SCHOOL TOOL

Regena on using the TI to teach printing
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TI and IBM, and how the patient TI modules helped Barry Traver's son get ahead in math
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PLUS:
- ☑ Bruce Harrison on Assembly
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► *TI99/4A — still going!* ◄

Contents

MICROpendium

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*READ THIS

Here are some tips to help you when entering programs from MICROpendium:
1. All BASIC and Extended BASIC programs are run through Checksum, the numbers that follow exclamation points at the end of each program line. Do not enter these numbers or exclamation points. Checksum was published in the October 1987 edition.
2. Long XBASIC lines are entered by inputting until the screen stops accepting characters, pressing Enter, pressing FCTN REDO, cursoring to the end of the line and continuing input.

Comments

Odds and ends

We've added another column this month, called Bugs & Bytes. The column focuses primarily on gossip, with information coming from bulletin boards as well as readers. Nothing in the column should be considered written in stone. It's just to let you know what's being talked about in the TI community. Some of it may actually come true someday while other items will always remain speculative.

You'll also notice that we're publishing only 32 pages this month. Don't worry. We'll be back up to 40 next month. Incidentally, coming next month will be the 1991 update for the MICROpendium Index by Elton Schooling. The complete index (1984-1991) is available for $6 on two disks. The 1991 update will be included on the April MICROpendium disk.

BOSTON FAIR CHANGES LOCATION

A last-minute change has moved the Northeast TI Fair April 4 to Waltham High School, in Waltham, Massachusetts, instead of the Waltham Central Middle School. The high school is about two miles from the old location, according to Ron Williams of the Boston Computer Society.

A MESSAGE TO DISK SUBSCRIBERS

A couple of MICROpendium disk subscribers have asked how to obtain the documentation for the Check+ budgeting program by Bill Gaskill. The program was included on the December 1991 and January 1992 disks as a bonus program.

To obtain the documentation, send $15 to Bill Gaskill, 2310 Cypress Ct., Grand Junction, CO 81506.

I DIDN'T KNOW THAT

This month's Extended BASIC column, by Barry Traver, is full of interesting tidbits about the TI, though it focuses on comparing TI XBASIC with PC QuickBasic. One thing I didn't know was that the same chip used in the TI99/4A is also used in one of the missiles which saw action in the Desert Storm operation last year. Looking at your humble TI console you have to wonder why the "ancient" CPU that drives it still plays a role in our country's defense. According to Barry, it is because of the chip's mathematical accuracy.

COMMITTEE ON STANDARDS

Don O'Neil and other vendors at Fest West last month have proposed manufacturing standards for the TI99/4A. The standards are designed to help reduce the confusion that crops up regarding various system configurations. This is a voluntary effort and appears worthy of support. Manufacturers of software and hardware would be encouraged to label their products according to the protocols developed by the National Committee for TI Standards. The committee will meet again in May at the Lima Multi Users Group confab to finalize their work. (See page 14 for more information.)

—JK

READER TO READER

• Sam Carey, 5820 S.E. Westfork St., Portland, OR 97206-0742, writes: Where can I get a 21.47727 MHz crystal for building a V9938 circuit? Would a 20 MHz or 22 MHz crystal be good enough?

• Olden Warren, 4016 Weber Way, Lexington, KY 40514, writes: I purchased the DUMPIT software from Tex-Comp about a year ago to dump some modules on to disk, one of them being the Household Budget Management cartridge. When following the instructions, I learned that it contained a ROM chip so I could not dump it onto a disk. January's MICROpendium contains an article by Randy A. Cook that says he successfully dumped the Household Budget Management cartridge onto a disk. Did he really mean to include that cartridge? Am I doing something wrong or has he figured out how to dump the ROM chips to disk?

On a separate subject, does anyone

know where I can get my hands on an RGB converter? I have the Chicago TI Users Group Hardware Reprints that contains an article from the Calgary 99ers which states that one was available some time ago (Model EVM-RGBCNV-01) from TI. It also includes a schematic showing how to build one (my copy is very faded and I cannot read the details). If anyone knows where I can get one or has built one using those schematics please contact me: (606) 223-4599 (home); (606) 288-2231 (work).

• Henry B. Ledyard, 600 Genesee Mountain Rd., Golden, CO 80401, writes: Please help me locate operating instructions and, if possible, a schematic for a SmarTEAM modem M/N 103/212A, S/N A-009428 made in Taiwan for SmarTEAM Inc., 19205 Parthenia, Northridge, CA 91324, (818)886-9726. I have located references to the company in library copies of PC Magazine (5/12/87) and confirmed

their address in current phone listings but the phone has since been disconnected. I would, of course, be most willing to pay for Xerox copies and mailing if one of your readers can assist me.

• Orval Beland, 142 Douglas Crescent, Saskatoon, Sask., Canada S7L 4S8, writes: Many of us have, or can obtain, a low-cost TI console as a spare or perhaps for use as a dedicated controller for a Christmas light display. I have been in consumer entertainment electronics repair for years, but I am green when it comes to computers. It seems to me that the TI99/4A could perhaps dynamically control up to 16 separate strings of Christmas lights to creat a great number of lighting patterns in conjunction with the physical layout of the lights.

I would find no problem in converting the 5-volt logic levels for switching the light strings through an optocoupler, but is

it possible to use an output port(s) to obtain a pre-programmed seequence? If so, how might a simple BASIC or XB program be written? If these questions can be answered I would be happy to help anyone else with the hardware designs, since electrical isolation of the console would be an important safety consideration.

• Chuck McConnell, 2232 S. Clarence Ave., Berwyn, IL 60402, writes: I would like to find out if there is any software that I could use with my TI99/4A (without disk drive) that would simulate the PSET(M,l00) plotting command? This plotting command is illustrated by the following example from Chaos, Fractals, and Dynamics: Computer Experiments (in BASIC) in Mathematics by R.L. Devaney, Addison-Wesley, 1990, pp. 34-35:

```
REM program ITERATE2
INPUT "x";x0
CLS (CALL CLEAR) is TI equivalent
FOR I=1 TO 200
        m=300 * x0
        PSET (m, l00)
        x1=4 * x0 * (1 - x0)
        x0=x1
NEXT I
END
```

The figure displays a program called ITERATE2. The aim of this program is to display the first 200 points on the orbit of x_0 under $F(x)=4x(1 - x)$ where $0 < x_0 < 1$. In the program, the actual plotting is accomplished by the two commands

```
M=300 * X0
PSET(M,l00)
```

The first line simply changes coordinates from x-coordinates from x-coordinates to screen coordinates, while the second line tells the computer to light up the pixel (m, l00). Recall that the number m is not usually an integer. The PSET command overcomes this difficulty by rounding m to the nearest integer before plotting the point. Thus we get only an approximation to the actual orbit when we use ITERATE2; we cannot in general distinguish two points whose distance apart is less than 1/300.

Reader to Reader is a column to put TI and Geneve users in contact with other users. Be sure to address your questions to Reader to Reader, c/o MICROpendium, P.O. Box 1343, Round Rock, TX 78680.

BUGS & BYTES

Buy out Paul Charlton movement

Frustrated with having to do without a completed operation system, some users are discussing the possibility of buying out Paul Charlton's interest in MDOS so that someone else can finish it. Charlton is difficult to reach, so it's not known what he thinks of this movement, but his interest in finishing MDOS has been on the wane for quite some time.

The whole point, of course, would be to finish the Geneve's operation system so that programmers can get on with the job of writing programs in a predictable environment. If, by some stroke of luck, such a buyout could be arranged, end users would inevitably have to pay for a final version of MDOS. But this shouldn't bother anyone, even though Myarc promised a final version free of charge. Look at other computer brands and what happens when the system software is upgraded. Version 5.0 of DOS for PCs and System 7 for the Mac all require payment. The question shouldn't be whether to pay but how much.

We tried, but we haven't given up yet

For months we've tried to get a review of HQ__Stacks by McCann software. This program runs on the Geneve and is supposed to be a hypercard-like clone from the Mac world. Unfortunately, our would-be reviewer, Doug Phelps, has finally given up.

"I have decided against completing it (because) ... it is my conclusion that there is practically no chance of anyone receiving support from Mike (McCann) if they purchase the program. For probably valid reasons, Mike has ceased all work on it. At the end of last year I sent Mike a package with diskettes of some programming I had done (with HQ__Stacks) and after calling him months later, he had not even looked at it. I had asked questions about the program and some programming techniques I needed to know about to write a stack I was working on. The program costs too much for a purchaser to not be able to get answers to the questions he may have, and I don't want to be responsible for someone buying it based on my review."

Talking of Michelangelo

The malicious "Michelangelo" virus scheduled to blow out a lot of IBM programs March 6 generated more hoopla than problems, but one good thing about being in a "special" niche with the TI99/4A is the lower probability of being the target of mischief of that kind. Plus, it's harder to hide destructive programs on the 4A or the Geneve.

Hardware plans

Delphi posts by Don O'Neil reveal that tentative plans for a project between him and Bud Mills Services are for a 9995 based console motherboard replacement, with a 9938 with 192K, composite video output, up to one megabyte on board RAM, regular keyboard interface, built-in mouse port, new single cassette port usint 1-inch jacks and two internal expansion slots, one of which can hold a cage for plugging the P-box "hose" in the rear or the console, sliding it inside up to the leg of the box. The motherboard will use the standard TI GROMs and sound chip (which would be pulled from the console being upgraded, as TI's copyrighted code cannot be duplicated, but the individual owner can put his copy into the new motherboard), and have the stanard cartridge port. The internal RAM will be 4A Memex style which offers RAMBO compatibility as well as the new features on 4A Memex. Various ideas are being batted around as to what to put into the second internal slot, but there's lots of time for the decision, as no formal announcement has been made, and, as O'Neil emphasized, absolutely no work has been done on the product yet.

Feedback

Broward's still here

As I was reading some of the newsletters from our exchange, I ran across an article written by Jim Peterson in *The Spirit of 99 Newsletter*, November 1991. In his article, "TI World News," he talks about some user groups that he no longer heard anything about. The Broward Computer Group was one of these groups. Here is an excerpt from Jim's article:

"I have observed that when a TI group opens its doors to other computers — Suncoast, Brevard, Broward, etc. — their newsletters soon drop any mention of the TI. Florida used to be a major center of TI activity, but only the Miami Group seems to be very active these days. Daytona survives only as an informal get-together, and several others have been swallowed up by big blue."

I'm writing this to inform Jim and all other interested parties that we, the Broward Computer Group, are still here. Not only are we still a strictly TI group, we also hold meetings every week. December is excluded as we only meet once that month and that is at an annual dinner. Meetings are held on Wednesdays and start at 7:30 p.m. The "first" Wednesday is the regular business meeting with the remaining Wednesdays used for demonstrations, hardware projects, troubleshooting, etc. In addition to the weekly meeting we publish the group's newsletter, *The NovelTI News*. Our newsletter contains mostly original articles written by our own members, with an occasional reprint.

We would also like to try to organize some type of swap meet or fair in Florida. We know there are quite a few TIers here in Florida who would like to meet others with the same interests in the *great* machine of ours. If you're one of them *please* write us at the address below.

Starting now, we are involved in an all-out membership drive. We invite all in- and out-of-state TIers to write us for more information on either becoming a member or just to obtain a subscription to *The NovelTI News*! All correspondence is to be sent to The Broward Computer Group, c/o Mark Wacholtz, 2141 NW 64th Ave. #15, Sunrise, FL 33313-3950.

We look forward to making new friends and continuing the support of the Texas Instruments 99/4A.

Mark Wacholtz
President, Broward Computer Group
Sunrise, Florida

Farewell to column

For more than three years now, I have written a column of Extended BASIC programs, subprograms, tips, utilities and specialized applications. Although writing many of these programs has been fun, the column as a whole has taken many hours each month. When it began in late '88, I had far more time to devote to programming than I do now. Things have changed for me. Then, I was writing part time, and my full-time job was in retail management. Now, I am self-employed as a science writer, desktop publisher and software trainer on (gasp!) PCs. Although a PC still can't do a decent sprite graphic in any version of BASIC, PCs do have the attention (and cash) of the business world. As all of the self-employed among you know, there is no such thing as part-time self-employment. Nearly every moment of time is dedicated to looking for clients, serving clients, or maintaining professional skills.

The time has come for me to pass the Extended BASIC reins, or maybe the subprograms, to someone else. I think John Koloen's choice of programmer is an excellent one. In the meantime, those of you who have even glanced at the column know that I am a nut on the subject of subprograms. Used generously, they allow major projects to be assembled in hours instead of months, and they were my salvation in reaching deadlines many times over the past three years. My accumulation of reusable subs has been accumulated on an SSSD disk, available directly from MICROpendium. *(Send $6 for the set of subprograms. — Ed.)* There are 110 sound effects, sort routines, printer utilities, screen dumps, directory readers, statistical calculations, text string manipulators and calendar/date calculation utilites, plus a copy of SUBINDEX2 so users can create an index of all the subs. No line numbers overlap in the collection, so they are all ready to merge and use in new applications.

I'm not putting my Extended BASIC cartridge into retirement, so from time to time I may send more programs out into the TI world, but for now I send my thanks and best wishes to all my readers in the entire TI community.

Jerry Stern
Baltimore, Maryland

Help with problems

A while ago, I wrote to you with a problem I had with a TI printer and how I couldn't get it to work because I didn't have a book on it. Well, after you printed my problem in your magazine, I heard from several people on what to do. I would like to thank each of them for taking time and writing to me. I must add that after I wrote to you, I was able to purchase a Star NX1000 Rainbow printer at a price I couldn't turn down. And since this printer has almost 100 percent of the Epson printer codes, it is much easier to work with. And I can use it with the TI-Artist Plus program and get really good graphics.

I recently bought Microsoft Multiplan and followed the instructions for making a backup copy. I have a two-disk-drive system and when I put the disk in drive 1, and try to load the program, it turns on drive 1, then tries to load it from drive 2 but then tells me it can't find the program. Is there any help to this? I have the enhancement package that I bought from you that has the TI-Writer updates and they work just great. But I would like to get an answer as to why I cannot get a backup to load.

Also on another note, I bought Column Text III by Ron Prewitt and tried to get this program working on a Star printer. The two column works fine, but when I try to print either the three or four columns, I get only 80 columns and then a carriage return with the remainder of the last column in the next row. Any ideas?

Larry Reeves
Mount Pleasant, Michigan
As far as loading your backup disk, the disk name may be the problem. Multiplan is looking for a disk named TIMP. We don't know the answer to your printer problem, but perhaps some of our readers know something about it. — Ed.

BASIC

Learning to print letters

By REGENA

I have one son who used the computer so much from the time he was born that he knew all the letters and where to find them on the keyboard but didn't practice his handwriting. I was more careful with the next son and he enjoys writing or copying words. However, some of his letters are formed incorrectly (for example, not starting at the top of the letter and drawing downwards.

My program this month shows the kindergarten-suggested procedure to print letters. The child may press any letter on the keyboard, and the capital and lowercase form of the letter are drawn on the screen. The child may trace the letter on the screen or use pencil and paper to practice lettering as the letters are shown on the screen. To end the program, press the Enter key.

I might note that the way the letters are drawn on the screen is the way most children are taught. The sequence differs in lettering for sign painting or speedball printing. For example, the letter "C" in child's printing is done in one curved stroke starting at the top and going counterclockwise. In using a speedball pen, you would use first a short stroke going clockwise from the top, then a second stroke from the top counterclockwise to complete the "C." Also, in lettering with pen or paint, the dot is placed before the i or j, and the T is crossed before the vertical line. However, in school, the process is reversed.

Lines 150-250 define graphics characters used in drawing the letters and define variables X, Y, Z and N. X, Y and Z are row numbers 6, 15 and 11, for the top of the capital letter, the bottom of the letter, and the top of the lowercase letter. N is equal to 96 and is used for the character number in CALL HCHAR statements.

Lines 260-390 receive the key pressed, which must be one of the alphabetic characters (upper or lowercase). The subroutines in Lines 360 and 380 are the 26 subroutines called for the 26 letters of the alphabet. Other lines are other subroutines for sections of the letters drawn.

Lines 400-460 draw a vertical line from row A to row B. The subroutine may be entered at Line 400, Line 410 or Line 420. Lines 470-660 draw a diagonal line such as the first stroke of the letter "A." Lines 670-830 draw a diagonal line down and to the right. Lines 840-860 are the delay subroutine used after each major stroke of a letter. Increase the value in Line 840 if you want a longer delay.

Lines 870-1140 are five subroutines that draw the rounded corners in various directions. Lines 1150-1190 draw four block characters horizontally. Lines 1200-1350 are two subroutines that draw the tops of diagonal lines. Lines 1360-1410 draw the capital V and Lines 1420-1650 draw the lowercase v, which are also used as parts of other letters.

Lines 1660-1750 are two subroutines that draw characters for diagonal lines. Lines 1760-6330 are the main instructions for each letter drawn. Lines 6340-7130 are more subroutines that draw parts of letters which are used in more than one letter. For example, Lines 7020-7130 are used to draw the curved section of the lowercase "h," "m" and "n." Lines 7140-7150 clear the screen and end the program.

This program is "full memory," so I had to use several techniques to conserve memory which may make the program harder to understand. Variables were defined in DATA statements rather than individual LET statements. Variable names are one letter in length. Whenever I had four or more common lines, I tried to use a general subroutine.

Before typing in, loading or running this program, be sure to use the procedure CALL FILES(1) … NEW if you are using the disk system.

If you would like to save typing effort and would like a copy of this program, please send $4 to *REGENA, 918 Cedar Knolls Dr., Cedar City, UT 84720.* Be sure to specify that you need "Printing" for the TI and whether you want cassette or diskette.

PRINTING

```
100 REM   PRINTING
110 REM   BY REGENA
120 CALL CLEAR
130 PRINT "LEARNING TO PRINT
 LETTERS"::::"PRESS A LETTER
."::"THE COMPUTER WILL SHOW
HOW   TO PRINT IT."
140 PRINT ::"PRESS <ENTER> T
O STOP."::::
150 FOR C=96 TO 126
160 READ C$
170 CALL CHAR(C,C$)
180 NEXT C
190 READ X,Y,Z,N
200 DATA FFFFFFFFFFFFFFFF,01
```

```
01030307070F0F,1F1F3F3F7F7FF
FFF,00008080C0C0E0E,F0F0F8F8
FCFCFEFE
210 DATA FEFEFCFCF8F8F0F0,E0
E0C0C0808,FFFF7F7F3F3F1F1F,0
F0F070703030101
220 DATA 071F3F7F7FFFFFFFF,E0
C08,E0F8FCFEFEFFFFFF,070301,
FFFFFFFEFEFCF8E,000000000001
0307
230 DATA FFFFF7F7F3F1F07,00
0000000080C0E,F0FCFEFFFFFFFF
FF,FFFFFFFFFFFEFCF,0F3F7FFFF
FFFFFF,FFFFFFFFFF7F3F0F
240 DATA FEFCF8F0F8FCFEFF,01
```

```
03070F1F3F7FFF,FEFCF8F0E0C08
,80C0E0F0F8FCFEFF,7F3F1F0F07
0301
250 DATA E0C080000080C0E,070
3010000010307,EFEFC7C7838301
01,7F3F1F0F1F3F7FFF,0183C7EF
FFFFFFFF,6,15,11,96
260 PRINT "PRESS ANY LETTER.
";
270 CALL KEY(3,K,S)
280 IF K=13 THEN 7140
290 IF (K>64)+(K<91)=-2 THEN
 320
```

REGENA ON BASIC—

(Continued from Page 8)

```
300 IF (K>96)+(K<123)<>-2 TH
EN 270
310 K=K-32
320 P=K-64
330 CALL CLEAR
340 C=8
350 IF P>13 THEN 380
360 ON P GOSUB 1760,1900,210
0,2160,2440,2590,2730,2940,3
050,3120,3330,3610,3700
370 GOTO 260
380 ON P-13 GOSUB 3840,3940,
4050,4150,4330,4540,4990,511
0,5300,5340,5510,5870,6080
390 GOTO 260
400 A=X
410 B=Y
420 FOR R=A TO B
430 CALL HCHAR(R,C,N)
440 NEXT R
450 GOSUB 840
460 RETURN
470 R=X
480 CALL HCHAR(R,D,97)
490 CALL HCHAR(R+1,D,98)
500 CALL HCHAR(R+2,D-1,97)
510 CALL HCHAR(R+2,D,N)
520 FOR R=R+3 TO Y-2 STEP 2
530 CALL HCHAR(R,D-1,98)
540 CALL HCHAR(R,D,101)
550 CALL HCHAR(R+1,D-2,97)
560 CALL HCHAR(R+1,D-1,N)
570 CALL HCHAR(R+1,D,102)
580 D=D-1
590 NEXT R
600 IF P>1 THEN 630
610 CALL HCHAR(Y,D-1,98)
620 GOTO 640
630 CALL HCHAR(Y-1,D-1,N)
640 CALL HCHAR(Y,D,101)
650 GOSUB 840
660 RETURN
670 R=X
680 CALL HCHAR(R,D,99)
690 CALL HCHAR(R+1,D,100)
700 CALL HCHAR(R+2,D,N)
710 CALL HCHAR(R+2,D+1,99)
720 FOR R=R+3 TO Y-2 STEP 2
730 CALL HCHAR(R,D,103)
740 CALL HCHAR(R,D+1,100)
750 CALL HCHAR(R+1,D,104)
760 CALL HCHAR(R+1,D+1,N)
770 CALL HCHAR(R+1,D+2,99)
780 D=D+1
790 NEXT R
800 CALL HCHAR(Y,D,103)
810 CALL HCHAR(Y,D+1,100)
820 GOSUB 840
830 RETURN
840 FOR W=1 TO 200
850 NEXT W
860 RETURN
870 CALL HCHAR(R+1,D,N)
880 CALL HCHAR(R,D,107)
890 CALL HCHAR(R+1,D-1,108)
900 CALL HCHAR(R,D-1,N)
910 RETURN
920 CALL HCHAR(R,D+1,N)
930 CALL HCHAR(R,D,105)
940 CALL HCHAR(R+1,D+1,106)
950 CALL HCHAR(R+1,D,N)
960 RETURN
970 CALL HCHAR(R-1,D,N)
980 CALL HCHAR(R,D,109)
990 CALL HCHAR(R-1,D-1,110)
1000 CALL HCHAR(R,D-1,N)
1010 RETURN
1020 CALL HCHAR(R,D+1,N)
1030 CALL HCHAR(R,D,111)
1040 CALL HCHAR(R-1,D+1,112)
1050 CALL HCHAR(R-1,D,N)
1060 GOSUB 840
1070 RETURN
1080 B=Y-1
1090 GOSUB 420
1100 CALL HCHAR(Y,C,111)
1110 CALL HCHAR(Y-1,C+1,112)
1120 CALL HCHAR(Y,C+1,N)
1130 CALL HCHAR(Y,C+2,N)
1140 RETURN
1150 V=X+4
1160 FOR W=1 TO 4
1170 CALL HCHAR(V,C+W,N)
1180 NEXT W
1190 RETURN
1200 R=X
1210 CALL HCHAR(R,D-2,104)
1220 CALL HCHAR(R,D-1,N)
1230 CALL HCHAR(R,D,99)
1240 CALL HCHAR(R+1,D-1,103)
1250 CALL HCHAR(R+1,D,100)
1260 CALL HCHAR(R+2,D-1,104)
1270 RETURN
1280 R=X
1290 CALL HCHAR(R,D+2,102)
1300 CALL HCHAR(R,D+1,N)
1310 CALL HCHAR(R,D,97)
1320 CALL HCHAR(R+1,D+1,101)
1330 CALL HCHAR(R+1,D,98)
1340 CALL HCHAR(R+2,D+1,102)
1350 RETURN
1360 GOSUB 1200
1370 GOSUB 700
1380 D=D+4
1390 GOSUB 1280
1400 GOSUB 470
1410 RETURN
1420 D=21
1430 R=Z-1
1440 GOSUB 1240
1450 CALL HCHAR(R+2,D,N)
1460 CALL HCHAR(R+2,D+1,99)
1470 CALL HCHAR(R+3,D,103)
1480 CALL HCHAR(R+3,D+1,100)
1490 CALL HCHAR(R+4,D,104)
1500 CALL HCHAR(R+4,D+1,N)
1510 CALL HCHAR(R+4,D+2,99)
1520 CALL HCHAR(R+5,D+1,103)
1530 CALL HCHAR(R+5,D+2,100)
1540 D=D+3
1550 GOSUB 840
1560 GOSUB 1320
1570 CALL HCHAR(R+2,D,N)
1580 CALL HCHAR(R+2,D-1,97)
1590 CALL HCHAR(R+3,D,101)
1600 CALL HCHAR(R+3,D-1,98)
1610 CALL HCHAR(R+4,D,102)
1620 CALL HCHAR(R+4,D-1,N)
1630 CALL HCHAR(R+5,D-1,101)
1640 GOSUB 840
1650 RETURN
1660 D=D-1
1670 CALL HCHAR(R,D+1,119)
1680 CALL HCHAR(R,D,N)
1690 CALL HCHAR(R,D-1,118)
1700 RETURN
1710 CALL HCHAR(R,D-1,121)
1720 CALL HCHAR(R,D,N)
1730 CALL HCHAR(R,D+1,120)
1740 D=D+1
1750 RETURN
1760 D=8
1770 GOSUB 470
1780 D=9
1790 GOSUB 670
1800 FOR C=6 TO 11
1810 CALL HCHAR(Y-2,C,N)
1820 NEXT C
1830 GOSUB 840
1840 C=25
```

REGENA ON BASIC —

```
1850 R=Z
1860 GOSUB 6390
1870 A=Z
1880 GOSUB 410
1890 RETURN
1900 GOSUB 6730
1910 D=C+4
1920 CALL HCHAR(R+4,D,117)
1930 CALL HCHAR(R+5,D,N)
1940 CALL HCHAR(R+6,D,N)
1950 CALL HCHAR(R+7,D,N)
1960 R=Y
1970 GOSUB 970
1980 CALL HCHAR(R,C+2,N)
1990 CALL HCHAR(R,C+1,116)
2000 CALL HCHAR(R-1,C+1,112)
2010 GOSUB 840
2020 C=20
2030 A=X+1
2040 GOSUB 420
2050 R=Z
2060 GOSUB 6550
2070 CALL HCHAR(R+4,C+1,116)
2080 CALL HCHAR(R+3,C+1,112)
2090 RETURN
2100 GOSUB 6770
2110 GOSUB 840
2120 C=25
2130 R=Z
2140 GOSUB 6390
2150 RETURN
2160 GOSUB 400
2170 V=X
2180 GOSUB 1160
2190 CALL HCHAR(X,C+5,107)
2200 CALL HCHAR(X+1,C+4,108)
2210 D=C+5
2220 FOR R=X+1 TO Y-1
2230 CALL HCHAR(R,D,N)
2240 NEXT R
2250 GOSUB 970
2260 FOR W=3 TO 1 STEP -1
2270 CALL HCHAR(Y,C+W,N)
2280 NEXT W
2290 GOSUB 840
2300 R=Z
2310 C=25
2320 GOSUB 6390
2330 A=X+1
2340 GOSUB 420
2350 RETURN
2360 GOSUB 400
2370 FOR D=C+1 TO C+5
2380 CALL HCHAR(X,D,N)
2390 NEXT D
2400 GOSUB 840
2410 GOSUB 1150
2420 GOSUB 840
2430 RETURN
2440 GOSUB 2360
2450 FOR D=C+1 TO C+5
2460 CALL HCHAR(Y,D,N)
2470 NEXT D
2480 GOSUB 840
2490 R=Z
2500 C=25
2510 FOR W=-3 TO -1
2520 CALL HCHAR(R+2,C+W,N)
2530 NEXT W
2540 GOSUB 840
2550 D=C-1
2560 GOSUB 870
2570 GOSUB 6420
2580 RETURN
2590 GOSUB 2360
2600 C=22
2610 R=X+1
2620 D=C+3
2630 GOSUB 870
2640 D=C
2650 GOSUB 920
2660 FOR R=X+2 TO Y
2670 CALL HCHAR(R,C,N)
2680 NEXT R
2690 GOSUB 840
2700 CALL HCHAR(X+4,C-1,N)
2710 CALL HCHAR(X+4,C+1,N)
2720 RETURN
2730 GOSUB 6770
2740 CALL HCHAR(Y-2,C+5,N)
2750 CALL HCHAR(Y-3,C+5,N)
2760 GOSUB 840
2770 V=Y-4
2780 C=C+2
2790 GOSUB 1160
2800 GOSUB 840
2810 R=Z
2820 C=25
2830 GOSUB 6390
2840 A=Z
2850 B=Y+3
2860 GOSUB 420
2870 CALL HCHAR(B+1,C,109)
2880 CALL HCHAR(B,C-1,110)
2890 CALL HCHAR(B+1,C-1,N)
2900 CALL HCHAR(B+1,C-2,N)
2910 CALL HCHAR(B+1,C-3,116)
2920 CALL HCHAR(B,C-3,112)
2930 RETURN
2940 GOSUB 400
2950 C=13
2960 GOSUB 420
2970 C=8
2980 GOSUB 1150
2990 GOSUB 840
3000 C=20
3010 A=X+1
3020 GOSUB 420
3030 GOSUB 7020
3040 RETURN
3050 C=10
3060 GOSUB 400
3070 C=22
3080 A=Z
3090 GOSUB 420
3100 CALL HCHAR(Z-3,C,N)
3110 RETURN
3120 C=12
3130 A=X
3140 B=Y-1
3150 GOSUB 420
3160 R=Y
3170 D=C
3180 GOSUB 980
3190 CALL HCHAR(Y,C-2,N)
3200 D=C-4
3210 GOSUB 1020
3220 C=24
3230 A=Z
3240 B=Y+3
3250 GOSUB 420
3260 R=B+1
3270 D=C
3280 GOSUB 980
3290 D=D-3
3300 GOSUB 1020
3310 CALL HCHAR(Z-3,C,N)
3320 RETURN
3330 GOSUB 400
3340 D=C+6
3350 FOR R=X TO X+3
3360 GOSUB 1660
3370 NEXT R
3380 CALL HCHAR(R,D,119)
3390 CALL HCHAR(R,D-1,N)
3400 GOSUB 840
3410 CALL HCHAR(R,D,117)
3420 FOR R=R+1 TO Y
3430 GOSUB 1710
3440 NEXT R
3450 GOSUB 840
```

REGENA ON BASIC—

```
3460 C=21
3470 A=X+1
3480 GOSUB 410
3490 CALL HCHAR(Z,C+3,119)
3500 CALL HCHAR(Z,C+2,118)
3510 CALL HCHAR(Z+1,C+2,119)
3520 CALL HCHAR(Z+1,C+1,118)
3530 CALL HCHAR(Z+2,C+1,119)
3540 GOSUB 840
3550 CALL HCHAR(Z+2,C+1,117)
3560 CALL HCHAR(Z+3,C+1,121)
3570 CALL HCHAR(Z+3,C+2,120)
3580 CALL HCHAR(Y,C+2,121)
3590 CALL HCHAR(Y,C+3,120)
3600 RETURN
3610 GOSUB 400
3620 FOR D=C TO C+5
3630 CALL HCHAR(Y,D,N)
3640 NEXT D
3650 GOSUB 840
3660 A=X-1
3670 C=23
3680 GOSUB 400
3690 RETURN
3700 GOSUB 400
3710 D=C+1
3720 GOSUB 670
3730 D=C+8
3740 GOSUB 470
3750 C=C+9
3760 GOSUB 420
3770 C=21
3780 A=Z
3790 GOSUB 420
3800 GOSUB 7020
3810 C=C+4
3820 GOSUB 7020
3830 RETURN
3840 GOSUB 400
3850 D=C+1
3860 GOSUB 670
3870 C=C+5
3880 GOSUB 420
3890 C=22
3900 A=Z
3910 GOSUB 420
3920 GOSUB 7020
3930 RETURN
3940 GOSUB 6960
3950 R=Z
3960 C=25
3970 D=C-1
3980 GOSUB 870
3990 GOSUB 6420
4000 CALL HCHAR(R+4,C-1,109)
4010 CALL HCHAR(R+3,C-2,110)
4020 CALL HCHAR(R+3,C-1,N)
4030 CALL HCHAR(R+2,C-1,N)
4040 RETURN
4050 GOSUB 6730
4060 C=21
4070 A=Z
4080 B=Y+4
4090 GOSUB 420
4100 R=Z
4110 GOSUB 6550
4120 CALL HCHAR(Y,C+1,116)
4130 CALL HCHAR(Y-1,C+1,112)
4140 RETURN
4150 GOSUB 6960
4160 CALL HCHAR(Y-2,C+3,120)
4170 CALL HCHAR(Y-1,C+3,121)
4180 CALL HCHAR(Y-1,C+4,120)
4190 CALL HCHAR(Y,C+5,117)
4200 CALL HCHAR(Y+1,C+5,121)
4210 CALL HCHAR(Y+1,C+6,120)
4220 GOSUB 840
4230 C=25
4240 R=Z
4250 GOSUB 6390
4260 A=Z
4270 B=Y+4
4280 GOSUB 420
4290 CALL HCHAR(B+1,C,119)
4300 CALL HCHAR(B,C+1,119)
4310 CALL HCHAR(B-1,C+1,118)
4320 RETURN
4330 GOSUB 6730
4340 FOR R=Z TO Z+2 STEP 2
4350 CALL HCHAR(R,C+2,103)
4360 CALL HCHAR(R,C+3,100)
4370 CALL HCHAR(R+1,C+2,104)
4380 CALL HCHAR(R+1,C+3,N)
4390 CALL HCHAR(R+1,C+4,99)
4400 C=C+1
4410 NEXT R
4420 CALL HCHAR(Y,C+2,103)
4430 CALL HCHAR(Y,C+3,100)
4440 GOSUB 840
4450 C=22
4460 A=Z
4470 GOSUB 410
4480 CALL HCHAR(A+1,C+1,106)
4490 CALL HCHAR(A,C+1,115)
4500 CALL HCHAR(A,C+2,N)
4510 CALL HCHAR(A,C+3,113)
4520 CALL HCHAR(A+1,C+3,108)
4530 RETURN
4540 D=C+5
4550 R=X
4560 GOSUB 870
4570 CALL HCHAR(R,C+3,N)
4580 CALL HCHAR(R,C+2,N)
4590 D=C
4600 GOSUB 920
4610 CALL HCHAR(R+2,C,N)
4620 CALL HCHAR(R+3,C,N)
4630 CALL HCHAR(R+4,C,111)
4640 CALL HCHAR(R+3,C+1,112)
4650 GOSUB 1150
4660 D=C+5
4670 CALL HCHAR(R+4,D,107)
4680 CALL HCHAR(R+5,C+4,108)
4690 CALL HCHAR(R+5,D,N)
4700 CALL HCHAR(R+6,D,N)
4710 CALL HCHAR(R+7,D,N)
4720 R=Y
4730 GOSUB 970
4740 CALL HCHAR(R,C+3,N)
4750 CALL HCHAR(R,C+2,N)
4760 D=C
4770 GOSUB 1020
4780 GOSUB 840
4790 C=22
4800 CALL HCHAR(Z+1,C+3,108)
4810 CALL HCHAR(Z,C+3,113)
4820 CALL HCHAR(Z,C+2,N)
4830 CALL HCHAR(Z,C+1,N)
4840 CALL HCHAR(Z,C,105)
4850 CALL HCHAR(Z+1,C,N)
4860 CALL HCHAR(Z+1,C+1,122)
4870 CALL HCHAR(Z+2,C,111)
4880 CALL HCHAR(Z+2,C+1,N)
4890 CALL HCHAR(Z+2,C+2,N)
4900 CALL HCHAR(Z+2,C+3,107)
4910 CALL HCHAR(Z+3,C+3,N)
4920 CALL HCHAR(Z+3,C+2,123)
4930 CALL HCHAR(Y,C+3,109)
4940 CALL HCHAR(Y,C+2,N)
4950 CALL HCHAR(Y,C+1,N)
4960 CALL HCHAR(Y,C,116)
4970 CALL HCHAR(Y-1,C,112)
4980 RETURN
4990 C=11
5000 GOSUB 400
5010 FOR D=C-3 TO C+3
5020 CALL HCHAR(X,D,N)
5030 NEXT D
5040 GOSUB 840
5050 C=23
5060 A=X+1
5070 GOSUB 420
5080 CALL HCHAR(Z-2,C-1,N)
5090 CALL HCHAR(Z-2,C+1,N)
```

REGENA ON BASIC—

```
5100 RETURN
5110 A=X
5120 GOSUB 1080
5130 CALL HCHAR(Y,C+3,N)
5140 CALL HCHAR(Y,C+4,N)
5150 CALL HCHAR(Y,C+5,109)
5160 CALL HCHAR(Y-1,C+4,110)
5170 FOR R=Y-1 TO X STEP -1
5180 CALL HCHAR(R,C+5,N)
5190 NEXT R
5200 GOSUB 840
5210 C=22
5220 A=Z
5230 GOSUB 1080
5240 CALL HCHAR(Y,C+3,114)
5250 CALL HCHAR(Y-1,C+3,110)
5260 GOSUB 840
5270 C=C+4
5280 GOSUB 410
5290 RETURN
5300 D=8
5310 GOSUB 1360
5320 GOSUB 1420
5330 RETURN
5340 D=4
5350 GOSUB 1360
5360 D=D+5
5370 CALL HCHAR(X,D,99)
5380 CALL HCHAR(X+1,D-1,96)
5390 CALL HCHAR(X+1,D,100)
5400 CALL HCHAR(X+2,D-1,124)
5410 R=X
5420 GOSUB 700
5430 GOSUB 1380
5440 D=22
5450 GOSUB 1430
5460 R=Z-1
5470 D=D+1
5480 CALL HCHAR(R+1,D,100)
5490 GOSUB 1450
5500 RETURN
5510 D=8
5520 FOR R=X+1 TO Y
5530 GOSUB 1710
5540 NEXT R
5550 GOSUB 840
5560 D=D-1
5570 FOR R=X+1 TO X+3
5580 GOSUB 1660
5590 NEXT R
5600 CALL HCHAR(R,D,119)
5610 CALL HCHAR(R,D-1,N)
5620 CALL HCHAR(R+1,D-2,N)
5630 CALL HCHAR(R+1,D-3,118)
5640 D=D-2
5650 FOR R=Y-3 TO Y
5660 GOSUB 1660
5670 NEXT R
5680 GOSUB 840
5690 D=22
5700 FOR R=Z TO Y
5710 CALL HCHAR(R,D,121)
5720 CALL HCHAR(R,D+1,120)
5730 D=D+1
5740 NEXT R
5750 GOSUB 840
5760 CALL HCHAR(Z,D,119)
5770 CALL HCHAR(Z,D-1,118)
5780 CALL HCHAR(Z+1,D-1,119)
5790 CALL HCHAR(Z+1,D-2,118)
5800 CALL HCHAR(Z+2,D-2,117)
5810 CALL HCHAR(Z+2,D-3,125)
5820 CALL HCHAR(Z+3,D-3,119)
5830 CALL HCHAR(Z+3,D-4,118)
5840 CALL HCHAR(Y,D-4,119)
5850 CALL HCHAR(Y,D-5,118)
5860 RETURN
5870 D=C
5880 FOR R=X TO X+4
5890 GOSUB 1710
5900 NEXT R
5910 GOSUB 840
5920 D=C+9
5930 FOR R=X TO X+3
5940 GOSUB 1660
5950 NEXT R
5960 CALL HCHAR(R,D,119)
5970 CALL HCHAR(R,D-1,N)
5980 CALL HCHAR(R-1,D-1,126)
5990 GOSUB 840
6000 C=C+4
6010 A=R+1
6020 GOSUB 410
6030 GOSUB 1420
6040 R=Y-1
6050 D=D-2
6060 GOSUB 1560
6070 RETURN
6080 V=X
6090 CALL HCHAR(X,C,N)
6100 GOSUB 6340
6110 CALL HCHAR(X,C+11,119)
6120 D=C+10
6130 FOR R=X+1 TO Y
6140 GOSUB 1660
6150 NEXT R
6160 GOSUB 840
6170 V=Y
6180 GOSUB 6340
6190 C=22
6200 V=Z
6210 GOSUB 1160
6220 GOSUB 840
6230 CALL HCHAR(V,C+5,119)
6240 C=C+4
6250 FOR R=Z+1 TO Y
6260 CALL HCHAR(R,C,119)
6270 CALL HCHAR(R,C-1,118)
6280 C=C-1
6290 NEXT R
6300 V=Y
6310 GOSUB 840
6320 GOSUB 1160
6330 RETURN
6340 FOR W=C+1 TO C+10
6350 CALL HCHAR(V,W,N)
6360 NEXT W
6370 GOSUB 840
6380 RETURN
6390 CALL HCHAR(R+1,C-1,108)
6400 CALL HCHAR(R,C-1,113)
6410 CALL HCHAR(R,C-2,N)
6420 D=C-4
6430 GOSUB 920
6440 CALL HCHAR(R+2,C-4,N)
6450 CALL HCHAR(R+3,C-4,N)
6460 CALL HCHAR(R+3,C-3,112)
6470 CALL HCHAR(R+4,C-4,111)
6480 CALL HCHAR(R+4,C-3,N)
6490 CALL HCHAR(R+4,C-2,N)
6500 IF P=15 THEN 6540
6510 CALL HCHAR(R+4,C-1,114)
6520 CALL HCHAR(R+3,C-1,110)
6530 GOSUB 840
6540 RETURN
6550 CALL HCHAR(R+1,C+1,106)
6560 CALL HCHAR(R,C+1,115)
6570 CALL HCHAR(R,C+2,N)
6580 CALL HCHAR(R,C+3,N)
6590 CALL HCHAR(R,C+4,107)
6600 CALL HCHAR(R+1,C+3,108)
6610 CALL HCHAR(R+1,C+4,N)
6620 CALL HCHAR(R+2,C+4,N)
6630 CALL HCHAR(R+3,C+4,N)
6640 CALL HCHAR(R+3,C+3,110)
6650 CALL HCHAR(R+4,C+4,109)
6660 CALL HCHAR(R+4,C+3,N)
6670 CALL HCHAR(R+4,C+2,N)
6680 RETURN
6690 GOSUB 6550
6700 CALL HCHAR(R+4,C+1,N)
6710 GOSUB 840
6720 RETURN
6730 GOSUB 400
6740 R=X
```

REGENA ON BASIC—

```
6750 GOSUB 6690
6760 RETURN
6770 D=C+5
6780 R=X
6790 GOSUB 870
6800 CALL HCHAR(R,C+3,N)
6810 CALL HCHAR(R,C+2,N)
6820 D=C
6830 GOSUB 920
6840 CALL HCHAR(X+1,C+1,106)

6850 FOR R=X+2 TO Y-1
6860 CALL HCHAR(R,C,N)
6870 NEXT R
6880 CALL HCHAR(Y,C,111)
6890 CALL HCHAR(Y-1,C+1,112)
6900 V=Y
6910 GOSUB 1160
6920 CALL HCHAR(Y,C+5,109)
6930 CALL HCHAR(Y-1,C+4,110)
6940 CALL HCHAR(Y-1,C+5,N)
6950 RETURN

6960 GOSUB 6770
6970 FOR R=Y-2 TO X+2 STEP -
1
6980 CALL HCHAR(R,C+5,N)
6990 NEXT R
7000 GOSUB 840
7010 RETURN
7020 CALL HCHAR(Z+1,C+1,106)
7030 CALL HCHAR(Z,C+1,115)
7040 CALL HCHAR(Z,C+2,N)
7050 CALL HCHAR(Z,C+3,N)
7060 CALL HCHAR(Z,C+4,107)
7070 CALL HCHAR(Z+1,C+3,108)
7080 CALL HCHAR(Z+1,C+4,N)
7090 CALL HCHAR(Z+2,C+4,N)
7100 CALL HCHAR(Z+3,C+4,N)
7110 CALL HCHAR(Z+4,C+4,N)
7120 GOSUB 840
7130 RETURN
7140 CALL CLEAR
7150 END
```

Harrison releases Bach Inventions for MIDI-Master

Two Harrison Software MIDI-Master music products were scheduled to be introduced at TICOFF March 14. The two sets of Inventions (Two-Part ánd Three-Part) by J.S. Bach are sets of 15 pieces each in the form of SNF source files, according to the manufacturer. Instrumentation has been left to the discretion of the user; the pieces will play as piano on most keyboards if used as supplied, the manufacturer says. The products require the MIDI-Master, Extended BASIC or Editor/Assembler, 32K memory, a MIDI instrument and at least one DS/SD disk drive. The source files can be edited using E/A, Funnelweb or TI-Writer. Each set of Inventions is on one DS/SD disk. Each set runs about 30 minutes. Price is $15 per disk, or both as a package for $25.

For information, or to order, contact Harrison Software, 5705 40th Place, Hyattsville, MD 20781.

Newsbytes

Standards committee lists system levels

A vendors' forum at Fest West in Phoenix, Arizona, Feb. 15, hosted by Don O'Neil of Western Horizon Technologies, generated a National Committee for TI Standards, which has created a proposal for guidelines for standards for manufacturers of TI-related hardware and software to follow. The standards will be decided at the Lima Multi Users Group in Lima, Ohio, this May, according to O'Neil.

Once standards are set, the committee recommends that all current and new software be labeled as Standard No. 1 Compliant, Standard No. 2 Compliant, etc., through four levels. The following are the level recommendations.

Level 1: TI99/4A console, 32K memory expansion, cassette and EA/5 loader (E/A, Supercart, TI-Writer, Multiplan, etc.).

Level 2: Level 1 system plus RS232 and DSDD disk drive and controller

Level 3: Level 2 system plus at least 128K of CPU RAM, bankable at the 6000 space.

Level 4: Level 3 system plus 9938/58 VDP with 192K VDP RAM.

O'Neil says users should forward their ideas on these standards to their local user group before the Lima fair. He may be contacted c/o South Bay TI Users Group, P.O. Box 110037, Campbell, CA 95011-0037.

Concept 99 software debuts at Fest West

, The Taylor Company presented several demonstrations at Fest West in Phoenix Feb. 15 showing the capabilities of the TI99/4A with Chris Taylor of the company demonstrating several modified TIs.

Taylor says he has developed Concept 99 software, the majority under the trademark t__ware. Core modules have been developed for the following: t__desk (a graphics interface), t__disk (a disk manager), t__base (a data filer), t__chess (a chess program), t__kick (a pop-up calculator, calendar, ASCII chart and notepad)

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The TI and the IBM

Some BASIC comparisons

By BARRY TRAVER
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This is the first of a series of three articles comparing the TI-99/4A and the IBM in general, and TI Extended BASIC and IBM QuickBASIC in particular. No, this is not an article to persuade you to give up your TI. If anything, it is the reverse! Each machine has advantages and disadvantages, and TI'ers should recognize that there are many things you can do on your standard TI that cannot be done on a standard PC. (If anyone thinks I'm overstating things, please withhold judgment until you have read the rest of this article.)

As I've said elsewhere, moving from the TI to the PC is not "moving up," but merely "moving over." True, you may gain a lot (e.g., access to powerful business programs like Lotus 1-2-3), but you lose a lot as well (more about that in a moment). In my opinion, getting an IBM (or, more likely, an IBM clone) makes the most sense IF it is a supplement to, and not a replacement for, your TI.

A TEACHING TOOL

Let me digress a minute to do a little parental boasting (although I'm not sure whether I'm boasting more about my son or more about my TI). When John Calvin was entering second grade, he already knew his times tables and how to multiply a three-digit number by a two-digit number (as well as do long division by a single-digit number) at a time when his classmates were just learning their addition tables. A gifted child, you say? Perhaps ... but that's not the point.

The point is that no matter how "gifted" you are, you don't automatically know how to perform mathematical operations like multiplication and division! You have to be specifically taught how to do those things. Well then, who taught John Calvin? It was "someone" who had more patience than his Dad ("Don't you know how to do that yet? I've shown you several times!") and "someone" who was able to keep his interest with lively music, colorful graphics, engaging animation, and clever speech. Yep, you got it: the "someone"

was the TI-99/4A.

John Calvin learned his math on the TI, receiving instruction in the concepts from Scott, Foresman and getting appropriate drill from Milliken, an unbeatable combination in my opinion. (Has John Calvin, now in ninth grade, kept up in mathematics? I'll let you know at the end of this article.) The TI kept his attention with full-color graphics, "spritely" animation, realistic speech, and harmonious music. What the TI offered our family, it continues to offer anyone who has a basic TI-99/4A system (console, speech synthesizer, and appropriate cartridges).

The special features in the Scott, Foresman modules are also available to anyone who can program in TI Extended BASIC. The TI allows you to have 16 colors on the screen at the same time (not true, by the way, for the more commonly used IBM screen modes), and - more importantly - the TI makes animated sprites (graphical figures that you can make move across the screen) easy to do. In addition, if "a pretty girl is like a melody," the TI allows you to have music that is more than pretty, because you can add harmony to the melody. (Or, if you prefer noise and sound effects, TI Extended BASIC allows you that as well.) TI XB also lets your computer talk (with hundreds of words built-in, and an unlimited vocabulary available if you use TI's text-to-speech package).

GRAPHIC DIFFERENCES

Now, those exciting features that we take for granted on any basic TI system - colorful animated graphics, speech, multi-voice music - cannot be taken for granted on the IBM. You can spend $1,750 or more on a PC system, and end up with monochrome graphics. (Check the ads in PC Magazine if you don't believe me.) Although many IBM's now have color, there is a variety of add-on color cards that are in use: CGA, EGA, and VGA, just to name the most popular. On the TI, you can ordinarily assume that the standard TI'er will have color on his system. On the IBM, you not only cannot assume color capabilities,

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EXTENDED BASIC—

(Continued from Page 14)

but there is no standard, common color configuration for those who do have color.

One thing is "standard" for graphics on the IBM, however. Regardless of what color card an IBM'er may have, it will not support the sprites we take for granted on the TI. It's not just that you don't have sprites with automotion (the ability to have figures keep moving across the screen once they're put in motion, without having to do anything "extra" to keep them moving): on the IBM, you don't have "true" sprites at all (regardless of whether you have CGA, EGA, VGA, or super-VGA!). You won't find any counterpart to the CALL SPRITE of TI Extended BASIC in QuickBASIC for the IBM. It's not just a language deficiency; the hardware simply doesn't support sprites.

Let me see if I can provide an analogy to illustrate the situation. On the TI, working with graphics is something like working with a background plus 28 overlays (actually 32, if you program in assembly). On the IBM, working with graphics essentially means working with a background. Period. Yes, you can "emulate" sprites to a certain degree, but what is really going on is more or less just a matter of continually re-drawing the background.

As some of you know from my CONEYGAMES, I like to program games for the TI in TI Extended BASIC. Some of them (e.g., NIMROW and SHUTOUT) are board games. It's not difficult on a TI to set up, for example, a red-and-black checkerboard with white and green checkers on it, and to move a checker from one square to another without messing up the background. In TI XB, CALL SPRITE and related statements make this rather easy to do. Well, it is not easy to do on a PC.

In the PC world, the two main companies that offer support packages for QuickBASIC are Crescent Software and MicroHelp Inc. These packages offer hundreds of routines to extend the powers of QuickBASIC (sort of like Jim Peterson's Nuts 'n Bolts disks for the TI). I talked with representatives from both companies (I even talked directly with Ethan Winder at Crescent), and I was told that they didn't have what I was looking for in ANY of their add-on

packages. Working with sprites on the TI is simple, because of the abilities of the 9918A video chip, but what is simple for us is difficult or impossible on the IBM PC.

SPEAK UP

Well, so much for programming colorful, animated graphics on the PC. (I didn't even mention the problems involved in doing un-animated graphics on the PC, such as having to deal with pixels that are rectangular rather than square!) Let's move on to speech. Even though it is an "extra," I suspect that almost all TI'ers have a speech synthesizer. (If they don't, they can ordinarily pick one up for $25 or less.) In the PC world, on the other hand, computers that can talk are in the minority. It involves purchasing a special card (e.g., AdLib or SoundBlaster), and not many people have made that investment. Just as TI XB's CALL SPRITE is missing from QuickBASIC for the PC, the same is true for CALL SAY. That is to say, QuickBASIC does not support speech.

Finally, let's take a look at music. Yes, QuickBASIC does support CALL SOUND, but it is rather pathetic in comparison to the CALL SOUND we have in TI XB. As I said earlier, all you get on the IBM is melody, no harmony, but the situation is even worse than that. In QuickBASIC, there is no provision for varying the volume of the sounds produced. (I suppose in some respects that doesn't make much difference, since most PC's just have a cheap internal speaker that isn't capable of much variation anyway. On a TI, in contrast, not only can you vary individual sound volumes with CALL SOUND, but the sound is output either through a TV set which also has its own volume control or through a high-fidelity sound system where you have an even greater control over the resulting sound.)

It is my opinion that the "bells and whistles" (and harmonious music and color and animation and speech) on the standard TI is not "frivolous frills," but essential for many of the uses to which a home computer is often put (e.g., education). Take away those things from the Scott, Foresman cartridges, for example, and I don't think my son's interest would have been enough to sustain his motiva-

(Continued from Page 14)

and t__learn (language tutor programs: Mid-East, European, Slavic, Asian).

Taylor says that for the programs to be marketable, they must be completed, tested and have manuals written, and he would like user input so he will know where to concentrate his resources. He would like to hear from users willing to make a deposit for programs to support continued development, and says he is willing to discuss terms for groups willing to pay for custom software, especially educational software.

Write Taylor at 1233 N. Mesa Dr. 2118, Mesa AZ 85201.

Rocky Mountain 99ers have new home, BBS

The Rocky Mountain 99ers have a new home and bulletin board, according to Dave Swartz, editor of the group's newsletter.

The group meets the second Tuesday of each month at the AT&T-owned Stanford Place II building, 7979 E. Tufts Parkway, Denver, Colorado. New phone number for the BBS is (303) 368-7298, at 300/1200/2400 BPS and 8 bits, no parity and 1 stop bit. Roger List, vice president of the club, is the sysop.

For further information about the club, contact Cliff Smart, (303) 972-8382.

Lima conference sets tentative schedule

A tentative schedule has been released for the Lima Multi User Group Conference May 15-16 at Reed Hall, the Ohio State University Lima Campus in Lima, Ohio.

The conference is free to all attendees and there is no charge for user groups, individuals and dealers who want tables in the exhibit area.

Setup will be 4-8 p.m. May 15. During these hours, as soon as systems to do so are set up, a designated representative from any user group can copy software from the Lima User Group software library, according to Charles Good of the group. No charge is made for the service, but user group representatives must provide their own blank disks.

Doors open for the fest at 7:30 a.m., with setup time until 9 a.m. for those arriving who did not set up the previous evening. User group representatives may

#29. LABEL MAKER I
Two great programs for making custom labels for disks, addresses video tapes or any other application. Even contains a graphic display of the TI-99/4A console. Now you can create custom labels of any number by just typing in the lines as you want them. Uses standard tractor labels.

#30. HOUSEHOLD BUDGET PRINTOUT
With this disk you print out the data you have stored with the TI HBM Module. HBM is a great module that can be used for many home and small business applications but TI forgot to include a printout function. This program comes with full instructions and we are sure that your HBM Module will now start being used. Fantastic programming job.

#31. MORSE CODE TRAINER DISK
This disk has everything you need to learn and practice Morse Code for the various FCC license exams. It also is great for scout groups and school "ham" clubs for group training and merit badge qualification. Professional quality.

#32. EXBASIC XMAS MUSIC
Two disk sides full of high quality xmas music that can be played throughout the holiday season and then used as a learning tool since it contains wonderful arrangements and graphics. Autoloading and menu driven.

#33. CHECKERS & BACKGAMMON
A collection of great checkers and backgammon games for the TI-99/4A. These are professional in quality and will keep you busy for hours.

#34. SOLITAIRE & SCRABBLE
Another collection of classic games for the TI-99/4A. Exbasic & 32K req.

#35. PROGRAMMING AIDS & UTILITIES I
A collection of some unusual programs of interest to programmers. One program shows a group of opening title displays, another is a cross reference program as good as any of the commercial ones, plus a great disk management utility.

#36. STRICTLY BUSINESS
A collection of various programs for evaluating loans, calculating interest, and other financial items such as return on investment and security performance. Two disk sides filled with financial and business related programs.

#37. LAPD COOKBOOK
This unofficial police cookbook was put together by one of our boys in blue who is also a gourmet chef. (Yes, it contains jailhouse chili) Over 50 great receipes from soup to nuts on two disk sides and each separate side can be called up on screen or printer in exbasic from a menu. As good as any of the new PC computer cookbooks we have seen.

#38. GREAT 99/4A GAMES VOL. I
A collection of professional games in assembly and exbasic that all load from a menu in exbasic. Includes a great ski game where you dodge the trees in a fast downhill run. We have included only the best.

#39. GREAT 99/4A GAMES VOL. II
Still more of the great ones from all over the world. The quality, graphics and speed of many of these games will make you wonder why they were never released commercially.

#40. ARTIFICIAL INTELLIGENCE
This disk contains the famouse computer program "Eliza" where you type in a question or a problem you are having and "Eliza" helps you find the solution. Also contains one of the better bio-rhythm programs so you can analyze all your emotional problems at one sitting.

#41. VIDEO GRAPHS MODULE BACKUP DISK
This disk is a backup of the discontinued Video Graphs Module from TI. For legal reasons, it can only be purchased for backup use by owners of the original module. Do not order UNLESS you have the original module and intend to use this disk only for backup purposes. Exbasic autoload...

#42. FUNNELWEB FARM UTILITY
You heard about this one, now direct from Australia is the latest version of this fantastic utility that puts everything at your command. From one program you can access word processing, editor assembler, telecommunications and just about everything else. A freeware program complete with documentation on a second disk side.

#43. BEST OF BRITAIN, VOL I
Now for the first time, a collection of the best 99/4A games Britain has to offer including the famous "Billy Ball" series of arcade games. Great graphics, action and excitement.

#44. LABEL MAKER I GRAPHICS
A disk filled with graphics for the Label Maker I disk (#29). Dozens of great graphics for custom labels!

#45. BEST OF BRITAIN, VOL II
This disk contains an outstanding 3-D graphics adventure game for the TI-99/4A. Carfax Abbey lets you actually move through a four story mansion complete with bats and vampires. You actually are placed in each room and go up and down stairs and through secret panels. Legend of Zelda...look out!

#46. SUPER TRIVIA 99
A great trivia game for 1 to 4 players with great questions and capability to add your own and print out the files. This one is a real challenge.

#47. INFOCOM RAPID LOADER
If you have Infocom games this is for you. Loads all TI Infocom games in only 28 seconds and permits new screen colors and improved text display. Comes with all documentation on disk.

#48. GHOSTMAN (from England)
This Pacman/Munchman type game starts at a slow pace and slowly speeds up to a break-neck pace. A totally new experience.

#49. DEMON DESTROYER (from France)
This great assembly game starts where Invaders leaves off. Add features like descending aliens and closing walls. Hours of great arcade action.

#50. OH MUMMY (from Germany)
Move through the chambers of a Pyramid in search of hidden treasure. Fantastic graphics and great entertainment.

#51. BERLIN WALL (from Canada)
This game requires a mine field to be crossed before escaping from E. Berlin. Good graphics and a real challenge.

#52. ANIMATION 99 (from Germany)
THIS IS THE ONE!!! A demo disk filled with computer animation routines like you have never seen before on any computer. See famous cartoon figures move with more realism that on Sat. morning TV. This disk received a standing ovation when previewed at a local users group. We have even included instructions how to do it yourself on the second disk side. This one is a show stopper!!!

#53. HACKER/CRACKER
A collection of disk copying programs that copy TI disks by tracks. If one of these can't copy a protected disk nothing will. We included a collection of the very best ones including both TI and CorComp compatible. These programs require 2 disk drives and 32K of memory.

#54. ASTRONOMY
This program from Australia plots the heavens and teaches you about the solar system. A great learning and reference tool. Exbasic and 32K required. Don't confuse this one with our Astrology demo. They are not the same...ask Nancy!

#55. SCREEN DUMP
This program allows you to dump disk and even module programs to a Star/Epson compatible printer. Comes with easy to follow plans to build a load interrupt switch which is needed to dump module programs. This dump program by Danny Michael is considered the best of the bunch! Complete with documentation.

#56. SPREAD SHEET
OK, it's not Multiplan but it works great and handles many spread sheet applications. A great way to learn to use spread sheet software. Comes with full instructions and documentation.

#57. TELCO
Considered one of the best data communications programs for the TI-99/4A. Complete with documentation.

#58. PR BASE
The alltime most popular and widely used data base program for the TI-99/4A. A freeware program that is widely supported and updated.

#59. GRAPH MAKER
A collection of the best programs for producing graphs and charts from your data. Exbasic and printer.

#60. FREDDY
A fantastic game where you guide the hero through underground passages filled with danger. Nintendo quality, great graphics and fast action. One of the best we have ever seen!!!

#61. THE MINE
A fast action game from F.R.G. that will keep you going for hours. Many screens and skills required.

#62. DISK MANAGER II MODULE BACKUP
The complete TI Disk Manager II on Disk. For legal reasons it is only available to owners of the original module for backup use.

#63. ASTROBLITZ/MAZOG
A pair of great games that continue where Parsec and Munchman leave off. Imagine Parsec with enemy space craft coming from in front and in back of your ship!!!

#64. MAJOR TOM/SPACE STATION PHETA
A pair of great space games. These two are going to keep you in front of the 99/4A for hours. Great!

#65. PERFECT PUSH
An all new space game where you assemble and launch a rocket ship in outer space while avoiding a space monster. This one is professional in very way..graphics, speed and action!!!

#66. HEBREW TYPEWRITER
This program converts your TI-99/4A keyboard into a typewriter that displays Hebrew letters on the screen. Can also be printed when used in conjunction with screen dump program (included). Great for religious training or making your copy of the dead sea scrolls or ten commandments!

#67. GENEALOGY
Now you can set up your family tree and store or print out the records. Great for keeping track of family relationships and records.

#68. CHESS
The original computer chess game Sargon has been reprogrammed for the TI-99/4A. Now play chess with your computer. Documentation included. Exbasic autoload.

#69. COMPUTER PLAYER PIANO/KEY-BOARD CHORD ANALYSIS
A unique music program which displays a piano on the screen and actually plays your selections.

#70. TI RUNNER II
The very latest (and best) "runner" game based on TI Runner and Star Runner. Great action, graphics and entertainment.

#71. KIDS LEARNING II
Two more disk sides loaded with the best in educational programs. Kids improve their math, spelling and comprehension skills while having fun.

#72. CERBERUS
Fantastic space game from Germany. Pilot your ship through narrow and crooked channels in space without colliding. Great graphics and music.

#73. CRYPTO (gram)
One of the best word games we have seen for any computer. Set up like a TV game show with great screen displays.

#74. LABEL MAKER II
Make labels for holidays and special events. You compose the text and select the resident graphics for the occasion.

#75. DISK CATALOGER
Now you can organize your disk files with this great utility. Files, sorts, and prints your records. Easy to use.

#76. PROGRAMMING AIDS AND UTILITIES II
A collection of very useful material. Includes a program to convert basic to exbasic so your old basic programs will load & run in exbasic, even with graphics. Also includes two on screen diagnostic programs to test your keyboard and processor. A great merge utility is also on this disk.

#77. MICROdex 99
A database program by Bill Gaskill which files and retrieves data such as magazine articles. A sample database is included.

#78. ARTCON+ BY RAY KAZMER
ATTENTION GRAPHX AND TI ARTIST USERS!!!
This program lets you convert Exbasic graphics to TI Artist and Graphx pictures. Also contains a new MAC-RLE (2) for converting from Artist to Graphx.

#79. DM1000 V3.5
One of the most popular disk managers for the TI-99/4A. Originally a rip-off of the CorComp manager, it has been improved and refined by talented users all over the world. This version is deemed the most reliable to date and is far advanced over the TI Disk Manager II. Distributed by permission from CorComp.

#80. BIRDWELL DISK UTILITY
A must if you are junto programming and software development. Besides being a great disk manager, it has provision for copying sectors, comparing files and is menu driven. Complete with documentation.

#81. HOME ACCOUNTING SYSTEM
A complete family & small business accounting system including a checkbook manager, budget analysis, mailing list and an inventory program. Complete with documentation. Easy to modify for specific needs.

#82. CROSSWORD PUZZLES
This program from Australia creates a different puzzle each time you run it. Self contained with definitions and vocabulary taken from a leading crossword dictionary. Great crossword fun.

#83. HOME APPLICATION PROGRAMS
A two disk side collection of useful programs for the home. Includes banking, cooking, home bar guide, utility records, and much much more. Something for everyone.

#84. GALACTIC BATTLE/SPY ADVENTURE
A pair of great commercial quality games from EB Software of TI Runner fame. Galactic Battle is a space "trek" type strategy game for one or more players. Spy Adventure is an adventure game that will keep you guessing for hours.

#85. AUTOBOOT UTILITY
This utility which can be installed on a disk loads and runs or displays most files. Now you can have a disk with exbasic programs, Editor Assembler programs and TI Writer files and run or display them all from exbasic.

#86. COLUMN TEXT III V3.2
A very useful utility for printing TI Writer and 99 Writer II files in separate spaced columns. Saves hours in producing a newsletter. Complete with documentation.

#87. ARCHIVER III
This utility allows you to "pack" or combine several files into one for space utilization. A number of boards are sending files packed to save transmission costs. This utility will let you pack and/or unpack these files.

#88. AUSSIE GAMES VOL 1
A collection of games from our friends down under. Includes a great card game and board game. Hours of fun and entertainment. Includes Matchmaker & TILO.

#89. PROCALC
This is an on screen calculator for decimal/hexidecimal conversions and much more. A must for the serious programmer.

 # 90. JET CHECKBOOK MANAGER
This checkbook manager is considered the ultimate with every feature you can think of for keeping track of your checking account and keeping records of your spending for budget and tax purposes. Complete with documentation.

#91. "THE MAZE OF CROG"(St. Valentine)
Ray Kazmer has created a great maze game with fantastic graphics and the characters from his now legendary "Woodstock" disk. Fun for all!!!

#92. HOUSEHOLD INVENTORY
Written by 99/4 programming great Charles Ehninger, this prize winner originally sold for $59.95. Keeps track of household, business or personal items by category and provides automatic updating for inflation etc. A must for tax and insurance records!

#93. THE 1989 KBGB GIRLIE CALENDAR
This latest offering from programming master Ken Gilliland prints out a jumbo 12 month calendar with a knock-out centerfold pinup for each month. If you like our #14 Figure Study disk, you will flip over this one. For Adults Only!! Exbasic & d/m printer.

#94. GREAT 99/4A GAMES VOL. 111
If you have seen vols. 1 & 2 of this series you know we only provide the very best. This latest volumn is also filled with a collection of great ones!

#95. WEATHER FORECASTER
The weather predictions are amazingly reliable and accurate! A great game "Lawnmower" and a mini database are also included to make this disk a fantastic value.

#96. STATISTICS & SORTING
Two great assembly utilities by John Clulow. STAT is a set of statistic routines for use in exbasic. SORT allows sorting by two separate fields and a choice of two types of sorts.

#97. MEMORY MANIPULATOR
This powerful utility lets you explore the entire memory in your 99/4A system and take apart what you find. User friendly!

#98. DAYS OF EDEN & DOORS OF EDEN two bible games)non-fiction) that work with the TI Adventure Module.

#99. GREAT 99/4A GAMES VOL. IV
This disk features the works of J. Peter Hoddie. All of these games are of commercial qualaity and well worth the donation requested!

#100. ASSULT THE CITY (T. of DOOM)
An exciting game for use with the Tunnels of Doom module. Several Exbasic bonus games are included.

#101. ENCHANCED DISPLAY PACKAGE.
This screen enhancement utility lets you do 40 columns, windowing, reverse scrolling, clock/alarm, and a whole host of other great tricks in exbasic. Fully documented.

#102. COLOSSAL CAVES ADVENTURE
This classic adventure now available for the 99/4A is what led to the Zork series. Hours of text adventuring.

#103. SORGAN, THE 99/4A ORGAN
This program which is currently selling for big bucks on module turns your 99/4A into an electronic organ. Sound effects, different instruments and voices, chord forms, color graphics with complete control of all.

#104. C99 COMPILER AND LIBRARY
This two-sided (flippy) disk gets you into C programming with your 99/4A. Comes with a great collection of utilities such as text & graphics. (E/A)

#105. KING'S CASTLE+
A great arcade style assembly game formerly offered on module. Also includes an EB "Trek" game and a collection of sprite & graphics from Tigercub's Jim Peterson.

#106. QUEST (Dungeons & Dragons)
One of the best D&D games around! You must destroy the Dark Lord to free your homeland! Complete with documentation on disk.

#107. STAR TREK MUSIC ALBUM
Ken Gilliand's music and graphics version of the TV theme and the three motion pictures. (Exbasic)

#108. FUNLPLUS BY JACK SUGHRUE
Fantastic disk packed with Funnelweb (#42) templates, utilities and prog. to augment and configure Funnelweb. Unbeliveable collection of fantastic aids to make the best even better!

#109. TI-WRITER MINI MANUAL
This disk prints out a five page TI Writer manual with everything you need to know to use TI Writer or the many clones such as 99Writer II. Additional aids for using this powerful word processor are included.

#110. DISK + AID
A powerful disk sector editor formerly sold for $20. Menu Driven and easy to use.

#111. POP MUSIC & GRAPHICS
This exciting disk from Germany features music/graphics written in 100% assembly and what comes from the TI sound chip is sure to astound you.

#112. INVOICE PACK
An excellent invoice preparation and printing program with instructions on how to modify it for your own business.

#113. LABEL MAKER 3
A collection of label programs to create mailing and disk envelopes, disk labels and much more!

EXTENDED BASIC—

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tion to work through all the cartridges. No, true, such things may not be very important on a "business computer," but they are important if you want to make learning "fun" for children (and adults too, for that matter!). We have those features not only in the TI modules, but also in TI Extended BASIC, so that we can include them in our own programming.

I don't mean to "knock" the IBM (we have a PC clone ourselves in our house, and find it useful for certain purposes, and there are some areas - e.g., speed - where it may have an edge over the TI), but I think it is important for TI'ers to realize that the TI-99/4A in 1992 still has some advantages over the IBM. To summarize what has been said so far by way of comparison, in TI XB you have CALL SAY, CALL SPRITE, and CALL SOUND, whereas in QuickBASIC for the PC you have no CALL SAY, no CALL SPRITE, and only an impoverished CALL SOUND (unless you happen to have a Tandy, which uses exactly the same sound chip that is on the TI-99/4A). If these features are important to you (as they are to me), then I recommend that you keep your TI!

MATHEMATICAL ACCURACY

Now let's move on to something more serious than "fun and games," the matter of mathematical accuracy. Let's take a simple BASIC program and run it on both machines:

```
100 J=1
110 FOR I=1 TO 10
120 J=J + .1
130 PRINT J;
140 NEXT I
```

Running the program on the TI in TI Extended BASIC, here is the output:

.1 .2 .3 .4 .5 .6 .7 .8 .9 1

Running the program on the IBM in QuickBASIC, here is the output:

.1 .2 .3 .4 .5 .6 .7 .8000001 .9000001 1

That makes life interesting, doesn't it?!

A number of years back Creative Computing magazine ran some benchmark programs and concluded (surprisingly for that magazine) that the TI-99/4A was more mathematically precise than a standard IBM. The preceding BASIC program certainly seems to confirm that verdict.

Maybe that is why the United States used the same 9900 CPU chip that is in our TI in one of the missiles that was used in (and responsible for) our victory in the "Desert Storm" Iraqi conflict this past year. QuickBASIC programming books warn you that instead of testing for an "equals" test, you should test to see whether your numbers are within a certain range of one another. This makes sense, because .1 + .1 + .1 + .1 + .1 + .1 + .1 + .1 does NOT equal .8 on the PC!

I apologize if this article seems to be somewhat heavy-handed in the basic (or BASIC) comparisons I have made, but I wanted to make the point that TI'ers should not be intimidated by the IBM nor be ignorant of features we have on the TI that are absent on the IBM. Admittedly, I have written an article in praise of the TI. To be perfectly fair, I should (and could) write an article in praise of the IBM, because there are many features I like about that machine as well (for example, Quick-BASIC has a beautiful programming environment with features like full-screen editing, etc., so that I am now using QuickBASIC on the PC to help me write TI XB programs for the TI!). The ideal situation in my opinion may be to own (or at least have access to) both machines and take advantages of the unique features of each.

CONVERTING PROGRAMS

If you happen to have a TI and a PC, let me close with some encouraging words. As long as you aren't working with fancy graphics, music, or speech, it isn't difficult to convert BASIC programs between TI Extended BASIC and QuickBASIC on the PC. I've done a fair amount of converting BASIC programs (some of them fairly lengthy) between the two machines myself, and in the next two articles I'll share with you some of the tricks I've found. Next month's article will concentrate on going from TI Extended BASIC to Quick-BASIC, and the following month's on the reverse.

There is a lot of overlap between the two languages (we'd naturally expect that, since Microsoft wrote TI BASIC as well as QuickBASIC, and TI XB is of course a superset of TI BASIC), but I'll be

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Newsbytes

Software and More publishes catalog

Software and More has published a catalog of the company's TI99/4A software.

Selling for $10 plus $1 shipping each are Grafiks and Music v2.2, which has various framed graphics pictures and songs, for which the words appear on screen as the songs play; Musical Christmas Tree in which the lights on the Christmas tree in the on-screen Christmas scene flash different colors as Christmas songs play; List of Labels Labeler, writ-ten for a Star Gemini 10X type printer, said to print out a list of labels with a "Thumbs Up!" graphic on the left side; and Valentine Card, which pictures a big heart in the center of the screen surrounded by a moving border of heart-shaped characters to the music of "I Left My Heart in San Francisco."

Fairware items available for a $1 copying charge plus $1 shipping are Telephone Dialer, a telephone number directory which is said to dial the number from the directory if the user puts the telephone mouthpiece by the monitor's speaker, and Flags and Map, which has pictures of various flags, including the Olympic flag, and a map of the 48 connected United States.

Checks should be made payable to Sam Carey. Send orders, or a self-addressed stamped envelope for a catalog, to Software And More, c/o Sam Carey, 5820 SE Westfork St., Portland, OR 97206-0742.

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Newsbytes

Tex-Comp will donate books to charities

Tex-Comp will donate TI books to non-profit organizations which will use them in their programs and which will pay shipping or arrange to pick the books up at Tex-Comp's warehouse, says Jerry Price of Tex-Comp.

He says to receive the books, the facility should send a letter stating that it is a chari-ty or non-profit organization, and that it wants the books for internal use, not for resale as a fundraiser and not for door prizes.

He says that Tex-Comp has contributed books and equipment to Eunice Spooner's student group at the Atwood-Tapley School; Marion Hall (Sister Pat Taylor); the St. Anthony Mission and the Special Awareness Center "and now we're looking for more."

Books available are Computer Playground, The Elementary TI99/4A, Programs for the TI Computer, Introduction to Assembly Language and Games TIs Play. These books are also for sale to the public from Tex-Comp at $1.49 each, or five for $4.95, plus 3 percent shipping on total orders (4 percent east of the Mississip-pi, $3 minimum).

Write Tex-Comp, P.O. Box 33084, Granada Hills, CA 91344.

Clearinghouse on line

The National Clearing House, designed as a means for clubs to share original newsletter articles, is on line, according to Dick Beery of the Central Ohio Ninety-Niners Inc.

Beery says any TI user group or individual may participate. Those using the service thereby become associate members of C.O.N.N.I. While anyone may upload files to the board, only members may download them. Membership cost is $30 the first year and $15 for each succeeding year to help defray the cost of equipment and maintenance.

The BBS operates at up to 2400 baud on the Spirit of '99 BBS, (614) 263-3412, 24 hours, 8N1, accessible through Starlink or PC-Pursuit.

Beery says first time callers should log on as new members and select the letter O to connect to the clearinghouse.

Checks should be made payable to

EXTENDED BASIC—

showing you some ways to handle the statements that are unique to one language (e.g., ACCEPT AT, CALL GHCAR, CALL HCHAR, CALL KEY, DISPLAY AT, MAX, MIN, RPT$ in TI XB, and DO...LOOP, LEFT$, LOCATE, LTRIM$, SELECT...CASE, UCASE$, WHILE...WEND in QuickBASIC). In addition, I'll note some places where the same word is used either slightly differently (e.g., STR$) or entirely differently (e.g., POS) in TI XB and in QuickBASIC.

In closing, let me say that I believe that the TI and IBM need not be competitors, but can be allies. In certain areas, the TI world has already benefitted greatly from the IBM world (for example, think of the TIPS graphics ported over by Ron Wolcott, not to mention RLE and GIF pictures brought over by others), and I believe that the relationship can be mutually productive (especially as we build a bridge between TI XB and QuickBASIC). Go ahead, buy a PC if you want; just be sure not to give up your TI (with its unique fea-

tures that IBM has still not caught up with)!

Oh, you wanted to know about whether the animated color graphics, speech, and sprightly music of the Scott, Foresman modules for the TI-99/4A made any long-lasting difference in my son's mathematical progress? Well, the TI can't claim all the credit (my son insists that we give due recognition to the excellent math textbooks by John H. Saxon, Jr. that we used the past couple of years while home schooling before John Calvin entered ninth grade this past fall), but he is now taking calculus at Phil-Mont Christian Academy (all the other students are twelfth graders) and has the highest average in the class! It all started with the TI, and even today I do not know any computer programs for elementary math (even for the IBM) that can match what the TI has to offer. Likewise TI Extended BASIC itself as a language continues to have many useful, unique features that we ought not to give up. (I may be exploring some of these in a separate series in this magazine.) Hang in there, and keep on compuTIn'!

1992 TI FAIRS

FEBRUARY
☐ Fest-West, Feb. 15-16, Days Inn-Phoenix/Camelback, 502 West Camelback, Phoenix, Arizona. Contact VAST Users Group, c/o Tom Pfeffer, 116 S. Stellar Parkway, Chandler, AZ 85226; H. Knight (602) 938-5446; R. Rees, (602) 869-8145; or the VAST BBS, (602) 233-0790.

MARCH
☐ T.I.C.O.F.F. (TI Computer Owners' Fun Faire — The IBM & Clone Owners' Fun Faire), 9 a.m.-4 p.m., March 14, Roselle Park High School, Roselle Park, New Jersey, $5. Contact Robert Guellnitz, Roselle Park Public Schools, 185 West Webster Ave., Roselle Park, NJ 07204, (908) 241-4550 (voice) or (908) 241-8902 (BBS).

APRIL
☐ Northeast Computer Fair, April 4, Waltham High School, Waltham Massachusetts, sponsored by TI99/4A User Group of the Boston Computer Society. Contact Ron Williams, 14 East St., Avon, MA 02322, or CompuServe 73030,2522.
☐ Dutch Annual TI-Fair, April 25, Utrecht, The Netherlands, sponsored by Dutch TI-Usergroup. Contact Drs. Erik C. van Wette, Hanninkhoek 39, 7546 AD Enschede, The Netherlands, phone: 31-53-778723.

MAY
☐ TI Orphan Reunion, 10 a.m.-5 p.m. May 9, Innisfail Lions' Hall, Innisfail, Alberta, Canada. Contact Fred Kessler, Box 20, Sundre, Alberta, Canada, T0M 1X0, (403) 638-3916.
☐ TI99/4A Users Group, UK, Annual Meeting, May 16, Princess Anne Training Centre, 10 Trinity St., Derby (Derbyshire, England). Contact Stephen Shaw, 10 Alstone Rd., Stockport, Cheshire England SK4 5H.
☐ Multi User Group Conference, May 15-16, Ohio State University Lima Campus. Contact Lima 99/4A Users Group, P.O. Box 647, Venedocia, OH 45894 or phone Dave Szippl (419) 228-7109 or Charles Good (419) 667-3131 evenings.

SEPTEMBER
☐ State of Washington TI Convention, Sept. 19, Tacoma, Washington. Contact Jim Tomkins, (206) 756-0934.

OCTOBER
☐ Chicago International World Faire, Oct. 30-31, Elk Grove, Illinois. Contact Chicago Users Group, 2515 Marcy, Evanston, IL 60211-1111.

NOVEMBER
☐ Australia TI-Faire, Nov. 14, Sydney, New South Wales. Contact Richard Warburton, (ISD) 61-2-9188132 or (STD) 02-9188132.

This TI event listing is a permanent feature of MICROpendium. User groups and others planning events for TI/Geneve users may send information for inclusion in this standing column. Send information to MICROpendium Fairs, P.O. Box 1343, Round Rock, TX 78680.

THE ART OF ASSEMBLY — PART 10

Off the end of the world

By BRUCE HARRISON
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When we started out with our TI Home computer, we had only the console, with Extended BASIC module. Storage was by cassette tape, and painfully slow. There are times when we consider those days to be golden.

Programming in Extended BASIC remained our mode of operation for several years, even after adding the PE Box, 32K memory, and of course a disk drive. Frustration set in when we kept running into the limitations imposed by the high-level language. Speed of execution became our greatest desire, and the hardest thing to achieve.

For all its drawbacks, however, Extended BASIC had one big advantage. The Interpreter was always in control of the machine. One could make all kinds of mistakes in the "program" fed to that interpreter, but it would always be able to stop the program and make that awful "BOOP" sound. We were protected and safe, like Christopher Columbus sailing around in the Mediterranean, there was no chance of sailing off the end of the world.

Of course frustration got to us, and we chose to seek the shorter route to India, through Assembly language. Talk about uncharted seas! No more BOOP! Once something assembled correctly, no more "SYNTAX ERROR". Just plain crashes, lockups, and screen displays from outer space.

In this new venture we found many ways to send the computer sailing "Off the End of the World." We'll recount a couple of those today.

One of the easiest ways to put the computer into a bottomless abyss is to try a VMBW operation when R2 is zero. Nobody ever made spectacular graphics like that can do. The screen fills with all kinds of patterns, multiple colors, changing apparently at random. It usually ends with the screen looking as if sync has been lost, and retrace lines are faintly visible, but flashing on and off at random positions. If we're lucky, it eventually gets back to somewhere stable, and then Function-Quit becomes active so we can escape from the abyss without resorting to the ON-OFF switch.

Another such experience happened when we were trying to get some of our music programs to run on Geneve. In these programs, we had to supply a DSRLNK to operate our Assembly program under Extended BASIC. Early testing showed that the DSRLNK we use for the TI would cause a lockup on the Geneve. One of our customers then supplied us the source code for a DSRLNK that he knew would work on his Geneve.

Eagerly we accepted, and placed this different DSRLNK in our source code. It assembled without error, so we loaded the Object file for testing on our faithful TI. Everything worked fine until we made a selection from the menu. The DSRLNK worked, in that it did bring in a file, and music played. There was just one small problem. The DSRLNK had turned our screen totally blank. It seems video output had been completely disabled, so the monitor was just a black screen free-running.

Nevertheless, the music continued to play until the number was over. We wondered if the Menu was on our invisible screen. The only way to tell was to pretend it was there and make a selection. To our complete surprise, the number selected loaded in and played, just as if the menu were visible.

Of course we didn't think it would be wise to ask our TI customers to put up with the blank menu just so our Geneve customers would be happy. We abandoned that DSRLNK. Actually, we first studied its source code for many hours, trying to decipher how it managed to blank the screen. No dice.

Much later, we discovered that the original DSRLNK we used on the TI would work on the Geneve if we entered

Harrison Software releases Easy Data

Harrison Software has released Easy Data, which combines advanced assembly routines with a "skeleton" Extended BASIC program, to which the user adds his own data to make high performance programs, according to Bruce Harrison of the company. "Mergeable" portions of program are provided.

The main ingredient is an assembly routine that uses data from the Extended BASIC program to assign values to array variables in that program. The data are sorted by the routine according to the user's wishes.

"The sort is done on either a numeric or string basis depending on the kind of variable it's reported into," says Harrison. "For instance, if data is in the form Last name, First name, Street address, City, State, Zip code, the user can, through the assembly routine, sort that data according to any two of those parameters. The user could, for example, sort by Zip code, with secondary sort by last name, so that all peo-ple in the same Zip code would appear in last-name order.

He says data consisting of 50 records of six fields each takes about three seconds to sort, regardless of its initial ordering. Harrison says the package includes a fast menu driver that works from user-supplied data to produce menus from simple data entries.

"Extensive error trapping has been built into the assembly routines to catch mistakes made in the CALL LINK statements and provide "plain English' error reports to the user," Harrison says.

Instructions, plus an XB program to print them, are provided on the disk. No knowledge of assembly is required, according to Harrison. Easy Data requires one disk drive, 32K and Extended BASIC.

The program sells for $6, including shipping, and comes on one SS/SD disk, complete with instruction and several demo programs.

For further information, or to order,

Newsbytes

write Harrison Software, 5705 40th Place, Hyattsville, MD 20781.

TI Orphan Reunion scheduled in Canada

The annual TI Orphan Reunion is scheduled from 10 a.m. to 5 p.m. May 9 at the Innisfail Lions' Hall, Innisfail, Alberta, Canada.

For further information, contact Fred Kessler, Box 20, Sundre, Alberta, Canada T0M 1X0 or (403) 638-3916.

Dutch users planning 80-column cartridge, fair

The Dutch TI-Usergroup, with approximately 175 members, has developed software and its "hardwaregroup" is developing an 80-column cart of which three have been completed, according to Erik van Wette, the group's secretary. The club plans a fair April 25 in Utrecht, The Netherlands.

Software is available on the club's Sub-Soft BBS, under FIDO node 2:283/305; the BBS is equipped with a US Robotics HST dual standard modem. The club can also receive mail through TI-ECHO, van Wette says.

The club publishes a newsletter, TIjdingen (TIdings) every two months, he says, "but it's written in the Dutch language, and that's certainly not German."

For information, contact Drs. Erik C. van Wette, Hanninkhoek 39, 7546 AD Enschede, The Netherlands, phone 31-53-778723.

Wrong address given for Cleveland group

The wrong address was given for the Cleveland Area 99/4A Users Group in the January 1991 issue. Write the group c/o Harrison W. Hoffman, 3925 Trowbridge Ave., Cleveland, OH 44109.

ART OF ASSEMBLY—

our menu via an Option 5 loader, instead of through Extended BASIC. We still don't know why that works! It has also been our experience that what works on one Geneve may not work on all of them.

Another fine mess we've created for ourselves was in the business of doing a VMBR operation without having set R2 to the correct value. This can have disastrous results, especially if you're reading into a data area that's ahead of most of your code. Zap, you've overwritten part of your program, and the computer rapidly gets "lost in space". We've done this particular trick on a number of occasions, and while it doesn't make any spectacular screen displays, it does very effectively lock up the computer so that only the ON-OFF switch has any effect whatsoever.

On one notable occasion, we were trying to bring in eighty characters from a VDP File buffer. As it happened, we had the number eighty handy at a data location somewhere in low memory (i.e. EIGHTY DATA 80). We could have written MOV @EIGHTY,R2, or LI R2,80. No, we made a slight mistake.

We had placed in our source code a sort of mixed metaphor, so it read LI R2,EIGHTY. That put the address of the data item EIGHTY into R2, not the value 80. The address, being a number something like >29E2, made our read operation from VDP bring 10,722 bytes from VDP into memory, wiping out our entire menu driver, and of course locking the computer up solid.

We stared at the printout of that source code for days on end without noticing that error. We even took the printout with us to Philadelphia while visiting a friend there. Near the end of our stay in Philadelphia, away from our beloved computer, we noticed the error, and of course then everything made sense.

The three hour drive back from Philly was filled with tension. Was that the only error? Would it work okay? Was there yet another error somewhere that we hadn't found? We couldn't bear the waiting to get home and try this fix. We did try it, and of course that cured the problem. We were able to sleep that night after all.

Sleepless nights are just another hazard

in this profession of computer programmer. There is a kind of tension that builds up when something isn't working right which is more deadly to sleep than 1000 cups of coffee.. "There must be a way to make this work! I know there's a way! What if I did another small operation before proceeding with..."

Sleep won't come, but tiredness does, and even while you're struggling with that one possible error, your lack of sleep is inducing others. Now you start getting syntax errors during the assembly run. You typed LI R0.14 instead of LI R0,14. Now you go back and fix that, but you're still not closing in on the original problem, and every load, save, and assemble is eating up the wee hours without any payoff.

Sometimes the exhaustion gets the better of us, and we "sleep on" the problem. This usually helps, and a fresh look at the source code in the morning brings a solution. It's always a good idea to take a sleep break, hard though that may be to do.

The hardest problems of all to find are the ones where some key step has been omitted. If something that's there is wrong, that's much easier to spot than something that's not there. Of course there is a debugger supplied with the E/A package. Why not use that to isolate the problem? We seldom resort to trying TI's debugger. Here's why.

First, one must know the actual addresses to use when the program is resident in memory. To be perfectly accurate in tracing a problem, this means running a fully listed assembly, generating a mountain of fan-fold paper which will be useful only until the problem is corrected. Second, one must make an educated guess as to where the problem occurs, and set a breakpoint before the suspect operation. If one could then single-step up until the disaster, the debugger would have earned its keep. One can't do that with TI's debugger, so the whole process becomes a tiresome series of stopping, reloading, taking another guess, then trying again.

Finally, many of the things we do involve situations where the debugger can't even be loaded into memory, because there's not enough room after our program loads, or else it will overwrite something

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we AORG'd when it loads.

Now and then our ability to create havoc on the computer is enhanced by the presence in our house of small animals. We have cats, and some of them have discovered our TI Computer console. One likes to curl up in a tight ball on top of the console while we're using it. She likes the warmth from its electronic innards. Sometimes her body sort of overlaps the keys, making it impossible to press the keys 1, 2 or 3.

Once your author committed the error of leaving the room while this darling little cat was atop the console. During his absence, the cat decided to walk across the keyboard, and when he returned, nothing from the Ramdisk menu would work. It took some time, but eventually a scenario emerged. The computer had been left with the Ramdisk menu on-screen. The cat must have hit key 5, which activates the Horizon Configure program. She'd then pressed any key, and put us into configure. The next key she must have stepped on was D for drives, then Q. This renamed drive #5 as drive Q. By the time we returned to the room, the screen had blanked. We hit Function-Quit to reset, and the menu came back, but those programs listed on the menu as being on drive 5 could not be accessed, since we no longer had a drive 5 on the system.

Pretty clever cat, that. It took quite a while to figure out what had happened, but only a minute to straighten out.

Another of our cats learned how to play a game with our old Star Delta 10 printer. She loved watching the printhead zoom back and forth, and seeing the paper advance. After a while, she figured out how to step on the On-Line button, then she'd just keep one little paw on the Line Feed button and watch as half a ream of paper headed down the back of the printer. We stopped using the Delta-10 some time ago, and she hasn't learned yet how to do this trick on the Star NX-1000.

As we write this, it's late on a summer evening, and the air conditioner is making the room a little chilly, so there's a cat curled up beside the console, under the desk lamp. The lamp keeps her warm, but

```
* THREE USEFUL SUBROUTINES - TWO THAT DISPLAY INTEGERS IN DECIMAL,
* ONE THAT DISPLAYS A WORD VALUE IN HEX NOTATION
*
* THIS FIRST VERSION OF INTDIS SHOWS INTEGER AS POSITIVE OR NEGATIVE NUMBER
* WILL DISPLAY NUMBERS FROM 0 THRU 32767 POSITIVE, OR THROUGH -32768 NEGATIVE
* NUMBER DISPLAYED IS RIGHT JUSTIFIED FROM POSITION POINTED TO BY R0 ON ENTRY
* TWO ENTRY POINTS ARE PROVIDED:
* USE INTDIS IF R5 POINTS TO INTEGER (WORD) IN MEMORY
* USE INTDI1 IF R5 CONTAINS INTEGER TO DISPLAY
* ON ENTRY, R0 POINTS TO LOCATION ONE SPOT BEYOND LEAST SIGNIFICANT DIGIT
* ON EXIT, R0 POINTS TO SAME LOCATION
* LEADING ZEROS ARE SUPPRESSED
* R1, R5, R6, AND R14 ARE USED AND MODIFIED BY SUBROUTINE
*
INTDIS MOV  *R5,R5        ENTRY WHEN R5 POINTS TO NUMBER - MOVE VALUE TO R5
INTDI1 LI   R14,INTSTK    ENTRY WHEN R5 CONTAINS NUMBER - POINT R14 TO STACK
       MOV  R5,R6         MOVE R5 VALUE TO R6
       ANDI R6,>8000      MASK OFF ALL BUT SIGN BIT
       MOVB R6,@NEGFLG    MOVE LEFT BYTE R6 TO FLAG BYTE
       JEQ  INTLOP        IF ZERO, JUMP
       NEG  R5            ELSE MAKE R5 POSITIVE VALUE
INTLOP MOV  R5,R6         MOVE R5 VALUE TO R6
       DEC  R0   /-       DECREMENT SCREEN LOCATION
       CLR  R5            CLEAR R5
       DIV  @TEN,R5       DIVIDE R5-R6 REGISTER PAIR BY 10
       SWPB R6            GET REMAINDER IN LEFT BYTE R6
       AB   @NUMBER,R6    ADD NUMBER MASK BYTE (>30)
       MOVB R6,*R14+      PLACE BYTE IN STACK AND INCREMENT POINTER
       MOV  R5,R5         SEE IF QUOTIENT WAS ZERO
       JNE  INTLOP        IF NOT, GO BACK FOR NEXT DIGIT
       MOVB @NEGFLG,R1    MOVE FLAG BYTE INTO LEFT BYTE R1
       JEQ  DISLOP        IF ZERO, JUMP AHEAD
       DEC  R0            ELSE DECREMENT SCREEN LOCATION
       MOVB @MINUS,R1     GET MINUS SIGN IN LEFT BYTE R1
*      AB   @OFFSET,R1    COMMENTED OUT - NEEDED IF RUN FROM XB
       BLWP @VSBW         DISPLAY MINUS SIGN
       INC  R0            POINT TO NEXT SPOT ON SCREEN
DISLOP DEC  R14           DECREMENT STACK POINTER
       MOVB *R14,R1       MOVE BYTE FROM STACK INTO LEFT BYTE R1
*      AB   @OFFSET,R1    COMMENTED OUT - USE ONLY IF RUN FROM EXTENDED BASIC
       BLWP @VSBW         WRITE DIGIT TO SCREEN
       INC  R0            INCREMENT SCREEN LOCATION
       CI   R14,INTSTK    COMPARE R14 TO BEGINNING OF STACK
       JGT  DISLOP        IF STILL GREATER, DISPLAY ANOTHER DIGIT
       RT                 ELSE RETURN TO CALLING PROGRAM
*
*
* SECOND VERSION OF INTDIS - IGNORES SIGN
* NUMBER MAY RANGE FROM 0 THROUGH 65,535 (ONE WORD)
* TWO ENTRY POINTS ARE PROVIDED
* USE INTDIS WHEN R5 POINTS TO A WORD IN MEMORY TO DISPLAY
* USE INTDI1 WHEN NUMBER TO BE DISPLAYED IS ALREADY IN R5
* ON ENTRY AND EXIT, R0 POINTS TO LOCATION ONE SPOT BEYOND LAST DIGIT
* DISPLAY RIGHT JUSTIFIES NUMBER FROM THERE
* SUPPRESSES LEADING ZEROS  (I.E. NUMBER 00045 WILL DISPLAY AS 45)
* R1, R5, R6, AND R14 ARE USED AND MODIFIED BY SUBROUTINE
*
INTDIS MOV  *R5,R5        MOVE INTEGER FROM MEMORY TO R5
INTDI1 LI   R14,INTSTK    POINT R14 AT STACK
INTLOP MOV  R5,R6         MOVE R5 VALUE INTO R6
       DEC  R0            DECREMENT SCREEN POINTER
       CLR  R5            CLEAR REGISTER 5
       DIV  @TEN,R5       DIVIDE R5-R6 REGISTER PAIR BY TEN
       SWPB R6            PLACE REMAINDER IN LEFT BYTE R6
       AB   @NUMBER,R6    ADD NUMERIC MASK (>30)
       MOVB R6,*R14+      STASH NUMBER ON STACK AND INCREMENT POINTER
       MOV  R5,R5         IS QUOTIENT ZERO
       JNE  INTLOP        IF NOT, THERE ARE MORE SIGNIFICANT DIGITS
DISLOP DEC  R14           DECREMENT STACK POINTER
       MOVB *R14,R1       MOVE BYTE FROM STACK TO LEFT BYTE R1
*      AB   @OFFSET,R1    COMMENTED OUT - USED ONLY WHEN RUN FROM EXTENDED BASIC
       BLWP @VSBW         WRITE TO SCREEN
       INC  R0            POINT AT NEXT SCREEN LOCATION
       CI   R14,INTSTK    COMPARE POINTER TO BEGINNING OF STACK
       JGT  DISLOP        IF GREATER, GO BACK FOR ANOTHER DIGIT
       RT                 ELSE RETURN
```

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now and then she shifts positions, and knocks papers off the desk and onto the floor.

But she is cute, cuddly, and purrs so sweetly when petted. (We are suckers for purring cats.) Besides, humans exist just to pick up papers, straighten out Ramdisks, and of course to feed cats. Don't believe this? Ask any cat.

Enough of this rambling. Today's sidebar has a couple of little subroutines you may find useful. As we promised, the subroutine INTDIS we mentioned last time is here, and in two versions. One version displays a one-word integer regardless of sign, so its screen output ranges from zero through 65535. The other takes the sign bit into account, and displays positive numbers from 0 through 32767 and negative numbers from -1 through -32768.

These of course can't be used together in a program as they're shown here, because labels would be duplicated. With changes to the labels, one could use both in a program.

The method used in these subroutines was suggested by one for the PC, in one of Peter Norton's books. First, we place the number right justified in the register pair R5-R6, by moving R5 to R6 and then clearing R5. We successively divide the number by ten. After each division, R5 contains the integer quotient and R6 contains the remainder. The first such divide makes R6 (remainder) equal the least significant digit. Dividing the quotient from this operation by ten makes the remainder equal the next significant digit, and so on. This continues until we find the quotient in R5 is zero, which means the remainder then in R6 is the most significant digit in the number. Of course Peter Norton had the luxury of doing this on a PC, so all he had to do to save each digit was to "PUSH DX" onto the established stack, then "POP" the digits back into a register for display. Here, we had to create our own stack in memory and used R14 as a pointer to that stack. The code shown in the sidebar is well annotated, so you should be able to follow its operation. On entry, R0 should point to a screen location where the decimal point would be if there were one. That is, the spot just beyond where the

least significant digit will appear. The value in R5 will be destroyed by the subroutine. The screen address placed in R0 before entry will be restored upon exit.

The other subroutine is for those cases where you want to see the Hex content of some word. The method used here was borrowed from another book of subroutines for the PC. By isolating the rightmost nybble each time, and successively shifting a register to the right, we place the four "digits" on a stack, then strip them off and display them in correct order.

We hope these subroutines will be useful in your programs. We also hope that we've gotten a few chuckles from our

readers. Those who've done some programming in Assembly will no doubt have stories of a similar nature to recount.

In our next article we promise to remain on a serious note throughout, and to pass along some useful tips.

SCCG BBS changes phone number

New telephone number for the Southern California Computer Group's BBS is (619) 282-8450. Steven Smith is sysop, replacing Lutz Winkler. The 24-hour board, 8N1, operates at 300, 1200 and 2400 bauds.

```
*
* SUBROUTINE HEXDIS DISPLAYS A HEX NUMBER ON SCREEN
* ON ENTRY, NUMBER TO BE DISPLAYED IS IN R5
* SCREEN LOCATION FOR FIRST "DIGIT" IS IN R0
* ON EXIT, R5 CONTAINS ORIGINAL NUMBER, R0 POINTS TO SPOT BEYOND LAST "DIGIT"
* R4, R6, R0, R1, R14 ARE USED AND CHANGED BY THE SUBROUTINE
*
HEXDIS
         LI    R4,4          FOUR "DIGITS" TO DISPLAY
         LI    R14,INTSTK    POINT AT STACK LOCATION
STKLP    MOV   R5,R6         MOVE R5 VALUE TO R6
         ANDI  R6,>000F      MASK ALL BUT LAST NYBBLE
         SWPB  R6            PLACE IN LEFT BYTE R6
         CB    R6,@TEN+1     COMPARE TO 10
         JLT   NUM           IF LESS, USE NUMBER MASK
         AB    @ALP,R6       ELSE ADD "A"-10 TO BYTE
         JMP   STCKIT        THEN JUMP
NUM      AB    @NUMBER,R6    ADD >30 TO BYTE
STCKIT   MOVB  R6,*R14+      PLACE BYTE IN STACK, INCREMENT POINTER
         SRC   R5,4          SHIFT R5 FOR NEXT NYBBLE
         DEC   R4            DECREMENT NYBBLE COUNT
         JNE   STKLP         IF NOT ZERO, GO BACK
         LI    R4,4          ELSE RESET R4 TO FOUR
HEXLOP   DEC   R14           DECREMENT STACK POINTER
         MOVB  *R14,R1       MOVE BYTE FROM STACK INTO R1
*        AB    @OFFSET,R1    COMMENTED OUT - FOR XB USE
         BLWP  @VSBW         WRITE TO SCREEN
         INC   R0            INCREMENT SCREEN LOCATION
         DEC   R4            DECREMENT CHARACTER COUNT
         JNE   HEXLOP        IF NOT ZERO, WRITE ANOTHER CHARACTER
         RT                  RETURN TO CALLING PROGRAM
*
*
* REQUIRED DATA SECTION - GOOD FOR ALL THREE SUBROUTINES
*
TEN      DATA  10            JUST THE NUMBER 10 AS A WORD
ALP      BYTE  55            ASCII VALUE FOR "A" WITH TEN SUBTRACTED (65-10=55)
INTSTK   BSS   5             RESERVED SPACE FOR DIGITS (FIVE)
MINUS    TEXT  '-'           MINUS SIGN READY FOR USE
NUMBER   BYTE  >30           NUMERIC VALUE MASK = ASCII FOR ZERO
NEGFLG   BYTE  0             FLAG BYTE FOR NEGATIVE NUMBERS
OFFSET   BYTE  >60           USED ONLY IF SUBROUTINE RUN UNDER XB
```

STARBASE RAIDERS

It takes strategy to shoot those space aliens

By JOHN KOLOEN

Starbase Raiders, written by Joe Delekto, combines elements of an arcade game with the strategy of a board game. If this were simply an arcade game, it would get tedious and as a game of strategy it would get boring. But combined, it is a winner.

Performance: The game starts with a view of a map that partitions the galaxy into quadrants. While some of the quadrants are empty, others contain icons for starbases and enemy fleets. Although there will be only several starbases scattered through the galaxy, there will be many enemy fleets. The object is to destroy the enemy fleets throughout the galaxy without being destroyed.

Most input is through the joystick, but several keys are also important. They are:

M — brings up the map of the galaxy
E — toggles engines
C — toggles computer gunsight
G — toggles external gravity
F — auto-firing
S — toggles shields
A — enemy tracking/lock on
W — activates hyperwarp
V — turns of enemy ship warning

Using the joystick, you move your ship's icon across the galaxy map in search of enemy fleets. After locating your ship on a quadrant displaying an enemy fleet icon, you press the fire button to enter the quadrant.

Like your ship, the enemy ships are armed with photon weapons. However, they do not maneuver well. You destroy the enemy ships by lining them up in your sighting box in the center of the screen and hit them with photon weapons. The fighting at this point is rapid, though only one ship attacks you at a time. The number of ships in each enemy fleet varies. The computer keeps track of the number of enemy ships in each fleet as well as the number remaining as you engage them, as well as your fuel supply. But the action is so fast that you don't have time to concentrate on anything that is not directly related to doing battle.

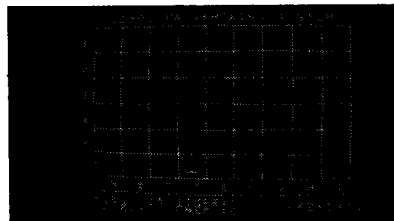Even though the enemy ships are rela-

Review

Report Card

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

Cost: $12.95, plus $3 S/H
Manufacturer: Asgard Software, P.O. Box 10306, Rockville, MD 20849
Requirements: TI99/4A, memory expansion, disk system, Extended BASIC or Editor/Assembler, joystick

tively easy to destroy, there are many of them and the damage to your ship is cumulative so that a single hit by each of the ships in an enemy fleet results in considerable damage. Screen color is used to indicate the level of damage your ship has sustained, changing from dark blue (no damage), to light blue, dark green, medium red and, finally dark red as the damage mounts up. Once your screen turns dark red, your only real option is to leave the encounter and go to a starbase in one of the other quadrants for repairs. Because the map is required to travel predictably between quadrants — and keeping in mind that the map is not available while in combat mode — you can use the "W" key to hyperwarp out of the battle but you won't know the destination until you get there. The preferred means of moving from quadrant to quadrant is through use of the galactic map.

Okay, suppose you've destroyed several fleets but in the process sustained

enough damage to turn your screen medium red. Now, my using the galactic map, you move to a quadrant containing a starbase icon and hyperwarp to the starbase. There is no actual starbase. Once inside the quadrant your ship is refueled and repaired automatically. Your next move is to leave the quadrant and again seek out enemy fleets. Remember, if an enemy fleet enters a quadrant with a starbase, the starbase will be destroyed. And without the starbases, you will never get to the next level.

Further complicating matters, your ship can be refueled and repaired only so many times on each level. So, if you are going to advance to the next level, it is necessary to destroy as many enemy fleets as you can without requiring frequent repair and refueling. Incidentally, there are also asteroid fields which have to be negotiated, but I'll leave that up to you to figure them out.

Ease of Use: With a joystick serving as the main input device and a handful of key commands available, the game is not difficult to learn or play. It's a basic shoot-em-up with a bit of strategy thrown in. Use of screen colors to alert you to the damage to your vessel means that users with monochrome monitors will have to refer to the galaxy map screen to see a readout on the damage level. But it's no big deal. You see each hit as it occurs on your ship and you know pretty much whether you've been hit frequently or not.

Documentation: The manual is an eight-page booklet and covers the gave more than adequately. It includes a little storyline about the Nebulon-2 galaxy for those who need a little background to set the mood. Otherwise, it describes all the functions and provides a few tips to help you enjoy the game. For example, the manual recommends that you use the auto-firing feature while manually controlling your vessel when in combat mode.

Value: Starbase Raiders is programmed in c99 and is a fine example of the power of this language. The price is modest and the product is enjoyable. The program is intelligently designed and entertaining enough to keep your attention. I like it.

CLASSIC CHECKERS

It's taken long enough but checkers for the TI is here

By JOHN KOLOEN

You have to wonder why nobody came up with a commercial version of checkers for the TI/Geneve until now. Classic Checkers, programmed by Chris Bobbitt, is a nicely done program with well-defined graphics and smooth movement of pieces across the checkerboard. It is also very fast.

Performance: What can you say about checkers that hasn't already been said? It's been around in one form or another since the time of the Egyptian pharoahs. The game we play today has been played since about the 16th century when the "must capture" rule was adopted. The 64-square board was standardized sometime during the 12th century. So, it's not a game that changes rapidly. If one of your ancestors happened to drop in on you, you might not be able to understand each other's language but it's a safe bet that you could both enjoy a game of checkers.

Of course, playing it on a TI or Geneve would pose problems for your ancestors, but it should pose no problem for you.

Performance: Classic Checkers is played on a standard "board" consisting of 32 white and 32 red squares. The pieces are black and white. In this game, white always moves first.

Classic Checkers allows you to play against the computer or against another player. Pieces may be moved either by use of the keyboard arrow keys — which I find to be inefficient — or by using a joystick or an Asgard Mouse. Having said that, I

Review

Report Card

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

Cost: $14.95, plus $3 S/H
Manufacturer: Asgard Software, P.O. Box 10306, Rockville, MD 20849
Requirements: TI99/4A, memory expansion, disk system, Extended BASIC or Editor Assembler, joysticks or Asgard Mouse; Geneve 9640

was unable to get it to work with my TI joysticks. It doesn't work with a Myarc Mouse.

Pieces are selected by manuevering a pointer over the piece that you want to
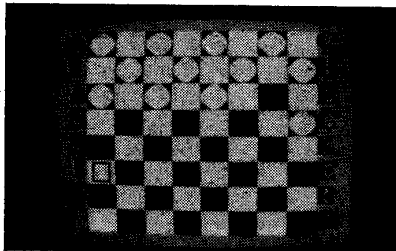
move and pressing the "fire" button on the joystick or the Enter key on the keyboard. Press the left button on the Asgard Mouse if you are using it as an input device. Then

move the pointer to the destination square and press the fire button again.

That's about all there is to it. Once you've made your selection, the computer rapidly moves the piece, automatically recording captures. It also automatically "crowns" pieces that reach the back row of squares. If you change your mind, simply enter an "illegal" move and the computer lets you start the selection process over.

If you expect the computer to turn into a challenging opponent, don't. While it makes its moves with blinding speed, it is blind to any but the most rudimentary strategy. The first time I played the computer I beat it simply by making a lot of strategic mistakes, some of them intentional. It seemed to have its own agenda and wasn't going to deviate from it no matter what I did. But for a speed game, it could be a good workout.

Ease of Use: It's checkers, for pity's sake. What could be easier.

Documentation: By using the eight-page booklet that comes with Classic Checkers, even those unfamiliar with the TI and the game of checkers can learn to play the game as well as to use the TI. So, perhaps, one of your ancestors could give you a match using Classic Checkers.

Value: Anyone who likes board games on computers can find enjoyment in this version of checkers. The price represents a good value given the flawless nature of the programming. Now, anyone for a game of draughts?

MICRO-REVIEWS

Grafics & Music, Payroll Files & Reports, Rattlesnake Bend-Zoom Flume-Castle Darkholm, and PrEditor

By STAN KRAJEWSKI

I don't know about you, but I like my TI Joysticks. I've tried others, but the way the TI Joysticks fit in the palm of the hand leads me to favor them. Just because they start working improperly is

no reason to toss them away. TI is still in business (they didn't abandon us completely) and they still sell the PC Film that operates the joystick. For just 42 cents you can buy the film, and that is al-

MICRO-REVIEWS—

most always the problem. The conductive metal seems to wear from use and it is easily replaceable. By just taking the two screws out from the back of the joystick that is not working, you see how simple it is to replace. The PC Film is connected to the wiring by a slip connector and you just slip the new one into place, and re-assemble it the reverse of the way you took it apart. It's that easy, and you don't need to pay for new joysticks, at more than $25. There is a $3 S&H charge, but buying more than you need for spares makes it worth while. Also include 6 percent sales tax. You send your order to Texas Instruments, P.O. Box 53, Lubbock, TX 79408 Attn. Dealer Parts. If any you receive are defective you can send them back for replacement at no extra charge. I bought eight of them and two were defective. No questions asked and I received the replacement promptly.

Ratings for the software reviewed in this column are based on the Star system that follows.

★ Leave it alone, back to the drawing board.

★ ★ Needs improvements, but workable.

★ ★ ★ A good program, worth trying.

★ ★ ★ ★ Send your money and buy it.

★ ★ 1/2
GRAFICS AND MUSIC V2.2

We all reach a point at which we decide either to start programming or be a non-programmer and just be able to modify programs as needed.

As for this 13-year-old, Sam Carey, I'm glad he is starting to write programs. This is not a bad program, but it is lacking the bells and whistles we've become accustomed to see. The style in which he uses assembly subroutines along with his understanding of Extended BASIC shows that this programmer does have talent. We need to encourage these young programmers if we want to see the TI braving into the future.

System requirements are Geneve 9640 or TI with 32K, disk drive and Extended BASIC.

This program on disk, starts off using a Load program which loads Extended BASIC and assembly subroutines, bringing you to the Load Section. You can see the programmer uses his own font type by looking at the menus. You now have a choice of loading either the "Graphics Section" or the "Music Section."

Upon entering the Graphics, you can load and display three framed pictures on your screen. 1. Picture of TI Console 2. Picture of Odie 3. Scene from "Peanuts." There is no print out option, but it's something you can show your friends and family on the screen. The entire program is menu driven, letting you go to the next section without breaking the program. Upon entering the Music Section, you have a choice of; 1. Climb Every Mountain 2. We Three Kings 3. Singin' in the Rain 4. When You Walk Through The Storm. For each song played, the words are on screen for you to follow along.

The songs are not bad, but seem to use one octave instead of using others simultaneously as the TI is capable of. Docs are included on disk.

Sam mentions the proceeds from this program are needed for him to expand his system. Let's help him out so he may continue programming on the TI, instead of losing him to another system. This program can be obtained by sending $10, which includes S&H, to Sam Carey, 5820 SE Westfork St., Portland, OR 97206.

★ ★ ★
Payroll Files and Reports

Here is a program that was created by a user, to help accelerate the payroll calculations in his business. He would like to make this program available for others who may have a small business. He states that system requirements are TI 99/4A Extended BASIC, 32K RAM, RS232, two disk drives with DS/DD or DS/SD capability and Epson-compatible printer. I found it works on the Geneve 9640 and one DS/SD drive is sufficient by swapping disks.

This program autoloads from Extended BASIC and is menu driven. By looking at the main menu you can see many options to give you flexibility. They include: 1. Calculations 2. Add Employee 3. Edit or Delete Data 4. Find Account By Name or Number 5. Alphabetize Accounts 6. Print Payroll Records 7. Start New Year 8. Open "Names" File.

Calculations does just what it says. It'll prompt you to insert the Database disk and display the employee names. You then

MICRO-REVIEWS—

(Continued from Page 27)

choose each employee and input the regular and overtime hours worked. The program will then calculate the salary, adjust it for Social Security, Medicare, Federal and State Withholding and display the take home pay. You may also print the report.

Add Employee — you can add a name and it will assign it to the next number. It holds such information as, Name, Address, Telephone, SS #, Marital Status, Withholding Exemptions and Hourly or Salary wage. It then displays the date and sets up the file.

Edit or Delete Data — displays all the information entered for each employee for editing or deletes entire entry.

Find Account — tells you if   account is active or not.

Alphabetize Accounts — arranges employees alphabetically on screen or printer with account number.

Print Payroll Records — displays or prints each employee's records by quarters and displays each pay period.

Start New Year — deletes names for individuals no longer employed and opens a new file for each employee still employed. Open Names File - opens the Names file on the database disk and sets the number of files at 0. The rates for Social Security, Medicare and Federal withholding taxes are for 1992 as published by the IRS in Circular E, Employees Tax Guide. These rates may be easily updated in the CALC1 program for each year. Withholding may also be changed to conform with the law in your state.

This program runs well but is limited to a 30-second delay between menu options. The author would like this program distributed as freeware and requires just a $5 fee for disk and postage. Send your order to Harold W. Evans, 293 Circle Hills Dr., Grand Forks, ND 58201.

★ ★ ★

Rattlesnake Bend — Zoom Flume — Castle Darkholm

I would like to thank Tex-Comp for making the Adventure Module available for me to make this review. Here is a collection of adventures that were processed by adventurers using the Tex-Comp Adventure Editor. Each program is packaged well in a sealed plastic bag. System requirements are TI 99/4A, 32K RAM, disk drive and the Adventure Module PHM 3041; or TI 99/4A, cassette recorder and Adventure Module.

In Rattlesnake Bend, you are Kid Poncho Dias, wandering through Death Valley looking to capture Santiago Escondido who is the most deceitful and unpredictable bandit in all of Santa Diablo.

Zoom Flume is a new twist in adventures, as it places you in a water park, with money and lots of water rides. Be careful, because you might find yourself outside the park and have to get in all over again. Did you forget to put your towel or your paper money up? What can you do with it if it gets soggy?

In Castle Darkholm you are chosen for your courage, skill and intellect, to face danger, saving mortal man from Baron Manfred Ritter Von Darkhold who has risen from the grave. It is up to you and only you to stop the slaughter by destroying the sinister Von Darkholm. This ad-

venture has two parts. "Crypt of Pain" is the first and "Gateway to Darkness" is Chapter 2.

These adventures are as good as any of the Scott Adams Adventures. As all of these adventures may take hours or even weeks to complete, you have the option of saving any one of your games to disk by typing "Save Game". In turn, you are prompted before each game whether you want to load a saved game or start over. These adventures are for true Adventurers, using your powers of logical reasoning. The instructions contain no hints, so you must use all your skill to advance in the game by using what you deduce as hints from the game itself. This is not hard, as they are all well done.

In all these adventures, the screen scrolls with game play instructions at the top half of the screen, telling you where you are and what you have to do. On the bottom half are all your commands you have used, and they continue to scroll down as you type in more commands. This lets you see the commands you have tried for a period of time, as it is easy to duplicate your instructions.

To enlighten your adventure, I suggest you get a Adventure Guide to help you along. This would be a must for a beginner, and is also available from this distributor at a nominal cost. More information is available free upon request. You will need it, as there is more than one guide for you to pick from.

These programs are available both on cassette and disk from Asgard Software P.O. Box 10306 Rockville, MD 20849. Castle Darkholm is $9.95, the others $7.95, plus Asgard's $3 per order S&H fee.

★ ★ ★

PrEditor

Unlike TI Writer or Funnelweb this Editor will allow up to two files in memory at once. Upon receiving this program I had to load it up and try this one out for my review.

System requirements are Geneve 9640 or TI99/4A, 32K RAM and at least one disk drive. System options are Super Cartridge, Mini-Memory, or one of the 80-

MICRO-REVIEWS—

(Continued from Page 28)

column cards available for the TI.

This is also the easiest loading Editor. You press either 1) for PrEditor or 2) for Configuration. If you have not yet configured the program to your system it is the first thing you must do.

As you enter the configuration program, the first prompt is Enter Name of First Segment. It asks this because you may want to modify the program and create multiple versions of it. Changing the program name it modifies the program internally, letting you keep each program by its own name for its particular use. In this way you do not need to keep changing the configuration each time it is used.

After you have created your file name, the next option lets you choose the foreground color and then the background color. Again unlike TI-Writer or its clones, the program gives you a choice of any one of the 16 colors the TI uses for both options. Next it asks 40 or 80 column mode. Margin set up is next. You may then choose your Horizontal Scroll Rate, Cursor Flash Rate & Cursor Repeat Rate (time of delay before the auto-repeat function kicks in when holding down a key).

The Line Speed Rate is next followed by Screen Scroll Lines (how many lines will scroll as the cursor hits the bottom). Tab Position is next, letting you preset any position with nine Tab options. If this is not enough, you now have a choice of; 1) No Extra Memory 2) Use 4K (used with the Mini Memory Cartridge 3) Use 8K (used with the Super cartridge). One of the finest options is changing any one of the 36 Fctn & Ctrl keys, including the Enter key, to any key you would like to use for each of the 36 options. Now you may save all this. To exit the configuration program is a simple press of the (N) key. This takes you back to the TI title screen and you can then load the Editor.

Say that we are in the Editor on a 40-column system. Instead of the screen windowing in three positions, (20 characters at a time), the text scrolls to the left one letter at a time as you type, although you can change it to suit your needs. This lets you see what you are typing better (if you're like me and lose your train of thought in 40-column mode) and you do not have to window back as frequently, but you still have the option of windowing if needed. You can see just about all the text in two windows. If you're using the full 80 columns only five letters appear in the third window. In 80-column mode your whole screen is visible, unless you change your margins from 0 to 1-9, the maximum. You will find that PrEditor will not allow you to move your cursor to the right unless there is text on the line where the cursor is. This lets you put more text in memory as it does not have to store a lot of blank spaces unless you tell it to.

Many more fine features include being able to switch between two files in memory by pressing Ctrl 5, and preserving the environment in each file. The cursor can move with lightning speed depending on how you have set it. The program contains many of the features of TI-Writer and its clones. You can view a file on disk while editing two others. Loading and saving files are as simple as pressing either Ctrl L or Ctrl S. A status line on the bottom lets you knows what line the cursor is on, block marking information lets you move text from one file to another and a marker lets you know what file you are looking at. It has single key press options instead of a command line as in TI-Writer. Also the insert character key stays active until you press it again.

The 17-page manual included explains everything from the editor to the configuration program. Also included is a PrEditor Quick Reference Chart. The packaging is in a dust-proof sealed bag. After hearing all this you would think that you might want to toss your TI-Writer or clones away. Don't do it yet. Although you have all these functions, I didn't find a key press for reformatting after splitting a line. There is no word wrap, leaving you to press enter after each line. No beep warns you when you are near the end of a line, either. Also, I found myself having to use the Tab key at each line to get where I wanted my Margin to start, even though there was a Set Margin option. What discouraged me the most was no Print File option. This program is great for writing programs and then converting them into runnable programs. But you might want to keep your other Editors for your word processing needs.

PrEditor is $14.95 plus $3 for S&H from Asgard Software, P.O. Box 10306, Rockville, MD. 20850.

If you would like your software or Hardware reviewed in this column, you may send it to Stan Krajewski, Route 6, Box 568-15 Live Oak, Florida 32060. If you would like it returned, please include postage. If you need to discuss something, for any reason, you may call me at 904-364-7897.
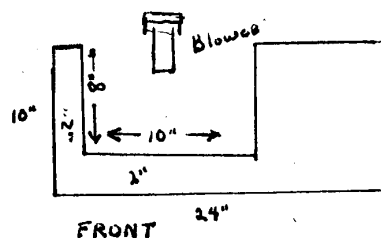
User Notes

Install a blower under your console

This comes from Joe Shisler, of Orlando, Florida. He writes:

For years I have used a blower under my TI99/4A console and have about eliminated lockups and failures that used to plague me. It is most useful if you use a Widget, for the heat buildup under a Widget is quite intense, even to the touch.

FRONT

I used a 10-inch by 24-inch sheet of three-quarter inch plywood and cut out roughly an 8-inch by 10-inch piece from the left side and back, leaving about a 2-inch border on the left side and front with an opening at the back. The console sits on this frame, and the cable and speech synthesizer rest on the right side.

I used a small fan removed from elec

(See Page 30)

User Notes

(Continued from Page 29)

tronic equipment and made a cardboard tube, about 6 inches long, that fit on the fan. I forced the airstream under the console by flattening one end of the tube and used package tape to hold it together.

Now I seldom have lockups, no matter how long use my computer.

Window Maker centers text automatically

This comes from W.L. Shepard, of Liverpool, New York. He writes:

The following program is one that I have found to be useful. It was written to be able to center up to five lines of text and enclose them in a "window." It is necessary only to produce the text lines, and the rest is automatic. As written, you may use from one to five lines of text. If more lines are desired, it is necessary to add more AND statements after line 210 and before line 220. You must also change the value of Z in lines 300 and 120 to equal the total number of lines.

If you want to enter the text lines as a permanent part of the program, delete the DISPLAY AT etc. from line 110, delete lines 130, 140 and 150, change the value of Z in line 110 to equal the number of lines of text, and write the new text lines in line 130. They should be in the form of: A$(1)="xxxxxxx" :: A$(2)="xxxxxxxx x" :: A$(3)="xxxxxxxx" etc.

```
100 ! WINDOW MAKER BY W.L. S
hepard. !250
110 N=4 :: Z=1 :: CALL CLEAR
 :: CALL SCREEN(5):: FOR I=0
 TO 13 :: CALL COLOR(I,15,5)
:: NEXT I :: DISPLAY AT(2,4)
:"ENTER THE TEXT." !212
120 IF Z>5 THEN GOTO 300 !20
0
130 ACCEPT AT(N,1)BEEP:A$(Z)
:: DISPLAY AT(24,4):"ANOTHER
 LINE?(Y/N)" !121
140 CALL KEY(0,K,S):: IF K=8
9 THEN Z=Z+1 :: DISPLAY AT(2
4,1):"              " :: N=N+1
 :: GOTO 120 !040
150 IF K=78 THEN 160 ELSE 14
0 !181
```

```
160 FOR I=1 TO Z :: X(I)=LEN
(A$(I)):: NEXT I !164
170 IF X(1)>X(2)AND X(1)>X(3
)AND X(1)>X(4)AND X(1)>X(5)T
HEN A=X(1):: GOTO 220 !210
180 IF X(2)>X(1)AND X(2)>X(3
)AND X(2)>X(4)AND X(2)>X(5)T
HEN A=X(2):: GOTO 220 !214
190 IF X(3)>X(1)AND X(3)>X(2
)AND X(3)>X(4)AND X(3)>X(5)T
HEN A=X(3):: GOTO 220 !218
200 IF X(4)>X(1)AND X(4)>X(2
)AND X(4)>X(3)AND X(4)>X(5)T
HEN A=X(4):: GOTO 220 !222
210 IF X(5)>X(1)AND X(5)>X(2
)AND X(5)>X(3)AND X(5)>X(4)T
HEN A=X(5):: GOTO 220 !226
220 CALL CLEAR :: B=(16-(A/2
)-1):: C=14-(A/2):: D=16+(A/
2):: CALL CHAR(128,"00000000
00FFFFFF"):: CALL HCHAR(3,B,
128,A+2)!003
230 CALL CHAR(129,"C0C0C0C0C
0C0C0C0"):: CALL VCHAR(4,B,1
29,2+Z):: CALL CHAR(130,"FFF
FFF0000000000"):: CALL CHAR(
131,"0303030303030303")!122
240 CALL HCHAR(6+Z,B,130,A+2
)!014
250 CALL VCHAR(4,D,131,2+Z)!
027
260 J=5 :: FOR I=1 TO Z :: C
=14-X(I)/2 :: DISPLAY AT(J,C
)SIZE(X(I)):A$(I)!088
270 J=J+1 :: NEXT I !110
280 !GOTO THE REST OF XB PRO
GRAM FROM HERE. !136
290 GOTO 290 !114
300 Z=5 :: GOTO 160 !135
```

Author finds error in XBASIC program

Jerry Stern reports there was a minor error in his CHECKBOOK program, published in the January 1992 MICROpendium. Lines 350 and 360 ran together, and some spaces were added inside a quoted string. This error does not occur on the copy of the program included on the January MICROpendium disk.

Stern writes: Unfortunately, those blank spaces are inside a set of quotes that form part of a file name, so the program as

listed will crash when the user tries to retrieve a file.

To correct the listing, break the line after "!162" and start the next line 360 fresh. Also, the middle part of 360 should read: S$="DSK"&STR$(DN)&"."&F$(L-64)

Note that the period is all alone inside the quotation marks, and has no spaces before it.

ASCII lister prints patterns and codes

This comes from Bill Gaskill, of Grand Junction, Colorado. He writes:

CHARPAT is a short utility for the XB programmer that is designed to print a listing of the ASCII code character and character pattern for ASCII codes 32-126. The carets in the listing are not a part of the program. I've included them only to show spacing for the user who keys the program in from the published listing.

```
100 DISPLAY AT(20,1)ERASE AL
L:"TURN PRINTER ON, PRESS EN
TER" :: CALL KEY(3,K,S):: IF
 K<>13 THEN 100
110 OPEN #1:"PIO",OUTPUT ::
GOSUB 150 :: FOR I=32 TO 126
 :: CALL CHARPAT(I,A$)
120 PRINT #1,USING "^^^^^^^^
^^###":I;:: PRINT #1,USING "
^^^^^#":CHR$(I);:: PRINT #1,
USING "^^^^^###############"
:A$
130 PRINT I;"^^"&CHR$(I)&"^"
&A$ :: IF I=90 THEN PRINT #1
:CHR$(12):: GOSUB 150
140 NEXT I :: PRINT #1:CHR$(
12):: CLOSE #1 :: STOP
150 PRINT #1:TAB(10);"^ASC^^
^CHR$^^^^^^^^CHARPAT" :: PRI
NT #1:TAB(10);"^---^^^-- --^
^^--------------" :: RETUR
N
```

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