following procedure:

Select Go
Select Name

Enter the Name, followed by a space and and the letter *R* (it may be upper- or lowercase).

The cursor will move to the NAMEd column while remaining on the current row. (Without entering *R*, the cursor would automatically move to the top of the NAMEd column.) Then use the down arrow to go the next line. The *R* could be suffixed with +1, etc., to get to another relative row, but that involves more typing than the down arrow. You may also use this technique with NAMEd rows, replacing the *R* with a *C*.

Fast Forth load with CC 512K card

E. N. Shepard, of Brownwood, Texas, writes:

I recently purchased a CorComp 512K card. I have found a useful enhancement to load Forth and some other unprotected programs, such as TI-Writer. Here it is:

1. Select BASIC. Place Forth disk in DSK1.
2. Enter CALL RMGR.
3. When the menu appears, select option 3 (disk copy). Copy Forth to the RAMdisk.
4. When menu returns, select option 8 and enter DSK1. Remove Forth program disk.
5. Exit the manager. Load the Editor/Assembler module.
6. Select Load and Run. Enter DSK1.FORTH as the program name.
7. Do what you want to do, FLUSH and exit to the TI monitor screen.
8. Select BASIC. Enter CALL RMGR. Select option 8 (drive number) and enter DSK5 when the menu reappears.
9. Select option 3 (disk copy) and place a formatted disk in drive 1.
10. Copy disk 5 to 1. You are now on disk and the RAMdisk (DSK5.) You will notice that loading speed is greatly enhanced.

However, be aware that work should

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be saved to a floppy disk. If you want to run out of the RAMdisk, removed the disk from DSK1 and rename the RAMdisk. Some programs, such as the one that indexes User Notes (April 1986 MICROpendium) will write over your data unless the RAMdisk and/or floppy are write protected.

Banner program prints 8-inch letters

Mike Machonis, of Severna Park, Maryland, has designed a short program that prints big letters. Only 9 lines long, the program outputs letters that are 8 inches high. The characters it prints are similar to normal dot-matrix characters, only much larger. The program won't replace professionally marketed banner programs, primarily because it doesn't utilize a character set designed for the printing of banners. However, you will get your message across with QDBANNER.

```
1 !QDBANNER by MIKE MACHONIS
 Severna Park, MD 21146 - Pr
ints Horizontal Banner with
letters 8 inches high - Code
d for Epson Printer
2 CALL CLEAR :: OPEN #1: "PI
O.CR" :: E$=CHR$(27) :: PRIN
T #1: E$;"A";CHR$(8);E$;"C";
CHR$(72) :: V$=CHR$(12)
3 DIM B$(16) :: HEX$="012345
6789ABCDEF" :: S$=RPT$(CHR$(
0),68) :: M$=RPT$(CHR$(255),
68) :: G$=E$&"K"&CHR$(220)&C
HR$(1) :: R$=CHR$(10)
4 FOR I=1 TO 16 :: READ B$(I
) :: NEXT I :: PRINT "ENTER
TEXT FOR YOUR BANNER": : ::
LINPUT T$
5 FOR N=1 TO LEN(T$) :: CALL
 CHARPAT(ASC(SEG$(T$,N,1)),H
X$) :: FOR B=3 TO 16 :: BIN$
=BIN$&B$(POS(HEX$,SEG$(HX$,B
,1),1)) :: NEXT B
6 FOR C=50 TO 54 :: FOR R=C
TO C-48 STEP -8 :: P=P+1 ::
IF SEG$(BIN$,R,1)="0" THEN P
$(P)=S$ ELSE P$(P)=M$
7 NEXT R :: FOR L=1 TO 9 ::
PRINT #1: G$; :: FOR P=1 TO
7 :: PRINT #1: P$(P) :: NEXT
 P :: P=0 :: PRINT #1: R$ ::
 NEXT L :: NEXT C
8 PRINT #1: V$ :: BIN$="" ::
 NEXT N :: PRINT #1: E$;"@"
:: CLOSE #1
9 DATA 0000,0001,0010,0011,0
100,0101,0110,0111,1000,1001
,1010,1011,1100,1101,1110,11
11
```

User Notes is a column of tips and ideas designed to help readers put their home computers to better use. The information provided here comes from many sources, including TI home computer user group newsletters. MICROpendium will pay $10 for any item sent in by readers that appears in this column. Mail tips to: MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

Classified

Software

YAK-MAN TALKS!

(1.) YAK-MAN, Menu Driven SPEECH Processor, Says anything you want! Forwards, Backwards, Even Pig Latin! EASILY Change Voices or Create and Store Speech! Many Preprogrammed Speeches and Features! Requires Speech Synthesizer and TE-II; (2.) STATES AND CAPITALS GAME, 1-2p, On-Screen Map! States, Capitals, Nicknames, Abbreviations! No Extras Required!; (3.) BIBLE BOOKS GAME, 1-2p, Hundreds of Clues! No Extras Required! (All Tapes) $14.95 each or ANY 2 FOR $19.95! TRINITY SYSTEMS, 1022 Grandview, Pittsburgh, PA 15237. v3,n12

BIRDSTRIKE

This action game for the TI99/4A 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. The animation will intrigue you. It requires Extended BASIC, and optionally utilizes joysticks and speech synthesizer. Take off from the city airport and encounter a flock of birds. If unsuccessful at maneuvering through the flock, the plane enters a spin and plummets to the ground. Try again, but it won't be just birds this time. Each flight is different, no patterns to memorize. Price is $15.00. Specify disk or cassette. Jackson Software, P.O. Box 2171, Attleboro MA 02703. v3n12

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