Covering the TI99/4A and the Myarc 9640

MICROpendium

Volume 8 Number 4 | May 1991 | $2.50

BASIC
A quiz on the states

• • •

EXTENDED BASIC
Programming with tokens

• • •

BASIC/ASSEMBLY
The conclusion of GRAPHICOMP

• • •

MY-BASIC
PAINTPRINT to output MY-PAINT pix

• • •

ASSEMBLY
Structured programming, top down and bottom up

Reviews
Windows V2.0
High Gravity
Filmlab
Video Tracker
CSGD Label Maker

Also inside:
- Using the Find directive with TI-BASE
- Crystalpoint Software releases MIDI-Master
- Harrison Software and Asgard Software release new products

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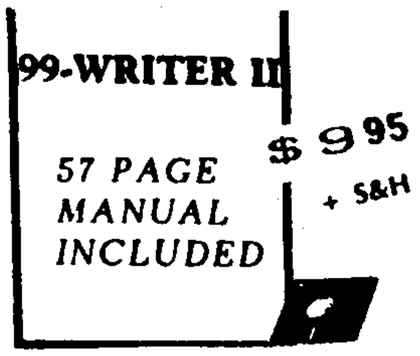

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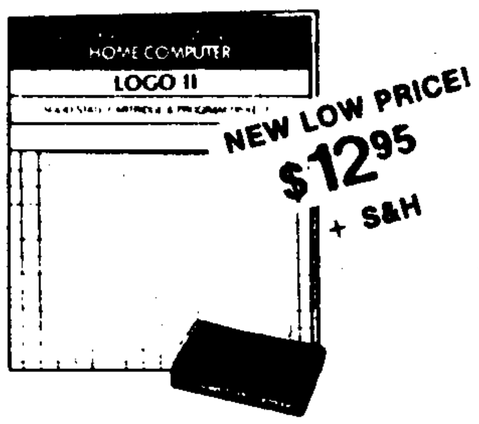

Logo II

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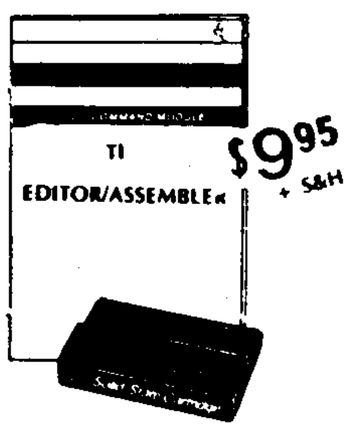

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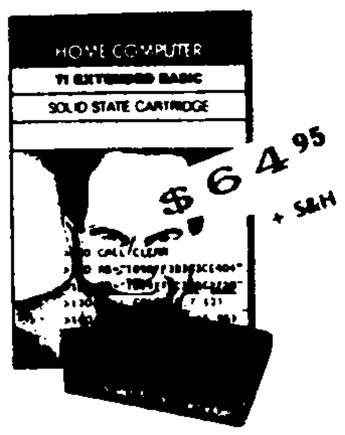
This is the **complete** version with manual, module, program disk and the disk version of Tombstone City as an example of assembly language programming. 32k and disk drive are required. This package will allow you to program the 99/4A in TMS 9900 Assembly Language and gives you access to all system features. Provides the fastest speed possible from the 16-bit processor!



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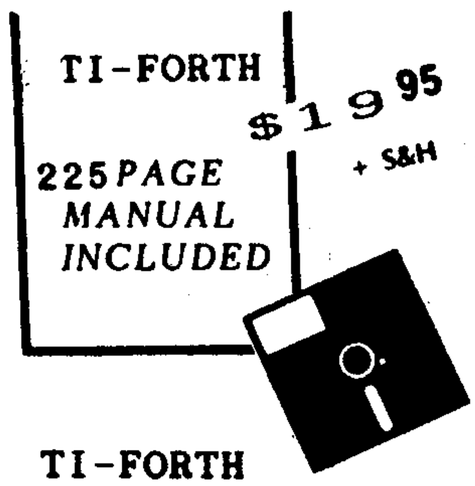

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***READ THIS**

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.

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Comments

TM Direct issues new catalog

TM Direct is sending out a new catalog of its products, according to Terry Miller, owner. Miller says about 25,000 copies were mailed. The catalog includes "a lot of older, hard to get TI stuff." TM Direct, formerly Triton Products, had been using the old Triton catalog prior to issuing its own book. Anyone who doesn't receive a catalog may request one from TM. The phone number is 800-336-9966.

CHICAGO FAIR

The Chicago TI Faire has a new name: The Chicago TI International World Faire. The fair will be held Nov. 2. According to Hal Shannafield, president of the Chicago TI User Group as well as IWF director, vendors can get a sizable break by signing up for tables well in advance. The price of a table is $60 for those who pay before the beginning of July, $75 for those who sign up between July and Sept. 15; and $80 for those who sign up after Sept. 15.

Shannafield says there will be more exhibition space at this year's fair, with two exhibition rooms. One will be used by commercial vendors while the second will be used by user groups. The site will be the Elk Grove Holiday Inn. The hotel is near O'Hare International Airport and a special room rate will be available to fair visitors. The rate is $49 per night, which includes breakfast. However, to get this rate, visitors need to make their reservations through the Elk Grove Holiday Inn and not through the Holiday Inn national reservation system. The hotel phone number is 708-437-6010.

HQ__STACKS COMPATIBILITY

McCann Software's new HQ__Stacks program for the Geneve, which was announced in last month's MICROpendium, works with either MDOS 1.14F or .97H. It doesn't work with other versions of MDOS. A mouse is also required. The program is priced at $49.95, and a demo is available for $10. The $10 will be credited toward the purchase of HQ__Stacks. Write McCann at 4411 N. 93rd St., Omaha, NE 68134.

—JK

Feedback

Updates on advice

With reference to my contribution to User Notes (March 1991), "Installing a one-chip 32K expansion RAM in the 4A console," it appears I sent you an early "version" of the article and not the final polished-up version. There are a few minor differences and some of your readers may have inquired about some vagaries that appear.

The first is in the paragraph numbered 18. Delete from "See Fig. 5" to end of paragraph. (No Fig. 5 is in the set of diagrams. I had deleted the original Fig. 5 as being unnecessary.)

The second is in paragraph 22. The second sentence should read "Solder the last diode horizontally to U504(14) so that its long end projects ..." etc. Also in 22, U540 should read U504.

Another item pointed out to me here recently is that some of the ICs in Fig. 6 have the wrong number of pins. U507 should have 14, and U510, 20 pins.

I regret any inconvenience these small discrepancies might cause but feel that most people attempting the installation will come to the right conclusion anyway by referring to circuits, diagrams and text as a whole.

Col Christensen
Redcliffe, Queensland, Australia

MANNERS catching up

Some TI user groups probably wonder if the Mid Atlantic Ninety Nine'ERS (MANNERS) are still in existence. Yes, we are. For several years, our officers and active members consisted of a president, a treasurer, a software librarian, a newsletter exchange librarian, a newsletter coordinator and an occasional newsletter editor.

In July of last year we acquired a newsletter editor who got our newsletter publication back on track. In December we had officer elections and added a vice president and secretary to the slate.

Several of us are catching up on reading the group's mail. With so few people involved, the mail has accumulated for quite some time. Another inhibiting factor was that the keeper of the mailbox was called to active duty during Desert Shield and Desert Storm. To further complicate things, there have been four address changes over a two-year period.

We hope this problem will not occur again. We have eliminated one problem by having two people responsible for mail collection. We hope to involve even more volunteers with group functions in the future.

For individuals and user groups who wish to renew or establish a newsletter exchange program with us or obtain information, our address is MANNERS, 15106-A Fredrick Rd., Ste. 136, Rockville, MD 20850. In addition, I may be contacted as user 51 on Bob and Bill's Bulletin Board (the BBBB), (301) 292-1482, or on TI-ECHO.

Ted A. Stringfellow
MANNERS Secretary
Washington, DC

Sellers beware!

I would like to pass on some information about a TIer in the New York area who has contacted some of our members about buying hardware and software items. He wants these items sent to him immediately, stating that he will send the money as soon as he gets the items.

I was convinced to send items in December before Christmas. Well, it's now April

(See Page 8)

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Feedback

(Continued from Page 7)

and no money has been received. I understand that I am not the only one in the TI community that has been taken. I would like to let everybody know, "Sellers beware." Get your money first.

Paul Wiese
Tampa, Florida

Queries, suggestions

I'd like to try that project (User Notes, March 1991), "Installing 32K RAM in the 4A console," but a report by someone who has installed the chip per instructions would give us skeptics some confidence.

We of the San Francisco 99ers had a revival meeting last month and had three visitors. Two of them joined. One offered to take over editing our newsletter. So the TI is not dead here on the middle West Coast.

Does anyone know the trick of changing Barry Boone's ARCIII menu to have option 0 return to DSK1.LOAD (XB) instead of UTIL1 (FWB)?

For what it's worth, Charles Good does a lovely job capturing the speakers' presentations at the Lima fair each year on VCR and sharing them with the TI community for a nominal fee, but could someone please remind him to check the placement of the mike so it doesn't pick up the PE-box noise?

Fred Layton
Oakland, California

Proved wrong

Re: VDP Clarification Feedback, March 1991, Paul Charlton is correct, I failed to consider the 9938's capability of displaying alternate buffers (or as Yamaha calls them, pages) when both the IL and EO bits in register 9 are set, thus doubling the number of lines. This was not done in ignorance. I had written this option off as totally unusable shortly after I installed my AVPC a couple of years ago and began to explore this video processor. The flicker produced by this option (at least on my run-of-the-mill Magnavox monitor) was simply too much to be bearable.

There are other considerations as well. One, as Paul mentions, is the fact that the built-in graphics operations only address one page at a time and extra code is needed to write coherently to both pages.

Another is the need to move the TI system's various buffers out of lower VRAM so that page 0 can be used for graphics. Again, this requires more code, not very desirable on a computer that isn't exactly blessed with an overabundance of memory.

For these reasons I never expected anyone to consider this mode seriously as a viable option for a program. Well, Alexander Hulpke did, proved me wrong and I apologize. YAPP does indeed provide a 424-line display and undoubtedly represents one of the — if not *the* —finest graphics programming efforts in the TI world. I know there are people with monitors good enough to let them enjoy all that resolution. As for myself, I'm rather happy with only 212 lines on a rock-steady screen.

Lutz Winkler
San Diego, California

Farewell letter

Do not renew — sorry. There's nothing in IBM to compare with your paper.

I am sorry I have to write this letter. Learned to compute with a TI and abandoned it a year and a half ago. I did not give up without a try. Wanted more memory so tried to get Myarc on phone to find out where to buy one. Tried 40-40 times Basking Ridge, New Jersey, and other location, never made contact in two days of trying. This after all the good press I read in MICROpendium. So if I couldn't reach them to buy, how was I going to contact them when I had trouble? *No sale!*

My money went for a used Epson Equity 1+. TI still connected and ready to go if need be. I liked a few programs better on TI at first but not so now. Had thought grandson would take old computer, but he runs his father's IBM compatible.

Did something foolish with Epson. Turned off and then right back on. Had to replace motherboard. Cost $175 but repaired by second day. Don't think I could get a TI fixed as fast.

With all the letters from people that had such success with Myarc — they drove me away.

Franklyn M. Hale
East Greenwich, Rhode Island

Poor response

After reading the editor's poor response to the "HFDC quirks" letter (April 1991), I decided to write as I have a Myarc Geneve and HFDC and use 360K as well as 720K floppies with no bugs worth mentioning.

Using 97H DOS with 97HPATCH and ROMPAGE (available on CompuServe in the Geneve library), I use 360K floppies as well as 720K, and can use programs such as Archiver and Telco with floppy drives, and MDM5 and Spell-It! and other programs on the hard drive, as well as other things that are not supposed to be possible with 97H DOS. The HFDC must be at an address of >1100 when using 97H.

97H DOS has major limitations used alone, but with the patches mentioned it becomes the most useful DOS and you will most likely never find a reason to go back to 1.14.

There is no reason to waste space in the DSK1 directory with programs such as MDM5 (use SETUP to change the path) and Telso (hold down the Enter key as Telco is loading to change path. MY-Word should be in the DSK (not DSK1) directory under a subdirectory name of MY-Word. I do not know if the path for TI-BASE can be changed as I do not use that program. I have used DSKU to change the path of some other programs that did not have the option. The DSK1 directory on my hard drive has only a few files in it, and I could even move those if I had the need.

JK is incorrect about "every HFDC owner knows the HFDC does not support streamer tape." I own the HFDC and did not know. Perhaps JK and others simply do not know how it is done. I would like to hear Myarc's side of that story. I can see why Lou may be upset. He should have been asked how it is done instead of assuming that it cannot be done. A lot of people assume that 97H DOS cannot be made to work with Archiver with floppies or MDM5. Ask "how is it done?" instead of saying "everybody knows."

Donald A. Richman
South San Francisco, California

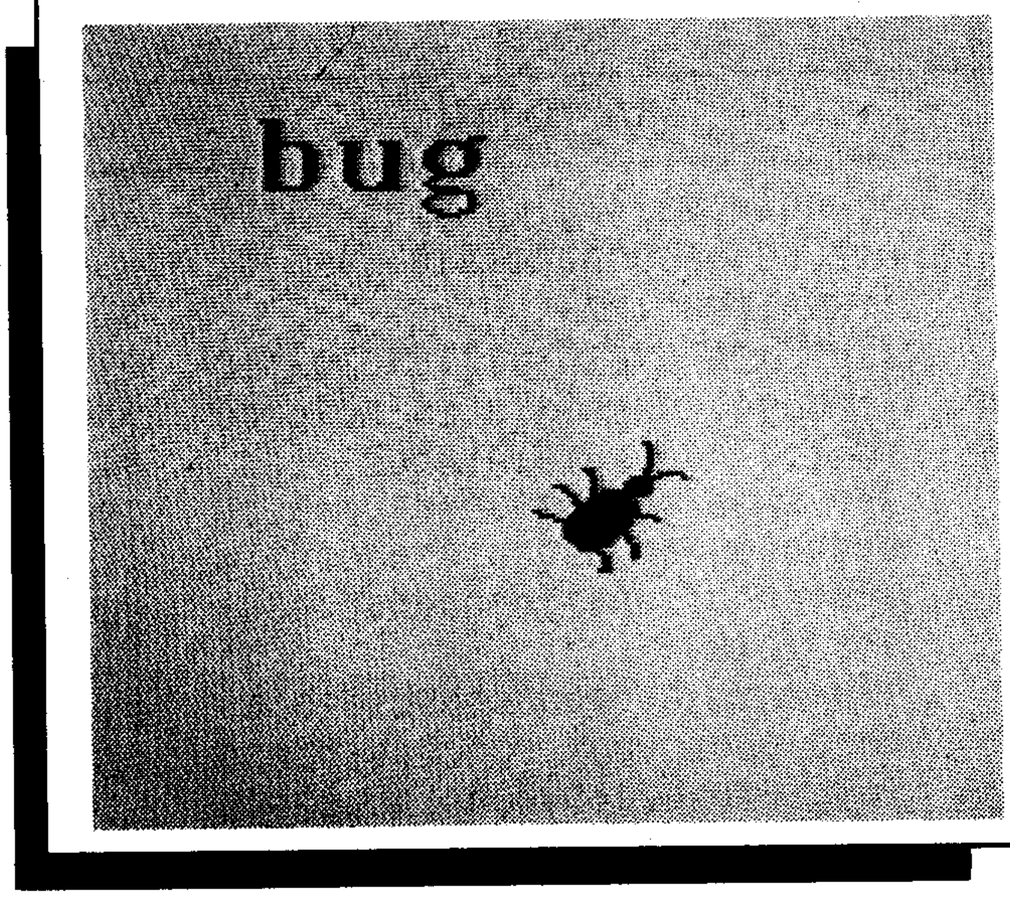
It would be nice if the HFDC supported a streamer tape, but the fact is that it does not. There is no software available to support streamer tape. Just ask Lou.—Ed.

BASIC

Words to read

By REGENA

This month's program is for preschoolers who are learning to read words. A word is shown on the screen in lowercase Roman style printed letters. After the child has a chance to read the word, a picture for the word is shown. The child may press the space bar to go to the next word or press the "S" key to stop.



Lines 220-1760 are the same character definitions and subroutines used in my "Learning to Read" program in the June 1990 MICROpendium, so if you have that program and want to save typing, you can use it for a starting base. These lines define characters to be used in printing the large lowercase letters. LW is the width of the letter — usually 2, but 3 for m and w. The subroutines draw the letter starting in a certain ROW and COLumn.

Lines 1800-2090 are the main section of the program. NW is the number of words. I used 18 basic words here, but it is not difficult to add more or change these. The first time through the list of words, each word is shown once. Lines 1800-2070 are a FOR-NEXT loop for these words. To avoid memorization of the order of the words, after the first time through the loop a FLAG is set so not all words will be shown. Lines 1840-1870 randomly choose whether the word will be shown.

Line 1880 branches to the subroutine with the appropriate DATA statements for a particular word and its graphics. The subroutine RESTORES a certain DATA line. Line 1890 then READs variables for W, the number of letters in the word; G, the number of graphic characters used; F, the foreground color; B, the background color; and W$, the word to be printed.

Lines 1900-1940 print the word. Lines 1950-1960 make graphic characters invisible. Lines 1970-2010 read from DATA statements an x-coordinate, a y-coordinate and a character definition. The character is defined, then placed on the screen. This process occurs for each graphic character. Lines 2020-2030 define the colors for the graphics, and the picture appears on the screen.

Lines 2050-2060 wait for the child to press the space bar or the "S" key to continue the program. Lines 2100-3140 contain the subroutines for each word.

Feel free to put in your own words and graphics for this program. I had my preschool son test these words and identify the pictures, and he suggested several words to include. If you can draw the pictures your own child wants, you will have a customized program.

Each subroutine starts with a RESTORE statement to start the data with the next line number. The first line of DATA contains the number of letters in the word, the number of graphic characters used, the foreground color, the background color and the word.

The coordinates in the next DATA statements are not actual rows and columns on the screen but relative numbers. The upper left corner of the graphics may be thought of as position 1.1. This represents the first row and first column. One character to the right would be 1,2. Continue across the row or down the column to place graphics. Most of these words use graphics within a 4x4 square.

The program defines a starting point of XX=12 and YY=12 for the starting row and column. The graphics are placed in row XX+X and column YY+Y on the screen. You are not limited to the 4x4 square, but I do allow only 16 graphics characters to be defined (color sets 2 and 3). You may have a picture that is much wider and only two characters tall, for example.

If you want to put in your own words, follow the example in one of my subroutines, and I think you will be able to do your own. The final DATA statements have an X value for the relative row position, a Y value for the relative column position, then the character definition. These three variables are designated for each graphic character. The program will read through the appropriate number of characters and place them on the screen.

To add words or change the number of words, change Line 150 for the number of words, then make sure line 1880 refers to the correct subroutine numbers. For more words, you may have to add another ON GOSUB statement and appropriate calculations for H to take care of line length. For example:

```
1880 IF H>18 THEN 1886
1882 ON H GOSUB 2100, ... (list 18 subroutines)
1884 GOTO 1890
1886 ON H-18 GOSUB ... (more subroutine numbers)
```

You may also wish to customize this program by adding sound or more graphics. You may add speech by using the Terminal Emulator 2 command module and Speech Synthesizer.

Remember as you type this and other published programs, do not type the exclamation point and following numbers. These numbers are to be used as a guide if you are using the Checksum program (see note on title page of MICROpendium).

If you type in the program and get an error message, the most

(See Page 10)

REGENA ON BASIC —

(Continued from Page 9)

likely place for an error is in a DATA statement (watch the commas.)

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

WORDS

```
100 REM WORDS TO READ !072
110 REM BY REGENA !071
120 CALL CLEAR !209
130 CALL SCREEN(8)!153
140 PRINT "** LEARNING TO RE
AD WORDS **" !101
150 NW=18 !150
160 PRINT : :"READ THE WORD
SHOWN." !055
170 XX=12 !155
180 PRINT :"A PICTURE WILL B
E DRAWN." !118
190 YY=12 !157
200 PRINT :"PRESS THE SPACE
BAR TO SEE  THE NEXT WORD."
!027
210 PRINT :"PRESS 'S' TO STO
P." !207
220 FOR C=91 TO 151 !212
230 READ C$ !254
240 CALL CHAR(C,C$)!081
250 NEXT C !217
260 DATA 00000000000F1C18,00
00000000E0303,00030C18181808
07,30F03030303030EC !185
270 DATA 38181818181B1C18,00
00000000E03018,1818181818181
C1B,18181818181830E !006
280 DATA 0000000000070C18,18
18181818180C07,1800000000083
0C,3818181818D83818,18181818
181838DC !199
290 DATA 18181F1818180C07,18
18F800000830C !113
300 DATA 0001030303030F03,F0
9818000000C,0303030303030307
,0000000000000008 !213
310 DATA 000000000CD03018,18
18180C0708100F,18181830E0000
08,070810100C03,F008080830C
!218
320 DATA 1818181818183C,00
03030000070303,0303030303030
303,6363261E !052
330 DATA 3818181818181818,00
00000000F0608,1B1E1918181818
3C,0000008040603078 !218
340 DATA 00000000003B1C18,00
00000000E33418,1818181818181
81F,0000000000DC3818,1818181
8181818F8 !223
350 DATA 0703030303030303,18
,0000000000E83818,181E070000
181C17,0000F018181830E !162
360 DATA 0000030303030F03,00
0000000000C,03030303030301,0
0000000001090E,0000000000381
818 !248
370 DATA 00000000003C1818,00
0000000001C0808,0C0C060603030
101,101020204040808,2C2C2646
43438181 !102
380 DATA 00000000003C180C,00
0000000001C081,06030102040810
38,204080C06030183C !151
390 DATA 01010202242418,0000
0000000001F181,0000000000F8183,
00000103060C181F,60C08000000
818F8 !198
400 GOTO 1770 !063
410 CALL CLEAR !209
420 LW=2 !092
430 IF L>13 THEN 460 !004
440 ON L GOSUB 480,530,580,6
30,680,730,780,850,890,930,9
70,1020,1060 !186
450 GOTO 470 !038
460 ON L-13 GOSUB 1120,1160,
1210,1270,1330,1380,1430,148
0,1520,1570,1640,1690,1720 !
144
470 RETURN !136
480 CALL HCHAR(ROW,COL,91)!1
73
490 CALL HCHAR(ROW,COL+1,92)
!105
500 CALL HCHAR(ROW+1,COL,93)
!106
510 CALL HCHAR(ROW+1,COL+1,9
4)!038
520 RETURN !136
530 CALL HCHAR(ROW,COL,95)!1
77
540 CALL HCHAR(ROW,COL+1,96)
!109
550 CALL HCHAR(ROW+1,COL,97)
!110
560 CALL HCHAR(ROW+1,COL+1,9
8)!042
570 RETURN !136
580 CALL HCHAR(ROW,COL,99)!1
81
590 CALL HCHAR(ROW,COL+1,96)
!109
600 CALL HCHAR(ROW+1,COL,100
)!144
610 CALL HCHAR(ROW+1,COL+1,1
01)!076
620 RETURN !136
630 CALL HCHAR(ROW,COL,99)!1
81
640 CALL HCHAR(ROW,COL+1,102
)!146
650 CALL HCHAR(ROW+1,COL,100
)!144
660 CALL HCHAR(ROW+1,COL+1,1
03)!078
670 RETURN !136
680 CALL HCHAR(ROW,COL,99)!1
81
690 CALL HCHAR(ROW,COL+1,96)
!109
700 CALL HCHAR(ROW+1,COL,104
)!148
710 CALL HCHAR(ROW+1,COL+1,1
05)!080
720 RETURN !136
730 CALL HCHAR(ROW,COL,106)!
219
740 CALL HCHAR(ROW,COL+1,107
)!151
750 CALL HCHAR(ROW+1,COL,108
)!152
760 CALL HCHAR(ROW+1,COL+1,1
09)!084
770 RETURN !136
780 CALL HCHAR(ROW,COL,99)!1
81
790 CALL HCHAR(ROW,COL+1,110
)!145
800 CALL HCHAR(ROW+1,COL,111
)!146
810 CALL HCHAR(ROW+1,COL+1,1
```

(See Page 11)

REGENA—

(Continued from Page 10)

```
12)!078
820 CALL HCHAR(ROW+2,COL,113
)!149
830 CALL HCHAR(ROW+2,COL+1,1
14)!081
840 RETURN !136
850 CALL HCHAR(ROW,COL,95)!1
77
860 CALL HCHAR(ROW,COL+1,96)
!109
870 CALL HCHAR(ROW+1,COL,115
,2)!068
880 RETURN !136
890 CALL HCHAR(ROW,COL,116)!
220
900 CALL HCHAR(ROW+1,COL,108
)!152
910 CALL HCHAR(ROW+1,COL+1,1
09)!084
920 RETURN !136
930 CALL HCHAR(ROW,COL,116)!
220
940 CALL HCHAR(ROW+1,COL,117
)!152
950 CALL HCHAR(ROW+2,COL,118
)!154
960 RETURN !136
970 CALL HCHAR(ROW,COL,119)!
223
980 CALL HCHAR(ROW,COL+1,120
)!146
990 CALL HCHAR(ROW+1,COL,121
)!147
1000 CALL HCHAR(ROW+1,COL+1,
122)!079
1010 RETURN !136
1020 CALL HCHAR(ROW,COL,128)
!223
1030 CALL HCHAR(ROW+1,COL,10
8)!152
1040 CALL HCHAR(ROW+1,COL+1,
109)!084
1050 RETURN !136
1060 CALL HCHAR(ROW,COL,123)
!218
1070 CALL HCHAR(ROW,COL+1,12
4)!150
1080 CALL HCHAR(ROW,COL+2,96
)!110
1090 CALL HCHAR(ROW+1,COL,11
5,3)!069
1100 LW=3 !093
1110 RETURN !136
1120 CALL HCHAR(ROW,COL,123)
!218
1130 CALL HCHAR(ROW,COL+1,96
)!109
1140 CALL HCHAR(ROW+1,COL,11
5,2)!068
1150 RETURN !136
1160 CALL HCHAR(ROW,COL,99)!
181
1170 CALL HCHAR(ROW,COL+1,96
)!109
1180 CALL HCHAR(ROW+1,COL,10
0)!144
1190 CALL HCHAR(ROW+1,COL+1,
98)!042
1200 RETURN !136
1210 CALL HCHAR(ROW,COL,123)
!218
1220 CALL HCHAR(ROW,COL+1,96
)!109
1230 CALL HCHAR(ROW+1,COL,12
5)!151
1240 CALL HCHAR(ROW+1,COL+1,
98)!042
1250 CALL HCHAR(ROW+2,COL,11
5)!151
1260 RETURN !136
1270 CALL HCHAR(ROW,COL,99)!
181
1280 CALL HCHAR(ROW,COL+1,12
6)!152
1290 CALL HCHAR(ROW+1,COL,10
0)!144
1300 CALL HCHAR(ROW+1,COL+1,
127)!084
1310 CALL HCHAR(ROW+2,COL+1,
115)!082
1320 RETURN !136
1330 CALL HCHAR(ROW,COL,123)
!218
1340 CALL HCHAR(ROW,COL+1,96
)!109
1350 CALL HCHAR(ROW+1,COL,11
5)!150
1360 CALL HCHAR(ROW+1,COL+1,
129)!086
1370 RETURN !136
1380 CALL HCHAR(ROW,COL,99)!
181
1390 CALL HCHAR(ROW,COL+1,13
0)!147
1400 CALL HCHAR(ROW+1,COL,13
1)!148
1410 CALL HCHAR(ROW+1,COL+1,
132)!080
1420 RETURN !136
1430 CALL HCHAR(ROW,COL,133)
!219
1440 CALL HCHAR(ROW,COL+1,13
4)!151
1450 CALL HCHAR(ROW+1,COL,13
5)!152
1460 CALL HCHAR(ROW+1,COL+1,
136)!084
1470 RETURN !136
1480 CALL HCHAR(ROW,COL,137,
2)!141
1490 CALL HCHAR(ROW+1,COL,10
0)!144
1500 CALL HCHAR(ROW+1,COL+1,
103)!078
1510 RETURN !136
1520 CALL HCHAR(ROW,COL,138)
!224
1530 CALL HCHAR(ROW,COL+1,13
9)!156
1540 CALL HCHAR(ROW+1,COL,14
0)!148
1550 CALL HCHAR(ROW+1,COL+1,
141)!080
1560 RETURN !136
1570 CALL HCHAR(ROW,COL,138,
2)!142
1580 CALL HCHAR(ROW,COL+2,13
9)!157
1590 CALL HCHAR(ROW+1,COL,14
0)!148
1600 CALL HCHAR(ROW+1,COL+1,
142)!081
1610 CALL HCHAR(ROW+1,COL+2,
141)!081
1620 LW=3 !093
1630 RETURN !136
1640 CALL HCHAR(ROW,COL,143)
!220
1650 CALL HCHAR(ROW,COL+1,14
4)!152
1660 CALL HCHAR(ROW+1,COL,14
5)!153
1670 CALL HCHAR(ROW+1,COL+1,
146)!085
1680 RETURN !136
1690 GOSUB 1520 !069
1700 CALL HCHAR(ROW+2,COL,14
7)!156
1710 RETURN !136
1720 CALL HCHAR(ROW,COL,148)
!225
1730 CALL HCHAR(ROW,COL+1,14
9)!157
```

(See Page 12)

REGENA—

(Continued from Page 11)

```
1740 CALL HCHAR(ROW+1,COL,15
0)!149
1750 CALL HCHAR(ROW+1,COL+1,
151)!081
1760 RETURN !136
1770 PRINT : :"PRESS ANY KEY
 TO START." !033
1780 CALL KEY(3,K,S)!190
1790 IF S<1 THEN 1780 !003
1800 FOR H=1 TO NW !226
1810 CALL CLEAR !209
1820 ROW=4 !179
1830 COL=6 !155
1840 IF FLAG=0 THEN 1880 !04
5
1850 RANDOMIZE !149
1860 R=INT(2*RND)!225
1870 IF R<1 THEN 2070 !038
1880 ON H GOSUB 2100,2160,22
20,2290,2350,2400,2460,2510,
2570,2630,2680,2740,2810,287
0,2920,2970,3040,3100 !001
1890 READ W,G,F,B,W$ !004
1900 FOR A=1 TO W !141
1910 L=ASC(SEG$(W$,A,1))-64
!170
1920 GOSUB 420 !245
1930 COL=COL+LW !222
1940 NEXT A !215
1950 CALL COLOR(2,1,1)!171
1960 CALL COLOR(3,1,1)!172
1970 FOR A=1 TO G !125
1980 READ X,Y,C$ !021
1990 CALL CHAR(39+A,C$)!070
2000 CALL HCHAR(X+XX,Y+YY,39
+A)!112
2010 NEXT A !215
2020 CALL COLOR(2,F,B)!063
2030 CALL COLOR(3,F,B)!064
2040 CALL KEY(3,K,S)!190
2050 IF K=32 THEN 2070 !083
2060 IF (K=83)+(K=115)THEN 3
150 ELSE 2040 !228
2070 NEXT H !222
2080 FLAG=1 !210
2090 GOTO 1800 !094
2100 RESTORE 2110 !163
2110 DATA 4,12,12,1,BELL !15
5
2120 DATA 1,1,00010103070F1F
1F,1,2,804040E0F0F8FCFC,2,1,
3F3F3F3F7F7F7F7F,2,2,FEFEFEF
EFFFFFFFF !167
2130 DATA 3,0,00000000010103
03,3,1,7FFFFFFFFFFFFFFF,3,2,
FFFFFFFFFFFFFFFF,3,3,0080808
0C0C0E0E !110
2140 DATA 4,0,070F03,4,1,FFF
FFF7F07,4,2,FFFFFFFFF,4,3,F0
F8E !215
2150 RETURN !136
2160 RESTORE 2170 !223
2170 DATA 3,13,2,1,BUG !039
2180 DATA 1,2,00000000000030
1,1,3,0100000000000101,1,4,0
80808080080003E,2,1,00000C02
01,2,2,0808080B0F9FBF7F !012
2190 DATA 2,3,0F1F1FDFFEF0F8
F8,2,4,C1,3,1,80710D03030303
01,3,2,FFFFFFFFFFFFFFFF,3,3,
F8FFF0F0E0E0901 !196
2200 DATA 3,4,00804,4,2,FE78
0402020206,4,3,08080808 !014
2210 RETURN !136
2220 RESTORE 2230 !027
2230 DATA 3,16,12,1,SUN !116
2240 DATA 1,1,00002010080402
01,1,2,00002020100808,1,3,80
808282848888,1,4,00000408102
0408,2,1,00003008060000FE !0
57
2250 DATA 2,2,831F3F7F7FFFFF
FF,2,3,E1F8FCFEFEFFFFFF,2,4,
0000C106000007F,3,1,00000006
083,3,2,FFFFFF7F7F3F1F87 !18
2
2260 DATA 3,3,FFFFFFFEFEFCF8
E1,3,4,00000060100C,4,1,0102
0408102,4,2,00080810202,4,3,
0090908888484808 !081
2270 DATA 4,4,804020100804 !
034
2280 RETURN !136
2290 RESTORE 2300 !097
2300 DATA 3,14,5,1,MUG !054
2310 DATA 1,1,000000010E1020
2,1,2,000000FF,1,3,00000000E
0100808,2,1,3C3F3F3F3F3F3F3F
,2,2,00FFFFFFFFFFFFFF !012
2320 DATA 2,3,78FBFFFEF8F8F8
F8,2,4,00F0F81C0C0C0C0C,3,1,
3F3F3F3F3F3F3F3F,3,2,FFFFFFF
FFFFFFFFF !066
2330 DATA 3,3,F8F8F8F8F8F9FF
FE,3,4,0C0C1C70E08,4,1,3F3F1
F03,4,2,FFFFFFFF,4,3,F8F8F08
 !112
2340 RETURN !136
2350 RESTORE 2360 !158
2360 DATA 3,7,11,1,BAT !035
2370 DATA 1,4,00001C3E7F7FFF
FE,2,3,0103070F1F3E7CF8,2,4,
FCE0C08,3,2,0103070F1E3870E,
3,3,F0C08 !146
2380 DATA 4,1,0F070301,4,2,C
08080808 !038
2390 RETURN !136
2400 RESTORE 2410 !208
2410 DATA 3,12,2,1,HAT !037
2420 DATA 1,2,0000000000073F
FF,1,3,0000000000E0FCFF,2,2,
7F8FF0FFFFFFFFFF,2,3,FEF10FF
FFFFFFFFF !147
2430 DATA 3,2,FFFFBF878080C0
F8,3,3,FFFFFDE10101031F,3,1,
000000060E3F7FFF,3,4,0000006
070FCFEFF,4,1,FF7F3F1F03 !07
8
2440 DATA 4,2,FFFFFFFFFF3F,4
,3,FFFFFFFFFFFC,4,4,FFFEFCF8
C !106
2450 RETURN !136
2460 RESTORE 2470 !012
2470 DATA 3,8,3,1,JUG !003
2480 DATA 1,2,03040403030303
03,1,3,C02020C0F8C4C4F8,2,2,
03070F3F7FFFFFFF,2,3,C0E0F0F
8FCFEFFFFFF !154
2490 DATA 3,2,FFFFFFFFFFFFFF
FF,3,3,FFFFFFFFFFFFFFFF,4,2,
FFFFFFFFFFFF7F07,4,3,FFFFFFF
FFFFFFED !134
2500 RETURN !136
2510 RESTORE 2520 !062
2520 DATA 4,13,12,1,HAND !15
2
2530 DATA 1,2,00000003070777
77,1,3,0000000000383838,2,1,
0000000707070707,2,2,77777
77777777777 !196
2540 DATA 2,3,38383838383838
38,3,1,0707070707070707,3,2,
77777FFFFFFFFFFF,3,3,B8F8F8F
8F8F9FFFF !046
2550 DATA 3,4,00000060E0E0E0
C,4,1,030303010101,4,2,FFF
FFFFFFFFFFFF,4,3,FFFFFFFFFF
FEFCF8,4,4,C080808 !100
2560 RETURN !136
2570 RESTORE 2580 !123
2580 DATA 4,9,16,1,BALL !112
2590 DATA 1,1,00030F1F2F337C
7F,1,2,FFFFFFFFFFFFFF,1,3,00
```

(See Page 13)

REGENA—

(Continued from Page 12)

```
C0F0F8F4CC3EFE,2,1,FFFFFFFFF
FFFFFFF !249
2600 DATA 2,2,FFFFFFFFFFFFFF
FF,2,3,FFFFFFFFFFFFFFFF,3,1,
7F7C332F1F0F03,3,2,00FFFFFF
FFFFFFFFF !035
2610 DATA 3,3,FE3ECCF4F8F0C
!000
2620 RETURN !136
2630 RESTORE 2640 !183
2640 DATA 3,10,2,1,DOG !032
2650 DATA 1,2,00000000007CEC
EE,2,1,01070F0F,2,2,BEEEF2FF
3F3F1F1F,2,3,0000000000C0FFF
F,2,4,000004060206FEFC !066
2660 DATA 3,2,0F0F0F0F0F0F0F
0F,3,3,FFFFFFFFFFFF8,3,4,FCF
CFCFCFCFCFC7C,4,2,0F0F0F0F0F
0E,4,4,3C3C3C3C3C1C !082
2670 RETURN !136
2680 RESTORE 2690 !233
2690 DATA 4,9,7,1,STOP !106
2700 DATA 1,1,000103070F1F3F
7F,1,2,FFFFFFFFFFFFFFFF,1,3,
0080C0E0F0F8FCFE,2,1,FFFFFFF
FFFFFFFFF !094
2710 DATA 2,2,FFFFFFFFFFFFFF
FF,2,3,FFFFFFFFFFFFFFFF,3,1,
7F3F1F0F070301 !098
2720 DATA 3,2,FFFFFFFFFFFFFF
FF,3,3,FEFCF8F0E0C08 !054
2730 RETURN !136
2740 RESTORE 2750 !037
2750 DATA 5,14,2,1,CLOCK !18
6
2760 DATA 1,1,000003040810202
,1,2,1FE0000001010303,1,3,F
8070080C0C0E0E,1,4,0000C0201
0080404 !003
2770 DATA 2,1,40404080808080
8,2,3,8080808080808080,2,4,
0202020101010101,3,1,8080808
08040404 !008
2780 DATA 3,3,80402010090707
0F,3,4,0101010101020202,4,1,
202010080403,4,2,00000000000
0E01F !071
2790 DATA 4,3,00000000000007
F8,4,4,0404081020C !011
2800 RETURN !136
2810 RESTORE 2820 !108
2820 DATA 4,12,14,1,BOOK !16
9
2830 DATA 1,1,00000738E0A0AC
A0,1,2,00F00C0201C11901,1,3,
001F6080000700C8,1,4,0000E01
C07850565 !198
2840 DATA 2,1,A0AEA0A7A0A7A0
A7,2,2,E10D01F901F101C1,2,3,
000738003F001F,2,4,05850505E
505C505 !223
2850 DATA 3,1,A0A0A0A3BCA3BC
C,3,2,010101C13DC33D03,3,3,0
00000033C43BCC,3,4,050505C53
DC53D03 !254
2860 RETURN !136
2870 RESTORE 2880 !168
2880 DATA 4,8,2,1,HOOK !079
2890 DATA 0,1,0C122141414101
01,1,1,0101010101010101,2,1,
0202020204040404,3,1,0808080
808080808 !000
2900 DATA 4,1,0804040201,4,2
,000000000081423C,4,3,202040
408,3,3,0080C0E0F0E0202 !129
2910 RETURN !136
2920 RESTORE 2930 !218
2930 DATA 4,9,5,1,BIRD !067
2940 DATA 1,1,0000000000070F
1C,1,2,0000000000C1E1F3,1,3,
00000001FFFFFFFF,2,1,7C1F0F0
703030301 !245
2950 DATA 2,2,FBFBFFFFFFFFFF
FF,2,3,FFFEFEFCF8FFFFFF,2,4,
0000001070E0C08,3,2,FF7F3F07
,3,3,FFFEFCF !211
2960 RETURN !136
2970 RESTORE 2980 !012
2980 DATA 3,16,15,1,POT !116
2990 DATA 1,1,0000000000030F
1F,1,2,000003033FFFFFFF,1,3,
0000C0C0FCFFFFFF,1,4,0000000
000C0F0F8 !103
3000 DATA 2,1,E37C3F3F3F3F3F
3F,2,2,FF1FE0FFFFFFFFFF,2,3,
FFF807FFFFFFFFFF,2,4,C73EFCF
CFCFCFCFC !207
3010 DATA 3,1,3F3F3F3F3F3F3F
3F,3,2,FFFFFFFFFFFFFFFF,3,3,
FFFFFFFFFFFFFFFF,3,4,FCFCFCF
CFCFCFCFC !082
3020 DATA 4,1,3F3F3F3F3F07,4
,2,FFFFFFFFFFFFFF,4,3,FFFFFF
FFFFFFFF,4,4,FCFCFCFCFCE !21
5
3030 RETURN !136
3040 RESTORE 3050 !082
3050 DATA 4,10,2,1,BOOT !124
3060 DATA 1,1,00010707070707
07,1,2,70FCFFFFFFFFFFFF,2,1,
0707070707070707,2,2,FFFFFFF
FFFFFFFFF !115
3070 DATA 3,1,0707070707070707
07,3,2,FFFFFFFFFFFFFFFF,4,1,
0707070707070707,4,2,FFFFFFF
FDFCFC3C !075
3080 DATA 4,3,C0E0F8FCFFFFFF
FF,4,4,0000000000C0C0C !220
3090 RETURN !136
3100 RESTORE 3110 !143
3110 DATA 4,7,2,1,FACE !044
3120 DATA 1,1,000F100006090F
0F,1,2,0001820000010101,1,3,
00E01000C020E0E,2,1,0F100000
02060101 !029
3130 DATA 2,2,01820000280083
FF,2,3,E010000080C,3,2,FE7C
!024
3140 RETURN !136
3150 CALL CLEAR !209
3160 END !139
```

READER TO READER

George J. Clark, 75 Aurora Ave., Pointe Claire, Quebec, Canada H9R 3G3, wants to know a current address to send Richard J. Marlen a fairware contribution. His letter was returned from 3156 Pinebrook Dr., Arnold MO 63010.

Henry E. Koehne wants help with a problem involving Funnelweb V4.31 80-column "Diskreview" and the DataBiotics Grand RAM. It will not allow viewing a RAMdisk D/V80 fiile and will not load such a file. The disk drives work fine. Further, neither the 40-column nor 80-column DRs will allow protect/unprotect operations from the RAMdisk, but work well on the disk drives.

Sam Carey, 5820 S.E. Westfork St., Portland, OR 97206 writes:

Can anyone help me by sending me technical information on the following products?: 1. TI/MY/CC Disk Controller Card. 2. TI/MY/CC RS232 Card. 3. 32K Card. 4. TI Flex Cable Interface Card. 5. TI Peripheral Expansion Box. 6. TI/TEAC/other disk drive (5¼"). 7. Yamaha's V9938 Advanced Videp Display Processor Chip. 8. IBMm/other XTm compatible keyboard. 9. CC/MY/Horizon/other RAM disk and any other information on TI99/4A equipment and peripherals.

EXTENDED BASIC

All sorts of sorts

By JERRY STERN

Some of the earliest applications written for computers were sort routines. All kinds of data-keeping programs are needed to rearrange data into numerical order, and many sort routines were published in the late seventies and early eighties. Some of them, like the bubble sort, are well known and easy to understand. Others, like the quick sort, are complex algorithms that work very well, but eat memory by the byteload.

When writing our own application programs, we should be able to make a reasonable decision about which sort routine to use. Depending on the size of the sorting job, the amount of sorting needed for that job, and the memory available, we can make a reasonable choice from the sort routines in SORTTEST. I have not written these routines myself, only collected them and translated them into TI Extended BASIC subprograms. Each sort routine has its own subprogram, and each one is used by passing data to it in a CALL statement.

```
300 CALL BUBBLE(20,X())
```

That statement tells the subprogram BUBBLE to take the entire array X, and sort the twenty values it finds starting at X(1).

There are several ways to include these routines in your programs. The easiest method is to save each subprogram in its own file in merge format. For example, save the bubble sort subprogram by typing, with only lines 30335 to 30385 in memory:

```
SAVE DSKx.BUBBLE, MERGE
```

If you are typing SORTTEST manually from the listing, I suggest typing each subprogram separately, saving it in MERGE format, and then merging them into the main program. That will prepare the subprograms for merging into any other application that needs them. Alternatively, use LINESAVER (MICROpendium, January 1989) to break SORTTEST into chunks.

If you are working from a cassette system, the MERGE commands are not available to you. To reuse these subprograms, you must type them into your application programs for each new project you create.

When you run SORTTEST, you can try to match the test data to the data that you would like to run your final program with. The first option is the size of the array, which can be anywhere from five to 500 numbers. Next, you may set how many digits past the decimal point the data will have. SORTTEST will then create a data test set for you, display the first 60 members of that set, and ask you which sort routine to run on that data. If you wish to time the trial, start timing from the moment you press the letter choosing the sort routine, and stop timing when the tone signals the end of the sorting process.

The slowest sort routines make the most passes through the entire array. The fastest algorithm will do the same work in the least number of passes. .... Choosing the best sort for your data will result in the fastest sort.

You will find that with small sets of test data, the fastest sort (QUICK) is about four times the speed of the slowest (BUBBLE), but with very large data sets, that ratio will change. Using 500 values for sorting, the quick sort routine took about three minutes, and the bubble sort took 30 times as long — but the ratio changes depending on how badly the numbers are out of order. (Start testing with a data set of about 100 numbers, and test several different sets of each size.)

Except for the quick sort, these sort routines use only one array to hold the values. They also make multiple passes through the array, testing pairs of values, and swapping the pairs that are out of order. The slowest sort routines make the most passes through the entire array. The fastest algorithm will do the same work in the least number of passes. Some sorts, like the bubble sort, may make many passes or only a few depending on how badly the data values are scrambled. Choosing the best sort for your data will result in the fastest sort.

BUBBLE SORT

The bubble sort has a bad reputation as a slowpoke, but it is useful for some programs. This is the simplest sort to understand. In a loop, the first value in the array is compared with the second value. If those two values are out of order, they are reversed. Then, the new second value is compared with, and possibly swapped with, the third value. That comparison progresses in a loop through the entire list. After one pass through the list, each high value has bubbled down until blocked by a higher value, and each low value will have bubbled up by one level. During each pass, these two processes will continue to percolate the values toward their sorted orders.

The bubble sort is best for short lists that are nearly in order, such as a list that if frequently added to at the end, and then resorted only to move the new values into their sorted positions in the list. It is terrible for lists that are in reverse order. An array of 100 numbers that are exactly in reverse order would require 100 passes through the bubble routine to complete the sort.

SHELL SORT

The shell sort also gets its name from how it moves numbers through the array. During the first pass through the array, this routine examines and swaps values that are separated by half the array. For an array of 100 values, that first pass will examine and swap values 1 and 51, then 2 and 52, 3 and 53, and so on. During the next pass, values that are only half as far apart will be tested; this will begin with 1 and 26, then 2 and 27. The third pass will examine values 1 and 13, 2 and 14, and the following passes will lower the intervals to six, three, and then to one. That last pass compares every sequential pair of values in the same way as the bubble sort does. However, the shell sort leapfrogs progressively smaller parts of the list, so a large array that is badly out of order will sort far more quickly using the shell sort than using the bubble sort.

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EXTENDED BASIC—

(Continued from Page 14)

METZNER SORT

The metzner sort is a variation on the shell sort, using no FOR-NEXT loop, and a few less comparisons. It is slightly faster than the shell sort.

DELAYED REPLACEMENT SORT

The delayed replacement sort, in the subprogram REPSORT, searches the array once for every value. During the first pass, it finds the lowest value, and swaps that value with the first number in the array. Then it searches the rest of the array, starting at the second value, searching for the second lowest value, which it swaps into the second spot. Each pass finds and positions the next value, and each pass searches one less value, as the unsorted portion of the array shrinks.

INSERT SORT

The insertion sort uses the opposite algorithm from the delayed replacement sort. First, it checks the first two numbers in the array, and swaps them if needed. Then it checks the first three numbers, and moves that third value up to the second or first spot if needed. During each succeeding pass, one more value is checked, moved into the proper spot, and all the values between the old and new locations are shifted down to make room.

RIPPLE SORT

The ripple sort is a combination of the bubble sort and the insertion sort. I've included it here for comparison, but avoid using it in a real application program — it does some odd things with the FOR-NEXT loop variable. Usually, it is not a good idea to change the FOR variable inside a loop. Sometimes I will trigger the last cycle of a loop by resetting the loop variable to its last value, but RIPPLE does much more. It cycles the loop variable up and down to move the newly-found lower values to the front of the array, and then resets the loop value to what it was before these manipulations began.

Yes, I know. That's a snobby way of saying, "That's not how we do things around here." Right. It is a horrible brute force programming technique that you can copy to other programs, where you will discover that this technique will take much longer to debug than a bubble sort would take to sort the New York city phone book. If you must cycle loops up and down, do it entirely with IF-THEN-ELSE statements — they are far easier to debug.

QUICK SORT

At last, we come to the fastest sort routine of the group. The quick sort was developed commercially, and will usually be the best sort routine for us to use in our own programs. But not always. There are some memory problems with the quick sort routine. First of all, it is a much longer routine than any of the others. Second, and much more memory-greedy, it requires a second array of the same size as the array being sorted, so that it can set up a list of pointers to the data. For a version of the quick sort routine that sorts text instead of numbers, look at CHARTBASE (May, 1989).

So which sort routine should you use? For very short lists that are already partially in order, use the bubble sort routine. For very large lists when memory is not a problem, use the quick sort. If memory is a problem on a large sort, try the metzner routine, or any of the others except the infamous ripple sort. That's right, the ripple sort is a known violator of proper programming technique, and you will be judged by the algorithms you keep.

SORTTEST

```
100 ! SORTTEST !043
110 ! J. L. Stern; TIXB 5/91
 !097
120 ! tests a variety of num
eric sort routines !004
130 DIM U(500),S(500)! unsor
ted list, sorted list !043
140 CALL CLEAR :: CALL BLUE
!228
150 CALL TITLE2 !031
160 W$(1)="And now, here's a
 word from our sponsor..." :
: W$(2)="Gone fishing...
          Back when the seaso
n ends." !039
170 W$(3)="Think Random Thou
ghts!         Think Random Th
oughts!!" !235
180 RANDOMIZE !149
190 CH$="BDIMQRSEbdimqrse" !
242
200 CALL PAUSE !232
210 DISPLAY AT(1,10)ERASE AL
L:"SORTTEST" :: CALL HCHAR(2
,12,95,8)!247
220 DISPLAY AT(4,1):"How lar
ge a test array? 20" :: ACCE
PT AT(4,25)SIZE(-3)VALIDATE(
DIGIT):N ! size of array !09
2
230 IF N<5 OR N>500 THEN DIS
PLAY AT(5,1)BEEP:"Must be be
tween 5 and 500!" :: GOTO 22
0 !090
240 DISPLAY AT(5,1):"":"How
many decimal places? 3" :: A
CCEPT AT(6,26)SIZE(-1):P ! d
ecimal Point !244
250 IF P>3 THEN DISPLAY AT(7
,1)BEEP:"Must be between 0 a
nd 3!" :: GOTO 240 !224
260 DISPLAY AT(7,1):"":W$(IN
T(RND*3)+1)!082
270 CALL RANDOMLIST(N,P,U())
!159
280 CALL HCHAR(3,1,32,704)!2
25
290 FOR L=0 TO MIN(N-1,59)::
 DISPLAY AT(INT(L/3)+3,1+9*(
L-INT(L/3)*3)):U(L+1):: NEXT
 L !159
300 FOR L=1 TO N :: S(L)=U(L
):: NEXT L !077
310 CALL PAUSE !232
320 CALL HCHAR(3,1,32,704)!2
25
330 DISPLAY AT(4,1):"Choose
a sort routine:": :"Bubble":
"Delayed replacement":"Inser
tion":"Metzner":"Quick":"Rip
ple":"Shell":"End testing" !
040
340 DISPLAY AT(16,1):"Begin
timing when you press the le
tter for your choice." !217
350 CALL KEYAT(4,23,L,CH$)!1
49
360 L=POS(CH$,CHR$(L),1):: I
F L=0 THEN 350 !207
370 IF L>8 THEN L=L-8 !090
380 IF L=8 THEN 680 !178
390 DISPLAY AT(16,1):W$(INT(
RND*3)+1)!007
400 ON L GOSUB 470,500,530,5
```

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EXTENDED BASIC—

(Continued from Page 15)

```
60,590,620,650 !123
410 CALL SOUND(200,330,3)!12
8
420 CALL HCHAR(3,1,32,704)!2
25
430 FOR L=0 TO MIN(N-1,59)::
 DISPLAY AT(INT(L/3)+3,1+9*(
L-INT(L/3)*3)):S(L+1):: NEXT
 L !157
440 CALL PAUSE !232
450 FOR L=1 TO N :: S(L)=U(L
):: NEXT L !077
460 GOTO 320 !144
470 !Bubble sort !183
480 CALL BUBBLE(N,S())!069
490 RETURN !136
500 !Delayed Replacement Sor
t !147
510 CALL REPSORT(N,S())!201
520 RETURN !136
530 ! Insertion Sort !038
540 CALL INSERT(N,S())!110
550 RETURN !136
560 ! Metzner Sort !080
570 CALL METZNER(N,S())!191
580 RETURN !136
590 ! Quick Sort !104
600 CALL QUICK(N,S())!021
610 RETURN !136
620 ! Ripple Sort !215
630 CALL RIPPLE(N,S())!101
640 RETURN !136
650 ! Shell Sort !099
660 CALL SHELL(N,S())!016
670 RETURN !136
680 ! End testing (Quit) !23
6
690 DISPLAY AT(16,1):"Quit,
New numbers                or Mo
re tests?" !095
700 CALL KEYAT(17,18,L2,"QNM
qnm")!086
710 IF POS("MmNnQq",CHR$(L2)
,1)>4 THEN CALL ENDING !125
720 IF POS("MmNn",CHR$(L2),1
)>2 THEN 210 ELSE 320 !189
28010 SUB RANDOMLIST(N,P,X()
)!166
28015 ! RANDOMLIST(Number of
 values,# of decimals,array)
 !240
28020 ! Creates random list
of N values, of P decimals,
in array X()-- JL Stern 5/91
 !066
28025 P=ABS(P):: IF P>10 THE
N P=10 !192
28030 FOR L=1 TO N :: X(L)=I
NT(RND*32700*10^P)/(10^P)::
NEXT L !087
28035 SUBEND !168
28040 SUB KEYAT(R,C,X,V$)!21
7
28045 ! KEYAT(Row, Column, A
SCII Return variable, Valida
tion string) JLS 2/91 !033
28050 ! Combines cursor flas
h with single key entry, val
idation !111
28055 C=C+2 :: CALL GCHAR(R,
C,N(0)):: N(1)=N(0):: N(2),N
(3)=30 !163
28060 CALL HCHAR(R,C,N(Y-INT
(Y/4)*4)):: Y=Y+1 !209
28065 CALL KEY(0,X,S):: IF S
<1 THEN 28060 !092
28070 IF POS(V$,CHR$(X),1)=0
 THEN 28060 !120
28075 CALL HCHAR(R,C,X)!144
28080 SUBEND !168
29160 SUB ENDING !036
29165 !CONFIRMS PROGRAM QUIT
 JLS 9/89 !129
29170 CALL SOUND(800,130,0,1
60,0):: DISPLAY AT(24,3):"PR
ESS SPACE BAR TO QUIT" !105
29175 CALL KEY(0,K,S):: IF S
<1 THEN 29175 ELSE IF K<>32
THEN SUBEXIT !003
29180 STOP :: SUBEND !194
29505 SUB BLUE !149
29510 ! SWITCHES DISPLAY TO
WHITE ON BLUE; JLS 7/88 !230
29515 CALL SCREEN(5):: FOR L
=0 TO 14 :: CALL COLOR(L,16,
1):: NEXT L :: SUBEND !202
30335 SUB BUBBLE(N,A())!055
30340 ! SORTS ARRAY A() OF N
 ELEMENTS BY ASCENDING ORDER
 !050
30350 FOR I=1 TO N-1 !072
30355 F=0 !253
30360 FOR J=1 TO N-I !152
30365 IF A(J+1)<A(J)THEN T=A
(J):: A(J)=A(J+1):: A(J+1)=T
 :: F=1 !090
30370 NEXT J !224
30375 IF F=0 THEN SUBEXIT !2
16
30380 NEXT I !223
30385 SUBEND !168
30530 SUB SHELL(N,X())!025
30535 ! SORTS ARRAY X() OF N
 ELEMENTS BY ASCENDING ORDER
 !073
30545 P=N !092
30550 IF P<=1 THEN SUBEXIT !
162
30555 P=INT(P/2):: M=N-P !07
0
30560 F=0 !253
30565 FOR J=1 TO M !140
30570 K=J+P !100
30575 IF X(J)>X(K)THEN T=X(J
):: X(J)=X(K):: X(K)=T :: F=
1 !183
30580 NEXT J !224
30585 IF F>0 THEN 30560 ELSE
 30550 !234
30590 SUBEND !168
30660 SUB METZNER(N,X())!200
30665 ! SORTS ARRAY X() OF N
 ELEMENTS BY ASCENDING ORDER
 !073
30675 M=N !089
30680 M=INT(M/2)!083
30685 IF M=0 THEN SUBEXIT !2
23
30690 K=N-M :: J=1 !234
30695 I=J !081
30700 L=I+M !097
30705 IF X(I)<=X(L)THEN 3072
5 !022
30710 T=X(I):: X(I)=X(L)!127
30715 X(L)=T :: I=I-M !004
30720 IF I>=1 THEN 30700 !03
3
30725 J=J+1 !013
30730 IF J<=K THEN 30695 ELS
E 30680 !006
30735 SUBEND !168
30820 SUB PAUSE !236
30825 FOR D=1 TO 100 :: NEXT
 D !241
30830 DISPLAY AT(24,2):"PRES
S ANY KEY TO CONTINUE" !088
30835 CALL KEY(0,K,S):: IF S
<1 THEN 30835 !049
30840 SUBEND !168
30995 SUB REPSORT(N,X())!210
31000 !DELAYED REPLACEMENT S
ORT, FOR SHORT LISTS ONLY !0
```

(See Page 17)

EXTENDED BASIC—

(Continued from Page 16)

```
39
31010 FOR I=1 TO N-1 :: K=I
:: FOR J=I+1 TO N !053
31015 IF X(J)<X(K)THEN K=J !
101
31020 NEXT J !224
31025 IF I<>K THEN T=X(K)::
X(K)=X(I):: X(I)=T !105
31030 NEXT I :: SUBEND !009
31035 SUB INSERT(N,X())!119
31040 ! (NUMBER OF ITEMS,ARR
AY TO SORT)INSERTION SORT !0
13
31050 FOR I=1 TO N-1 :: K=X(
I+1):: FOR J=I TO 1 STEP -1
!020
31055 IF K>=X(J)THEN 31070 !
172
31060 X(J+1)=X(J)!151
31065 NEXT J :: J=0 !099
31070 X(J+1)=K :: NEXT I ::
SUBEND !094
31075 SUB QUICK(N,X())!030
31080 !(NUMBER OF VALUES,ARR
AY TO BE SORTED) !072
31090 K,I=0 :: DIM S(500)!04
2
31095 S(I+1)=1 :: S(I+2)=N !
207
31100 K=K+1 !015
31105 IF K=0 THEN SUBEXIT !2
21
31110 K=K-1 :: I=K+K !240
31115 A=S(I+1):: B=S(I+2)!01
0
31120 Z=X(A):: U=A :: L=B+1
!125
31125 L=L-1 !018
31130 IF L=U THEN 31155 !136
31135 IF Z<=X(L)THEN 31125 E
LSE X(U)=X(L)!093
31140 U=U+1 !035
31145 IF L=U THEN 31155 !136
31150 IF Z>=X(U)THEN 31140 E
LSE X(L)=X(U):: GOTO 31125 !
085
31155 X(U)=Z !050
31160 IF B-U>=2 THEN I=K+K :
: S(I+1)=U+1 :: S(I+2)=B ::
K=K+1 !080
31165 IF L-A>=2 THEN I=K+K :
: S(I+1)=A :: S(I+2)=L-1 ::
K=K+1 !061
31170 GOTO 31105 !073
31175 SUBEND !168
31565 SUB TITLE2 !035
31575 DISPLAY AT(7,10)ERASE
ALL:"SORTTEST" :: CALL CHAR(
95,"00FF"):: CALL HCHAR(8,12
,95,8)!027
31580 DISPLAY AT(12,2):"Nume
ric Sort Routine Test" !208
31590 DISPLAY AT(19,5):"1991
 JERRY L. Stern" !185
31595 SUBEND !168
32380 SUB RIPPLE(N,A())!087
32385 ! RIPPLE SORT ROUTINE:
IMPROVED VERSION OF BUBBLE S
ORT !236
32390 A(0)=-999999 !075
32395 FOR I=2 TO N :: HI=I !
167
32400 IF A(I)<A(I-1)THEN TP=
A(I):: A(I)=A(I-1):: A(I-1)=
TP :: I=I-1 :: GOTO 32400 EL
SE I=HI !253
32405 NEXT I :: SUBEND !009
```

M Y - B A S I C

PAINTPRINT lets you output MY-PAINT pictures to a printer

By JIM UZZELL
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This month's program will allow you to print MY-PAINT pictures. However, some readers may not be able to use it.

First, your printer MUST have BOTH of the following capabilities;

- The ability to download characters into RAM CHR$(27);CHR$(38);CHR$(0);n1 n2 m0 m1...m11
- The ability to define and download NLQ characters. Same as above + m12....m22 also CHR$(27);"x1" or equivalent

If you met the first test you have a chance of using this program.

To use all of the features of this program you must have all of the following commands or their equivalents:

CHR$(27);"3";CHR$(X)
set printer to X/216
CHR$(27);"S";CHR$(1)
select superscript
CHR$(27);"W";CHR$(1)
select expanded printer
CHR$(27);"M"
select elite printing
CHR$(27);"h";n
select double or quadruple high
CHR$(27);"a";CHR$(X)
select left, center or right print
CHR$(15)
select condensed

If you have all of the above you have a good chance of using this program, but there are no guarantees. I might note here that I used a STAR NX-10 to develop this program.

There is one limitation on using this program, you can only print MY-PAINT pictures painted in the default colors and be reasonably assured that what is printed will look like what you see on the screen. Example, if you mix the color black to white in MY-PAINT then print it, black will print as black.

I know some of you will ask — why limit it to only the default colors? Just look at the number of data statements in the program. To define a character pattern for all possible mixes of color would make the program prohibitively large to be published in MICROpendium.

Those who are still with me, let me explain the two features (SIZE and ALIGNMENT) of the program.

(See Page 18)

MY-BASIC—

(Continued from Page 17)

SIZE — Size allows 10 options, yes you can print 10 different sizes of a MY-PAINT picture. Sizes range from approximately 2x2 inches to full page width x two pages long.

ALIGNMENT — Alignment allows you to print your picture either left, center or right justified.

For those who cannot use this program, I apologize, (you could buy another printer) but specialized programs come along from time to time. An example of this is YAPP (Yet Another Paint Program). To use YAPP in a pure TI requires the purchase of an 80-column card ($200) and, for convenience, a mouse ($50), plus the cost of YAPP. With no provision, as far as I could determine, to use the keyboard to execute all available features, a user would have to invest about $300 to use YAPP. This is what I call a specialized program. I hope no one will interpret this as a put-down of YAPP, it isn't, the subject is "specialized" not "functionability," and new ideas are welcome and greatly appreciated when they expand our computing capability.

Some food for thought, if MY-PAINT pictures can be printed to a printer, why not print it to a D/V 80 file and through an .IF transliterlate file, print it along with your text, or create a program to display a text file and your MY-PAINT picture on the screen together. I am sure there other ideas, so think.

Have fun with PAINTPRINT.

CHECKSUMS

0 950 1330 1412 1314 856 2544 963 1881 2011
3304 3514 1885 1925 3303 915 1878 654 1307
1233 1952 1924 3308 920 4617 439 1948 1929
3319 922 4622 439 1953 1925 3303 915 4618
439 1890 1930 3314 926 4623 439 1895 2369
683 1802 4899 761 3386 4455 827 4674 2895
2071 1892 3700 2341 2762 2620 2797 1468 2304
1470 2062 1472 2445 1465 2207 1467 2260 1469
2028 1471 2393 1473 2221 1466 2215 1468 2390
1470 2273 1472 2267 1474 2072 1467 1610 1469
3350 4753 4794 490 3148 3304 3125 1879 1414
1793 2276 775 2795 2117 3760 1794 729 4420
1520 5032 1884 2647 2650 3245 3956 3164 4559
197 2364 3164 3963 4337 3544 3546 4341 2670
2674 2654 2659 2204 2719 2691 2493
TOTAL 307003

PAINTPRINT

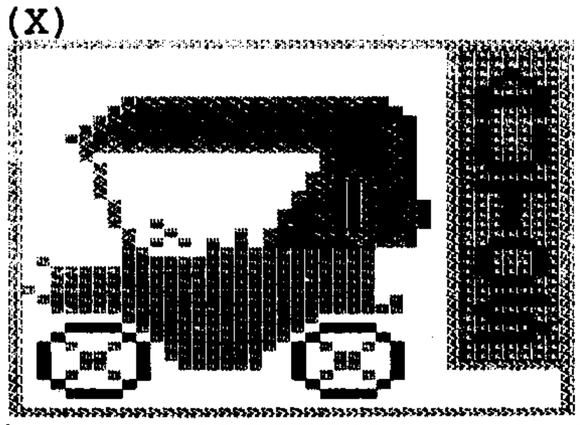
```
100 ON ERROR 590
110 REM DDI SOFTWARE
120 REM COPYRIGHT 1991
130 CALL GRAPHICS(2,2)
140 CALL CLEAR
150 DIM PC(16),PR(16),PG(16)
,PB(16),J$(40),J(80)
160 OPEN #1:"PIO"
170 PRINT #1:CHR$(27);"3";CH
R$(1);
180 PRINT #1:CHR$(27);"x";CH
R$(49);
190 PRINT #1:CHR$(27);CHR$(3
8);CHR$(0);CHR$(160);CHR$(16
0);
200 FOR M=0 TO 22 :: READ MM
 :: PRINT #1:CHR$(MM); :: NE
XT M
210 PRINT #1:CHR$(27);"x";CH
R$(0)
220 PRINT #1:CHR$(27);"x"&CH
R$(1);
230 PRINT #1:CHR$(27);CHR$(3
8);CHR$(0);CHR$(161);CHR$(16
3);
240 RESTORE 630
250 FOR X=1 TO 3 :: FOR M=0
TO 22
260 READ MM
270 PRINT #1:CHR$(MM);
280 NEXT M :: NEXT X
290 PRINT #1:CHR$(27);"x";CH
R$(0);
300 PRINT #1:CHR$(27);"x"&CH
R$(1);
310 PRINT #1:CHR$(27);CHR$(3
8);CHR$(0);CHR$(164);CHR$(16
6);
320 RESTORE 690
330 FOR X=1 TO 3 :: FOR M=0
TO 22 :: READ MM :: PRINT #1
:CHR$(MM); :: NEXT M :: NEXT
 X
340 PRINT #1:CHR$(27);"x";CH
R$(0);
350 PRINT #1:CHR$(27);"x"&CH
R$(1);
360 PRINT #1:CHR$(27);CHR$(3
8);CHR$(0);CHR$(167);CHR$(16
9);
370 RESTORE 750
380 FOR X=1 TO 3 :: FOR M=0
TO 22 :: READ MM :: PRINT #1
:CHR$(MM); :: NEXT M :: NEXT
 X
390 PRINT #1:CHR$(27);"x";CH
R$(0);
400 PRINT #1:CHR$(27);"x"&CH
R$(1);
410 PRINT #1:CHR$(27);CHR$(3
8);CHR$(0);CHR$(170);CHR$(17
2);
420 RESTORE 810
430 FOR X=1 TO 3 :: FOR M=0
TO 22 :: READ MM :: PRINT #1
:CHR$(MM); :: NEXT M :: NEXT
 X
440 PRINT #1:CHR$(27);"x";CH
R$(0)
450 PRINT #1:CHR$(27);"x"&CH
R$(1);
460 PRINT #1:CHR$(27);CHR$(3
8);CHR$(0);CHR$(173);CHR$(17
5);
470 RESTORE 870
480 FOR X=1 TO 3 :: FOR M=0
TO 22 :: READ MM :: PRINT #1
:CHR$(MM); :: NEXT M :: NEXT
 X
490 PRINT #1:CHR$(27);"x";CH
R$(0)
500 PRINT #1:CHR$(27);"%";CH
R$(49);CHR$(0);
510 GOTO 930
520 DISPLAY AT(20,1):" ":" "
:" ":" "
530 DISPLAY AT(20,1):"PRINT
ANOTHER SIZE Y/N  N" :: ACCE
PT AT(20,25)SIZE(-1)VALIDATE
("YN"):A$
540 IF A$="Y" THEN DISPLAY A
T(20,1):" " :: GOTO 550 ELSE
 560
550 GOSUB 1250 :: PRINT #1:C
HR$(27);"@" :: PRINT #1:CHR$
(27);"%";CHR$(49);CHR$(0); :
: GOTO 1090
560 CALL TCOLOR(6,16) :: DIS
PLAY AT(20,15):" PICTURE Y/N
  N "; :: ACCEPT AT(20,29)SI
ZE(-1)VALIDATE("YN"):B$ :: C
ALL TCOLOR(16,6)
570 IF B$="Y" THEN GOTO 580
ELSE 590
580 CALL RESETPLT :: RESTORE
590 PRINT #1:CHR$(27);"x";CH
R$(0);CHR$(27);"%";CHR$(0);C
HR$(27);"@"
600 IF B$="Y" THEN CLOSE ALL
 :: GOTO 140
610 CLS :: CLOSE ALL :: CALL
 RESETPLT :: END
620 DATA 11,0,0,0,0,0,0,0,0,
```

(See Page 19)

MY-BASIC—

(Continued from Page 25)

```
0,0,0,0,0,0,0,0,0,0,0,0,0,0
630 DATA 11,255,255,255,255,
255,255,255,255,255,255,255
640 DATA 0,0,0,0,0,0,0,0,0,0
,0
650 DATA 11,170,21,64,170,1,
64,170,21,64,170,0
660 DATA 0,0,0,0,0,0,0,0,0,0
,0
670 DATA 11,149,0,72,0,162,0
,85,0,8,0,165
680 DATA 0,0,0,0,0,0,0,0,0,0
,0
690 DATA 11,149,42,64,149,42
,64,149,42,64,149,42
700 DATA 0,0,0,0,0,0,0,0,0,0
,0
710 DATA 11,170,0,85,170,0,8
5,170,0,85,170,0
720 DATA 0,0,0,0,0,0,0,0,0,0
,0
730 DATA 11,170,17,0,170,85,
0,170,17,0,170,85
740 DATA 0,0,0,0,0,0,0,0,0,0
,0
750 DATA 11,170,0,0,170,0,0,
170,0,0,170,0
760 DATA 0,0,0,0,0,0,0,0,0,0
,0
770 DATA 11,82,129,36,66,24,
129,36,24,66,36,145
780 DATA 0,0,0,0,0,0,0,0,0,0
,0
790 DATA 11,168,5,64,42,1,64
,130,17,64,170,0
800 DATA 0,0,0,0,0,0,0,0,0,0
,0
810 DATA 11,170,5,64,42,1,64
,138,17,64,170,0
820 DATA 0,0,0,0,0,0,0,0,0,0
,0
830 DATA 11,145,36,66,24,36,
129,24,66,36,129,82
840 DATA 0,0,0,0,0,0,0,0,0,0
,0
850 DATA 11,170,85,0,170,85,
0,170,85,0,170,85
860 DATA 0,0,0,0,0,0,0,0,0,0
,0
870 DATA 11,170,5,64,170,1,6
4,170,17,64,170,0
880 DATA 0,0,0,0,0,0,0,0,0,0
,0
890 DATA 11,182,8,1,214,8,1,
182,8,1,214,8
900 DATA 0,0,0,0,0,0,0,0,0,0
,0
910 DATA 11,0,0,0,0,0,0,0,0,
0,0,0
920 DATA 0,0,0,0,0,0,0,0,0,0
,0
930 DISPLAY AT(20,1):"*LOAD*
 DSK"; :: ACCEPT AT(20,11):T
D$
940 DISPLAY AT(20,1):" " ::
OPEN #2:"DSK"&TD$&"-CR",INTE
RNAL,INPUT ,VARIABLE 128
950 FOR X=2 TO 16 :: INPUT #
2:PC(X) :: INPUT #2:PR(X) ::
 INPUT #2:PG(X) :: INPUT #2:
PB(X)
```



```
960 CALL PALETTE(PC(X),PR(X)
,PG(X),PB(X)) :: NEXT X
970 FOR X=1 TO 40 :: INPUT #
2:J$(X) :: NEXT X :: CLOSE #
2
980 U=1 :: FOR X=1 TO 40 ::
M=0 :: FOR Y=1 TO 80 STEP 2
990 J(Y)=VALHEX(SEG$(J$(U),Y
,2))
1000 CALL DCOLOR(J(Y),5)
1010 CALL POINT(1,X+76,Y-M+1
00)
1020 M=M+1 :: NEXT Y :: U=U+
1 :: NEXT X
1030 GOTO 1090
1040 U=1 :: FOR X=1 TO 40 ::
 FOR Y=1 TO 80 STEP 2
1050 J(Y)=159+VALHEX(SEG$(J$
(U),Y,2))
1060 IF Y<79 THEN PRINT #1:C
HR$(J(Y)); ELSE PRINT #1:CHR
$(J(Y))
1070 NEXT Y :: U=U+1 :: NEXT
 X
1080 GOTO 520
1090 DISPLAY AT(22,1):"PRINT
 SIZE  1 2 3 4 5 6 7 8 9 10"
 :: DISPLAY AT(23,1):"CHOICE
" :: ACCEPT AT(23,8):A
1100 DISPLAY AT(20,1):"PRINT
 ALIGNMENT 1=LEFT 2=CENTER 3
=RIGHT" :: DISPLAY AT(21,1):
"CHOICE" :: ACCEPT AT(21,8):
B
1110 IF B=2 THEN M=1 :: GOSU
B 1300 :: GOTO 1130
1120 IF B=3 THEN M=2 :: GOSU
B 1300 :: GOTO 1130
1130 ON A GOTO 1140,1150,116
0,1180,1170,1190,1200,1220,1
210,1230
1140 GOSUB 1240 :: GOSUB 126
0 :: GOSUB 1280 :: GOSUB 131
0 :: GOTO 1040
1150 GOSUB 1240 :: GOSUB 126
0 :: GOSUB 1280 :: GOTO 1040
1160 GOSUB 1240 :: GOSUB 126
0 :: GOSUB 1270 :: GOSUB 128
0 :: GOSUB 1310 :: GOTO 1040
1170 GOSUB 1250 :: GOSUB 131
0 :: GOTO 1040
1180 GOSUB 1250 :: GOSUB 128
0 :: GOSUB 1310 :: GOTO 1040
1190 GOSUB 1250 :: GOSUB 127
0 :: GOSUB 1280 :: GOSUB 131
0 :: GOTO 1040
1200 GOSUB 1250 :: GOSUB 128
0 :: GOSUB 1310 :: Z=1 :: GO
SUB 1290 :: GOTO 1040
1210 GOSUB 1250 :: GOSUB 127
0 :: Z=1 :: GOSUB 1290 :: GO
TO 1040
1220 GOSUB 1250 :: GOSUB 128
0 :: Z=1 :: GOSUB 1290 :: GO
TO 1040
1230 GOSUB 1250 :: GOSUB 128
0 :: Z=2 :: GOSUB 1290 :: GO
SUB 1310 :: GOTO 1040
1240 PRINT #1:CHR$(27);"3";C
HR$(12); :: RETURN
1250 PRINT #1:CHR$(27);"3";C
HR$(24); :: RETURN
1260 PRINT #1:CHR$(27);"S";C
HR$(1); :: RETURN
1270 PRINT #1:CHR$(27);"W";C
HR$(1); :: RETURN
1280 PRINT #1:CHR$(27);"M";
:: RETURN
1290 PRINT #1:CHR$(27);"h";C
HR$(Z); :: RETURN
1300 PRINT #1:CHR$(27);"a";C
HR$(M); :: RETURN
1310 PRINT #1:CHR$(27);CHR$(
15); :: RETURN
```

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#22. ASTROLOGY
This one is as good as anything you will see in an arcade. Great color graphics and displays of the Zodiac. Enter your birthdate and learn about your sign, your lucky days and famous events in history on your birthday. Even prints out a report. Can be used as a great moneymaker at a charity event. Help guide your spouse's career.

#23. WILL WRITER
Enter your answers to a group of computer asked questions and this program then writes you a last will and testament. Now you can leave your TI-99/4A to your favorite nephew. Works with any printer. Appears legal in all states but better check that out!

#24. ENGINEERING CALCULATIONS
A two sided computer handbood of dozens of the most often used engineering and technical formulas. A real time saver. Does conversions, calculations and even designs electrical circuits. A must for anyone whose profession or hobby involves scientific calculations. Even has medical and communications applications.

#25. MEDICAL ALERT
This disk contains many menu accessible files covering most everyday medical emergencies. A good "what to do until the doctor or paramedic comes" guide. Well written and organized. Could very easily save a life!

#26. R RATED GAME
It was bound to happen. A talented (but demented) programmmer in Germany wrote an Invaders type game but with most unusual guns and targets. Definitely not what you would find at your neighborhood arcade. Not only a great party game but some great programming. You must be over 18 to order this one!!

#27. KIDS LEARNING
An educator in Georgia put this two sided disk collection of educational programs together. Contains great material. Math, geography, reading improvement, and even IQ testing. All high quality programs for kids of all ages.

#28. LOADERS AND CATALOGERS
We put together a collection of the best programs that catalog and load a group of programs on a disk. Just try them, pick the one you like and transfer it to another disk with the file name LOAD and you are in business.

#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.

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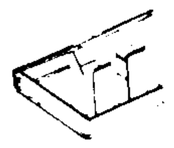

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#48. GHOSTMAN (from England)
This Pacman/Munchman type game starts at a slow pace and slowly speeds up to a break-neck pace. A totally new experience.

#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/KEYBOARD CHORD ANALYSIS
A unique music program which displays a piano on the screen and actually plays your selections.

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Two bible games)non-fiction) that work with the TI Adventure Module.

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This disk features the works of J. Peter Hoddie. All of these games are of commercial qualaity and well worth the donation requested!

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An exciting game for use with the Tunnels of Doom module. Several Exbasic bonus games are included.

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

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THE ART OF ASSEMBLY - PART 1

Structured programming, top down and bottom up

By BRUCE HARRISON

Frustrated with Extended BASIC? Tired of waiting for C? Fed up with Forth? P. O.'d at Pascal? The answer to your problems is the "Native Language" of your computer's heart, Assembly Language.

Many programmers today shun this language as being unnecessary, antiquated, and obsolete. We who do our programming in Assembly believe that it's the most valuable of all computer languages. There are three things that make Assembly worth while:

1. It maximizes the speed of execution of any operation we're trying to peform;

2. It can minimize the memory required to perform any given tasks;

3. Through Assembly we gain access to all the facilities and capabilities the computer has to offer. No other language can make those three things true at the same time.

From the programmer's viewpoint, there are two major drawbacks to Assembly:

1. It is **very** labor-intensive. A simple "Accept At" function may require two pages of source code to implement;

2. It requires a much more intimate knowledge of what really goes on in the computer. Such knowledge takes lots of study, and much trial and error plodding to acquire.

This series of articles is based upon years of exprience, much of it painful, in exploring the capabilities and limitations of the TI-99/4A through Assembly programming. It is not designed as a beginner's course. For that, we recommend Ralph Molesworth's excellent book *Introduction to Assembly Language Programming on the TI-99/4A* from Steve Davis publishing.

In this first installment, we'll cover some general topics as background for the programmer who's ready to move beyond the beginner stage, but is not quite sure how to proceed. We'll cover the topics of Structure and Memory mapping. This will be very general coverage, just to give you the "feel" of thinking through your programming efforts. In later installments, we'll get into the more detailed aspects so you can become comfortable in programming with Assembly.

Structure is your servant! We say that deliberately. For many programmers the relationship becomes the wrong way around, as they slavishly "structure" far beyond any logical reason or necessity. Structure in your programming effort should help you to keep your efforts organized and focused, and in some cases will help minimize the memory required to hold your programs and data. It must not be allowed to become an end unto itself.

Perhaps a small example will help illustrate my point. In a book on PC Assembly language, the author put together a whole book of subroutines which, for the most part, could be lifted directly and used in PC programs. In some instances, however, he went overboard with structure. He gave a subroutine to place a single character on the screen. To use the subroutine, one would place the desired character's ASCII value in a register, then call the subroutine to display that character. He presented another subroutine to place a space on the screen. That subroutine simply placed ASCII 32 in the register, then called the "display a character" subroutine.

What's wrong with that process is mainly that there's twice as much "overhead" in both time and memory usage to print a space that way. The main program could put any character, including a space, in the register, then call the "display character" subroutine, rather than involve two levels of subroutine to perform the same function.

That kind of thinking is rampant in the PC community, and is one of the reasons PC owners need megabytes of memory to run commercial software packages. On the TI, with its limited memory capacity, we can't afford that kind of thinking. Again, structure is useful only as long as it serves the programmer.

I'll cite just one other example of structure gone amok, from a TI BASIC program I once examined. (I won't name the program or the author.) This program used a menu selection to execute its functions. Each function was organized as a subroutine. Not one of those subroutines was called from more than one place in the main program. A simple ON-GOTO to branch directly to the desired section of the code would have done nicely, with a GOTO at the end of each function to return to the menu. In later installments of this series we'll show an efficient and effective way to perform branching from a menu-select situation, using an Assembly version of the ON-GOTO function.

TOP DOWN AND BOTTOM UP

So how does one sensibly apply structure without going overboard? There are two approaches which we use here at Harrison in combination. They're called Top Down and Bottom Up. From the Top Down, we recommend that some kind of overall flow chart be constructed early in the "thinking" stage of the program. For many programmers, it will help to actually draw a chart of the flow through the program's major functions. In some cases, a physical chart won't be required, but there should be at least a mental image of what the major functions are and how they should relate to one another. On occasion in my programming experience, I've ignored my own advice on this matter, and in all such cases have gone through endless agonizing revisions and re-writings of code because I omitted that first step. Once the major functions are identified, the Top Down approach proceeds to break those into smaller and smaller subdivisions of what needs to be done. From this a pattern will emerge, showing that many places in the main stream program will need the same primitive operations performed. This is where the idea of subroutines becomes a powerful tool, and it's also where the Bottom-Up idea can be useful.

In Bottom-Up programming, we start with simple functions, such as getting keystrokes from the keyboard, or placing characters on the screen, then build a program structure to optimize the

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ART OF ASSEMBLY—

(Continued from Page 25)

use of these "primitive" tools.

Good programs need the influence of both these approaches at the same time.

Once the overall structure is broken down a couple of levels, we should have a clear view of what kinds of subroutines we'll need, and how to use them in building upward to bigger structures like menu drivers, input screens, and so on. Experienced Assembly programmers usually have a stable of existing subroutines developed as part of other efforts, so they can use those, usually with minor modifications, in the new program. In future articles, we'll present actual source code for subroutines we've found useful.

MASTERING MEMORY

Memory is your Master! Now let's move on to the subject of Memory. There isn't much, so we must be careful how we use it. That starts with a knowledge of what we can use. There are two major blocks of memory available to the Assembly programmer. In Low Memory, from >2000 thru >3FFF, there are about 6K bytes that we can safely use, reserving the space at the beginning for the E/A utilities, and space at the end for the REF/DEF table.

In High Memory, there is lots of space, about 24K bytes from >A000 through >FFE6. In a normal Option 3 E/A program, only this 24K-byte section will be open for your use as program storage. There are ways to make effective use of the low memory part as well as the high memory part, but these require techniques such as AORG, which we're not ready to cover just yet. Just to give you a hint, virtually every program we write here at Harrison involves use of AORG to give us maximum use of the available memory.

One frequently overlooked memory resource is the memory associated with the Video Display Processor, also known as VDP RAM. This can't be used directly for executable code, but can be used for a kind of "auxilliary" data storage. In most modes of VDP operation, there are about 10K bytes of VDP RAM that can be safely used to stash data.

In this series of articles, we'll show many techniques for saving memory in performing various functions.

As you already know, our good friend Barry Traver is writing a series of articles on using Assembly routines along with Extended BASIC. Our series of articles is intended for the programmer who's trying to make whole programs in Assembly. We'll make every effort not to overlap Barry's efforts, but there will be instances where we may give slightly different versions of routines that he's already covered. At some point in the series, we plan to cover methods for making All-Assembly programs operate with the Extended BASIC module, or perhaps we should say in spite of the XB module.

In our next article, we'll start from the bottom up with some primitive subroutines that we've used. Along with that, we'll show the techniques for minimizing use of memory and maximizing speed of execution. When the series is done, we'll offer the whole series on disk as D/V 80 files to make them easier to access.

Harrison is owner of Harrison Software.

MS Express releases new software for TI

MS Express Software has released three new programs, Adventure Hints-Series II, Sliding Block Puzzles-Series II and Sliding Block Solutions-Series II.

Adventure Hints-Series II by Lynn Gardner requires a TI99/4A console, a monitor or TV screen, disk drive system (minimum configuration of 1 SS/SD drive) and the Adventure Module. The hints are designed to help users solve adventure games. Suggested retail price is $9.95 plus $1 shipping and handling.

Both the new Sliding Block disks are by Norman Rokke. Sliding Block Puzzles-Series II contains three sliding block puzzles, two of which have two different objectives, making five different games. It contains a save game feature.

Sliding Block Puzzles-Series II requires a TI99/4A console, a color monitor or TV, a disk drive system (minimum configuration of one SS/SD drive), 32K memory expansion and Extended BASIC. Suggested retail is $7.95 plus $1 shipping and handling.

Sliding Block Solutions-Series II provides help with the puzzles on the disk above. The user can choose whether to receive the help on the screen, printer or both. Requirements are the same as for Sliding Block Puzzles-Series II.

For further information, or to order, write MS Express Software, P.O. Box 498, Richmond, OH 43944. Ohio residents should add sales tax to their orders.

BASIC ASSEMBLY

Peeks and Pokes with strings in VDP and CPU RAM

By BARRY TRAVER

It may not be immediately evident, but this month's column is about some rather basic (assembly) concepts of computer knowledge, essential stuff like reading (PEEKing), 'riting (POKEing), and 'rithmetic (since everything in computers is ultimately a matter of arithmetic, binary or hex or decimal). The practical implications and applications of the four routines provided here will be seen in future articles (including next month's article on how to have the computer write assembly source code to recreate ANY screen display capable of being created from Extended BASIC, including XB code that cannot be handled by GRAPHICOMP), so get these PEEKs and POKEs down, because they can be very useful.

Before we turn to this month's topic, however, now may be a good time for us to review where we've been and where we're going. This column on "BASIC assembly" deals with linking (X)BASIC with assembly. Many CALL LINKs include the passing of parameters — such as CALL LINK("POKEV",ADDRES,STRNG$) — so it is important to have my GET/SEND/S file as published in the June 1990 issue of MICROpendium. Also, using assembly routines with XB is usually awkward unless the assembly routines are embedded in XB programs for quick loading; thus Todd Kaplan's ALSAVE and ALLOADM from the September 1990 issue of MICROpendium will get continued use in this column. (If you're lacking these files, I will send them to you on a SS/SD disk if you send a check for $4.00 to Barry Traver, 835 Green Valley Drive, Philadelphia, PA 19128, telling me that you want the "BASIC assembly" disk.)

Without using the file GET/SEND/S, this month's source code would be much longer than it is, so my "practical parameter passer" is demonstrating that it is a time- and memory-saver. (You may be interested to know that I am re-doing my XXB or "eXtended eXtended Basic" to free up memory space so that I will be able to add more assembly routines when I come out with version 1.6 of this aid to XB programmers.) Next month's column will premiere a program called either SNAPSHOT or VDP/SAVER (I haven't decided on a final name yet, but the program works great!), and that program is an XBASIC/assembly hybrid that requires the use of GET/SEND/S (June 1990), ALSAVE and ALLOADM (September 1990), and PEEKV (this month's column), so I hope you're keeping track of all of your issues of MICROpendium!

CPU AND VDP RAM

Now on to this month's routines.... Unless you have a GRAM emulator device, there are essentially two types of RAM (Random Access Memory) in your computer: CPU RAM and VDP RAM. You can PEEK into (i.e., read from) either, and you can POKE into (i.e., write to) either. (Texas Instruments sometimes uses the word LOAD rather than POKE to refer to poking or loading values into memory, but I prefer to restrict the word LOAD to refer to the LOADing of disk files. No big deal, however.)

Extended BASIC does not include a PEEK or a POKE for VDP RAM. It does include a PEEK and a POKE (which it calls LOAD) for CPU RAM, but both involve specifying values a byte at a time. That is, in TI XB, you can use commands like the following:

```
CALL PEEK(ADDRES,VALUE1,VALUE2,VALUE3,VALUE4,VALUE5,...)
CALL LOAD(ADDRES,VALUE1,VALUE2,VALUE3,VALUE4,VALUE5,...)
```

In my opinion, however, it is much more efficient to read a string from memory or write a string to memory instead of having to work with distinct, separate, individual values, one byte at a time. A string may be up to 255 bytes (or characters) long, and I'd rather pass along one 255-byte string as a parameter than to pass along 255 numeric parameters (which XB wouldn't let me do anyway)!

Assembly language contains some nice utilities known as VMBR (VDP RAM Multiple Byte Read) and VMBW (VDP RAM Multiple Byte Write). It doesn't contain similar utilities for CPU RAM, but — as you can see from PEEKPOKE/S — it was not difficult to invent such (they only require four lines of code each!).

PEEKING AND POKING

For all four routines, I set up the parameters the same way: I use the first parameter for the memory ADDRESs in CPU RAM or VDP RAM, I use the second parameter for the STRiNG$ to be read or written, and (in the case of PEEKing) I use the third parameter to indicate the LENGTH of the string.

As suggested above, the BL @GET, BL @SEND, and B @RETURN — thanks to the file GET/SEND/S — are very efficient replacements for what might have been otherwise rather tiresome code. The code remaining is fairly straightforward, most or all of the concepts having been explained in previous articles. Remember that in assembly (unlike BASIC), the first byte of a string specifices the length of the string. Remember also that a byte is half a word, which is the reason why those SWPB R2 and SRL R2,8 instructions are needed. (When you're doing mathematics with the length, you want the value to be in the right byte of the Register, but when you're moving the byte to a string location, you want the value to be in the left byte of the Register.)

Warning: indiscriminate use of POKEC or POKEV may have unpredictable results. It may, for example, cause your system to lock up, so that you have to turn it off and back on before you can use it again. (Texas Instruments warns that the same may be true of PEEK, but I have never had that happen in my own experience.)

Using these four routines — PEEKC, PEEKV, POKEC, and POKEV — in a practical way is often similar to solving adventure games: you may not be able to get anywhere without a good map. Well, memory maps — for both VDP RAM and CPU RAM —

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BASIC/ASSEMBLY—

(Continued from Page 27)

can be very helpful for working in assembly language. If you are fortunate enough to have the manual for the MG Explorer program (available first from Millers Graphics and then later from Bytemaster Services), you already have detailed maps to assist you in your exploring of computer memory. (We'll provide some map outlines ourselves in the next article.)

One final comment for now: if you are using PEEKV or POKEV to read from or write to the screen, remember that XB has a >60 (or decimal 96) offset to keep in mind. That is, if you want to read from the screen area (0 to 767 in normal graphics mode), you have to subtract 96 from each character of the string you get in order to make sense of the result. Likewise, if you want to write to the screen area, you have to add 96 to each character of the string in order to accomplish your intended result. (The only VDP area affected in this way is the screen.)

You already know from GRAPHICOMP an easy way to write to the screen. (Just let GRAPHICOMP create an assembly version equivalent to a DISPLAY AT statement in XB.) For a homework assignment, you may want to see if you can modify the code for PEEKV to read a string from the screen in a meaningful way. (Maybe you can call your new routine PEEKSC to indicate that it can be used to PEEK at the SCreen.) Since XB contains a CALL GCHAR but not a CALL GSTRING (maybe TI was uncomfortable with the possible connations of such an expression?), perhaps you can rectify that omission.

To prevent possible misunderstandings here (and to put in a word for my own preferences in "entertainment"), let me suggest that the reference to GSTRING reminds me (and should remind you) not of the burlesque hall but the concert hall (as in "Air on the G String," referring to the second movement of Bach's Suite no. 3 in D major for orchestra). <grin> With that matter definitively settled, I bid you farewell till next month. Keep on compuTIn'!

Traver publishes a diskazine for TI users called Genial TRAVelER.

PEEKPOKE/S

```
0001  * PEEKS AND POKES
0002
0003  * Copyright (C) 1991 by Barry Traver,
0004  *  835 Green Valley Drive, Phila., PA
0005  *  19128 (phone:  215/483-1379)
0006
0007        COPY "DSK1.GET/SEND/S"
0008
0009  * CALL LINK("PEEKV",ADDRES,STRNG$,LENGTH)
0010
0011        DEF  PEEKV
0012
0013  ADDRES EQU  PARAM1
0014  STRNG$ EQU  PARAM2
0015  LENGTH EQU  PARAM3
0016
0017  PEEKV  LWPI WS
0018
0019        BL   @GET
0020
0021  * GET LENGTH OF STRING FROM XB
0022
0023        MOV  @LENGTH,R2
0024        SWPB R2
0025        MOVB R2,@STRNG$
0026
0027  * GET STRING FROM VDP RAM
0028
0029        MOV  @ADDRES,R0
0030        SWPB R2
0031        LI   R1,STRNG$+1
0032        BLWP @VMBR
0033
0034  * PASS STRING BACK TO XB
0035
0036        B    @SEND
0037
0038  * CALL LINK("PEEKC",ADDRES,STRNG$,LENGTH)
0039
0040        DEF  PEEKC
0041
0042  * ADDRES EQU  PARAM1
0043  * STRNG$ EQU  PARAM2
0044  * LENGTH EQU  PARAM3
0045
0046  PEEKC  LWPI WS
0047
0048        BL   @GET
0049
0050  * GET LENGTH OF STRING FROM XB
0051
0052        MOV  @LENGTH,R2
0053        SWPB R2
0054        MOVB R2,@STRNG$
0055
0056  * GET STRING FROM CPU RAM
0057
0058        MOV  @ADDRES,R0
0059        SWPB R2
0060        LI   R1,STRNG$+1
0061        BL   @CMBR
0062
0063  * PASS STRING BACK TO XB
0064
0065        B    @SEND
0066
0067  CMBR   MOVB *R0+,*R1+
0068        DEC  R2
0069        JNE  CMBR
0070        RT
0071
0072  * CALL LINK("POKEV",ADDRES,STRNG$)
0073
0074        DEF  POKEV
0075
0076  * ADDRES EQU  PARAM1
0077  * STRNG$ EQU  PARAM2
0078
0079  POKEV  LWPI WS
```

(See Page 29)

BASIC/ASSEMBLY—

(Continued from Page 28)

```
0080
0081        BL   @GET
0082
0083  * WRITE STRING AT VDP LOCATION
0084
0085        MOV  @ADDRES,R0
0086        LI   R3,STRNG$
0087        MOVB *R3+,R2
0088        SRL  R2,8
0089        MOV  R3,R1
0090        BLWP @VMBW
0091
0092        B    @RETURN
0093
0094  * CALL LINK("POKEC",ADDRES,STRNG$)
0095
0096        DEF  POKEC
0097
0098  * ADDRES EQU  PARAM1
0099  * STRNG$ EQU  PARAM2
0100
0101  POKEC  LWPI WS
0102
0103        BL   @GET
0104
0105  * WRITE STRING AT CPU LOCATION
0106
0107        MOV  @ADDRES,R0
0108        LI   R3,STRNG$
0109        MOVB *R3+,R2
0110        SRL  R2,8
0111        MOV  R3,R1
0112        BL   @CMBW
0113
0114        B    @RETURN
0115
0116  CMBW   MOVB *R1+,*R0+
0117        DEC  R2
0118        JNE  CMBW
0119        RT
0120
0121        END
```

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Using the find directive

By BILL GASKILL
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You will note that there are two command files included in this article, one named CHANGE that belongs to the MICROPEN program we are building, and another named EDIT, that is included because it shows a more complex use of the FIND directive. DO NOT use EDIT as part of the MICROPEN application, but you may certainly save it for future use in your own programs. The discussion that follows centers around the EDIT command file.

First, EDIT shows how one can create a relational link between two files using only one input to access records in both files. The key to relational data base management is the existence of a link field between the two files. In this case, LASTNAME is the link field, with FIRSTNAME being used as a detail identifier. Thus both files contain LastName and FirstName fields. In the EDIT command file FirstName is required because there will likely be more than one record with the same Last Name, but chances of having two records that share both last and first names are much smaller.

Second, in order to use the FIND directive in this example, both files must be sorted on the LASTNAME field. FIND only operates on sorted data bases, by the primary sort

(See Page 30)

```
* edit 06/01/90
LOCAL ENTER C 5
LOCAL LN C 5
LOCAL FN C 3
WHILE LN<>"END"
TOP
CLEAR
WRITE 05,13 "EDIT A RECORD"
WRITE 06,13 (13-)
WRITE 08,02 "TYPE IN THE WORD END TO EX;
IT TO MENU."
WRITE 12,02 "ENTER <LASTNAME> AND <FIRS;
TNAME> DATA"
WRITE 16,1 "Use 5 characters for Lname,;
3 for Fname."
WRITE 18,5 "LNAME:>^^^^^<^^FNAME:>^^^<"
READSTRING 18,12 LN
IF LN="END"
RETURN
ELSE
ENDIF
READSTRING 18,27 FN
WRITE 23,1,"ONE MOMENT PLEASE...^^^^^^^"
FIND LN
WHILE FN<>FNAME
MOVE
ENDWHILE
EDIT
SELECT 2
TOP
FIND LN
WHILE FN<>FNAME
MOVE
ENDWHILE
EDIT
SELECT 1
RETURN
* change 06/01/90
* copyright 1990 by Wm. Gaskill
SET TALK OFF
LOCAL SB C 10
TOP
CLEAR
WRITE 10,13 "CHANGE A RECORD"
WRITE 11,13 (15-)
WRITE 15,09 "Use up to 10 characters."
WRITE 18,10 "ENTER DATA:>^^^^^^^^^^<"
READSTRING 18,22 SB
CLEAR
WRITE 18,01 " SEARCHING FOR:"
WRITE 18,17 SB
FIND SB
WHILE .NOT.(EOF)
IF SB=SUBJECT
EDIT
ELSE
MOVE
ENDWHILE
ENDIF
RETURN
```

Windows V2.0

New version boasts better compatibility, utility

By DOUG PHELPS

This is a review of Windows V2.0 for the Geneve. Although I previously reviewed Windows V1.0, this latest version deserves a review all to itself because it bears little resemblance to its predecessor, functionally. This program has progressed to the point that it is practical to use it as a complete front-end for your Geneve operating system. What few commands are not provided in Windows can always be accessed from an MDOS command line window or another program.

Windows V2.0 differs from its V1.0 ancestor in several respects. For one, there is no longer an option to use the keyboard instead of mouse input. (A Myarc compatible mouse may be purchased from OPA for $25.) The keyboard option was removed due to difficulties with non-Windows specific programs. Another new option is the ability to use a Logitech serial mouse instead of a Myarc mouse. The Logitech mouse is connected to RS232 serial port No. 1 using a null modem cable. However, it is currently compatible only with programs using Bruce Hellstrom's mouse driver software (which is utilized with Windows itself). It cannot be used with YAPP, MY-Art, etc. The Asgard mouse may be supported in the future. A programming package is available with all necessary information for interfacing with the driver.

Another change is the use of an 80-column text-mode screen instead of a graphics-mode screen. This was done to insure better compatibility with more programs. A flashing arrow is moved around and as it crosses the menu selections, they are individually highlighted in yellow. It is much easier now to make an accurate selection.

Review

Report Card

Performance ..... **A**
Ease of use ..... **B**
Documentation ..... **A**
Value ..... **A+**
Final grade ..... **A**

Cost: $10 for registered owners with serial number; $15.00 for subscribers of 9640 News; $25 for non-subscribers
Manufacturer: Beery Miller (9640 News), P.O. Box 752465, Memphis TN 38175-2465
Requirements: Geneve 9640

MORE THAN JUST DEMOS

Although there have been a few "demo" type programs released to utilize Windows, (MY-Art picture-type stuff) very few "useful" productivity programs have been released. The only one I know of is a program that Beery Miller wrote that he uses to process orders which he receives. But, this is a program for a pretty specific job.

There is some good news, however. Many more programs are now able to run under Windows than before. This is not due to a change in the programs, but, because of the fine-tuning to Windows done by Miller. For example, "The Printer's Apprentice" (by McCann Software) previously wreaked havoc when loading into Windows, causing the computer to lock-up. Under V2.0 though, it works nicely with only a minor display glitch if one fails to exit TPA to Windows while not at TPA's main menu. This causes a screen color change which is corrected upon return to the drawing screen. TPA also co-exists with other programs, although some experimentation may be necessary to determine what order is best to load programs into Windows.

Picture Transfer also functions now, although if it is exited while viewing a picture, the picture will not be restored upon return. This is because of the amount of video memory used to display a picture. Picture Transfer requires 128K and Windows reserves only 64K for program screen restoration. (Almost all programs require only 64K for restoring a screen). However, Pressing F9 to back-up to the command screen will allow you to re-load the picture. Let me emphasize that this problem occurs only if one chooses to exit PT and then return. It functions normally if you do not leave PT until you are finished with it. Like TPA, it is a non-fatal error anyway.

DIFFERENT MEMORY USE

That brings up a new point to consider. One of the reasons that Windows V2.0 has improved so much is because of the reservation of 64K of memory to restore the video processor upon return to each program. That means that, in addition to the memory required to run each program, an additional 64K is needed for each one as well. Without a RAMdisk configured, on

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(Continued from Page 29)

field. It does not look at nested sort fields at all.

Despite the complex appearance of the code, the operation of the command file really only performs a couple of functions. It locates the first occurrence of the last-name specified and then goes into a loop that searches for the correct first name. The record counter is incremented by one if both of the conditions LN=LNAME and FN=FNAME) are not met. When they are the edit mode is activated.

When Fctn 9 is executed to escape from the edit mode, slot two is chosen to activate the second file. The process is then repeated using the same values that the user originally typed in. When Fctn 9 is pressed from the second file the original screen is displayed, prompting you to enter the word END to exit the program.

WINDOWS V2.0—

(Continued from Page 30)

a standard system with no additional memory, the computer has 300K+ for other programs. To utilize this program to its fullest, that is, to be able to have more than one or two programs in memory at once, will require either the purchase of a MEMEX card from Bud Mills Services, or the modification of an existing Myarc 512K card. It is possible, though, that the programs you wish to run will co-habit quite nicely in this amount of memory. With a standard system, using Windows, you will be unable to use TPA, I believe. If my calculations are correct, the system would be around 60K+ short.

COMPATIBLE PROGRAMS

Among programs that are known to work with few side effects are: TPA, Picture Transfer, DISkASSEMBLER, the GPL interpreter (but, control of Windows is lost until GPL is exited), Tetris for MDOS (by Klaus Gebecke and marketed by 9640 News), and the MDOS editor by Peter Muys released in 9640 News. I have also successfully run Directory Manager, by Clint Pulley. As a matter of fact, Directory Manager has become one of my favorite programs to have in memory along with others. It is very handy to drop into during a session if disk management work is necessary.

It is still not possible to swap in and out of a program that is run using Barry Boone's EXEC. As before, these, and all programs that demand a command line argument must be run in the MDOS window. (I believe that there are also additional technical reasons why EXEC programs are not swappable). It is recommended that not more than one non-Windows task be run while running other Windows-compatible programs, as it could cause problems. However, as I can attest, more than one non-Windows specific program may be swapped in and out of memory as often as needed.

WHO NEEDS THE MDOS COMMAND LINE?

In my opinion, Windows is now a viable alternative to the use of the MDOS command line for various disk housekeeping chores and has risen above the status of "toy." Now that V2.0 has been released, and demonstrated its compatibility with my older programs, I now boot up with Windows as my interface every time my Geneve is switched on. Those disk-related functions not provided by Windows can be obtained by dropping to the MDOS window and performing them from the command line, or by running another program such as Directory Manager. Functions supported by DM and not Windows include, file copying and printing disk or disk directory listings to printer (or disk). With this program loaded along with Windows, just about every conceivable disk chore can be performed while using any MDOS program, just by swapping tasks.

Need a disk formatted while using TPA? Drop out to Windows and format one and jump right back into TPA where you left off. Lose your listing of graphic files on a disk while using TPA? Drop out to Windows and either go to the MDOS command line interpreter window and print out a directory, or swap tasks with Directory Manager (if it is loaded) and print it out from there. Voila! You now know what is on your disk without having to save your work to disk, exit TPA, obtain a printout (or format a disk), and then reload TPA. Windows would save you much time in this case, not to mention aggravation. Pretty neat trick, huh?

I think that Windows will probably be used more by people swapping tasks like this than those running two or more programs simultaneously (multi-tasking). I could probably go a long time without ever needing to run two programs at once, but, now that I have the ability to swap two at once, there's no way I'm going to go back to the way I used to do it.

My only major complaint with this version of Windows is that once a program is loaded, (through Windows, not the command line) there is still no way to reclaim the memory after you are through with an individual program without rebooting the system. That is, if you are using TPA and complete your task and want to load another program but don't have enough room with TPA still in memory, you must reboot to do this. This isn't a fatal flaw, but, hopefully one which can be corrected in the next update.

BETTER DOCUMENTATION

The documentation has improved along with the program. Now that Windows is more compatible with additional programs, there are specific references to the use of different programs with Windows. With this update, instead of waiting for programs to be written to use with Windows, we can use the ones we already have, and wait on the enhanced ones. If you are tired of the MS-DOS type interface for your Myarc 9640, Windows V2.0 really could mark the end of the "Big Blue" blues.

Crystal Software to sell MIDI Master 99

MIDI Master 99 will now be marketed by Crystal Software Inc., according to Mike Maksimik, creator of the device.

Previous plans for Asgard Software to market the device have been cancelled.

MIDI Master 99 v2.2, now available, allows loading of disk-based music files and compiling of symbolic music files for playing on the MIDI interface. Version 3.0, which was tentatively scheduled for release toward the end of May, will record keyboard-based music. Maksimik says purchasers of v2.2 will receive v3.0 at no charge as long as they send in the registration card packed with the software.

MIDI Master 99 v2.2, which includes interface, software, two connecting cables and documentation is available for $45 from Michael J. Maksimik, Crystal Software Project, 635 Mackinaw Ave., Calumet City, IL 60409-4014. Checks should be made payable to Michael Maksimik.

High Gravity

Use ballistics, save the space station

By BOB CARMANY

High Gravity, written by Tom Wible, is one of the many games that are an exercise in ballistics. By altering the speed and trajectory of an object, you attempt to hit a target with it. Of course, you have gravity to contend with, hence the name of this protram. As you attempt to choose the correct path from your spaceship to the space station, there are anywhere from one to nine planets to contend with on the way. The gravitational pulls vary, so you can forget trying to wind your way through the lot of them on the first try. It becomes an interesting exercise in physics to chart a successful course to the space station.

Performance: The program loaded easily from all the load environments supplied with no surprises along those lines at all. All the commands are simple single keypresses and easy to remember once you read the documentation (the first step in any program).

The program does exactly what the documentation says it will and I encountered no problems except for the two mentioned in the documentation. The first causes a reverse in motion because of simulations calculations and the second causes a crash in apparemtly empty space. Since the documentation forewarns you, they can be accepted.

Why the relatively low grade? Despite the promise of a program written in c99, High Gravity has some weaknesses. The graphics are second-rate at best. The planets appear as colored disks with flattened ends and the space station (your target) is merely an "X." I found it quite a let-down from the promise a c99 program held. In fact, I have seen many Extended BASIC programs with similar ballistic simulations with much superior graphics.

Conversely, options to change velocity and even reconfigure your solar system as you wish largely balance out the primitive graphics. In short, an average grade of "C."

Ease of use: The program is easy to use. It doesn't require much preparation and the documentation can be easily read and understood. All the commands are simple, single keypresses and don't need a lot of study to master. For example, "I" increases the velocity of the probe capsule. When you go to the reconfigure section, the other keypresses are just as easy to remember (e.g., "P" for "Planets," "C" for "Capsules"). In fact, you don't even have to know what ballistics entails to take advantage of this program. You can save the space station without being a physicist. This is one of the major strong points of the program. They don't make programs much easier to use than this one.

Documentation: The eight-page booklet that comes with High Gravity is thorough and easy to read. Each command is explained in detail and one section even contains a digression on physics and gravitation for those of you interested in the mechanics of the program. Although it won't pass for a textbook, this digression will give the user a rudimentary idea of simple ballistic trajectories and how they are affected by gravitational variables. The documentation is well written and concise, containing only a couple of minor typographical errors. In short, it is another of the program's strong points.

Final grade: The fact that the documentation is quite well done and the program easy to use makes it just a bit above the average commercial program. It isn't as good as some but a good deal better than most efforts I have seen recently. Remember, "C" is average, and High Gravity is above that. If the graphics didn't detract so much from the performance, it would have been

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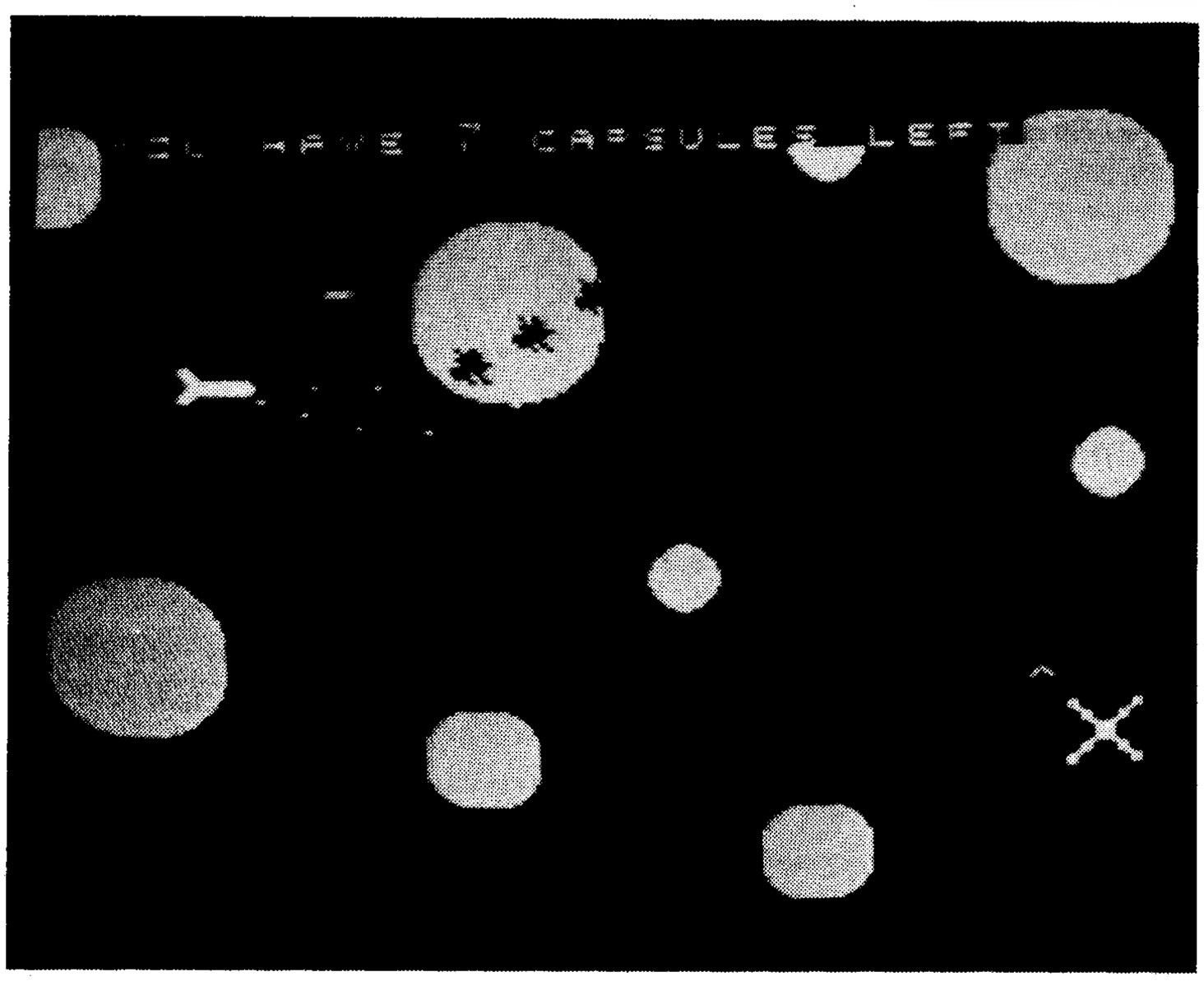
Review

Report Card

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

Cost: $14.95
Manufacturer: Asgard Software, P.O. Box 10306, Rockville, MD 20850
Requirements: Console, monitor or TV, disk system, 32K memory expansion, XB, E/A or Mini-Memory and a joystick.



MICRO-REVIEWS

Filmlab, Video Tracker and CSGD Label Maker

By HARRY T. BRASHEAR

Ratings for the software reviewed in this column are based on a star system as follows:

★ Leave it alone, back to the drawing board.

★★ Needs improvements, but workable.

★★★ A good program, worth trying.

★★★★ Send your money and buy it.

I would like to make a correction from last month concerning YAPP. I mis-priced the update cost and got my wrist slapped by Asgard for it. Please note: The cost of a YAPP update if you are a registered owner of the program is $4 and there is no postage charges. Sorry about that folks.

I also inadvertently left out the fact that the new Page Pro Effects was developed by two people, Paul Scheidemantle AND Ed Johnson. It was Ed that turned Paul's XBASIC ideas into super fast assembly for the program. It's the best Page Pro utility yet. Well done you two.

Starting out this month, I have two video databases to look at. They both have very special features and you will need to choose based on your own needs.

★★★ FILMLAB (FOR TI BASE)

This database by Ken Gilliland is being distributed by NOTUNG Software. It can be used only with TI-Base (Texaments) version 3.0 or higher.

Filmlab was designed for the connoisseur of the video movie collectors because it's a very busy database. The author is a movie buff and likes to get down to details in his listings. Take a look at the data inputs and you'll understand what I mean. This is a "snap" that I took of the database structure.

FIELD	DESCRIPTOR	TYPE	WIDTH
1	FILMTITLE	C	040
2	STAR1	C	030
3	STAR2	C	030
4	STAR3	C	030
5	DIRECTEDBY	C	030
6	PRODUCEDBY	C	030
7	MUSICBY	C	030
8	BW__OR__C?	C	001
9	FILMYEAR	C	004
10	LENGTH	C	003
11	SCALE:1TO4	C	001
12	TAPE	C	004
13	COUNTER	C	004
14	REC__SPEED	C	001
15	ABCDEHKMSW	C	001
16	SYNOPSIS	C	175
17	NOTES	C	050

That's about as detailed as you can get with a movie! If you're familiar with TI-Base, you also realize that each complete entry is going to eat about two sectors of disk space. Even if you are dealing with DSDD, you will "only" get about 700 movies per floppy disk.

Par for the course with these utilities, you load up TI-Base, then type DO MENU at the first prompt and off you go. The title and menus are in reverse video this time, real standouts.

The first menu gives you three options:

1. Add A Film
2. Edit A Film
3. Printer Options.

The first two options are self-explanatory, but the third is where most of the work takes place in this program. Printer Options are as follows:

Full List Report: This one dumps all the information on any given movie. It requires about a half page to do so and asks after each printing if you want to advance the page.

Person Name Report: This option looks through all the names in the file and prints out only the movies involved with that given name (star, director, etc.).

Short List Report: This is a somewhat abbreviated report on each movie, but prints all the records in order by movie title.

Type Field Sort: Prints all movies in a given category.

Year Made Report: Types out all movie made in a given year.

Okay, I told you it was a busy database. If you have a lot of movies, be prepared to settle down for a few days of serious input. The idea is, when you're done, your movies will be as well organized as one of those 10-pound movie reference guides.

I like the program a lot, but I did feel that the reports needed a little better formatting. I found them a little hard to read and that's the ONLY reason this program didn't get the fourth star. Other than that, it's a fabulous program and well worth the price.

Send $7, plus $1for shipping, to NOTUNG Software, 7647 McGroarty Street, Tunjunga, CA 91042.

★★★★ VIDEO TRACKER

This package is for the beer drinkers among us,(figuratively speaking). That is to say, if you're like me, you don't give a hoot who co-stared, who directed or how

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HIGH GRAVITY—

(Continued from Page 32)

a truly excellent effort. Maybe there is a version 3.0 in the future.

Value: This is a tough category! The real question concerns whether or not the performance of the program justifies the purchase price. Besides the shortcomings in the graphics, I didn't find the program nearly as addictive as the hype in the documentation. The application as a ballistics tutor is limited in interest. The program does have some redeeming value as a pure game if you are willing to put up with the frustration of seeing probe capsule after probe capsule crash unceremoniously into one of the planets. Over all, it doesn't qualify as an exceptional value. It is just about average.

The program is a welcome respite from the ""shoot 'em up" space game programs usually seen. High Gravity isn't a "teal" at $14.95, but you probably won't regret spending your money to buy it!

MICRO-REVIEWS—

(Continued from Page 33)

long it is. I just want to know if I've got it and what tape it's on.

This program has five required inputs: Film Title, Star, Category, Tape Number, footage Counter Number and about 40 characters for notes.

What makes the program unique is that it also prints the cassette labels for you, in two styles. When you finish typing in the information for an entire cassette (up to 15 titles per cassette), it asks if you want to print the label now and how many. I wondered about that "How Many?", but then I discovered that some people also like to label the boxes.

Standard 15/16ths labels don't fit the cassette groove so the program also lays in cut lines above and below the titles — neat idea. It prints up to five titles in superscript elite and the tape number on the far right. I found them to be readable in spite of the small print. If you have more than five titles on the cassette, the program prints consecutive labels.

The other label format is Page Pro. Yep, if you like you can print your labels with fancy edges from any Page Pro printing utility, then back them up and print the data on them. Fannn-cy! There are three PP label templates for 10 label strips. If you have special tapes with only three titles on them, you can use the templates and Page Pro fonts for super fancy output.

This program will also print out sorted reports by title, category, star, tape number or "as entered." You can update the labels too, but that's a slow process since it has to look through the entire database to make sure it has all titles. That was my one complaint, but I didn't see any way around it.

Video Tracker is a stand alone database programmed in XBASIC. It works well, doesn't crash, and has a lot of versatility. The label printing makes it valuable so it costs more: $11.95 plus $2.50 shipping and handling. Buy it from Asgard Software, P.O. Box 10306, Rockville MD 20849.

CSGD LABEL MAKER

Did someone forget something? There aren't any stars up there! No, I didn't forget to rate it. I spent 15-20 minutes trying to make up my mind between four stars (Send your money quick and buy it) and one star (Save your money and back to the drawing board). The program made me mad from start to finish and I'll explain why at the end of my review.

I concede, CSGD Label Maker is a four-star program. See, count them; ★, ★, ★, ★, four stars. It is the label making program to end all label making programs. Let's look at it.

The program takes up approximately 232 archived sectors. Within this file are all the programs, docs, and about 200 graphics in CSGD format. The program is entirely assembly code from start to finish, so it's speed of execution is optimum. It also includes loaders for XBASIC, Mini-Memory and Editor/Assembler.

While CSGD Label Maker looks, acts and smells like a number of others of the same genre, there are a few new wrinkles. First of all, there is a configuration option that allows you change all of the printer commands — any printer brand should work. Densities can be changed, as well as the styles of type used on the label. If you have a fancy multi-font printer you can utilize whatever it offers.

The program allows the printing of a graphic catalog, 110 CSGD-size graphics per page.

Any graphic can be edited on a very nice full-screen editor. The graphic is shown in normal size next to the editor and changes to it are instantaneous. This function is handled with a joystick or keyboard.

Labels can be saved, including the graphic, for future reference — that is, the graphic and text are saved to the same file.

A separate program is included with the disk that does something neat with the CSGD graphic files. If you remember, CSGD's are only about three sectors long. Since TI only allows 127 files per disk, you end up with a lot of wasted space. This utility sets up it's own disk directories so that you can put 716 CSGD graphics on a DSDD disk. Now that's neat!

Okay, did you see me say anything bad about the program? Of course not, it's beautiful, a programing masterpiece. So what got me all bent out of shape anyway? Two things; First of all, it's another label program! This one IS better, no question of that, but do we really NEED another label program? Steve Hoshield, the author is showing fantastic talent in assembly programming. There are dozens of programs that are still needed for the TI. This program was a waste. Steve should be proud of the effort, but it just wasn't needed.

The other thing that bugs me, (and you've heard this one before) is this two bit hooker attitude that we TIers seem to have fallen into. This program HAD to represent at least 3-6 months of intensive work; Steve has thrown it up in the air as fairware, expecting a lousy $5 for his efforts. I'll make you a bet, Steve; I'll bet you make less than $100 in the next three months for this program. I know for a fact that an equal amount of labor on a more productive program, at a reasonable price, could net him a potential $5,000 with a commercial distributor. Go ahead folks, prove me wrong and make it worth his while.

Harry's rules apply, send the $5 plus disk and postage to Steve Hoshield, 2265 W. Parks Road, Saint Johns, MI 48879.

If you would like me to review your software in this column, please send it to Harry T. Brashear, 2753 Main St., Newfane, NY 14108. If you would like it returned include an SASE.

If you want to yell at me in person, call me sometime: 716-778-9104 (but not during Star Trek)!

USER GROUP UPDATE

These are additions and updates to our user group listings, begun in our May 1987 issue.

Florida

Suncoast 99ers, c/o Frank Barlow, Secretary, 1326 S. Madison, Clearwater, FL 34616 (new address). BBS (813) 449-2202.

Utah

TI SlaVes (Salt Lake and Valley User Group), 1396 Lincoln, Apt. B, Ogden, UT 84404, new address (shared address with Ogden Users Group).

Newsbytes

New site selected for Chicago Faire

The Chicago TI International World Faire is scheduled Nov. 1-2 at a new site, the Elk Grove Holiday Inn in Elk Grove Village, Illinois.

According to the newsletter of the Chicago TI Users Group, the new site has free shuttle service to and from O'Hare Airport.

Events will begin with a social mixer the evening of Nov. 1. During the day the Chicago TI Users Group will maintain a hospitality suite for those who come early. The fair itself will be during the day Nov. 2, with a banquet that evening at which the John Birdwell Memorial Prize will be presented. Admission to the mixer is $5 and to the banquet is $15.

According to the newsletter, a special rate is available at the Holiday Inn using the tracking code IWF by calling the Elk Grove Holiday Inn at (708) 437-6010. A double room is $49 per night, including a cooked-to-order breakfast each morning and cover charge to the "Acapulco Bar" night club waived. The special rate is not available through the Holiday Inn 800 number.

For further information, write the Chicago TI Users Group, P.O. Box 578341, Chicago, IL 60657.

1992 Fest-West slated for Phoenix, Arizona

The 1992 Fest-West is scheduled for Feb. 15-16 in Phoenix, Arizona. Host will be the Valley of the Sun TI Users Group (VAST), according to Tom Pfeffer, publicity chairman for the event.

For further information, contact Pfeffer at 116 S. Stellar Parkway, Chandler, AZ 85226.

EGI 80-column card set to ship in May; Screen Preview ready

Shipping for the Asgard **EGI (Extended Graphics Interface)** 80-column card for the TI99/4A was scheduled to begin in May, according to the company, and Asgard Software has produced **Screen Preview** by Joe Delekto.

The **EGI,** a standalone sidecar style device, provides 80-column support for composite and analog RGB monitors, as well as an IBM-compatible mouse port on a standard TI99/4A, according to the manufacturer.

The device is available as a basic kit, a complete kit or a ready-to-go EGI.

The basic kit includes an EGI circuit board, a V9938 VDP chip, a custom-built case, a standard EPROM DSR (includes Extended BASIC programming support), one set of schematics, a parts list and parts vendors list, construction tips and documentation for DSR software. Suggested retail is $95.

The complete kit includes the above items as well as all other parts necessary, including miscellaneous ICs and RAM chips and source information for power supply. Also included are coupons for 20-40 percent off Asgard Software 80-column compatible products and five disks of 80-column software. Suggested retail is $160.

The ready-to-go EGI includes all items in the complete kit, plus power supply, all labor for construction and testing, one year warranty on all parts and labor and one copy of the YAPP 80-column paint program by Alexander Hulpke. Suggested retail is $250.

A 7 percent surcharge is added to Mastercard and Visa orders. Add $5 per order shipping and handling for U.S./Canada orders, $7.99 airmail.

Screen Preview is described as a replacement for the TI-Writer formatter. According to the manufacturer, it formats text files with embedded TI-Writer commands to the screen in a miniature format. The user can view an entire page at a glance, checking margins, page breaks and other formatting. **Screen Preview** is compatible with TI-Writer and all variations (such as Funnelweb and BA-Writer). It is compatible with hard drive systems and most RAMdisks. It requires 32K, a disk system and printer.

A 12-page manual describing the program operation and formatting commands supported is included.

Suggested retail is $12.95 plus $2.50 S&H.

For information, or to order, contact Asgard, P.O. Box 10697, Rockville, MD 20849; (703) 255-3085; or C_BOBBITT on Delphi, C.BOBBITT on GEnie or 72561,3241 on CompuServe.

Harrison resumes TI product creation

Bruce Harrison of Harrison Software says the company has returned to making new products for the TI99/4A, and has a new music disk, **Il Pastor Fido**, scheduled to debut at the Lima Computer Fair in May.

Previously, Harrison had announced that the company would not produce new products for the 4A, but would continue to sell and support its TI products in existence. He says that, since he has retired from his federal civil service job, he finds he can now work on programs for both the TI and PC.

Il Pastor Fido (The Faithful Shepherd) is a disk containing six sonatas by Antonio Vivaldi, running 86 minutes. The music was originally written for the musette, a wind instrument resembling a small bagpipe. The program is not Geneve-compatible. It requires Extended BASIC, 32K and one DS/SD or SS/SD drive (customers should specify double-sided or flippy).

The program is available for $6 including shipping from Harrison Software, 5705 40th Place, Hyattsville, MD 20781.

Program package offered for $12

KB Computer Concepts is now offering three programs, the games **Spinner** and **Memory Motel** and **YALP (Yet Another Lotto Program)**, described as a "system to let you win big in the lottery," for $12 plus $2 for postage and handling.

Checks should be made payable to Keith Bergman.

For information or to order, write KB Computer Concepts, c/o Keith Bergman, 3001 West Bancroft #634, Toledo, OH 43606.

***Newsbytes* is a column of general information that reaches thousands of TI and Geneve users. Information from manufacturers, authors, distributors, user groups, etc. is welcome. Illustrations and photographs will be used when space permits. Products listed in this column are not necessarily endorsed by MICROpendium. Send items to MICROpendium Newsbytes, P.O. Box 1343, Round Rock, TX 78680.**

User Notes

The program works just fine

This comes from Extended BASIC columnist Jerry Stern. He writes:

Once again, Arthur Dubeau has placed me in the position of having to guess why his version of one of my programs doesn't run according to the same rules that Extended BASIC imposes on the rest of us. In the March User Notes he suggests a change to BARCHART, just as he suggested corrections in DIR some months earlier.

Arthur, your modification of BARCHART doesn't work on my copy of the program, nor is it necessary. You recommended changing the value in the TAB on line 710 from 30 to 40. Since every bar in the chart must start at tab position 30, for the bottom line of the graph to start at position 40 indicates that something is wrong. I played with your modification and my original copy of BARCHART, which DOES match MICROpendium's published version. For everyone but Arthur, try BARCHART as published before making that change. Arthur, please check and see if your listing matches this one:

```
700 PRINT #2:TAB(30):AX$;CR$; !113
710 PRINT #2:TAB(30):AX$; !004
```

I suspect that your change in the line 710 tab line is caused by leaving the CR$ off in line 700. If so, your correction will only work for some values of data in the last bar of the graph. The CR$ is needed in 700 to reset the line so that line 710 can print correctly at position 30.

Arthur, you may, as can any MICROpendium reader, write directly to me and I will try to help you with any problem listings in Extended BASIC. As much fun as corresponding through User Notes is, I don't really want to confuse other readers of these pages with small chunks of programs that will work only for extremely specific program variations. Besides, letters from my readers have been directly responsible for some column ideas, and suggestions help me to find out what topics are most looked for in XB programming. If you enclose a printout of your typed-in version of any program causing headaches, I can do much better than just guess why the software is misbehaving. I can be reached at 1323 Mantle Street, Baltimore, MD 21234-6014.

Double column text formatter

This comes from Sam Carey of Portland, Oregon. He writes:

I wrote this program because I was printing out 28-column listings, and then came the problem: the 28-column listing used only half the page.

What this program does is take half of a program listing (or any other D/V80 file) and move it to the other side of the page. This program is not a 28-column lister, it's a utility to be used with a 28-column lister.

When you first load the program it asks for the filename of the program listing. Then it loads the listing, rearranges it, and asks for the output listing filename, and saves the rearranged list.

Lines 2-7 load the listing. Lines 8-10 rearrange the listing. Lines 11-15 save the listing. The DIMension statement in line 3 limits the length of the original 28-column document to 200 lines, and 102 lines of double column output. The number of lines the program can actually handle may vary. It may be necessary to process fewer lines in order to avoid a Memory Full error message (the program uses most of the available stack memory with longer files).

```
1 REM LISTING FIXER
      by Sam Caray !126
2 DISPLAY AT(10,1)ERASE ALL
BEEP:"FILE NAME PROGRAM LIST
ING:  DSK1." !203
3 DIM IN$(200),OUT$(102)!169
4 ACCEPT AT(11,6)SIZE(10)BEE
P:F$ :: F$="DSK1."&F$ :: OPE
N #1:F$,INPUT !196
5 IF EOF(1)THEN 8 ELSE R=R+1
 :: LINPUT #1:IN$(R):: IN$(R
)=IN$(R)&RPT$(" ",40-LEN(IN$
(R)))!167
6 DISPLAY IN$(R)!028
7 GOTO 5 !084
8 F$="" :: HL=INT(R/2):: R=0
 :: CLOSE #1 !180
9 FOR X=1 TO HL+1 !156
10 OUT$(X)=IN$(X)&IN$(X+HL):
: IN$(X)="" :: NEXT X !163
11 DISPLAY AT(10,1)ERASE ALL
 BEEP:"OUTPUT LISTING FILE N
AME:" :: ACCEPT AT(11,1):G$
!151
12 OPEN #2:G$,OUTPUT !097
13 FOR S=1 TO HL+2 !152
14 DISPLAY OUT$(S)!126
15 PRINT #2:OUT$(S):: NEXT S
 :: CLOSE #2 :: CALL CLEAR :
: END !010
```

Rub those disks

Have you even tried to load a program from a disk and gotten a message that the disk wasn't initialized — despite the knowledge that it had been initialized and that there was a program on the disk?

Frequently such errors are caused simply because the disk isn't situated properly within the disk jacket. This suggestion may not help in most cases, but it's worth a try.

Grab the disk by two corners and gently pull one edge of the disk jacket against the side of a table. (Remember this is the disk jacket, which encases the disk itself and not the Tyvek or paper sleeve in which you store the disk.) Then do the same thing to the other edge of the disk, being careful not to catch the read/write slot against the table. Reinsert the disk in the drive and see if it comes up. This has worked for us on several occasions. The tip comes from a PC user who will remain anonymous.

Program does hex, decimal, binary conversions

This comes from Louis D. King, of Sebring, Florida. He writes:

I wrote this program to convert decimal, hexidecimal and binary numbers to other bases. Values of decimal 4,294,967,295, hexidecimal FFFFFFFF, and binary to 32 places can be converted. The program is menu driven.

```
10 REM ***********************
***** !254
20 REM * NUMBER BASE CONVERS
ION * !120
30 REM *     BY LOUIS D. KING
    * !048
```

(See Page 37)

User Notes

(Continued from Page 36)

```
40 REM *              2/24/91
    * !142
50 REM *              X-BASIC
    * !021
60 REM ************************
***** !254
100 CALL SCREEN(4):: DIM T$(
6)!133
110 FOR N=0 TO 6 :: READ T$(
N):: NEXT N !243
120 CALL CLEAR !209
130 DISPLAY AT(1,1):"*******
**********************" !171
140 DISPLAY AT(2,1):"* DECIM
AL, BINARY AND HEX *" !202
150 DISPLAY AT(3,1):"*
 CONVERSION          *";!045
160 DISPLAY AT(4,1):"*******
**********************":,:!203
170 FOR N=0 TO 6 !065
180 DISPLAY AT(N*2+6,1):N+1;
"- ";T$(N)!231
190 NEXT N !228
200 DISPLAY AT(20,1):"(MAXIM
UM INPUT :DECIMAL 4294967295
,HEXIDECIMAL FFFFFFFF,BINARY
 32-PLACES)":,:!079
210 DISPLAY AT(24,1):"CHOICE
 ?" !106
220 ACCEPT AT(24,10)BEEP VAL
IDATE("1234567"):CHOICE !002
230 IF CHOICE>7 THEN 220 !06
8
240 ON CHOICE GOTO 260,400,2
60,400,660,660,780 !228
250 REM *** HEX TO DECIMAL *
** !173
260 CALL CLEAR :: DEC=0 !214
270 DISPLAY AT(2,2):"* ";T$(
CHOICE-1);" *" !055
280 DISPLAY AT(9,1):"HEXIDEC
IMAL # ?" !248
290 ACCEPT AT(9,17)BEEP SIZE
(8)VALIDATE(DIGIT,"ABCDEF"):
HEX$ !086
300 FOR N=1 TO LEN(HEX$)!142
310 A=ASC(SEG$(HEX$,N,1))!06
8
320 IF A<58 THEN 340 !137
330 A=A-55 :: GOTO 350 !102
340 A=A-48 !056
350 DEC=DEC*16+A :: NEXT N !
178
360 IF CHOICE=3 THEN 570 !15
8
370 DISPLAY AT(12,1):"DECIMA
L";DEC !203
380 GOTO 530 !099
390 REM *** DECIMAL TO HEX *
** !173
```

(See Page 38)

User Notes

(Continued from Page 37)

```
400 CALL CLEAR :: HEX$="" !2
25
410 DISPLAY AT(2,2):"* ";T$(
CHOICE-1);" * " !055
420 DISPLAY AT(9,1):"DECIMAL
 # ?" !198
430 ACCEPT AT(9,13)BEEP SIZE
(10)VALIDATE(DIGIT):DEC !042
440 IF CHOICE=4 THEN 570 !15
9
450 B=DEC/16-INT(DEC/16)!128
460 DEC=INT(DEC/16)!135
470 IF B>.5625 THEN 480 ELSE
 500 !236
480 HEX$=CHR$(B*16+55)&HEX$
!246
490 GOTO 510 !078
500 HEX$=CHR$(B*16+48)&HEX$
!248
510 IF DEC>.0624 THEN 450 !0
19
520 DISPLAY AT(12,1):"HEXIDE
CIMAL ";HEX$ !091
530 DISPLAY AT(17,1):"MORE C
ONVERSIONS ?" !119
540 ACCEPT AT(17,20)BEEP VAL
IDATE("YN"):IP$ !077
550 IF IP$="Y" THEN 240 ELSE
 120 !075
560 REM *** DEC & HEX TO BIN
ARY *** !181
570 BIN$="" !130
580 B=(DEC/2-INT(DEC/2))*2 !
063
590 DEC=INT(DEC/2)!081
600 BIN$=STR$(B)&BIN$ !250
610 IF DEC>0 THEN 580 !200
620 DISPLAY AT(12,1):"BINARY
 (MSB T0 LSB)" !037
630 DISPLAY AT(13,1):BIN$ !1
40
640 GOTO 530 !099
650 REM *** BINARY TO HEX AN
D DECIMAL *** !133
660 CALL CLEAR :: DEC=0 !214
670 HEX$="" :: C=1 !011
680 DISPLAY AT(17,2):"* ";T$
(CHOICE-1);" * " !110
690 DISPLAY AT(22,1):"BINARY
 # ? (MSB TO LSB)
                      " !201
700 ACCEPT VALIDATE("01"):BI
N$ !235
710 IF LEN(BIN$)>32 THEN 690
 !223
720 FOR N=1 TO 13 :: PRINT :
: NEXT N !245
730 FOR N=LEN(BIN$)TO 1 STEP
 -1 !240
740 DEC=DEC+C*VAL(SEG$(BIN$,
N,1))!084
750 C=C*2 :: NEXT N !104
760 ON CHOICE-4 GOTO 450,370
 !006
770 DATA HEXIDECIMAL TO DECI
MAL,DECIMAL TO HEXIDECIMAL,H
EXIDECIMAL TO BINARY,DECIMAL
 TO BINARY,BINARY TO HEXIDEC
IMAL,BINARY TO DECIMAL,QUIT
!146
780 CALL CLEAR :: END !222
```

MICROpendium pays $10 for items submitted by readers for publication in User Notes. If you have a tip or idea, routine or other information that may be of interest to other readers send it to MICROpendium User Notes, P.O. Box 1343, Round Rock, TX 78680.

1991 TI FAIRS

MARCH

Family Computer Exposition and Ham Radio Festival, (formerly TICOFF), March 6, Roselle Park High School, 185 West Webster Ave., Roselle Park NJ 07204. Sponsored by students of the high school and the Old Bridge Ham Radio Club. For information write the high school or call (201) 241-4550 or call the 24-hour informational BBS at (201) 241-8902.

APRIL

Northeast TI99/4A Home Computer Fair, April 6, Central Middle School, Waltham, Massachusetts. Contact Justin Dowling, The Boston Computer Society, One Center Plaza, Boston, MA 02108.

Canadian TI-Fest, April 27, Merivale High School, Nepean, Ontario, Canada. Contact Bill Gard, 3489 Paul Anka Dr., Ottawa, Ontario, Canada K1V 9K6 or (613) 523-9396 or Fax (819) 997-2194 Attn: DMES 2.

MAY

TI Orphan Reunion, May 11, Innisfail Lions Hall, Innisfail, Alberta, Canada. Contact Fred Kessler, Box 20, Sundre, Alberta, Canada T0M 1X0 or (403) 638-3916.

TI99/4A Users Group, UK, Annual Meet, May 11, The Music Hall, The Square, Shrewsbury, England. Contact Stephen Shaw, 10 Alstone Rd., Stockport, Cheshire, England, SK4 5AH.

Multi User Group Conference, May 18, Reed Hall, Ohio State University Lima Campus. Contact the Lima User Group, P.O. Box 647, Venedocia, OH 45894, or phone Dave Szippl evenings, (419) 228-7109.

West Coast Computer Fair, May 30-June 2, San Francisco, California. San Franciso 99ers to participate. P. O'Sullivan, 6720 Colton Blvd., Oakland, CA 94611.

SEPTEMBER

6th International TI User Treffen, Sept. 13-15, Berlin. Contact Henry Hillsberg, Uhlandstr. 70, (W) 1000 Berlin 31, Germany.

Convention, weekend of Sept. 21, Tacoma, Washington. Contact Barb Wiederhold, (206) 546-1865 (BBS) or (206) 546-1205.

NOVEMBER

Chicago International World Faire, Nov. 1-2, Elk Grove Holiday Inn, Elk Grove Village, Illinois. Contact Chicago TI Users Group, P.O. Box 578341, Chicago, IL 60657.

1992 TI FAIRS

FEBRUARY

Fest-West, Feb. 15-16, Phoenix, Arizona. Contact VAST Users Group, c/o Tom Pfeffer, 116 S. Stellar Parkway, Chandler, AZ 85226.

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.

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