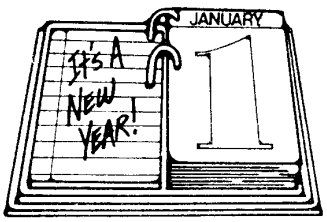
Covering the TI99/4A and the Myarc 9640

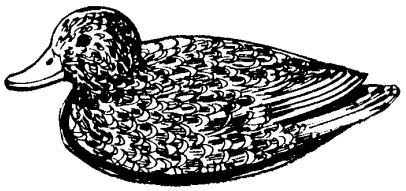
MICROpendium

Volume 8 Number 11 December 1991 $2.50

Write a calendar program

See page 6





Why a duck?

See page 14

Eunice Spooner, kids and TIs

See page 19

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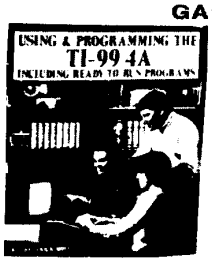

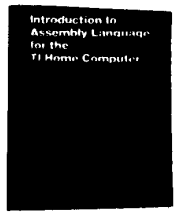

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COMPUTER PLAYGROUND ON THE TI-99/4A
This is the perfect book to provide children, grades 2-6, with their first exposure to the world of computers. Everything is kept simple with over 70 pictures and drawings to color and a series of simple activities to lead the child through elementary computer understanding and programming. Ideal for both schools and computer camps. Contains sample programs and lessons on how to modify and write them. Many illustrations in full color. 128 pages. TEX-COMP price **$1.95**

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Contents

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***READ THIS**

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

Comments

I'm not holding my breath but I may getting my HFDC back from Myarc. My source says it could happen anytime. This is almost as exciting as the release of western hostages in the Mideast. Hallelujah!

GARFIELD/WOODSTOCK TO RETURN?

I've been told that a Halloween-based program featuring Garfield or Woodstock is in the works. I'm told that if the product comes out, it will have "spectacular graphics and sound."

OPA TO EXPLAIN DELAYS

Several readers have complained about delays in receiving products from OPA. Gary Bowser says that he will be posting an open letter on Delphi explaining the situation. We'll provide information on this as soon as it is available.

WHAT MONTH IS THIS?

In case you didn't notice, the November 1991 issue of MICROpendium carried a cover date of October 1991. Boy, are we embarrassed. Jerry Price of Tex-Comp suggests the snafu should increase the collector's value of that issue of MICROpendium. Others asked if we got any calls. Yes, we got calls. And this is just to let everyone know that it was a mistake and it won't happen again. We've hired a cover date editor and he'll start work on December 32nd.

SALE CONTINUES FOR A FEW

Sometimes timing is everything. A case in point was the MICROpendium sale on disks and back issues that expired Nov. 30. Unfortunately, a number of readers didn't receive their November editions until December, which meant that they were closed out of the sale. But not to fear. For those who think they missed the sale because they received their issues so late, we'll continue to off those special prices until Jan. 15. However, this special price will be available only to those who have already received the November edition. We are not running the ads this month and as far as I know it will be the one and only time we will offer back issues at a discounted price.

CONGRATULATIONS BARRY TRAVER

I ran out of space last month before I could offer my congratulations to Barry Traver as the recipient of the first John Birdwell Memorial Fund award. The award was presented at the Chicago TI Faire in November. I can't think of anyone in the TI community who deserved it more. Barry is a tireless supporter and promoter of the TI and has been doing it for many years.

—JK

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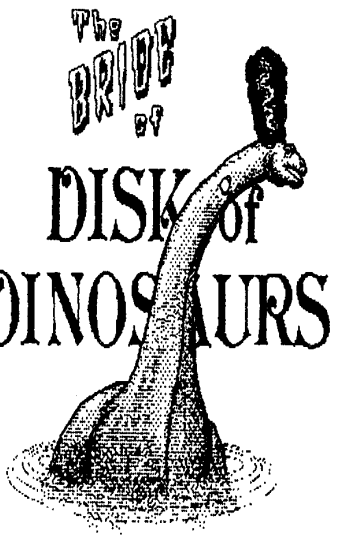

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Feedback

Reader recommends reading back issues

I recently took advantage of your offer to buy back issues. I decided to read all the issues as I filed them in their two-inch binders. I recommend others take the time. Ideas and hints were refreshed and better understood now, e.g., I have a monthly portfolio file that had room for only a few words of comment. By adding a double colon and inserting another PRINT statement, I now have all the room I'll need.

The October '84 issue has a letter from an apparently computer-wise guru, Earl Hall of Chicago, Illinois. He says he agrees with those who thinks the 99 has only six months to live.

Where are you now, Earl? Not in the brokerage business, I hope.

Bob Zink
Naples, Florida

E/B Module Expander lauded by reader

I am writing to let 99ers know of a great product for their computer called E/B Module Expander. Anyone interested in finding out more about this jewel should read Harry Brashear's MICROreview of it in the December 1990 issue of MICROpendium, or write to the manufacturer, William A. Shores, Suite #107, 5679 S. Transit Rd., Lockport, NY 14094.

EBME puts Extended BASIC and five other cartridges into one "can," which takes up no more space in the cartridge port than a single module does. If you are an electronics buff, with the ability to do soldering and the like, a kit is available for $25 plus $3 shipping/handling. If you are like me and require turn-key products, Mr. Shores will create the product for you for an additional $20 labor. Along with the $48, you will need to send him the modules you want put into the EBME and a list of the order they are to be accessed on the rotary switch used to activate each one. When you see the end product, you will be impressed.

Bill Gaskill
Grand Junction, Colorado

'Pick of the litter'

I, and others like me, would be lost if not for your fine publication filled with all the articles and tutorials that keep this non-programmer going. I have been an avid TIer for about five years now, and though I own other machines, my TI is the "pick of the litter" and I use it constantly. Your magazine and the help of the Puget Sound 99ers have gotten me and several of my fellow enthusiasts over some very rough hurdles, and I especially thank Chuck Wynne for all his patience when I called at some very odd hours. Please keep your fine publication coming, and don't forget those tutorials for us "non-programmers."

David M. Myrick
Oak Harbor, Washington

Teen user writes

I am 16 years old, and have been using the TI for about eight years now. My grandfather introduced me to his TI when I was about eight years old. Since we lived so far apart, I could only get a hand on the T about twice a year or so, until one Christmas in 1986 when I was given my own. I was so excited, I grabbed hold of my grandpa and didn't let go until he finally pried me off.

Five years later, I still use that same TI for everything. Of course, over the years I have been able to add to my system and now own hundreds of disks, a three-drive double density system, a printer, a monitor, many cartridges, a modem and a great satisfaction with a terrific machine. I am very comfortable with Extended BASIC and write many programs.

I have been a subscriber to your magazine for two years now, and I would like to tell you how much I enjoy it. The tips, programs, ideas and updates are very helpful in keeping up to date with my computer. I admit that some articles are over my head, but I learn more each issue.

I have thought of starting my own users' group, since I don't think southern Minnesota has one, but I haven't found many people who even own a TI around the area. I have "fooled around" with the idea, however, and have already completed a possi-

(See Page 7)

Feedback

(Continued from Page 6)

ble first issue for the newsletter, named the club, wrote rules and regulations, set up costs and have put much time and thought into this project, but not finding enough users has been discouraging.

I also thought you would like to know that not everyone reading your magazine is an adult, and I, for one, am as big a fan of the TI as anyone I know. Thank you, once again, for a top-notch publication, and continue the terrific work.

Eric T. Gerlitz
North Mankato, Minnesota

Persons interested in joining a group may contact Gerlitz at 2116 Northridge Dr., North Mankato, MN 56003. — Ed.

April in November?

Fast item, of *major interest!* Did you know that *my* 1991 Star-Trek Calendar does *not* have *two* "Octobers" in it?

I'm just wondering how many other 99ers were sharp enough to spot the "date" on the front cover of your "*November*" issue! You should have saved that for the April (1st) issue!

Ray Kazmer
Sunland, California

What! The cover date! A mistake? Yes, sharp-eyed readers across the country spotted the error. And thanks to all of you who let us know. But, even though the cover said "October," it was really the November edition.—Ed.

Geneve user seeks language to program

I am writing you out of desperation. I have tried writing to Myarc, but you can probably guess the results. Don't misunderstand; I have no hard feelings against Myarc. I think they are a great company for having stuck with the TI all these years.

Here is my problem: I own a Geneve 9640 and would like to develop software for it. I have Myarc's Advanced BASIC v.2.99A, but it is so bug-ridden that it is almost impossible to write any kind of program with it. I need to know where I could purchase a programming language (with documentation) such as assembler, PASCAL, Forth or even a decent BASIC.

Chad Transtrum
Caldwell, Idaho

You are correct about Myarc BASIC. As long as you do not try to do assembly language CALLS and stick with the more basic elements of MAB you should get by. Every programmer we know who has tried to do serious work with MAB has encountered bugs that eventually forced them to give up. Casual users shouldn't have a problem with it, however.

For information about the current status of other languages for the Geneve — such as c — contact 9640 News, P.O. Box 752465, Memphis, TN 38175.—Ed.

Send your letters to MICROpendium Feedback, P.O. Box 1343, Round Rock, TX 78680.

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BASIC

Printing a calendar

By REGENA

With the start of a new year coming, many people think of planning and using a new calendar. Many calendar programs are available, so I won't offer another calendar program as such, but I will help you be able to write your own if you prefer.

I would like to mention that if you have WordPerfect (on another computer), the January 1991 *WordPerfect The Magazine* offers several macros to print monthly calendars, daily planners and action planners.

For the TI, however, let me offer you a few very simple ideas for programming to produce a calendar. A very basic monthly calendar is drawn using the following program, PRINTCAL. This blank calendar is drawn with no redefined characters. the minus sign is used for horizontal lines, and the ¦ symbol (found on FCTN A) is used for the vertical lines. You may add your own numbers or messages for the dates.

```
100 REM PRINTCAL !055
110 REM BY REGENA !071
120 CALL CLEAR !209
130 PRINT "SUN MON TUE WED T
HU FRI SAT": : : : : : : : :
 : : : : : : : : : : : : : :!0
52
140 FOR ROW=3 TO 19 STEP 4 !
210
150 CALL HCHAR(ROW,2,45,29)!
177
160 FOR COL=2 TO 30 STEP 4 !
176
170 CALL VCHAR(ROW+1,COL,124
,3)!083
180 NEXT COL !116
190 NEXT ROW !142
200 CALL HCHAR(23,2,45,29)!2
32
210 GOTO 210 !033
220 END !139
```

Line 130 prints the day abbreviations, then scrolls the line to the top of the screen. Lines 140-200 draw the "lines." Line 210 holds the picture on the screen until you press FCTN 4 (CLEAR).

The next program, PRINT2, does the same thing, only on a printer. No defined characters are used. Put your own printer configuration in Line 120, the OPEN statement. L$ is defined as the horizontal line, and the vertical lines again use the ¦ symbol and are printed with several printed lines of C$. This is a general purpose month for you to fill in your own dates and messages.

```
100 REM PRINT2 !153
110 REM BY REGENA !071
120 OPEN #1:"RS232.BA=600" !
222
130 PRINT #1:TAB(11);"SUN
   MON       TUE       WED
  THU       FRI       SAT" !12
1
140 L$="----------------------
------------------------------
----------------" !117
150 C$="¦         ¦         ¦
       ¦         ¦         ¦
       ¦         ¦" !012
160 FOR J=1 TO 5 !061
170 PRINT #1:TAB(8);L$ !214
180 FOR K=1 TO 5 !062
190 PRINT #1:TAB(8);C$ !205
200 NEXT K !225
210 NEXT J !224
220 PRINT #1:TAB(8);L$ !214
230 CLOSE #1 !151
240 END !139
```

In printing any calendar or day planner, the critical thing is determining which day of the week you need. On a monthly calendar, you need to know what day of the week the month starts on, then you can figure out how to print the rest of the month (and some months may need six lines rather than the five my examples have).

The following program contains an algorithm for determining the day of the week given any date (after 1752, when we changed from the Julian to the Gregorian Calendar). There are several ways to do this. Usually, you find the number of days in the year up to the date you want. The year determines which of the seven days the year could start on. Dividing by 7 and checking the remainder gives the day.

The algorithm I used is in Lines 540-600 of the following program, DAY OF WEEK. You may enter a year, then a month, then a day date. The names of the days are in DAY$(D). The month entered is a number from 1 to 12, then the three-letter month name is contained in the string M$. The number of days in the month is determined from the string NM$. Notice the numbers 30 28 31 30 ... squeezed together. Line 410 takes two of the numbers depending on the month number to determine NM.

Most of the IF statements are used to keep you within the proper bounds as you are entering numbers for the year (after 1752), the month (from 1 to 12) and the day (from 1 to the number of days in the month).

```
100 REM JANUARY !244
110 REM BY REGENA !071
120 OPEN #1:"RS232.BA=600" !
222
```

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REGENA ON BASIC —

(Continued from Page 8)

```
130 PRINT #1:TAB(27);!152
140 PRINT #1:CHR$(27);CHR$(8
0);CHR$(73);CHR$(27);CHR$(92
);"J A N U A R Y" !202
150 PRINT #1:CHR$(27);CHR$(8
0);CHR$(67);CHR$(27);CHR$(92
): : :!138
160 PRINT #1:TAB(11);"SUN
   MON       TUE       WED
  THU       FRI       SAT" !12
1
170 L$="--------------------
----------------------------
---------------" !117
180 C$="|         |         |
       |         |         |
       |         |" !012
190 PRINT #1:TAB(8);L$ !214
200 PRINT #1:TAB(8);"|
  |         |         | 1
 | 2       | 3       | 4
|" !151
210 GOSUB 320 !145
220 PRINT #1:TAB(8);"| 5
  | 6       | 7       | 8
| 9       | 10      | 11
|" !003
230 GOSUB 320 !145
240 PRINT #1:TAB(8);"| 12
  | 13      | 14      | 15
 | 16      | 17      | 18
|" !087
250 GOSUB 320 !145
260 PRINT #1:TAB(8);"| 19
  | 20      | 21      | 22
 | 23      | 24      | 25
|" !082
270 GOSUB 320 !145
280 PRINT #1:TAB(8);"| 26
  | 27      | 28      | 29
 | 30      | 31      |
|" !058
290 GOSUB 320 !145
300 CLOSE #1 !151
310 STOP !152
320 FOR J=1 TO 4 !060
330 PRINT #1:TAB(8);C$ !205
340 NEXT J !224
350 PRINT #1:TAB(8);L$ !214
360 RETURN !136
370 END !139
```

Now suppose you want a real month. Let's use January 1992. The first day is on Wednesday. I printed the same basic calendar but put the day numbers in. Also, I added the name of the month in expanded print at the top. This program is called JANUARY, and you will probably have to make adjustments for your printer. Line 120 is the OPEN statement that needs your own printer configuration.

Lines 130-140 print "J A N U A R Y" in expanded print. These CHR$() numbers are necessary for the Texas Instruments Omni 800, Model 825, printer that I use with my TI computer. If you have an Epson printer, CHR$(14) or CHR(27);CHR$(14) will probably work for expanded print. Line 150 gets back to normal 10 characters per inch. On an Epson, CHR$(20) cancels expanded print. Also, several blank lines are printed here.

Lines 190-290 print the days and draw the lines. The subroutine in Lines 320-360 make the boxes longer for each day.

You may want to redefine print characters or use different characters to get better lines. The IBM print set has lines and double lines for certain characters (characters 179-218).

Of course, you will also want to customize the printing for the size of calendar page you want for your own planning. This program just gets you started.

```
100 REM DAY OF WEEK !185
110 REM BY REGENA !071
120 DIM DAY$(7)!249
130 CALL CLEAR !209
140 M$="JANFEBMARAPRMAYJUNJU
LAUGSEPOCTNOVDEC" !172
150 NM$="3128313031303131303
13031" !014
160 PRINT "DETERMINING THE D
AY OF THE" !104
170 PRINT :"WEEK GIVEN THE D
ATE": : :!078
180 FOR D=1 TO 7 !057
190 READ DAY$(D)!074
200 NEXT D !218
210 DATA SUNDAY,MONDAY,TUESD
AY,WEDNESDAY,THURSDAY,FRIDAY
,SATURDAY !110
220 PRINT : :"YEAR ";!215
230 INPUT Y !235
240 Y=INT(Y)!172
250 IF Y>1752 THEN 280 !202
260 PRINT :"YEAR MUST BE AFT
ER 1752": :!091
270 GOTO 220 !043
280 LEAP=0 !217
290 IF Y/4<>INT(Y/4)THEN 340
 !065
300 LEAP=1 !218
310 IF Y/400=INT(Y/400)THEN
340 !068
320 IF Y/100<>INT(Y/100)THEN
 340 !255
330 LEAP=0 !217
340 PRINT : :"MONTH NUMBER,
1-12 ";!048
350 INPUT M !223
360 M=INT(M)!148
370 IF (M>0)+(M<13)=-2 THEN
400 !228
380 PRINT :"ENTER MONTH FROM
":"1 (JAN) TO 12 (DEC)" !045
390 GOTO 340 !164
400 MONTH$=SEG$(M$,M*3-2,3)!
073
410 NM=VAL(SEG$(NM$,2*M-1,2)
)!204
420 IF M<>2 THEN 440 !125
430 NM=NM+LEAP !215
440 PRINT : :"DATE ";!196
450 INPUT D !214
460 D=INT(D)!130
470 IF (D>0)+(D<(NM+1))=-2 T
HEN 520 !224
480 PRINT :MONTH$;" HAS";NM;
"DAYS." !164
490 PRINT :"CHOOSE DATE 1 TO
";NM !138
500 GOTO 440 !008
510 REM CALCULATE !104
520 CALL CLEAR !209
530 PRINT MONTH$;" ";STR$(D)
;",";Y !215
540 A=INT((1/M)+.6)!162
550 B=Y-A !092
560 C=M+12*A !064
570 E=B/100 !101
580 X=INT(13*(C+1)/5)+INT((5
*B)/4)-INT(E)+INT(E/4)+D-1 !
165
590 X=X-(7*INT(X/7))+1 !115
600 PRINT :DAY$(X): : :!055
610 END !139
```

Now, to make your own calendar program, combine the DAY OF WEEK program with your printing program. To print any month, you only need to enter the first day of the month to determine which day of the week starts the month. Then use the

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EXTENDED BASIC

Getting it all on tape

By JERRY STERN
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Video cassette recorders are in nearly every home these days, and I, like everyone else, tape my favorite shows to watch again. But the episode titles usually aren't enough to jog my memory — I can't always tell which episode is the one I want to watch. Before VCRs, when our home movies were all in Super-8, we made titles for them with little stick-on letters that we arranged and photographed so that we could tell which vacation city we were watching. But it was always a hassle to set up a copy stand or a tripod and arrange the letters. How about a computer program to do all that work for us?

VIDEOTITLE is this month's program. It will let you create title screens for videotapes, and it will edit, store, retrieve, and play these titles into the VCR, along with choices of screen colors, sound effects, and the length of each screen display. Up to six screens of titles may be recorded. And if you'd like sprite graphics or speech in your introductions, you can easily add them to a subprogram and customize the playback.

But first, how can you get the TI99/4A sound and video into the VCR? That's very easy on a TI computer. You'll need a standard TI monitor cable — many of you already have one of these for hooking up the console to a composite monitor or to a television that has direct video inputs. The cable has one end to fit into the console where the old RF converter cable usually fits, and at the other end, two or more RCA plugs to fit into the television or the VCR. Only two of the RCA plugs are used, one each where the VCR jacks are labeled "Video Input" and "Audio Input," so any others will just hang loose. If you don't already have a monitor cable, ask for a monitor cable to fit a Commodore 64 — it's the same cable used on the TI, and usually easier to find. When you run VIDEOTITLE, you'll monitor the computer through the output from the VCR.

Before running the program, check the default printer name on line 90 and change it as needed. On line 1010, CHR$(15) is used to turn on condensed print, and a few printers may need a change there. And on line 80, choose a default disk drive number.

If you would like different sound effects than the samples I've chosen, you may substitute them as you wish by merging them in after resequencing them to fit into the program below line number 28000. Your subprograms can use any effects you like, such as speech or sprite motion, but if you use sprites, be sure to either delete the sprites at the end of the subprogram, or add a CALL DELSPRITE(ALL) statement at the beginnings of lines 640 and 1270, and at the end of 1240. After making any changes in the sound subprograms, update the descriptions in lines 570 to 590, and the CALL statements for the subprograms in 650 to 730.

The program is broken into a set of modules for each of the functions from the menu. The directory module, starting on line 210, uses the subprogram CAT to read and display the contents of a disk. The load and save modules, at lines 270 and 1280, record or retrieve all of the screen data in an Internal/Variable 80 disk file. The print module prints out the text from all six screens of titles in two rows of three screens across. The printout can be trimmed and folded horizontally to fit into the VHS tape sleeve.

The edit routine, starting on line 410, has several choices. First, choose which screen of the title to edit, by number, or enter zero to return to the main menu. Next, enter the length to display that particular title screen, or press enter to accept the default choice. (You may change the default length by resetting LN(L)=10 in line 150 to whatever length, in full seconds, that you prefer.) The next prompt, "Edit Text, Colors, Sound choice?" will take you to three additional screens. The color screen allows you to choose a background color for each title screen. If you do not choose a color, the default is dark blue. You may change that default, also in line 150, by resetting the CL(L)=5 equation to use another color from the TI color set, but do not use transparent as a color choice.

The sound screen simply displays the nine available choices of sound subprograms to play with each screen. There is no default for this choice, so if no sound is chosen, the title screen will be silent.

Finally, there is the text editing screen. It is totally blank when you start, and you may enter text on any line. The cursor will start on line one, and each time you end a line with either enter or function down, the cursor will move down to the next line. To go up a line, end a line with function up. To exit the screen when you have finished, use enter or the function arrows to move down past the bottom of the screen, or up past the top. A reminder screen will prompt you with these keystrokes just before you enter each blank screen.

And now, ready for recording? Did you save the title set first? Next, choose Record from the main menu, and press a key to clear the screen. Start the VCR recording, and then press another key to start the first title screen. Each screen will be displayed for the length of time that you chose, PLUS the length of any subprogram sound effect. Each screen is wiped horizontally before the next display. If you would prefer a more conventional screen clearing, or a fancier one, substitute your choice for the CALL VCHAR statement in line 1250. After the last title screen, the screen will blank again while you stop the VCR, and then you may press any key to return to the main menu. If the VCR

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REGENA ON BASIC —

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computer to print the numbers in the proper order as you are printing the lines. Of course, you can get really fancy and add features such as printing that every second Tuesday is Library Board meeting and every first and third Wednesday is City Council. Then add in the birthdays for your family and friends and other appointments you have.

Best wishes for the New Year!

EXTENDED BASIC—

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doesn't appear to be recording properly, or if you just
change your mind and want to go back and edit a screen again, hold down any key while the titles are playing, and the program will return within a few moments to the main menu.

But what should the text on each screen say? How about the tape counter numbers for each show, or episode, or football game on the tape. And maybe the title of the tv show, or the starring actors, or the featured athletes, or possibly the date and time of the recording for historical events. That's ideal for the Winter Olympics, coming up in a few more weeks.

Then, when your friends admire your custom tape titles, you can tell them how you did them and let them try to copy the technique. They won't be able to make tape titles on a PC without a special video output board (about $500), and a sound board (about $200). And if they want speech in their introductions as well, they'd better add some synthesizer software along with those sound cards. As fancy as those PCs have gotten, we TI-99ers still have a few advantages...

VIDEO TITLE

```
80 DR$="DSK2." ! Default dis
k drive !243
90 PR$="RS232.DA=8.BA=4800"
! Default disk drive !232
100 ! VIDEO TITLE !188
110 ! TIXB 12/91 J. L. Stern
 !084
120 ! Creates videocassette
taped intros and labels !208
130 DIM TX$(6,24),CL(6),LN(6
),SP(6)!210
140 MT=-1 :: SV=-1 ! empty f
lag and saved flag !140
150 FOR L=1 TO 6 :: CL(L)=5
:: LN(L)=10 :: SP(L)=0 :: NE
XT L !125
160 CALL CLEAR :: CALL BACKD
ROP(5):: CALL TITLE2 !018
170 CALL KEY(3,K,S)!190
180 IF MT THEN CALL VCHAR(14
,12,42,3):: CALL KEYAT(19,10
,X,"DLEQ"):: GOTO 200 !242
190 CALL KEYAT(19,10,X,"DLEP
RSQ")!014
200 ON POS("DLEPRSQ",CHR$(X)
,1)GOTO 210,270,410,950,1090
,1280,1420 !013
210 ! Directory !088
220 DISPLAY AT(1,10)ERASE AL
L:"Directory" :: CALL HCHAR(
2,12,95,9)!038
230 DISPLAY AT(4,1):"Which d
rive?":DR$ !012
240 ACCEPT AT(5,4)SIZE(-1)VA
LIDATE("123"):X !155
250 CALL CAT(X):: CALL PAUSE
 !111
260 GOTO 160 !239
270 ! Load an intro !094
280 DISPLAY AT(1,4)ERASE ALL
:"Load an Introduction" :: C
ALL HCHAR(2,6,95,20)!219290
DISPLAY AT(4,1):"Load Introd
uction from":DR$ !032
300 CALL KEY(3,X,S):: ACCEPT
 AT(5,4)SIZE(20):D$ !157
310 IF LEN(D$)<3 THEN 400 !2
43
320 OPEN #1:"DSK"&D$,INTERNA
L,VARIABLE 80 !151
330 FOR L=1 TO 6 :: INPUT #1
:CL(L),LN(L),SP(L)!093
340 DISPLAY AT(20,1):"Retrie
ving screen #:";L !164
350 FOR L2=1 TO 24 :: INPUT
#1:TX$(L,L2):: NEXT L2 !179
360 NEXT L !226
370 CLOSE #1 !151
380 CALL PAUSE !232
390 MT=0 !088
400 GOTO 160 !239
410 ! Edit an intro !100
420 CALL CLEAR !209
430 DISPLAY AT(1,7)ERASE ALL
:"Edit a Title Set" :: CALL
HCHAR(2,9,95,17)!199
440 DISPLAY AT(4,1):"Which s
creen set (1-6, 0 to quit) w
ill you edit? ";MAX(SC,1)!12
1
450 ACCEPT AT(5,23)SIZE(-1)V
ALIDATE(DIGIT):SC !148
460 IF SC=0 OR SC>6 THEN SC=
0 :: GOTO 940 !093
470 MT,SV=0 !180
480 DISPLAY AT(7,1):"Seconds
 to display?";MAX(LN(SC),20)
:"(Zero length skips screen.
)" !032
490 ACCEPT AT(7,21)VALIDATE(
DIGIT)SIZE(-3):LN(SC)!157
500 DISPLAY AT(10,1):"Edit T
ext, Colors, or Sound choice
? T" !021
510 CALL KEY(3,X,S):: CALL K
EYAT(11,9,X,"TCS")!245
520 ON POS("TCS",CHR$(X),1)G
OSUB 830,750,540 !039
530 GOTO 430 !254
540 ! Sounds edit routine !0
11
550 DISPLAY AT(1,5)ERASE ALL
:"Edit Sounds Choice" :: CAL
L HCHAR(2,7,95,18)!222
560 DISPLAY AT(4,1):"Choose
from:" !160
570 DISPLAY AT(6,1):"1 ALERT
    -Warning Alarm   2 ATTAC
KGUN-Guns            3 BOMB
    -War sounds      4 HAMME
R   -Swordfight" !042
580 DISPLAY AT(10,1):"5 MOTO
R    -Car sounds      6 ROBO
TWAR -S/F Epics       7 SIRE
N    -Police Dramas   8 SONA
R    -Undersea travels" !080
590 DISPLAY AT(14,1):"9 WHEE
L    -Game Shows" !150
600 DISPLAY AT(16,1):SP(SC)!
056
610 ACCEPT AT(16,2)SIZE(-1)V
ALIDATE(DIGIT):SP(SC)!163
620 IF SP(SC)>9 OR SP(SC)<1
THEN 610 !226
630 ON SP(SC)GOSUB 650,660,6
70,680,690,700,710,720,730 !
197
640 RETURN !136
650 CALL ALERT(5):: RETURN !
087
660 CALL ATTACKGUN :: RETURN
 !026
670 CALL BOMB :: RETURN !147
680 CALL HAMMER(15):: RETURN
 !204
690 CALL MOTOR(5):: RETURN !
112
700 CALL ROBOTWAR(5):: RETUR
N !082
710 CALL SIREN(3):: RETURN !
094
720 CALL SONAR(5):: RETURN !
```

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```
098
730 CALL WHEEL :: RETURN !23
3
740 RETURN !136
750 ! Color edit routine !14
2
760 DISPLAY AT(1,6)ERASE ALL
:"Edit Color Choice" :: CALL
 HCHAR(2,8,95,17)!097
770 DISPLAY AT(4,1):"Choose
from:" !160
780 DISPLAY AT(6,1):"2 Black
       9 Med. Red     3 Med.
Green 10 Lt. Red      4 Lt. G
reen  11 Dark Yellow 5 Dark
Blue  12 Lt. Yellow" !045
790 DISPLAY AT(10,1):"6 Lt.
Blue    13 Dark Green  7 Dark
 Red    14 Magenta     8 Cyan
        15 Gray
        16 White" !185
800 ACCEPT AT(15,1)SIZE(2)VA
LIDATE(DIGIT):CL(SC)!204
810 IF CL(SC)>16 OR CL(SC)<2
 THEN 800 ELSE X=CL(SC):: CA
LL BACKDROP(X)!204
820 RETURN !136
830 ! Screen edit routine !2
39
840 DISPLAY AT(13,1):"   Whe
n editing each text   screen
, end a line with     Functi
on E (up arrow) to    edit t
he next line up, or" !038
850 DISPLAY AT(17,1):"Functi
on X or Enter to edit the ne
xt line down.            Whe
n done, arrow up or   down p
ast the end of the    screen
." !006
860 CALL PAUSE !232
870 CALL CLEAR :: CALL KEY(5
,X,S)!032
880 FOR R=1 TO 24 :: DISPLAY
 AT(R,1):TX$(SC,R):: NEXT R
!238
890 R=1 !010
900 CALL ROWINPUT(R,TX$(SC,R
),X)!074
910 IF X=2 THEN R=R-1 ELSE R
=R+1 !001
920 IF R>0 AND R<25 THEN 900
 !140
930 RETURN !136
940 GOTO 160 !239
950 ! Print a label !081
960 DISPLAY AT(1,4)ERASE ALL
:"Print a Sleeve Insert" ::
CALL HCHAR(2,6,95,21)!243
970 DISPLAY AT(4,1):"Print s
leeve insert to":PR$ !031
980 CALL KEY(3,X,S):: ACCEPT
 AT(5,1)SIZE(-28):PR$ !194
990 IF LEN(PR$)<3 THEN 1080
!252
1000 OPEN #1:PR$,DISPLAY ,VA
RIABLE 132 !109
1010 PRINT #1:CHR$(15)! cond
ensed print !094
1020 FOR L=1 TO 6 STEP 3 !23
8
1030 DISPLAY AT(20,1):"Print
ing screens #:";L;"to";L+2 !
094
1040 FOR L2=1 TO 24 :: PRINT
 #1:TX$(L,L2);TAB(32);" | ";
TX$(L+1,L2);TAB(64);" | ";TX
$(L+2,L2):: NEXT L2 !033
1050 PRINT #1:CHR$(10);CHR$(
10);CHR$(13):: NEXT L !097
1060 CLOSE #1 !151
1070 CALL PAUSE !232
1080 GOTO 160 !239
1090 ! Record an intro !061
1100 DISPLAY AT(1,3)ERASE AL
L:"Record an Introduction" :
: CALL HCHAR(2,5,95,23)!189
1110 DISPLAY AT(4,1):"   Whe
n you press the next  key, t
he screen will clear. Start
the VCR, and then     press
any key to begin the" !129
1120 DISPLAY AT(8,1):"playba
ck of the titles.        Whe
n the titles end, the last s
creen will clear.     After
turning off the VCR," !240
1130 DISPLAY AT(12,1):"press
 any key to return to  the m
enu.":"Using the pause key t
o startand stop the VCR usua
lly    improves the results.
" !084
1140 DISPLAY AT(18,1):"   Pr
ess and hold any key   durin
g the display to end   the t
itle sequence early." !133
1150 CALL PAUSE :: CALL CLEA
R !059
1160 CALL BACKDROP(CL(1))!02
2
1170 CALL KEY(0,X,S):: IF S<
1 THEN 1170 !233
1180 FOR L=1 TO 6 :: CALL BA
CKDROP(CL(L))!042
1190 FOR L2=1 TO 24 :: DISPL
AY AT(L2,1):TX$(L,L2):: NEXT
 L2 !084
1200 IF SP(L)=0 THEN 1220 !2
16
1210 ON SP(L)GOSUB 650,660,6
70,680,690,700,710,720,730 !
123
1220 FOR L3=1 TO LN(L):: CAL
```

(See Page 13)

Dr. Who	0-2116	2117-3565
The Trial of a Time Lord	On Ravelox, the Dr. and Peri discover that the Earth has been blasted by a fireball and moved two light years from its proper position.	Part II On Thoros Beta, Peri and the Doctor meet up with Sil again, and his superior Lord Kim, the dying ruler of Thoros Beta. Dr. Crozier is attempting to perform brain transplantations in order to save Kim.
(1986 Season)		
The entire season takes the form of a trial against the doctor, on the charge that he has meddled in the affairs of other planets.	The immortal, a robot that runs on black light, guards secrets left by the sleepers from Andromeda, and Sabelom Glitz and Dibber attempt to steal those secrets.	King Urcanos, a prisoner of Crozier, escapes, falls in love with Peri, and the Doctor is pulled out of time by the Valvard at a very bad moment...
The prosecution is performed by the Valvard, and the evidence is presented from the records in the matrix.		

Sample of data file

EXTENDED BASIC—

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```
L SOUND(970,330,30)!008
1230 CALL KEY(0,X,S):: IF S<
>0 THEN 1270 !012
1240 NEXT L3 !021
1250 CALL VCHAR(1,1,32,768):
: NEXT L !091
1260 CALL KEY(0,X,S):: IF S<
1 THEN 1260 !067
1270 GOTO 160 !239
1280 ! Save an intro !109
1290 DISPLAY AT(1,4)ERASE AL
L:"Save an Introduction" ::
CALL HCHAR(2,6,95,20)!234
1300 DISPLAY AT(4,1):"Save I
ntroduction as":DR$ !077
1310 CALL KEY(3,X,S):: ACCEP
T AT(5,4)SIZE(20):D$ !157
1320 IF LEN(D$)<3 THEN 1410
!233
1330 OPEN #1:"DSK"&D$,INTERN
AL,VARIABLE 80 !151
1340 FOR L=1 TO 6 :: PRINT #
1:CL(L),LN(L),SP(L)!103
1350 DISPLAY AT(20,1):"Savin
g screen #:";L !233
1360 FOR L2=1 TO 24 :: PRINT
 #1:TX$(L,L2):: NEXT L2 !189
1370 NEXT L !226
1380 CLOSE #1 !151
1390 CALL PAUSE !232
1400 SV=-1 !035
1410 GOTO 160 !239
1420 ! Quit or Clear !078
1430 DISPLAY AT(21,1):"Start
 a new title or Quit?":" S"
!158
1440 CALL KEY(3,X,S):: CALL
KEYAT(22,2,X,"SQ")!169
1450 IF X=81 THEN 1550 !090
1460 IF SV THEN 1510 !145
1470 DISPLAY AT(21,1)BEEP:"T
he current title set has   n
ot been saved!" !123
1480 DISPLAY AT(23,1):"Start
 a new title or Return?":" R
" !126
1490 CALL KEY(3,X,S):: CALL
KEYAT(22,2,X,"SR")!170
1500 IF X=82 THEN 1580 ELSE
MT=-1 !021
1510 MT,SV=-1 ! clear variab
les here !190
1520 FOR L=1 TO 6 !064
1530 FOR L2=1 TO 24 :: TX$(L
,L2)="" :: NEXT L2 :: NEXT L
 !094
1540 GOTO 150 !229
1550 IF SV THEN CALL CLEAR :
: STOP !200
1560 DISPLAY AT(21,1):"The c
urrent introduction hasnot b
een saved!" !193
1570 CALL ENDING !032
1580 GOTO 160 !239
1590 SUB ROWINPUT(R,T$,X)!23
8
1600 !ROWINPUT(Row, Text str
ing returned, Code for enter
-1, up-2, or down-3) JLStern
 12/`91 !194
1610 ACCEPT AT(R,1)SIZE(-28)
:T$ :: CALL KEY(5,X,S)!202
1620 IF X=11 THEN X=2 ELSE I
F X=10 THEN X=3 ELSE X=1 !03
2
1630 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 IF X=13 THEN X=N(0)ELS
E 28060 !059
28075 CALL HCHAR(R,C,X)!144
28080 SUBEND !168
28640 SUB WHEEL !227
28645 ! WHEEL OF FORTUNE, SL
OWING DOWN, JLS 7/90 !251
28650 CALL SOUND(2000,440,30
,330,30,610,30,-4,0)!235
28655 FOR L=610 TO 150 STEP
-40 :: CALL SOUND(99,440,30,
330,30,L,30,-4,0):: NEXT L !
021
28660 CALL SOUND(2000,440,30
,330,30,150,30,-4,0)!234
28665 SUBEND !168
28670 SUB ATTACKGUN !020
28675 ! ATTACKGUN: MULTISHOT
 AUTOMATIC WEAPON FIRE SOUND
 EFFECT, JLS 7/90 !249
28680 FOR L=1 TO 5 :: CALL S
OUND(-200,-5,3):: CALL SOUND
(100,-5,10):: NEXT L !085
28685 SUBEND !168
28705 SUB ROBOTWAR(N)!156
28710 ! SOUNDS OF ROBOTS BAT
TLING FOR N SECONDS, JLS 7/9
0 !106
28715 FOR L=1 TO N*2 :: CALL
 SOUND(RND*1000,-INT(RND*8)-
1,3):: NEXT L !113
28720 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
29185 SUB BACKDROP(X)!124
29190 ! RESETS CHARACTERS AN
D SCREEN TO COLOR FROM 1 TO
16 /JLS 9/89 !206
29195 ! 1 BLANKS SCREEN WITH
 CURRENT BACKGROUND COLOR !2
05
29200 IF X=1 THEN Y=1 :: GOT
O 29215 !183
29205 X=X-1 :: ON X GOSUB 29
220,29225,29225,29230,29225,
29225,29225,29225,29225,2922
5,29225,29225,29225,29225,29
225 !204
29210 CALL SCREEN(X+1)!171
29215 FOR L=0 TO 14 :: CALL
COLOR(L,Y,1):: NEXT L :: SUB
EXIT !217
29220 Y=9 :: RETURN !035
29225 Y=2 :: RETURN !028
29230 Y=16 :: RETURN !082
29235 Y=15 :: RETURN !081
29240 SUBEND !168
30820 SUB PAUSE !236
30825 FOR D=1 TO 100 :: NEXT
 D !241
```

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EXTENDED BASIC—

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```
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
31565 SUB TITLE2 !035
31570 DISPLAY AT(2,9)ERASE A
LL:"VIDEO TITLE" :: CALL CHA
R(95,"00FF"):: CALL HCHAR(3,
11,95,11)!166
31575 DISPLAY AT(5,4):"Video
 Cassette Labeler" :: TB$=RP
T$(" ",9)!078
31580 DISPLAY AT(7,6):"12/`9
1 Jerry Stern" !243
31585 DISPLAY AT(9,1):"
 Please Choose:":"":TB$;"D D
irectory":TB$;"L Load":TB$;"
E Edit":TB$;"P Print":TB$;"R
 Record" !133
31590 DISPLAY AT(16,1):TB$;"
S Save":TB$;"Q Quit or Clear
" !228
31595 SUBEND !168
32175 SUB CAT(X)! SUBPROGRAM
 EQUIVALENT OF DIR(DISK NUMB
ER TO READ DIRECTORY FROM) !
013
32180 DIM T$(5):: T$(1)="DIS
/FIX" :: T$(2)="DIS/VAR" ::
T$(3)="INT/FIX" :: T$(4)="IN
T/VAR" :: T$(5)="PROGRAM" !0
34
32185 OPEN #5:"DSK"&STR$(X)&
".",INPUT ,RELATIVE,INTERNAL
 :: INPUT #5:A$,J,J,K !182
32190 PRINT "DSK    DISKNAME=
";A$:"AVAILABLE=";K;"USED=";
J-K:"FILENAME    SIZE TYPE
    P":"_________ ____ ____
_____ _" !215
32195 FOR L=1 TO 127 :: INPU
T #5:A$,A,J,K !190
32200 IF LEN(A$)=0 THEN CLOS
E #5 :: SUBEXIT !086
32205 PRINT A$;TAB(12);J;TAB
(17);T$(ABS(A));!094
32210 IF ABS(A)=5 THEN 32220
 ELSE B$=" "&STR$(K)!099
32215 PRINT SEG$(B$,LEN(B$)-
2,3);!194
32220 IF A>0 THEN PRINT ELSE
 PRINT TAB(28);"Y";!013
32225 NEXT L :: CLOSE #5 ::
SUBEND !041
32255 SUB ALERT(N)!161
32260 ! DETONATION ALERT SOU
ND EFFECT FOR N SECONDS !074
32265 FOR L=1 TO N :: FOR M=
440 TO 784 STEP 20 :: CALL S
OUND(-99,M,0):: NEXT M :: NE
XT L !093
32270 SUBEND !168
32275 SUB SIREN(L)!168
32280 ! SIREN SOUND EFFECT F
OR L*2 SECONDS JLS 9/85 !150
32285 FOR T=1 TO L :: FOR N=
600 TO 800 STEP 10 :: CALL S
OUND(-200,N,0):: NEXT N !021
32290 FOR N=800 TO 600 STEP
-10 :: CALL SOUND(-200,N,0):
: NEXT N :: NEXT T :: SUBEND
 !086
32315 SUB BOMB !141
32320 ! BOMB DESCENT AND EXP
LOSION SOUND EFFECT JLS 9/85
 !049
32325 FOR S=659 TO 220 STEP
-15 :: CALL SOUND(-200,S,3):
: NEXT S :: CALL SOUND(-1000
,-6,0):: SUBEND !092
32330 SUB MOTOR(N)!186
32335 ! MOTOR NOISE SOUND EF
FECT FOR N SECONDS JLS 9/85
!234
32340 FOR L=1 TO N*8 :: FOR
F=-5 TO -7 STEP -1 :: CALL S
OUND(-99,F,0):: NEXT F :: NE
XT L :: SUBEND !119
32365 SUB SONAR(N)!172
32370 ! SONAR SOUND EFFECT F
OR N*1.5 SECONDS JLS 9/85 !2
52
32375 FOR L=1 TO N*2 :: CALL
 SOUND(100,440,X):: FOR Y=1
TO 3 :: CALL SOUND(1,440,14+
X):: NEXT Y :: CALL SOUND(50
0,330,30):: NEXT L :: SUBEND
 !154
32475 SUB HAMMER(N)!228
32480 ! HAMMER(STEP=5), GONG
(1) OR SWORDFIGHT(15) SOUND
EFFECT, REPEATED N TIMES,JLS
 11/85 !061
32485 FOR L=1 TO N :: FOR A=
0 TO 30 STEP 15 :: CALL SOUN
D(-99,400,A,1300,A,3000,A)::
 NEXT A :: CALL SOUND(300,33
0,30):: NEXT L :: SUBEND
```

THE ART OF ASSEMBLY PART 7

Why a Duck?

By BRUCE HARRISON
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This month's installment is not for the faint of heart. It will be heavy seas, high winds, rough waters. The subject is loaders. A loader is a program whose primary job is to load another program. Much of this article will be difficult to understand, and you may feel a little like Chico Marx in the movie The Coconuts, when he keeps asking Groucho "Why a duck?" Groucho was, of course, speaking of a "viaduct."

Putting first things first, we should answer the question "Why a Loader?" There are two answers to that question: One is speed, the other is memory allocation. One can, for example, write a loader that performs certain "once only" chores, then is mostly replaced by the program it loads, thus freeing up memory space for that program to use. The example we'll use this month is taken from our Word Processor. In the sidebar is the source code for a loader we use so that the program may be used with the E/A module or the TI-Writer module. The file it creates is an Option 5 type program file called UTIL1. That is the default filename that both

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E/A Option 5 and TIW Option 3 will look for on DSK1.

TWO PROGRAMS IN ONE

We said the going would get rough, and here's the opening blast of the hurricane. This source code actually makes two programs in one. The object file containing both programs is loaded into memory under E/A Option 3, along with TI's SAVE utility. We enter the program by typing GETUT as a Program Name, thus entering the first of the two programs at that label. This little program gets a memory image file containing the Extended BASIC utilities and stashes that code within the memory space occupied by the second program, then exits to TI's SAVE utility, so we can save the second program to disk as UTIL1.

"Why a Duck?" you ask. Well, over here is the viaduct. Just kidding! The reason is simple. The Word Processor was first developed as an Option 3 E/A program, mainly for our own use. When we decided to market it as a commercial product, we adapted it to run under Extended BASIC with a custom loader submerged under an XB LOAD program. This meant that all the utilities such as VMBW, KSCAN and so on were handled as Equates to the locations of these vectors when XB is in place. Much later, we decided, as part of a general upgrade, to add the ability to load from either E/A or TIW. Still, the bulk of the program relied on finding utilities where XB places them. Thus we had to give our UTIL1 loader the capability of putting all those utilities in the right place before turning the computer over to the Word Processing program.

We then wrote a small Assembly program which would run under XB and capture the XB utilities for us in a memory image file called XBUT. Having that gave us the means to use the source code shown in the sidebar along with TI's SAVE utility to create our own custom Option 5 loader.

And that is part of the reason for a custom loader. Back when we decided to make the program operate from Extended BASIC, we needed a loader so that we would not have to load the object file with XB's CALL LOAD. The Word Processor proper fills nearly all of both the Low and High portions of the 32K memory. The object file (uncompressed) fills 394 sectors of disk space, and cannot be loaded by the E/A Option 3 loader because it AORGs into space used by that loader itself. Loading that object code under Extended BASIC takes all of seven minutes. That's a long time to look at a screen which says "LOADING MAIN PROGRAM" and "PLEASE STAND BY." Thus we included in the WP code a custom "save" utility so that the WP program could save itself as five separate memory image files. Then we wrote a loader which would be embedded under an XB LOAD program, and would load in these five memory image files from the disk. That way, from selecting XB to the Main Menu of WP on screen takes about 25 seconds from a floppy drive, or about four seconds from RAMdisk.

LOW MEMORY

>2008 thru >24F2 = XB Utilities
>24F4
MENUCODE — Entry and Menu
>2A66
PRINTCODE — Printing Part & Configuration
>39FE = End of configure part

HIGH MEMORY

>A000
WORDCODE1 — 9898 Bytes
WORDCODE2 — 9898 Bytes
WORDCODE3 — 1132 Bytes
>F1C0 = End of Main Code
>F690 = Start of Loader Code
>FFE6 = End of DSRLNK Utility

Fig. 1

Much of the code in this month's sidebar is derived from that original Assembly loader we wrote for submerging under the XB LOAD program. It's not the prettiest code we've shown. In fact it's probably the ugliest we'll ever show you. We have violated many of our own rules in throwing this together. For example, there are data sections mixed in among the code sections. Also, there are places where we could have used our own methods to save memory space, but haven't done so. Instead, we followed the maxim "First, get it to work."

When we looked at the source code to prepare it for this article, we found "dead code" sections, subroutines that were never called, and unused data lines in it. Our only excuse is that this was mostly borrowed from the loader written for the XB version, hastily thrown together for a show deadline, and we quit looking at it once we got it to work. The version shown here will still work, but has been cleaned up considerably, and of course has been annotated so you can follow what it's doing line by line.

MEMORY MAPPING

Before we look at the source code in detail, let's look at the memory mapping for the WP program (see Fig. 1). In Low memory we have the XB utilities, then the section of code which starts up the program and puts the menu on the screen. Starting at >2A66 we have the code used for printing documents, plus the part that finds and reads a user's configuration file if he's configured his copy. That all ends at >39FE.

In High memory we have three arbitrarily divided sections of the code, which ends at >F1C0.

These five sections of code are stored on the disk in five memory image files, named as shown in Fig. 1. The part called PRINTCODE could have been combined with the MENUCODE in one file, except that the section PRINTCODE is on occasion overwritten by either utility programs loaded as overlays, or by text from a Move or Copy text operation. Thus there are times during the program's operation that it must re-load PRINTCODE to print a document.

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As you can see, the Loader sits at the higher addresses in High memory. At present, there's a gap between the end of the main program's code and the loader's beginning. If we wanted to, we could have the last section of code in the main program overlap all but a small portion of the loader without any harm. As it is, we have no plans presently for using up that remaining space.

Now into the source code. The REFs at the beginning refer to the E/A utilities which are available to us when the object code is loaded under Option 3. The code between label GETUT and the line reading B @SAVE is all that gets executed after the Option 3 loading. This code establishes a Peripheral Access Block using the data at label SAVDT, then uses DSRLNK to bring the memory image file XBUT into a VDP RAM buffer area. It then performs a VMBR operation to place that file's contents at label DATALD, within the part of the code that will be saved as UTIL1.

The TI SAVE utility takes everything between label SFIRST and SLAST and stores that as an Option 5 program file, which we name UTIL1. Thus the section at GETUT allows us to embed the Extended Basic utilities within that Option 5 program file before it's saved to disk.

We hope that's all clear, because if it isn't, then what follows will be very muddy indeed.

THE LOADER

We now plunge into the murky waters of how the actual loader, saved as UTIL1, works. The very first thing it does is stash R11, which probably could be dispensed with, but it's there. Next it loads a temporary workspace, rather than our usual >20BA. The reason for this is simple. We will be writing to the area in low memory that includes >20BA, using registers as pointers, and we can't overwrite the workspace we're using. Thus we have a temporary workspace at label WS16 within the UTIL1 program's space.

The program now moves the 1262 bytes containing the XB utilities from label DATALD to their proper place in low memory, using the loop at label PUTUT. From this point on, the program will use the XB equates for its utility vectors such as VMBW. We've given these equates different names so they won't conflict with the REFs used in the GETUT section.

At label OPEN, we perform what's called "Boot Tracking". This section of code finds out what disk drive the UTIL1 program was loaded from, and passes that information into the PAB data that it will use to load the main program's five memory image

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SIDEBAR 7

```
* SOURCE CODE FOR UTIL1 LOADER
* TO LOAD HARRISON'S WP UNDER EDITOR/ASSEMBLER OPTION 5
* THIS IS ACTUALLY TWO PROGRAMS IN ONE
* THE FIRST GETS AND STOWS THE XB UTILITIES WITHIN THE SECOND,
* THEN BRANCHES TO TI'S SAVE UTILITY
*
        AORG    >F690           SET MEMORY LOCATION FOR THIS CODE
        DEF     GETUT           DEFINE ENTRY POINT FOR FIRST PROGRAM
        REF     SAVE            REFERNCE THE LABEL SAVE IN THE TI SAVE UTILITY
        REF     VMBW,VMBR,VSBW,VSBR,DSRLNK
GETUT   MOV     R11,@>8300      STASH REGISTER 11 AT >8300
        LWPI    WS16            LOAD A WORKSPACE WITHIN OUR OWN CODE
        LI      R0,PAB1         SET POINTER FOR PERIPHERAL ACCESS BLOCK
        LI      R1,SAVDT        POINT TO THE DATA FOR THAT PAB
        LI      R2,19           NINETEEN BYTES IN THE PAB DATA
        BLWP    @VMBW           WRITE 19 BYTES TO VDP RAM
        AI      R0,9            ADD 9 TO R0
        MOV     R0,@PABPNT      PLACE THAT NUMBER AT >8356
        CLR     @STATUS         CLEAR THE GPL STATUS BYTE
        BLWP    @DSRLNK         GET THE XB UTILITIES INTO VDP BUFFER FROM DISK
FILE
        DATA    8               DATA FOR DSR LINKAGE
        L       R0,>1020        POINT TO BUFFER SPACE IN VDP RAM
        LI      R1,DATALD       POINT R1 TO LOCATION WITHIN PROGRAM TO BE
SAVED
        MOV     @SAVDT+6,R2     GET LENGTH OF FILE INTO R2
        BLWP    @VMBR           READ THE XB UTILITIES INTO MEMORY
        B       @SAVE           BRANCH TO THE TI SAVE UTILITY
SAVDT   DATA    >0500,>1020,0,>24F6->2008,>0009
        TEXT 'DSK4.XBUT'
*
* END OF FIRST PROGRAM
*
* START OF SECOND PROGRAM
* THE PART FROM HERE TO THE END IS SAVED BY THE TI SAVE UTILITY AS FILE UTIL1
* THIS PART IS WHAT LOADS THE FIVE MEMORY IMAGE FILES COMPRISING THE WP PRO-
GRAM
*
        DEF     SFIRST,SLAST,SLOAD  DEFINED LABELS REQUIRED BY TI'S SAVE UTILITY
SFIRST
SLOAD
        MOV     R11,@>8300      STASH R11
        LWPI    WS16            LOAD TEMPORARY WORKSPACE
        LI      R9,DATALD       POINT AT DATA FROM SAVED XB UTILITIES
        LI      R10,>2008       POINT AT START OF XB UTILITY VECTOR AREA
        LI      R4,>24F6->2008  SET R4 FOR NUMBER OF BYTES IN XBUT
PUTUT   MOV     *R9+,*R10+      MOVE A WORD INTO LOW MEMORY AREA, INCRE-
MENT POINTERS
        DECT    R4              DECREMENT COUNT BY TWO, SINCE WE'RE MOV-
ING A WORD
        JNE     PUTUT           IF NOT ZERO, REPEAT
        B       @OPEN           BRANCH TO NEXT SECTION OF CODE
WS16    BSS     32              TEMPORARY WORKSPACE
DATALD  BSS     >24F6->2008     STORAGE AREA FOR XB UTILITIES
FSTEND  EQU     >2A66           END OF FIRST SECTION OF MAIN PROGRAM
ENDCNF  EQU     >39FE           END OF CONFIGURATION SETTING CODE
DEFPRN  EQU     >F0F8+200       END OF HIGH MEMORY PART OF WP
FAC     EQU     >834A           FLOATING POINT ACCUMULATOR
WS      EQU     >20BA           REAL WORKSPACE
VSBRA   EQU     >2028           THE XB VSBR VECTOR'S ADDRESS
OPEN
* THE SECTION HERE AT LABEL OPEN PERFORMS "BOOT TRACKING"
* THAT IS, IT TELLS OUR PROGRAM WHICH DRIVE IT WAS LOADED FROM
        MOV     @>83D0,R12      GET THE CRU BASE IN R12
        MOV     @>83D2,R9       GET THE ROM ADDRESS FOR DEVICE
        LDCR    @ONES,0         ENABLE THE ROM
        AI      R9,4            ADDING FOUR PUTS US AT THE LENGTH BYTE
        MOVB    *R9+,R4         PLACE THAT IN R4 AND INCREMENT R9
        SRL     R4,8            RIGHT JUSTIFY LENGTH IN R4
        LI      R10,SAVDT3+10   POINT TO TEXT BUFFER
MOVIT   MOVB    *R9+,*R10+      MOV ONE BYTE FROM ROM TO TEXT BUFFER
        DEC     R4              FINISHED?
        JNE     MOVIT           NO, DO ANOTHER BYTE
        LDCR    R4,0            DISABLE THE ROM (R4 IS ZERO AT THIS POINT)
        MOVB    @SAVDT3+13,R1   MOVE DRIVE NUMBER (OR LETTER) INTO R1
        MOVB    R1,@MENUDT+13   THEN MOVE INTO THE PAB DATA LINES
        MOVB    R1,@WRD1DT+13
        MOVB    R1,@WRD2DT+13
        MOVB    R1,@WRD3DT+13
        B       @MENU           BRANCH TO NEXT SECTION OF CODE
ONES    DATA    >0101           WORD TO TURN ON ROM IN CRU
*
VMBWA   EQU     >2024           XB'S VMBW VECTOR LOCATION
```

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files. Thus if one has the Word Processor disk in drive 2, or any other drive including RAMdisk, the UTIL1 program will go to that same drive to find its files and load them. This program, incidentally, has not been made compatible with hard disk systems, but will load and run from any floppy or RAMdisk, regardless of what its drive number or letter is.

After that, we branch to label MENU, where we load the final workspace at >20BA. Next we perform a little operation that's only needed when we've entered with the TI-Writer module. We simply capture the character definition for the space character, then use that to define the zero character — CHR$(0) — to look like a space. The main WP program will load its own character set beginning at character one — CHR$(1) — and extending through character 144, but the TIW module would leave the zero character defined, and we want it to look like a space.

Now we do some VWTR operations to set the screen to text mode, set up the colors for text mode, and to insure that VDP will look for character definitions at >800, then clear the screen. Now we give the user two messages on the screen, and get on with the real work of loading the five memory image files.

This would get repetitious, so we'll just go through the process of loading the first such file, called MENUCODE. First, we set R0 to point to the PAB area in VDP, R1 to point to the data, R2 to the length of that data, then write the PAB into VDP RAM. The PAB contains the opcode 05, which is used to load a memory image file. Next in the PAB is the VDP buffer address into which the bytes from that file will be dumped by the DSR. The third word in the PAB is always 0 for this kind of file, and the fourth indicates the maximum number of bytes to be taken from the file. This number must be equal to or greater than the actual file content. In our case, we've made it exactly equal to the number of bytes found in MENUCODE. Finally, there's a byte set to zero, then the length of the file descriptor, followed by the file descriptor text 'DSKx.MENUCODE'. The "x" is there to indicate that the 1 of DSK1 will have been replaced by the boot tracking process.

Once we've moved the PAB address plus nine into >8356 and cleared the STATUS, we proceed to get the file into the VDP RAM buffer by a BLWP @DSRLNJ. DSRLNJ? Why not DSRLNK, you ask? The utility vector DSRLNK has been overwritten when we moved the XB utilities into Low

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```
VMBRA   EQU     >202C           XB'S VMBR LOCATION
VSBWA   EQU     >2020           XB'S  VSBWA
VWTR    EQU     >2030           XB'S VWTR LOCATION
KEYADR  EQU     >8374           KEY-UNIT ADDRESS
STATUS  EQU     >837C           GPL STATUS BYTE
SCRMO   EQU     >83D4           STORAGE LOCATION FOR SCREEN MODE BYTE
PABPNT  EQU     >8356           POINTER LOCATION FOR DSR LINKAGE
PAB1    EQU     >400            FIRST PAB ADDRESS
TEXMO   BYTE    >F0             TEXT MODE BYTE
BLNKLN  TEXT    '
OPMSG   TEXT    'LOADING IN MAIN PROGRAM'  TEXT MESSAGE
PSBMSG  TEXT    'PLEASE STAND BY'
CRITE   BSS     8
*FOLLOWING DATA SECTION CONTAINS THE PAB DATA FOR THE SECTIONS OF MAIN PROGRAM
MENUDT  DATA    >0500,>1000,0,FSTEND->2574,>000D
        TEXT    'DSK1.MENUCODE'
SAVDT3  DATA    >0500,>1000,0,ENDCNF-FSTEND,>000E
        TEXT    'DSK1.PRINTCODE'
WRD1DT  DATA    >0500,>0D00,0,9983,>000E
        TEXT    'DSK1.WORDCODE1'
WRD2DT  DATA    >0500,>0D00,0,9983,>000E
        TEXT    'DSK1.WORDCODE2'
WRD3DT  DATA    >0500,>0D00,0,DEFPRN+2->A000-9983-9983,>000E
        TEXT    'DSK1.WORDCODE3'
* MAIN PART OF LOADER BEGINS HERE
MENU    LWPI    WS              SETS UP WORKSPACE
        MOVB    @TEXMO,@SCRMO MOVE BYTE >F0 INTO >83D4
        CLR     @KEYADR         CLEAR WORD AT >8374
* THE NEXT SIX LINES ARE HERE TO CLEAR OUT THE DEFINITION OF CHARACTER ZERO.
* THAT CHARACTER IS DEFINED WHEN WE ENTER FROM TI-WRITER MODULE, SO WE SET IT
* UP TO LOOK LIKE A SPACE CHARACTER.
* THIS IS NECESSARY SINCE OUR WP MAKES USE OF CHARACTER ZERO, AND WE WANT IT TO
* LOOK LIKE A SPACE ON THE SCREEN
        L       R0,32*8+>800    SET R0 TO SPACE CHARACTER DEFINITION
        LI      R1,CRITE        USE A STORAGE SPACE
        LI      R2,8            EIGHT BYTES TO GET
        BLWP    @VMBRA          READ EIGHT BYTES
        LI      R0,>800         POINT TO CHARACTER ZERO DEFINITION
        BLWP    @VMBWA          WRITE EIGHT BYTES
TEXT    LI      R0,>01F0        PREPARES FOR TEXT MODE
        BLWP    @VWTR           SETS SCREEN IN TEXT MODE
        LI      R0,>074E        SETS COLORS
        BLWP    @VWTR           FOR TEXT MODE
        LI      R0,>0401        PREP TO SET CHARCTER TABLE AT >800
        BLWP    @VWTR           SET IT THERE
CLS     CLR     R0              POINT R0 TO SCREEN ORIGIN
        LI      R4,24           24 ROWS TO CLEAR
        LI      R1,BLNKLN       POINT TO 40 SPACES TEXT
        LI      R2,40           40 CHARACTERS PER ROW TO WRITE
LOOP    BLWP    @VMBWA          WRITE 40 SPACES
        A       R2,R0           MOVE WRITE ADDRESS 1 LINE (ADD 40 TO R0)
        DEC     R4              DECREASE COUNT OF ROWS
        JNE     LOOP            IF NOT ZERO,LOOP BACK AND DO ANOTHER
        LI      R0,9*40+9       SET R0 FOR ROW 10, COLUMN 10
        LI      R2,23           23 CHARACTERS IN MESSAGE
        LI      R1,OPMSG        POINT R1 AT MESSAGE
        BLWP    @VMBWA          WRITE MESSAGE "LOADING IN MAIN PROGRAM"
TO SCREEN
        LI      R0,11*40+12     SET R0 FOR ROW 12, COLUMN 13
        LI      R2,15           15 BYTES IN MESSAGE
        LI      R1,PSBMSG       WRITE "PLEASE STAND BY"
        BLWP @VMBWA             TO THE SCREEN
        LI      R0,PAB1         POINT R0 TO PERIPHERAL ACCESS BLOCK VDP ADDRESS
        LI      R1,MENUDT       POINT TO FIRST PAB DATA BLOCK
        LI      R2,23           23 CHARACTERS IN BLOCK
        BLWP    @VMBWA          WRITE PAB TO VDP RAM
        AI      R0,9            ADD NINE TO ADDRESS
        MOV     R0,@PABPNT      MOVE THAT VALUE TO >8356
        CLR     @STATUS         CLEAR STATUS BYTE
        BLWP    @DSRLNJ         USE DSR LINKAGE VECTOR
        DATA    8                 DATA FOR DSR LINK
        LI      R0,>1000        POINT TO BUFFER AREA
        MOV     @MENUDT+6,R2    GET FILE LENGTH INTO R2
        LI      R1,>24F4+128    POINT AT LOW MEMORY LOCATION FOR FIRST
CODE SECTION
        BLWP    @VMBRA          READ THE SECTION MENUCODE INTO LOW MEMORY
        LI      R0,PAB1         POINT TO PAB LOCATION
        LI      R1,SAVDT3       SAVDT3 IS SECOND PAB DATA PORTION
        LI      R2,24           24 BYTES TO WRITE
        BLWP    @VMBWA          WRITE PAB INTO VDP
        AI      R0,9            ADD NINE TO ADDRESS
        MOV     R0,@PABPNT      MOVE THAT TO >8356
        CLR     @STATUS         CLEAR GPL STATUS BYTE
        BLWP    @DSRLNJ         USE DSR LINKAGE VECTOR
        DATA    8               REQUIRED DATA
        LI      R0,>1000        POINT TO BUFFER
```

ART OF ASSEMBLY—

(Continued from Page 17)

memory, so we can't use it. Instead, we've included a DSR Linkage (thanks to Doug Warren/Craig Miller) which has been renamed DSRLNJ so it won't upset the Assembler. This is the same DSRLNK that was included in Barry Traver's column some time ago. That link vector and its associated code is part of our program UTIL1, which is kept in the highest available addresses in High memory.

When our main program is running, it too uses this linkage vector to perform file accesses. It also uses the GPLLNK included in our UTIL1 program, just before DSRLNJ.

Okay, so now we've got the section called MENUCODE in VDP RAM. The next step is to put that into Low memory at the correct address. That address is >24F4+128, or >2574. The 128 bytes between >24F4 and >2574 are used when we enter from XB to stash some system data which XB will need when we exit the program, hence the actual content of our WP program starts at >2574. Moving of the code into its proper place is done by a BLWP @VMBRA, which is of course one of those XB utilities we put in place earlier.

This process continues until we've loaded all five memory image files. These files are true memory image, with no file headers attached to them. Many authors will go to some trouble about making file headers, but our reasoning was that, since the only possible use these files have is to be loaded by our own loader, there was no point in providing them with headers. There are days when we regret that decision, especially when we make changes in the main program which require changing the addresses equated in our loader, which then must be re-assembled just because one of those addresses changed by two bytes. The very next time we write a WP program, we'll put a file header of some kind in, giving us some information about the length of the file's content, and then we won't need to change and assemble the loader each time we change the main program.

The last couple of things this program does is to place the last section of code (WORDCODE3) into high memory, send the drive designator byte to location >FD0E+13, then branch to address >2840, the entry point of the main progam. Location >FD0E+13 is meaningless in this program per se, but it happens to be the location where the XB loader has the drive designator byte, so we park that byte at that location, where the main program can get the information about what drive the program disk resides in.

(See Page 19)

```
        LI      R1,FSTEND       POINT TO END OF FIRST CODE SECTION
        MOV     @SAVDT3+6,R2    LENGTH OF CODE SECTION IN R2
        BLWP    @VMBRA          MOVE THE FILE PRINTCODE INTO LOW MEMORY
        LI      R1,WRD1DT       POINT TO NEXT PAB DATA
        LI      R0,PAB1         SET R0 TO PAB
        LI      R2,24           24 BYTES TO WRITE
        BLWP    @VMBWA          WRITE DATA TO PAB
        AI      R0,9            ADD NINE
        MOV     R0,@PABPNT      MOVE TO >8356
        CLR     @STATUS         CLR STATUS
        BLWP    @DSRLNJ         DSR LINK
        DATA    8               REQ'D DATA
        LI      R0,>0D00        SET TO BUFFER LOCATION
        LI      R1,>A000        POINT R1 TO START OF HIGH MEMORY
        LI      R2,9983         9983 BYTES IN FILE
        BLWP    @VMBRA          READ THIS SECTION INTO HIGH MEMORY
        LI      R0,PAB1         RESET TO PAB
        LI      R1,WRD2DT       SECOND HIGH MEMORY PART
        LI      R2,24           24 BYTES
        BLWP    @VMBWA          WRITE PAB
        AI      R0,9            ADD 9
        MOV     R0,@PABPNT      TO >8356
        CLR     @STATUS         CLR STATUS
        BLWP    @DSRLNJ         DSR LINK
        DATA    8               DATA
        LI      R0,>0D00        POINT TO BUFFER
        LI      R1,>A000+9983   ADDRESS FOR SECOND SECTION OF HIGH MEMORY
CODE
        LI      R2,9983         9983 BYTES TO READ
        BLWP    @VMBRA          READ INTO HIGH MEMORY
        LI      R0,PAB1         SET TO PAB
        LI      R1,WRD3DT       THIRD HIGH MEMORY PART
        LI      R2,24           24 BYTES PAB DATA
        BLWP    @VMBWA          WRITE TO VDP
        AI      R0,9            ADD 9
        MOV     R0,@PABPNT      TO >8356
        CLR     @STATUS         CLR STATUS
        BLWP    @DSRLNJ         DSR LINK
        DATA    8               DATA
        LI      R0,>0D00        SET TO BUFFER
        LI      R1,>A000+9983+9983 ADDRESS FOR LAST SECTION OF CODE
        MOV     @WRD3DT+6,R2    LENGTH OF CODE SECTION
        BLWP    @VMBRA          READ CODE INTO HIGH MEMORY
        MOVB    @SAVDT3+13,@>FD0E+13  "MAILBOX"   THE DRIVE DESIGNATOR
FOR MAIN PGM
        B       @>2840          BRANCH TO MAIN PROGRAM ENTRY POINT
* GENERAL PURPOSE GPL AND DSR LINKS
* FOR USE UNDER EXTENDED BASIC
* THIS CODE BY DOUG WARREN/CRAIG MILLER OF MILLER'S GRAPHICS
GPLWS   EQU     >83E0
GR4     EQU     GPLWS+8
GR6     EQU     GPLWS+12
STKPNT  EQU     >8373
LDGADD  EQU     >60
XTAB27  EQU     >200E
GETSTK  EQU     >166C

        AORG    >FF2C           SET MEMORY LOCATION FOR LINKAGE ROUTINES
* THIS AORG IS SET SO THAT UTILITIES WIND UP AT THE SAME LOCATION AS WITH THE
* EXTENDED BASIC LOADER
GPLLNK  DATA    GLNKWS
        DATA    GLINK1
RTNAD   DATA    XMLRTN
GXMLAD  DATA    >176C
        DATA    >50
GLNKWS  EQU     $->18
        BSS     >08
GLINK1  MOV     *R11,@GR4
        MOV     *R14+,@GR6
        MOV     @XTAB27,R12
        MOV     R9,@XTAB27
        LWPI    GPLWS
        BL      *R4
        MOV     @GXMLAD,@>8302(R4)
        INCT    @STKPNT
        B       @LDGADD
XMLRTN  MOV     @GETSTK,R4
        BL      *R4
        LWPI    GLNKWS
        MOV     R12,@XTAB27
        RTWP
*
*
PUTSTK  EQU     >50
TYPE    EQU     >836D
NAMLEN  EQU     >8356
```

ART OF ASSEMBLY—

(Continued from Page 18)

This loader is fairly messy, and we really should get around to cleaning it up, but the idea this month was to give you some ideas to play with, and to show some essential things a loader must do. We understand that there are some "general purpose" loaders available in the TI community, but our experience has been that, since our own style of doing things is unique, we're stuck with writing our own loaders. After doing a couple of them, one can always take an old one, make some changes to the source code, and generate a new custom loader with very little effort. We hope you now know "Why a Duck".

Our next article will go into the topic of file accesses in more depth, with emphasis on trapping errors in file operations.

```
VWA     EQU     >8C02
VRD     EQU     >8800
GR4LB   EQU     >83E9
GSTAT   EQU     >837C

DSRLNJ  DATA    DSRWS,DLINK1
DSRWS   EQU     $
DR3LB   EQU     $+7
DLINK1  MOV     R12,R12
        JNE     DLINK3
        LWPI    GPLWS
        MOV     @PUTSTK,R4
        BL      *R4
        LI      R4,>11
        MOV     R4,@>402(R13)
        JMP     DLINK2
        DATA    0
        DATA    0,0,0
DLINK2  MOVB    @GR4LB,@>402(R13)
        MOV     @GETSTK,R5
        MOVB    *R13,@DSRAD1
        INCT    @DSRADD
        BL      *R5
        LWPI    DSRWS
        LI      R12,>2000
DLINK3  INC     R14
        MOVB    *R14,@TYPE
        MOV     @NAMLEN,R3
        AI      R3,-8
        BLWP    @GPLLNK
DSRADD  BYTE    >08
DSRAD1  BYTE    00
        MOVB    @DR3LB,@VWA
        MOVB    R3,@VWA
        SZCB    R12,R15
        MOVB    @VRD,R3
        SRL     R3,5
        MOVB    R3,*R13
        JNE     SETEQ
        COC     @GSTAT,R12
        JNE     DSREND
SETEQ   SOCB    R12,R15
DSREND  RTWP
SLAST   END
* SLAST MARKS THE END OF WHAT'S SAVED IN THE FILE UTIL1
```

Calendars available from Ogden group

The Ogden (Utah) TI99/4A Users Group is selling a 1992 calendar, created by group members David Mischler and Mel Bragg, using Page Pro 99.

The illustrated calendar has spiral binding at the top so pages can be flipped over each month. Besides holidays, it lists meeting dates for the Ogden TI99/4A Users Group and the Salt Lake City group, as well as dates for Fest West '92. The calendars are $4 plus $1 shipping from the Ogden TI99/4A Users Group, c/o Mel Bragg, 1396 Lincoln, Apt. B, Ogden, UT 84404.

Eunice Spooner turns kids on to TI's and computing

By LAURA BURNS

The founder of the only all-kids TI users group is now conducting an adult group in Maine.

Eunice Spooner, who sponsors a TI club of kindergarten through eighth-grade students at the Atwood-Tapley Elementary School in Oakland, Maine, says parents this year have asked her ""How can I keep up with my children?"

The adults-only group that was formed as a result met on the first Thursday in October and November and now participants want to meet the first and third Thursdays, she says.

Oakland, Maine, is "basically a mill town," she says. "People can't afford an Apple or an IBM, but they do want their children to learn computing. They're willing to spend $25 on a used TI or to rent one for $5 a month to see how their child likes it."

> Spooner ... was teaching first grade in 1982 when she had an automobile accident which broke her neck. At the time of her accident, she was working on a masters degree in math education ... and had learned TI Logo as her class project. She says she "fell in love" with the Logo programming language.

Spooner had taught kindergarten and was teaching first grade in 1982 when she had an automobile accident which broke her neck. She is now a quadriplegic. At the time of her accident, she was working on a masters degree in math education at the University of Maine and had learned TI Logo as her class project. She says she "fell in love" with the Logo programming language.

She was hospitalized in December after the accident, which occurred when she was on the way to the National Council of Teachers of Mathematics conference in Boston, and got out in May in time for the high school graduation of the eldest of her three sons.

She began volunteering at the Oakland Elementary School for three days per week. The desire of the students for

(See Page 24)

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#2. WHEEL OF FORTUNE, BLACKJACK & JOKER POKER
Three fantastic freeware programs on one disk. Professional quality and the best "wheel" game around at any price. Vanna would love it !

#3. DUMPIT
This disk helps you transfer many TI modules to disk. Recommended for users with some programming ability. Ed/Assembler and "widget" recommended.

#4. PRINTART
Two disk sides filled with files that print out great quality pictures on most printers. Many famous TV and comic characters on this disk. "Beam me up Scotty."

#5 ORIGINAL TI SALES DEMO DISK WITH TI-TREK GAME
This disk is packed full of assorted files of all types. Graphics, speech etc. Contains complete TI-TREK game for Speech Editor or TE-II module.

#5A. TI MUSIC/GRAPHICS
A great collection of music and matching graphics. Great examples of music & sprite programming.

#6. EXBASIC MUSIC
A two disk side collection of music & graphics that we consider some of the best.

#7. SPACE SHUTTLE MUSIC/GRAPHICS
One of the real outstanding examples of programming. This disk has it all. Great graphics, music, and continuity. A real salute to the space program. It is almost like watching a movie!

#8. LOTTO PICKER
This program randomly generates numbers for use in the various state lotto games and even runs a simulated lotto game. Easy to modify for pick 6 etc. games. A great learning and fun disk.

#9. MONA LISA PRINT OUT
This disk prints out a near photo quality picture of that lady with the clsssic smile. We understand it was made by digitizing the original with a super powerful computer and converting the output to run on the TI-99/4A. Impresses everyone who sees it! Requires Epson printer compatibility.

#10. GOTHIC PRINT
This disk lets you type out a phrase on the screen and then print it out in gothic (Old English) style. Looks like hand-lettered calligraphy. Use for invitations, announcements and business cards.

#11. ANIMATED CHRISTMAS CARD "WOODSTOCK"
This disk was actually originally sent to TEX-COMP as a greeting from master programmer Ray Kazmer. It was just too good not to share! One of the best examples of computer animation and graphics you will see on any computer!

#12. TI-99 OLOPY
This great piece of programming actually simulates and plays the famous board game. For legal reasons we cannot name the game but "do not pass Go! but go directly to Jail!"

#13. STRIP POKER (PG RATED)
Play Poker against your TI-99/4A. When you win a hand she loses--a piece of her clothes that is. Don't worry about being a lousy poker player. Another file is included where you don't even have to know an ace from a king.

#14. FIGURE STUDY (PG RATED)
A collection of Playboy type centerfolds that can be printed out at your command. Use with any printer.

#15. STAR/EPSON PRINTER DEMO
This 2 sided disk contains a large collection of demo programs to put your Star/Epson compatible printer through its paces. Learn what control codes can do! Lots of text and graphics examples. Second side has a great tutorial on printer graphics with examples!

#16. SIDEWAYS PRINTOUT
This program allows you to print out the material from your printer sideways. Great for spreadsheets, banners and large graphics. Second side contains some new enhancements for Multiplan not available on the TI upgrade.

#17. TI FORTH DEMO
This demo disk was released by TI to show the power of Forth. Fantastic music and graphics. Ed/Assem and 32k required!

#18. TI DIAGNOSTIC
This program loads into the Mini-Memory module and checks out your entire system. Much better than disk based diagnostics that cannot be used if a problem in the disk system is at fault. Complete documentation on second side.

#19. TI WRITER/MULTIPLAN UPGRADE
This disk released by TI adds real lower case to your TI Writer, speed to Multiplan and other enhancements. Easy to use., just substitute new files for old! Instructions included.

#20. ACCOUNTS RECEIVABLE
This self contained prize winning program loads and runs in Exbasic and has all the features found in a progessional accounting system. Complete with documentation and a second disk side with report generating programs.

#21. DATA BASE DEMO DISK
A progessional data base program that was originally written to store various magazine articles from computer magazines and then find them by name, subject, key word, or publication. Fast, easy to use and easy to adapt for other applications. Come complete with sample data to make learning data base processing easy. Completely menu driven and unprotected.

#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.

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#29. LABEL MAKER 1
Two great programs for making custom labels for disks, addresses video tapes or any other application. Even contains a graphic display of the TI-99/4A console. Now you can create custom labels of any number by just typing in the lines as you want them. Uses standard tractor labels.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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BUY TEN DISKS GET THREE FREE
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#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!!!

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

TEX-COMP
Celebrating Our Tenth Year

#114. PANORAMA
drawing and illustration program that ...pliments Graphx and TI Artist. A must ...r the serious 99/4A artist!
#115. GRAPHICS DESIGN SYSTEM
A complete system for creating graphic screens in full color for your programs by J. Peter Hoddie. Fully documented.
#116. FOURTH TUTORIAL
A lesson in FORTH programming on how to create graphics.
#117. UNIVERSAL DISASSEMBLER
This powerful utility written in Forth allows disassembly of programs off disk in any format, in memory, and even off of P-Box cards. Very complete with some very unique features.
#118. FAST TERM
One of the most popular and recommended of the 99/4A terminal emulator programs. Supports TE-II, ASCII, and X-Modem transfers, print spooling and more. Loads from Exbasic or E/A.
#119. RAG LINKER
A utility for converting DIS/FIX 80 assembly object code files to PROGRAM image. This allows files to load faster and take up less space on disk. Full Doc
#120. BITMAC
The original BITMAC is now available at $4.95 with all original documentation. A powerful graphics program for the 4A which lets you print where you want..even over pre-existing text. Create great graphics in 16 colors, print text sideways, mirror image, upside down etc. etc. A must for anyone into 99/4A graphics. Comes with second bonus disk with utilities such as sign & banner makers. Even can computer generate your own signature!
#121. SUPER YAHTZEE & WHEEL II
If you like Yahtzee this disk is for you. A great version written in high speed assembly. Also included is another version of Wheel of Fortune which also lets you create your own puzzles with a puzzle edit program included.
#122. ADULT ADVENTURE
A trily adult adventure for use with the TI Adventure Module. Also included is a bonus adventure (not adult) "LOST GOLD" which is one of the better ones we have seen recently.

#123. GREAT 99/4A GAMES, VOL V
THE FIFTH IN OUR BEST SELLING GAME COLLECTION SERIES. TWO DISK SIDES PACKED WITH THE BEST!
#124. GREAT 99/4A GAMES, VOL VI
TWO MORE DISK SIDES FILLED WITH THE THE BEST GAMES AVAILABLE.
#125. BLACKJACK & POKER
A DISK BACKUP FOR MODULE OWNERS.
#126. VIDEO CHESS
A DISK BACKUP FOR OWNERS OF THE ORIGINAL MODULE. LOADS IN ESBASIC!
#127. PIX-GRAPHICS UTILITY
THIS IS THE FREEWARE VERSION OF JIM REISS' UTILITY THAT CAN DISPLAY TI-ARTIST, GRAPHX AND RLE GRAPHICS AND CONVERT FORMATS.
#128. TETRIS--THE SOVIET MIND GAME!
THIS INTERNATIONAL HIT IS NOW AVAILABLE FOR THE 99/4A. EXBASIC AUTOLOAD AND ENGLISH INSTRUCTIONS.
#129. CASH DRAWER
A COMPUTERIZED CASH REGISTER PROGRAM THAT PRINTS RECEIPTS, COMPUTES DAILY TOTALS AND EVEN FIGURES SALES TAX.
#130. THE ORGANIZER
THE ORIGINAL ORGANIZER PROGRAM WHICH LETS YOU ORGANIZE, SCHEDULE AND ARRANGE BUSINESS AND PERSONAL ACTIVITIES!

#131. COMPUTER CRAPS
THE BEST CASINO CRAPS GAME AVAILABLE FOR THE 4A. COMES WITH FULL DOCUMENTATION.
#132. AMBULANCE
A DISK BACKUP OF THE ARCADE MODULE BY FUNWARE. LOADS IN EXBASIC!
#133. DRIVING DEMON
A DISK BACKUP OF THE ARCADE MODULE BY FUNWARE. LOADS IN EXBASIC!
#134. ROTO-RAIDER
A DISK BACKUP OF THIS HIT MODULE BY ROMOX. LOADS IN EXBASIC.
#135. ARCTURUS
A DISK BACKUP OF THE HIT SUNWARE ARCADE MODULE. TI'S ANSWER TO ZAXXON!
#136. ANT-EATER
A DISK BACKUP OF THIS HIT ROMOX MODULE
#137. CROSSFIRE
A DISK BACKUP FOR OWNERS OF THE ORIGINAL TI ACTION MODULE FROM SIERRA ON-LINE.
#138. FIREHOUSE COOKBOOK
A TWO DISK SIDE COLLECTION OF THE BEST FIREHOUSE RECEIPES, FOR ANY BIG GROUP!
#139. MOONMINE
A DISK BACKUP FOR OWNERS OF THE MODULE
#140. MASH
A DISK BACKUP FOR OWNERS OF THE ORIGINAL
#141. MOONSWEEPER
A DISK BACKUP FOR OWNERS OF THE ORIGINAL
#142. TOUCH TYPING TUTOR
A DISK BACKUP FOR OWNERS OF THE ORIGINAL
#143. CONGO BONGO
A DISK BACKUP FOR OWNERS OF THE ORIGINAL
#144. STAR TREK
A DISK BACKUP FOR OWNERS OF THE ORIGINAL
#145. BUCK ROGERS
A DISK BACKUP FOR OWNERS OF THE ORIGINAL
#146. THE PRESIDENTS
A TI FIRST! THE BIOGRAPHIES OF EVERY U.S. PRESIDENT ON TWO DISK SIDES. GREAT FOR SCHOOL, TRIVIA AND HISTORY BUFFS.
#147. CALENDAR-NOTEPAD
THE BEST "CALENDAR MAKER" PROGRAM WE HAVE SEEN. KEEP TRACK OF APPOINTMENTS, SPECIAL OCCASIONS AND PRINT OUT ANY MONTH. INCLUDES A GREAT CALENDAR UTILITY FOR ANY DAY/DATE IN THE FUTURE!
#148 KENO & SLOTS
TWO TOP RATED GAMES BY BOB GASTONI. THE VERY BEST AND REALISTIC KENO GAME WE HAVE SEEN. JUST LIKE VEGAS!
#149. GREAT 99/4A GAMES VOL. VII
FEATURES "BLOCKBUSTER" THE ULTIMATE MULTI-LEVEL BREAKOUT GAME PROGRAMMED IN (.
#150. ULTIMATE TRIVIA
A COLLECTION OF SEVEN INFORMATIVE AND THINKING TYPE TRIVIA GAMES-THE BEST!!

ATARI SOFT BACKUPS
#151 JUNGLE HUNT*
#152 POLE POSITION*
#153 DONKEY KONG*
#154 PROTECTOR II*
#155 PAC MAN*
#156 CENTIPEDE*
#157 DEFENDER*
#158 SHAMUS*
#159 MS. PAC MAN*
#160 DIG DUG*
#161 PICNIC PARANOIA*
#162 MOON PATROL*
*DISK VERSIONS OF DISCONTINUED MODULES. LOAD IN EXBASIC-SOLD AS A BACKUP FOR MODULE OWNERS

INFOCOM BACKUPS DISKS. BACKUPS OF ORIGINAL EXBASIC AUTOLOAD-
#163 ZORK I
#164 ZORK II
#165 ZORK III
#166 HITCHIKER'S GUIDE TO THE GALAXY
#167 WITNESS
#168 ENCHANTER
#169 INFIDEL
#170 PLANETFALL
#171 SORCERER
#172 DEADLINE
#173 CUTTHROATS
#174 SUSPENDED
#175 STARCROSS

TI BACKUP DISK-
BACKUPS FOR THE OWNERS OF ORIGINAL. LOAD FROM EX-BASIC.
#176 AMAZING
#177 HOUSEHOLD BUD.MGT.
#30 H.B.M.DATA PRINOUT
#178 DEMON DESTROYER
#179 POPEYE
#180 QUEBERT
#181 METEOR BELT
#182 BLASTO
#183 CAR WARS
#184 FACE MAKER
#185 SUPER FLY*
#186 SPACE BANDITS*
#187 BIG FOOT*
* NOT FOR MBX SYSTEM
BACKUPS OF HIT MODULES
#188 KILLER CATERPILLER
#189 ESPIAL (HIT VERSION)
#190 BLACK HOLE & SPACE AGGRESSOR
#191 GREAT 99/4A GAMES VOL. VIII.COLLECTION OF THE BEST. 2 SIDES
#192 GREAT 99/4A GAMES VOL. IX. 2 SIDES PACKED WITH THE BEST GAMES EVER.
#193 SPY'S DEMISE DISK BACKUP OF THE ARCADE GAME BASED ON "ELEVATOR ACTION".
#194 ST. NICK, GHOSTLY SPELLING+, THE HIT GAME ON DISK PLUS EDUCATIONAL GAMES.
#195 TINY LOGO
#196 JOTTO
#197 PRO TENNIS +

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SPOONER—

(Continued from Page 19)

more computer time led to the founding of the Oakland Computer Club five years ago. The club has met weekly at the school ever since and has approximately 40 members.

The club started with cassette systems but now is looking for more disk systems to use, she says. A library of modules is available and club members can check them out as they would library books. After signing out one educational module per week for three weeks, a club member can check out a game module the first week.

For the meetings, she notes, it is "a challenge to come up with programs for elementary school programmers to type in. It's really the only programming they get. Usually in school it's using 'canned software.'"

Atwood-Tapley Elementary received one of 25 Technology in Maine awards three years ago, bestowed for innovative computer use in the classroom, Spooner notes.

Spooner teaches an extra hour of computing for students with disk drives one day per week so they can learn "more about how to use word processors, Page Pro and the printer, things that I can't cover in the meeting."

Spooner drives a wheelchair-accessible van which Oakland residents raised money for.

"Until I got my van the principal had to drive me to school in his car with my wheelchair," she says.

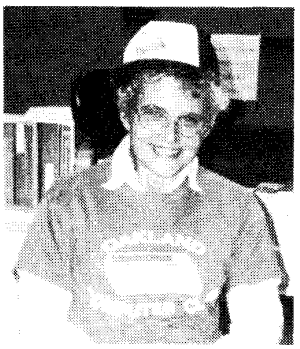
Parent-built carts allow 15 TI computers to be wheeled to different locations in the school and to the library on computer club nights. In addition, three computers with printers and double disk drives are permanently in the library.

The club newsletter publishes the programs used at the club meetings.

"It's hard to get children to write articles," she notes. The newsletter is exchanged with about 40 other TI users groups.

"I'm thankful they send me their monthly issues in exchange for ours only three times a year," she says.

The club has held fundraising projects for four years. The first year, members bought their first disk drive and printer. For the past three years, funds have been used for a field trip to the Boston Computer Museum. Last time, 30 students and 26 adults went. The group members carried their lunches, spent four hours at the museum and stopped for supper at the Burger King. To raise funds for the trip, the students sold candy bars, computer club shirts and hats.



Atwood-Tapley Elementary received one of 25 Technology in Maine awards three years ago, bestowed for innovative computer use in the classroom, Spooner notes.

Another source of funds for the club is its Logo videotape, suggested to Spooner by Charles Good of the Lima, Ohio, Users Group. The five-hour tape with a Logo demo disk sells for $10.

"It cost me $5 to make and the other $5 goes to the club, more if people donate more," she says.

More than 100 of the Logo tapes (reviewed in October 1990 MICROpendium) have been sold. They are available from Eunice Spooner, Webb Rd. Box 3720 RFD, Waterville, ME 04901.

"I love Logo because of the geometry it teaches," she says. "Students can work with variables in the second and third grades. With ordinary math they don't do it until sixth or seventh grade. They don't get tired of the program, and it's good for all abilities."

Last spring she attended her first TI fair in Lima, Ohio, along with a student from the club.

"It was wonderful to meet people I had heard of and talked to on the phone," she says, "so I wanted to go to the Chicago Faire. It was great to go. I bought a MIDI Interface because our music teacher wanted to hook up a keyboard to the TI."

The club has received a number of TIs through donations and she has bought others at yard sales.

"The Cedar Valley Club in Iowa, has been very supportive," she notes. "A lot of TI club members have outgrown the educational modules which we need so desperately at school and they donate them."

Spooner says she receives a great deal of community and volunteer support.

"The girl that takes care of me, though not a great fan of computers, has learned to fix GROM ports, replace power supplies, put in keyboards and fix modulators. She had a good time at the Chicago Faire, though she wasn't looking forward to it," Spooner says. "She's a homebody, doesn't like to fly. But she began finding 'good deals' in Chicago."

Spooner's sons have all been to the Boston Fair, but she has not yet been. Her sons have telephoned from the fair with information on computer equipment she may want to buy in previous years. She hopes to attend the 1992 event in Boston if it is wheelchair accessible. The drive from Maine to Boston — 3 hours — is too long for a person with Spooner's limited neck rotaton and arthritis to drive without another adult along.

Her oldest son is a computer consultant, the second works for Digital and the third son, studying business at Northeastern, is "using computers galore." They got "hooked" by their first visit with her to the Boston Computer Museum, she says.

Now that the boys are out of the house, she says a project is to redesign her home with a huge computer room instead of extra bedrooms, which will accommodate, among other items, her 24-hour BBS, which operates at (207) 465-9065. By having a local BBS available, students can call from the modem at school. The BBS operates on three disk drives with Ed Schram's After Hours program.

Her next school project is to do videotapes of club projects.

Newsbytes

Program gets update

Casino Games has been revised to include more assembly language routines and some changes to simulate casino action play more closely, according to the manufacturer, Dennis F. Rebello.

The game begins with the player in the casino's bank where he withdraws his starting bankroll. The bankroll, including any winnings, follows the player from one game to the next and the player can return to the bank for additional funds, if needed, until his account is depleted. After making the withdrawal, the player enters the casino's lobby, where he can choose between playing video poker or blackjack, going back to the bank or leaving the casino.

Video poker offers the player a choice of playing on a 25-cent, 50-cent or $1 machine and each machine allows the player to place a wager of from one to five coins.

Blackjack has been revised to limit minimum and maximum bets and to follow Atlantic City rules more closely when doubling down and splitting hands. A Blackjack Basic Strategy Chart is includedwith each game.

Casino Games v1.5 comes on a single-sided, single-density disk and sells for $12.95 and requires Extended BASIC and 32K memory. Owners of **Casino Games** may update to v1.5 by sending the original copy plus $1 shipping and handling to Dennis F. Rebello, 89 Little Neck Ave., Swansea, MA 02777.

T.I.C.O.F.F. scheduled

T.I.C.O.F.F. (TI Computer Owners' Fun Faire — The IBM & Clone Owners' Fun Faire) is scheduled from 9 a.m. to 4 p.m. March 14 at Roselle Park High School, Roselle Park, New Jersey.

The event is sponsored by the Roselle Park High School Student Council. Admission is $5, and money raised goes for student scholarships. Robert Guellnitz, science supervisor and computer exposition coordinator for the Roselle Park Public Schools, says the project, now in its seventh year, has raised more than $20,000 in scholarships for students in the past six years. This year 10 percent of the paid gate will be donated to the March of Dimes Foundation, he says. The event has been recognized by the New Jersey Association of Student Councils with a "Top 10 Projects Award."

The event will feature an indoor vendor area, including a "swap shop" where used equipment can be bought or sold. A series of computer seminars and workshops is scheduled during the day.

For further information, contact Guellnitz at the high school, 189 West Webster Ave., Roselle Park, NJ 07204, (908) 241-4550. BBS number is (908) 241-8902.

KBCC relocates, issues new catalog

New address for KB Computer Concepts is 1625½ Roosevelt, Toledo, OH 43607-1462.

The company has released a new catalog of hardware and software. According to Keith Bergman of the company, the company is liquidating its hardware stores to concentrate on software and has reduced prices. For a catalog, send a self-addressed stamped envelope to the above address.

Harrison Software offers audiotape

Harrison Software offers an audiotape for "those who want our MIDI-Master music without investing in a MIDI insturment," according to Bruce Harrison of the company.

The MIDI-Master concert on stereo cassette tape is a combination of the 20 pieces from Anna Magdalena's Notebook by J.S. Bach, along with Bach's Italian Concerto.

Except for the last piece, all were produced on a Casio CT-650 Keyboard using a TI99/4A with MIDI-Master 99 The Italian Concerto was done on the same Casio, but with a PC and Cakewalk software driving the MIDI. Various instruments, including piano, harpsichord and pipe organ sounds are used. The tape has 45 minutes of music, with the same selections on both sides of the 90-minute cassette

The product was introduced at the Chicago TI Faire in November. More MIDI-Master music may be made available under the company's J.C. Bach Music label, according to Harrison.

The tape sells for $10, and features Dolby B Noise reduction on standard "Normal Bias" tape. Check or money order, which includes shipping, may be sent to Harrison Software, 5705 40th Place, Hyattsville, MD 20781.

Jan. 10 deadline set for Fest West vendors

Jan. 10 is the deadline for vendors for the 1992 Fest West in Phoenix, Arizona, Feb. 15-16.

Vendors must send reservation requests with an advance deposit of $20 (the full cost of a space) to VAST Computer User Group, TI Fest West '92 Committee, 4316 W. Altadena, Glendale, AZ 85304.

The event will be held 9 a.m. to 5 p.m. Saturday and 9 a.m. to 3 p.m. Sunday at the Day's Inn Phoenix/Camelback, 502 W. Camelback Rd.

Speakers will make presentations on the TI99/4A and the Geneve. A "Vendors' Forum," an open meeting for software and hardware developers, will be conducted by Don O'Neil Saturday evening.

Special rates of $54 for one to four persons in a room are available from the Days Inn, (602) 264-9290 or 1-800-688-2021 to persons mentioning Fest West when they call.

For further information on Fest West. call (602) 938-5446 or (602) 869-8145.

Want to reach thousands of TI users without paying a dime? Send information about your products and services to MICROpendium Newsbytes, P.O. Box 1343, Round Rock, TX 78680.

USER GROUP UPDATE

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

Nebraska

Omaha TI User Group, c/o Ken Olson, RR1, Box 5, Kennard, NE 68034 (new address).

Pennsylvania

Nittany Users of Texas Instruments, State College, Pennsylvania, disbanded, October 1991.

Outside U.S.

Argentina

T.I.G.E.R.S. (Texas Instruments 99/4A Group of Everlasting, Recalcitrant Survivors) — Spanish name, T.I.G.R.E.S. (Texas Instruments 99/4A "Grupo Recacitrante y Empedernido de Sobrevivientes)," Casilla de Correos #39, (1429) Buenos Aires, Argentina. Newly formed group, Francisco T. Molina "transient de facto coordinator."

Types of scanners and programs that make the job easier

By RAY KAZMER

This is the second part of a two-part series started last month. —Ed.

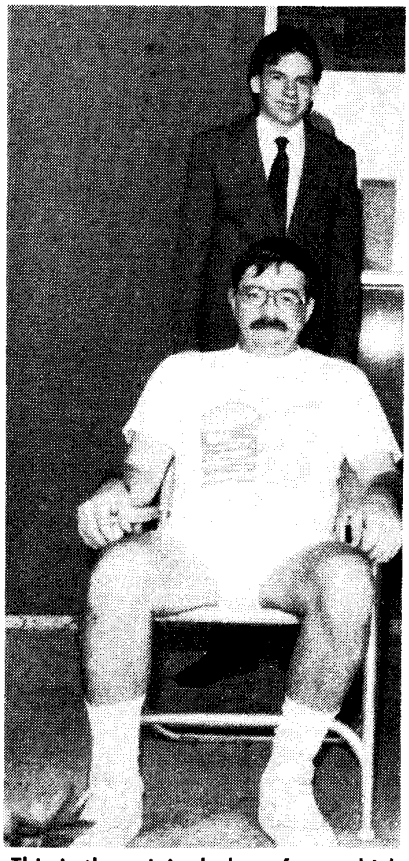
TYPES OF SCANNERS

There are 3 basic types of SCANNERS.

• RED LIGHT SCANNERS: Avoid these, if you plan to scan color photos. They make blank white skin tones (faces.)

• YELLOW-GREEN LIGHT SCANNERS: What I use and recommend. (Around $200.)

• COLOR (WHITE LIGHT) SCANNERS: These work by making three, or four "color overlays" which are then merged over each other, to produce one "colored" picture. An "alignment frame" comes with each unit, and allegedly keeps this scanner in alignment with your originals. (No way!) Prices start at at $695 and go up. But until the technology improves (and the prices come down) I intend to forget about color and be satisfied with plain B&W.



This is the original photo from which the scanned photo was made (at right).

The scanner I use, is a DFI HS3000, which creates a PCX image. Incidentally, the drawings of the HS3000, were scanned right out of the HS3000 manual, and look almost identical to the originals.

The HS3000 scanner has one quirk, which is worth a mention. Though it usually does a decent job with color prints, it appears to love scanning B&W photos. If you create a scan of a poorly exposed color print, you may get muddy looking results. But, if you have a B&W photo made from the same color negative before you scan the picture, the scanner produces a very nice scan, with a fairly wide range of tones.

Scanning photographs and enlarging them to fill a standard 8.5 X 11-inch sheet of paper in your dot matrix printer is an easy job, but remember this — if a photo you are scanning is not sharp, then your end results will also be blurred. Always use razor sharp, original photographs.

If you're one of the two people who bought my Star Trek, The Next Generation 1991 Calendar (from Notung Software) you know that scanned photos have an unusual quality about them. Seen close-up, you see each pixel, and how the patterns are laid out. But if you step back, a scanned photo, which was printed on your dot matrix printer, starts to look a heck of a lot like an actual B&W photograph.

Sample of a scanned photo. Original photo is at left.. The photo was scanned at a resolution of 100 dots/inch.

FIRST PUBLISHER

With a possible exception of fonts, most graphics should be cleaned up (or edited) and changed to a format which a TI can accept before you transfer them to your TI. I found only one PC program which adequately does both jobs for you — First Publisher V.3.0 (at about $100.).

First Publisher can import a .PCX scan, display it on your monitor so you can make whatever changes you want, then save

(See Page 27)

SCANNERS—

(Continued from Page 26)

your picture in .MAC format, which is what this secret process requires.

A special note: Earlier versions of First Publisher can make the needed .MAC format, but will also heavily distort an image. If you purchase First Publisher, be sure that it's version 3.0, or later. Earlier versions are still being sold by software discount companies at "big savings," but you'd be wasting your loot.

Even with V.3.0 there is still a very minor amount of vertical distortion when you use First Publisher to print a scan. Screen images match your originals but a printout is slightly "taller" than the First Publisher screen image. But a lot of testing paid off and I've made an absolutely uncanny discovery.

When I printed that same MAC image with PIX-PRO, there was no distortion at all. The PIX-PRO print exactly matched the scan and the original, even at full-page sizes. I don't know what that implies about First Publisher but I do know it means Jim Reiss is a genius!

Incidently, a MAC image created this way will not load properly into MACFLIX. (I suspect there may be a problem with the file headers, but I'm not sure.)

The first thing you should do with First Publisher is to draw a frame which exactly matches the size of a TI screen, 192 pixels high by 256 pixels wide. You may be surprised at how small that rectangle looks on a VGA screen. The frame should then be saved as an .ART file. Whenever you make scans in the future which you wish to transfer to a TI as a TI-Artist picture, simply load the frame over your scan, place it where you want to crop it, erase everything outside the frame, move your scan (still in it's frame) to the top left corner of First Publisher's screen, and then save it in .MAC format. Now you're ready to transfer it to a TI.

TRANSFERRING TO A TI

The scanned drawings on these pages were transferred from a normal PC "360" disk to a TI DSDD disk using PC-Transfer. (The term "360" refers to the amount of data the PC floppy disk holds (360K) which is about the same amount of data storage as we have on a TI DSDD disk.)

I found two problems with PC-Transfer. Although there is an option to "format a PC disk," my PC-AT, could not read it. The disk looked like an unformatted disk to my PC. This is no big deal unless you intend to send something to a friend on a PC disk, formatted via PC-Transfer. But PC-Transfer could read (and write to) a 360K disk, which had been formatted on my PC.

The second problem is more serious. I purchased my copy of PC-Transfer soon after it was first released. It's V.1.0 and I never found out if there were any updates. This copy will transfer an RLE, (D/F128) to a PC disk, but nothing else, not even a D/V80 text file. As far as I know, I was doing it right. Also, I have a graphic program on my PC which loads RLEs, but RLEs transferred via PC-Transfer, come out totally scrambled. It seems my version of PC-Transfer is a "one way" deal.

There's a slim chance a null modem could cure my TI to PC problem, but my main objective was to get graphics to my TI from my PC, not the other way round. There is one sure way to transfer any TI graphic to a PC — print, then scan them.

I'm sure someone will ask about how to transfer video frames, for animation. But that's a whole new ball of snakes to untangle. I have done it, but the dither (dot pattern) was unacceptable. The problem is on the PC end. (I simply have not found a PC graphics converter, that works as well as PIX-PRO, on a TI.)

THE FUTURE

I couldn't help noticing the wish list in Feedback (October 1991.) Most of the "wishes" the writer wanted are possible today, and some will be here very soon. His second wish, for a TI scanner, may be announced any day, although I really can't see how it could work on unmodified 99/4As, due to the massive memory needed to create scans. I have a hunch that a TI scanner could only work on the 9640, but then how long will 9640s be available?

In February 1988 (at the TI-XPO-88 in Las Vegas) in a room full of people I made a statement that one day our TIs would be able to run any PC program. You can imagine the laughs that drew. We cannot do it yet, but we're getting closer. We now have ways to use hard drives, add 2 megabytes of memory, a mouse, use 80-column cards, 1.2 megabyte floppy drives and make it all run at PC speeds by accelerating it.

Making most PC programs run on a TI would not require too much more. All of these mini-miracles are currently coming from many different sources, but any day now I expect somebody to realize what we almost have here. And then it will happen. Lewis Turner will get his wish — a 99/4A that runs any IBM program, maybe with a "CALL PC" switch.

This article isn't intended to make you rush out and blow $2,000 on a PC, but if you just can't live without one, go ahead. But, if you do, just remember to keep your TI. For just a few dollars more, it will someday make one heck of a "PC backup console," and still be able to run all of your TI programs.

If anybody out there, knows another transfer method (or format combination) which can put PC graphics on our TIs (or vice versa) I would really like to hear about it. Please write to me at: 8614 Foothill Blvd., #221,Sunland, CA. 91040.

Well, I'm tired of typing now, so I think I will go and scan all those neat little graphics, in the Yellow Pages!

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NUSHC, P.O. Box 1343, Round Rock, TX 78680. (Sorry, U.S. orders only.)

Character recognition takes training

By RAY KAZMER

Most OCR (Optical Character Recognition) programs have a few ready-made font files, built-in. They are used to make comparisons of character patterns in image files captured with a scanner. Once an OCR "recognizes" each individual character in an image file, it is able to write an ASCII file (D/V80) to disk, which is identical to the scanned image. (That's the secret of how OCRs work!)

Fonts provided with OCRs are usually sufficient to get you started with most books, magazines and dot-matrix typefaces, if the text you scan, exactly matches the OCR's fonts. (Don't count on that!)

Fortunately, OCRs can be "trained" to "recognize" fonts which are new to them. Training consists of specifically identifying which character three times for each character (in both upper and lower cases, every number, punctuation mark and symbol). By doing so, you can create a new OCR font file, custom-made for a specific published font.

My first attempt at scanning a MICROpendium XB program listing was without training "The Cat Reader," the OCR I own. That produced a horrible mess! Luckily, I knew the first golden rule of programming: "WHEN ALL ELSE FAILS, READ THE MANUAL!"

Since no program listing contains all possible font characters, re-training an OCR may take months of publications, if you want a very high rate of accuracy.

The following tables (one for BASIC and XB, and another for E/A listings) is going to save you months of re-training your OCR, if you have one. You can scan both and custom train your OCR for every character in both fonts, in one pass!

For short BASIC and XB programs, the listings may be printed using the typesetter font. Occasionally assembly programs with short line lengths will be output using a laser font.—Ed.

Font Name: Courier (used with laser printer for most BASIC and Extended BASIC program listings in MICROpendium.)

```
!"#$%&'()*+,-./0123456789:
;<=>?@ABCDEFGHIJKLMNOPQRST
UVWXYZ]\[^_`abcdefghijklmn
opqrstuvwxyz{|}~!"#$%&'()*
+,-./0123456789:;<=>?@ABCD
EFGHIJKLMNOPQRSTUVWXYZ]\[^
_`abcdefghijklmnopqrstuvwx
yz{|}~!"#$%&'()*+,-./01234
56789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ]\[^_`abcdefgh
ijklmnopqrstuvwxyz{|}~
```

Font Name: CG Times (used with Compugraphic digital typesetter for Assembly program listings in MICROpendium.

```
!''#$%&'()*+,-./0123456789:
:<=>?@ABCDEFGHIJKLMNOPQRST
UVWXYZ]\[^_`abcdefghijklmn
opqrstuvwxyz{|}~!"#$%&'()*
+,-./0123456789:;<=>?@ABCD
EFGHIJKLMNOPQRSTUVWXYZ]\[^
_`abcdefghijklmnopqrstuvwx
yz{|}~!"#$%&'()*+,-./01234
56789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ]\[^_`abcdefgh
ijklmnopqrstuvwxyz{|}~
```

1992 TI FAIRS

FEBRUARY

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

MARCH

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

APRIL

Northeast Computer Fair, April 4, sponsored by TI99/4A User Group of the Boston Computer Society. Contact Ron Williams, 14 East St., Avon, MA 02322.

MAY

TI99/4A Users Group, UK, Annual Meeting, May 16, Princess Anne Training Centre, 10 Trinity St., Derby (Derbyshire, England). Contact Stephen Shaw, 10 Alstone Rd., Stockport, Cheshire England SK4 5H.

Multi User Group Conference, May 15-16, Ohio State University Lima Campus. Contact Lima 99/4A Users Group, P.O. Box 647, Venedocia, OH 45894.

SEPTEMBER

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

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

Cellular automata

Life and Linus let you create 'little universes'

By HARRY WILHELM

An entire class of programs exists that is known as "cellular automata." A cellular automaton is a little "universe" of one, two, three or more dimensions that exists within the computer. It contains a "playing field" of cells, each of which can either be vacant or else contain an "organism." Initially a starting colony of organisms is placed in the playing field. The computer examines the "neighborhood" around each cell and then uses a set of simple rules to determine the future of every cell in the universe.

Cellular automata can be created to model real life conditions. A friend of mine who works for IBM wrote one that predicted how cracks would propagate in a ceramic material as it dried.

Even more tantalizing is the possibility of building digital computers within the confines of a cellular automaton. For more information I strongly recommend a fascinating article in the "Computer Recreations" column in the May 1985 issue of *Scientific American*.

I became interested in cellular automata for other reasons: They are interesting to program, and they can generate screen displays that are as beautiful as they are unpredictable.

LIFE

The most famous cellular automata is called LIFE, which was first described in Martin Gardner's column in Scientific American, October 1970. It was developed by John Conway of the University of Cambridge in England.

LIFE's universe exists within a flat, two dimensional matrix of cells, each of which has 8 adjacent cells. Conway's "genetic laws" were chosen to make the behavior of the population relatively unpredictable. These laws are:

Survivals. Each organism having two or three neighbors will survive into the next generation.

Deaths. Each organism with more than three neighbors will disappear due to overcrowding. An organism having fewer than two neighbors will disappear due to loneliness.

Births. Each empty cell having exactly three neighbors will give birth to a new organism.

It is important to understand that all births, deaths, and survivals happen simultaneously, with each contributing to the new configuration of the colony in the next generation.

The colony develops in unusual, sometimes beautiful and always unexpected ways. After many generations, some colonies will die out completely, but most starting patterns reach a stable configuratin that is either stationary or else oscillates through a series of configurations forever.

When you type in the program, make sure to save it before you try to run it for the first time. This is important because any errors in the assembly language part will crash the computer and destroy your efforts!

All the information needed to run LIFE is given in the title screen. This particular version of LIFE is played on a 24 x 32 matrix of cells. It uses a "wrap around" screen so that cells at the four edges of the screen will interact with the cells at the opposite edge.

INITIAL CONFIGURATIONS

To get you started, here are a few starting configurations that give interesting results:

******* (Develops a complicated pattern)

********** (This develops a stable configuration that oscillates through 15 generations before repeating itself.)

```
 ***
*   *        (Develops a complicat-
*   *         ed pattern)
```

```
 **
*  *         (a "glider")
 *
```

This last pattern is what is known as a "glider." It oscillates through 4 generations before returning to the original pattern, which is displaced one square diagonally.

LINUS

LINUS is a one dimensional, or "line" automaton. For LINUS, the universe is a small place consisting simply of a line containing 240 cells. When LINUS runs, the initial configuration of the colony is displayed at the top of the screen. Each subsequent generation is displayed on the next row down until 192 successive generations are displayed on the screen. It is somewhat like looking at a strip of movie film where each frame is taken a fraction of a second later than the preceeding frame.

MISSING LINK REQUIRED

LINUS requires The Missing Link to run. As with LIFE, when you type in LINUS be sure that you save it before running it for the first time. Before running LINUS you may need to convert it from program format to I/V254 format as detailed on pages 23-24 of the The Missing Link manual, select 1 disk file and the 16 color mode. Then load and run LINUS.

Unlike LIFE, LINUS lets you modify the "genetic laws" and thereby create your own custom automaton. You will first be prompted for the width of the neighborhood which should be 3,5,7 or 9. For example, entering a 3 would tell LINUS that for each of its 240 cells it should examine a 3 cell wide neighborhood containing the center cell and one cell on each side of the center.

LINUS will add up the contents of all the cells in the neighborhood except for the center cell. A vacant cell contains a 0 and an occupied cell contains a 1, so if the neighborhood is 3 cells wide the sum must be a 0, a 1, or a 2.

The next two inputs let you determine the course of action for each possible sum. The first input tells LINUS what to do when the central cell is a one; the second is for when the central cell is a zero.

For example:

Sum of ones in neighborhood: 210

Next state of central cell: 100

If the two cells surrounding the central cell both contain a "1" then the central cell will be a "1", otherwise the central cell will be a "0."

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AUTOMATA—

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Finally you can choose either a random or a custom starting configuration. (At this point in the menu, pressing Fctn 9 lets you go back and reconfigure your automaton.) Choosing the random option requires a few seconds to generate a pattern. If you choose the "custom" option a tiny cursor appears in the upper left hand corner of the screen. Press the space bar to make an empty cell and press the "period" key to make an occupied cell. Press "Enter" when you like the initial configuration.

After processing 192 generations, LINUS changes the border color to gray and waits for a key press. At this point pressing Fctn 9 lets you go back to try out a different starting configuration. Pressing the space bar causes the screen to scroll and another 64 generations to be processed.

You will doubtless find your own favorite automatons, but to start you out here are a few of my favorites:

Width: 7
If center cell is a one: 1100100
If center cell is a zero: 1100100

Try the random option a few times and you should see patterns that resemble mountain ranges. Then try out this custom configuration which makes a "glider": 1011

Another good one is:
Width: 7
If center cell is a one: 0101100
If center cell is a zero: 0101000

Use the random option with this automaton and you'll see many "gliders."

One final note on The Missing Link. There simply wasn't enough room in memory to include a "validate" option like the one in standard XB. But there is a way to do it. At the end of LINUS are two subprograms, VALID and UNVALID. The first acts like the VALIDATE option by forcing CALL LINK("INPUT") to recognize only those keys that you specify. The second restores normal keyboard activity.

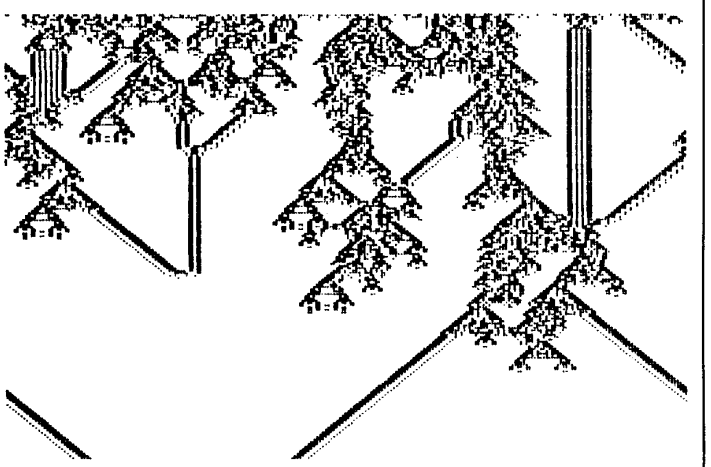
Lines 330, 440, and 540 show how to use the VALID subprogram. Before performing a CALL LINK("INPUT") you must include the following lines of code: CALL PEEK(-31956,A, B):: B$="A STRING":: CALL LINK("VALID",A,B)

CALL LINK("VALID") does not need to be used before every CALL LINK("INPUT"). You only need to use it again if you wish to change the validation string. If you need to use variable names other than A, B, and B$ it is VITAL that they be the same length. For example: X, Y, and Z$ would work, but not A1, B1, and B2$.

I hope you enjoy LINUS and LIFE as much as I have and would enjoy hearing about your own favorite automatons.

Width of neighborhood: 7 cells
When central cell is a one:
Sum of ones in neighborhood: 6543210
Next state of central cell: 0101100

When central cell is a zero:
Sum of ones in neighborhood: 6543210
Next state of central cell: 0101000



AUTOMATA—

LIFE

```
100 !LIFE - program
          COPYRIGHT 1990
          by Harry Wilhelm
 !007
110 CALL CLEAR :: DISPLAY AT
(2,11):"L I F E" :: DISPLAY
AT(4,7):"by Harry Wilhelm" :
: DISPLAY AT(8,1):"Move curs
or with arrow keys." !044
120 DISPLAY AT(10,1):"Use sp
ace bar to put down  or to
pick up a cell." :: DISPLAY
AT(13,1):"Press <ENTER> to s
tart LIFE." !221
130 DISPLAY AT(15,1):"Hold a
ny key to pause LIFE." !122
140 DISPLAY AT(17,1):"Press
<Fctn 9> to interrupt LIFE a
nd modify the screen." :: DI
SPLAY AT(20,1):"Press <Fctn
9> again to  clear the sc
reen." !029
150 DISPLAY AT(24,7):"(press
 any key)" !188
160 CALL KEY(0,K,S):: IF S<1
 THEN 160 !230
170 CALL CLEAR :: CALL INIT
!240
180 CALL LOAD(9460,64,192,16
0,96,32,0,2,224,37,240,4,192
,2,1,50,0)!151
190 CALL LOAD(9476,2,2,3,0,4
,32,32,44,2,3,50,0,2,4,53,0)
!134
200 CALL LOAD(9492,205,51,2,
131,50,32,22,252,2,3,52,224,
```

(See Page 31)

AUTOMATA—

(Continued from Page 30)

```
2,4,49,224)!196
210 CALL LOAD(9508,205,51,2,
131,53,0,22,252,2,3,49,223,2
,7,0,1)!240
220 CALL LOAD(9524,4,196,4,1
97,2,135,0,1,22,6,2,35,0,96,
177,19)!019
230 CALL LOAD(9540,2,35,255,
161,16,1,177,51,177,51,177,1
9,2,35,0,30)!011
240 CALL LOAD(9556,177,51,17
7,115,177,19,2,35,0,30,177,5
1,177,51,2,135)!181
250 CALL LOAD(9572,0,32,22,7
,2,35,255,160,177,19,2,35,0,
96,4,199)!125
260 CALL LOAD(9588,16,1,177,
19,5,135,2,131,53,33,19,26,2
,35,3,223)!169
270 CALL LOAD(9604,2,133,128
,0,19,15,2,132,20,0,17,9,2,1
32,30,0)!028
280 CALL LOAD(9620,21,6,2,6,
138,0,212,198,2,35,251,224,1
6,201,2,6)!146
290 CALL LOAD(9636,128,0,16,
249,2,132,30,0,22,250,2,6,13
8,0,16,243)!197
300 CALL LOAD(9652,2,1,54,0,
4,32,32,36,2,0,8,17,208,95,4
,32)!103
310 CALL LOAD(9668,32,32,5,1
43,2,143,36,248,17,2,2,15,36
,244,4,224)!216
320 CALL LOAD(9684,131,116,4
,32,32,28,208,96,131,124,32,
96,36,248,19,2)!178
330 CALL LOAD(9700,4,96,36,2
50,2,224,131,224,4,96,0,106,
"",9742,36,244,"",8192,36,25
0)!008
340 CALL CHAR(42,"00387CFEFE
FE7C38")!121
350 CALL CLEAR !209
360 CALL SCREEN(6):: CALL CO
LOR(2,16,1)!251
370 R=12 :: C=16 !241
380 CALL GCHAR(R,C,G):: CALL
 HCHAR(R,C,30):: CALL KEY(0,
K,S):: CALL HCHAR(R,C,G):: I
F S=0 THEN 380 !169
390 IF K=15 AND S=1 THEN 350
 !091
400 IF K=13 THEN CALL SCREEN
(2):: GOTO 430 !126
410 IF K=32 AND S=1 THEN G=G
+20*((G=42)+.5):: CALL HCHAR
(R,C,G)!044
420 R=R-(K=11)*(R>1)+(K=10)*
(R<24):: C=C-(K=8)*(C>1)+(K=
9)*(C<32):: GOTO 380 !233
430 CALL LINK("L")!024
440 CALL KEY(0,K,S):: IF K=1
5 THEN 360 !220
450 IF S=0 THEN 430 ELSE 440
 !185
```

LINUS

```
100 ! LINUS - A LINE AUTOMOT
ON !010
110 ! by Harry Wilhelm !150
120 !Requires THE MISSING LI
NK - 1 disk file, 16 colors
!234
130 !!131
140 !!131
150 CALL LOAD(-24576,2,1,160
,42,2,129,160,58,20,14,192,1
,2,2,131,74,140,176,22,6)!07
2
160 CALL LOAD(-24556,140,176
,22,4,140,176,22,2,192,48,4,
80,2,33,0,8,16,239,4,96)!046
170 CALL LOAD(-24536,32,90,8
3,84,82,73,78,71,160,58,76,7
3,78,69,65,82,160,116,4,32)!
245
180 CALL LOAD(-24516,60,18,1
6,240,162,87,2,0,162,88,2,1,
0,240,4,194,208,144,2,130)!1
27
190 CALL LOAD(-24496,32,0,21
,3,220,32,160,114,16,2,220,3
2,160,115,6,1,22,245,4,224)!
151
200 CALL LOAD(-24476,161,60,
4,96,0,106,0,14,0,14,0,2,0,5
,0,1,2,224,161,52)!204
210 CALL LOAD(-24456,2,132,0
,191,22,5,7,4,2,224,131,224,
4,96,0,106,5,132,22,21)!214
220 CALL LOAD(-24436,2,4,0,1
28,2,0,40,0,2,1,163,72,2,2,1
6,0,4,32,32,44)!048
230 CALL LOAD(-24416,2,0,32,
0,4,32,32,36,2,0,48,0,4,193,
2,2,8,0,6,160)!005
240 CALL LOAD(-24396,58,246,
2,0,161,94,2,1,162,88,2,3,0,
240,204,49,6,67,22,253)!
250
250 CALL LOAD(-24376,200,227
,162,88,162,78,200,227,163,6
2,161,84,5,195,2,131,0,10,22
,246)!244
260 CALL LOAD(-24356,2,7,161
,94,194,7,4,192,112,24,19,3,
194,96,160,106,16,2,194,96)!
218
270 CALL LOAD(-24336,160,108
,194,160,160,112,98,32,160,1
10,176,56,6,10,22,253,6,192,
5,128)!035
280 CALL LOAD(-24316,9,9,24,
4,217,224,160,114,0,250,16,3
,217,224,160,115,0,250,5,135
)!014
290 CALL LOAD(-24296,2,135,1
62,78,22,225,4,197,209,165,1
62,88,19,2,4,32,47,188,5,133
)!070
300 CALL LOAD(-24276,2,133,0
,240,22,247,16,162,"",8192,1
60,0)!146
310 W$="5" :: AONE=10 :: AZE
RO=20 !177
320 CALL LINK("CLEAR"):: CAL
L LINK("PRINT",1,93,"L I N U
 S"):: CALL LINK("PRINT",10,
72,"a line automaton")!136
330 CALL PEEK(-31956,A,B)::
B$="3579" :: CALL VALID(A,B)
:: CALL LINK("PRINT",50,1,"W
idth of neighborhood:  cell
s"):: CALL LINK("INPUT",50,1
39,W$,1,W$):: W=VAL(W$)!196
340 CALL LINK("PRINT",75,1,"
When central cell is a one:"
):: CALL CONVERT(85,W,AONE)!
143
350 CALL LINK("PRINT",120,1,
"When central cell is a zero
:"):: CALL CONVERT(130,W,AZE
RO)!188
360 CALL LINK("PRINT",180,1,
"Random or custom pattern? (
R/C)")!105
370 CALL KEY(3,K,S):: IF K=1
5 AND S=1 THEN 320 ELSE IF K
<>67 AND K<>82 THEN 370 !040
380 AONEM=INT(AONE/256):: AO
```

(See Page 32)

AUTOMATA—

(Continued from Page 31)

```
NEL=AONE-AONEM*256 :: AZEROM
=INT(AZERO/256):: AZEROL=AZE
RO-AZEROM*256 !040
390 CALL LOAD(-24470,AONEM,A
ONEL,AZEROM,AZEROL,0,INT(W/2
),0,W)!051
400 CALL LINK("CLEAR"):: CAL
L LINK("COLOR",13,4):: CALL
SCREEN(15):: CALL LINK("CHAR
",46,"8")!236
410 IF K=67 THEN 440 ELSE CA
LL LINK("PRINT",184,1,"gener
ating random pattern")!018
420 RANDOMIZE :: RND$="" ::
FOR I=1 TO 60 :: RND$=RND$&S
EG$("        .  .   .. .   .
. ..  ....   .  .. . . ....
 .. .... ....",1+(RND*64 AND
 252),4):: NEXT I !129
430 CALL LINK("CLEAR"):: CAL
L LINK("CHSIZE",1,1):: CALL
LINK("PRINT",1,1,RND$):: CAL
L LINK("STRING",RND$):: GOTO
 460 !033
440 CALL PEEK(-31956,A,B)::
B$=". " :: CALL VALID(A,B)::
 CALL LINK("CHSIZE",1,3):: C
ALL LINK("INPUT",1,1,A$,240)
!020
450 A$=A$&RPT$(" ",240-LEN(A
$)):: CALL LINK("STRING",A$)
!053
460 CALL SCREEN(4):: CALL LI
NK("LINEAR"):: CALL SCREEN(1
5)!237
470 CALL KEY(3,K,S):: IF K<>
15 AND K<>32 THEN 470 !194
480 IF K=15 THEN CALL LINK("
CLEAR"):: CALL LINK("COLOR",
2,8):: CALL SCREEN(8):: CALL
 LINK("CHSIZE",6,8):: GOTO 3
60 ELSE 460 !194
490 SUB CONVERT(R,W,X)!101
500 CALL LINK("PRINT",R,1,"S
um of ones in neighborhood:
"&SEG$("876543210",10-W,10))
!132
510 CALL LINK("PRINT",R+10,1
,"Next state of central cell
:")!104
520 A$="" :: FOR I=W-1 TO 0
STEP -1 :: IF X>=2^I THEN X
X-2^I :: A$=A$&"1" ELSE A$=A
$&"0" !108
530 NEXT I !223
540 CALL PEEK(-31956,A,B)::
B$="01" :: CALL VALID(A,B)::
 CALL LINK("INPUT",R+10,175,
A$,W,A$)!114
550 X=0 :: FOR I=W-1 TO 0 ST
EP -1 :: IF SEG$(A$,W-I,1)="
1" THEN X=X+2^I !096
560 NEXT I !223
570 SUBEND !168
580 SUB VALID(A,B):: AD=A*25
6+B-65530 :: CALL LOAD(9649,
0,"",9652,INT(AD/256),AD)::
SUBEND !228
590 SUB UNVALID :: CALL LOAD
(9649,6,"",9652,38,40):: SUB
END !023
```

The Missing Link is a graphics environment available from Texaments, 53 Center St., Patchogue, NY 11772; 516-475-3480. TML was reviewed in the Sept. 1990 MICROpendium.—Ed.

MICRO-REVIEWS

MDOS Tetris, Barricade and Aircraft, Autos, Starwars, etc.

By STAN KRAJEWSKI

As I promised last month, I ran both Scud Busters and Codebreakers on the Geneve. They worked, as long as you load them through the Editor/Assembler as the documentation says, instead of using the Extended BASIC autoloader.

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

★ Leave it alone, back to the drawing board.

★★ Needs improvements, but workable.

★★★ A good program, worth trying.

★★★★ Send your money and buy it.

★★★★

MDOS TETRIS

I'm sure almost everyone has either tried or got hooked on the Tetris game by now, as there there are quite a few versions of it. Tetris is the puzzle game where different shaped blocks drop from the top of the screen as you frantically try to align the pieces into a solid row before they come to a stop on the bottom of the screen.

This version should not be mistaken for a version that was reviewed in a past edition of MICROpendium.

MDOS Tetris loads right out of MDOS, making it easy for the Geneve owner to load. System requirements for this disk are: Geneve 9640, MDOS 1.01 or higher. At the MDOS prompt just type "Tetris" and the program will load.

The title screen is beautifully done in a GIF format. The features of this game, that go beyond any other version that I have seen, are: The configure screen can be used in any one of three languages (you can choose Spanish, English, or German); you may toggle between type of monitor (color or monochrome), difficulty level (1-6), and rotation of blocks, all using single keypresses.

The play screen looks almost like the typical Tetris playfield except that the background is black, highlighting the board. Also, the score is on the right side, but instead of one score it displays the number of pieces used and rows completed.

I thought I was a very acomplished player by mastering the version of Tetrls published in MICROpendium. I made it through all nine levels, and still kept go

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MICRO-REVIEWS—

(Continued from Page 32)

ing. However, in MDOS Tetris, I am still using level 1 after many hours of playing.

While playing you use the arrow keys. Being that these keys are separate from the keyboard keys, there is no confusion trying to find the right key. The up arrow turns the block, the side arrows move the block either way, while the bottom arrow drops the block. At anytime you can pause the game by pressing the space bar. Also, you can return to the configure screen anytime by pressing F3. The Esc key is also used to end the game, if desired.

A great deal of attention has been given to the details of this game, including a 3D effect of the "Game Over" phrase on the piled up blocks. As stated by the distributor, "It is the first graphics-oriented program written to specifically use the features of the V9938 chip."

This program is distributed by: 9640 News, P.O. Box 752465, Memphis, TN. 38175-2465. The price is $15.

★ ★ ★ ★

AIRCRAFT, AUTOS, STARWARS & SOLAR SYSTEM TOUR GRAPHICS & BONUS DISK

As stated by the title, this set of disks has something for just about anybody. If you are into graphic designs, you will enjoy the many pictures this set of disks offers, plus more. System requirements are; TI or Geneve with disk drive, 32K or more, RLE or TI-Artist programs, E/A, Extended BASIC, or Super Extended BASIC modules.

I brought up with my MAX-RLE and TI-Artist 41 aircraft designs, 18 classic autos, and 42 Starwars and Planetary designs, with information. Yes, you can even learn something from the graphics of the Planetary designs, as they are not only pleasing to the eye, but also have much information added to the designs.

As I mentioned, you can use them with MAX-RLE or TI-Artist, and those who have Super Extended BASIC can also use the included programs to create a slide show and print dump, using the module's TI-Artist capability.

On the bonus disk is a D/V80 + Pics program that also take advantage of Super Extended BASIC, as it lets you add a small D/V80 file to TI-Artist pictures. You may also modify this program to fit your needs. Also included on the bonus disk are: 5 games, 2 simulations, a sprite designer, and a program called HODBAC that can convert a number from hexadecimal, octal or decimal into binary and back.

The sprite designer is worth mentioning, as it creates both single character and double-size sprites. You just press 0 for off and 1 for on to create your sprite, then it calculates the character definition, and displays it on screen. It also has a "P" option to print it.

For the money these disks are a four-star value. The disks are available from Randy Packham, RR2 Nanticoke, Ont., NOA 1LO, Canada. Send a money order for $15 for DS/DD (4 disks) or $20 for SS/SD (6 disks).

★ ★ ★ ★

BARRICADE for ABASIC

About three years ago I played a game similar to this on an IBM clone. Tetris had come out for that machine a short time earlier, and this was more or less the sequel. After playing that game, I knew that a game with graphics like this would never be developed for the TI. Back then, games were non-existent for the Geneve. I remembered this game well, and I was excited to see this one done for our community.

Well, now, the Geneve has evolved with a more or less unchanged operating system, including a stable ABasic, thus letting programs be developed that look similar to PCs. System requirements for this disk are: Geneve, color monitor, disk drive, MDOS V.96h or higher, and Advanced BASIC V2.99 or higher.

This is my first experience in using ABasic, and its command environment is similar to TI Extended BASIC. So, you feel right at home loading and running ABasic programs. The graphics at the beginning and end are well done. I enjoyed watching stationary characters explode into roaming sprites.

The game starts with a colorful title screen with surprising sounds, and text popping on screen. It then asks you if you would like to read the documentation. If you choose yes, it explains the scenario. It then continues with the object of the game, the keypresses, and then the scoring.

The game starts right after the on-screen instructions end, dropping colorful square blocks from any one of the four sides on this 3D grid. There are many blocks, and the drop speed is determined by the color of the blocks. By pressing the arrow keys you can move the blocks within the grid, trying to align the colored blocks in rows or columns of the same color before it reaches the center grid. As the block reaches the center grid it slides to the opposite side, or to the next block. You can manuver the blocks up, down, left or right, depending upon whether they are on the north and south wall, or the east and west wall. Corners can be made but they are tricky. If a block falls on a block of the same color, the square is emptied. If it falls on a block of a different color, it will change to the new color. There are also black killer blocks that fall down the wall, erasing the first color block it hits. But they can be used to your advantage, steering them to erase blocks that are not in order.

The game continues until the timer runs out. There is also an option for a double game length which also double the number of blocks from 100 to 200.

Game play is very fast. In the double game length, you must score more than twice the points of a normal length game to bring down the barrier.

The sounds really add to the game, especially the sounds that are produced by hitting the arrow keys. It lets you precicely count how many squares on the grid that you move. This is to a player's advantage because it would be hard to play, as the keyboard buffer takes over and continues moving your piece, if you hold the key too long. The game can be terminated at anytime by pressing CTRL B, taking you back to the ABasic prompt. This game is distributed by: 9640 News, P.O. Box 752465, Memphis, TN 38175-2465. The price is $15.

If you would like your software or hardware reviewed in this column, send it to: Stan Krajewski, Route 6 Box 568-15, Live Oak, FL 32060. If you would like it returned, include postage. If you need to dis-

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MICRO-REVIEWS—

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cuss something, for any reason, call me at 904-364-7897.

CABLING FOR MONITORS AND THE GENEVE

I finally received a new RGB monitor. My older Magnavox Model 8CM515, that I purchased 2 1/2 years ago is no longer available. It has been replaced with the newer Model 1CM135. Unfortunately this monitor comes with an IBM cable, 9-pin D socket on both ends. This makes it impossible to plug it into the Geneve, as the Geneve uses an 8-pin DIN socket. My old cable was useless, as it did not have the 9-pin on the monitor side. I was shocked to find out that even a TI supply distributor didn't have the proper cable to go with this same monitor that he sold.

To make a long story short, I removed the 8-pin DIN from my old cable, and installed it onto the new monitor cable. I did it this way, as I was able to keep the in-line fuses this new cable comes with. I have my new monitor working perfectly as the end result.

I'm sure that my new cable will work with any IBM compatible monitor in the future. I am mentioning this as I did not know where to turn for a pre-made cable, as there are no user groups, or individual TIers anywhere around me. If I had this trouble, I thought others might also has the same problem. Everything I heard from other sources, after making a few long distance phone calls, on how to connect the wiring to the pins was incorrect. Only after sitting down and studying the pin-outs from both the Geneve and the monitor was I able to make the original monitor cable work.

Monitor Connection Schematic

Black-2
(X)

4-() (X)-**5 Brown**

8

1-() (X) (X)-**3 Red Audio-RCA plug**

Blue

Red-6-(X) (X)-**7 Orange**

Below is the color scheme of the cable that comes with Model 1CM135 for do-it-yourselfers. If you would like me to make the cable up for you, you may send your old cable, and the new monitor cable, with $15, to me. This will include postage and the RCA plug for sound. If you have just the new cable and need me to make a Geneve end on it, I will get the 8-pin DIN and make it up for $17. If you would like a different color monitor to work with your Geneve, send me your cable with a copy of the pin assignments from the the user's manual for that monitor. If you need any other type cable made, I may be able to help you. You can call me first if you like.

This is looking from the backside. Pins 1 and 4 are left open. Horizontal sync. is not necessary to hook up. Pins 1&4 are left open. 'X's denote connections. The audio plug should be grounded to the housing.

Artist Font Maker

Slick addition to your graphics

By BOB CARMANY

Artist Font Maker (herafter referred to as AFM) was not exactly what I had expected from the name. Being a bit traditional, I figured that it was just like the rest of those programs that allowed the user to create new character fonts from scratch — in this case, for TI-Artist. Wrong! The end result was a character font usable by TI-Artist but the actual creation of the characters was to be done with a separate program. In fact, AFM is more along the lines of a conversion program than of an actual font creator. Nonetheless, it is still a "slick" addition to your graphics programs.

What AFM does is take TI-Artist pictures, Graphx screens and RLEs and converts them into character fonts compatible with TI-Artist. It does so by converting a user-defined area of the screen into the TI-Artist font format and assigning an alphabetic letter designation to it. This leads to some interesting possibilities. Since an area of the screen is converted, it would be a relatively simple matter to combine an original character font and small picture into a unique TI-Artist character set. The only catch is that you have to use one of the drawing programs to create your initial screen. That could prove to be a bit tedious if you aren't interested in graphics. But, then, why would you consider the program in the first place if you weren't interested in graphics?

Performance: AFM performed flawlessly. Although the documentation mentioned that it was in DSDD format, I got the SSSD version. No problems were en-

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Review

Report Card

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

Cost: $9.95 + $3 shipping and handling
Manufacturer: Asgard Software, P.O. Box 10306, Rockville, MD 20849
Requirements: Console, monitor or TV, disk system, 32K memory expansion, Editor/Assembler (or suitable program image loader), TI-Artist. GraphX or other similar program optional.

ARTIST FONT MAKER—

(Continued from Page 34)

countered in loading and running the program. I tried several program-image loaders and the program loaded from them as well as the E/A cartridge. The actual conversion portion of the program was extremely fast and I was able to discover no hidden bugs lurking about. In short, it delivered everything it promised.

Ease of Use: A few simple keypresses are all that are required to operate the program. Once the brief documentation is read, it is an easy matter to step right into the program and start compiling a library of fonts for TI-Artist. In fact, the biggest problem is having a screen ready to convert with AFM. Nothing is complicated or difficult to master, and what mistakes you can make in operating the program are easily corrected and explained in the documentation.

Documentation: AFM comes with a seven-page booklet (including disclaimers, copyright, etc.). It doesn't take long to read and digest the contents, and there certainly isn't anything left out. All the keypresses are explained, along with the mundane details of loading the program, disk contents and other ""exciting" material. A section discusses how to create your own fonts for conversion with AFM. There is even a section about the only mistake you can make using the program — mislabeling a character. The corrective action is explained clearly and concisely. In fact, the documentation is complete and thorough throughout.

Value: Certainly, you have to consider whether AFM will be worth acquiring or if it is something you can do without. The only question I have about this program is whether, after 5 years of TI-Artist, any fonts haven't been converted by now. After all, I have about 10 disks of fonts ready for use with TI-Artist and I can almost always find something for the application I am working on. Otherwise, AFM is a good investment.

Final Grade: The program does what it is advertised to do and performs superbly. There is no reason to give it anything but the best marks. I couldn't find any flaws in either the program itself or the documentation. It should fit a niche for those of you who want to create a unique character font for use with TI-Artist. It is an excellent effort!

Sound F/X

The TI never sounded so good

By JOHN KOLOEN

Sound F/X, by Barry Boone, is a program that makes one ask — why wasn't this done before. The program runs on the very same system that TI stopped producing seven years ago and yet it is like no other program currently available for the TI.

Sound F/X, of course, is an assembly language program that plays digitized sounds on the TI or Geneve. It was officially introduced at the Chicago TI Faire in November, though I first heard the sounds it produces this summer when Barry played a few samples over the phone. To put it mildly, I was impressed to hear the voice of Porky Pig saying "Th that's all, folks" played through the TI's tiny speaker. It came through loud and clear.

Sound F/X loads through Extended BASIC, Editor/Assembler and TI-Writer, as well as from the MDOS command line using EXEC on the Geneve.

The main menu screen gives you several options including: loading a F/X sound file; playing the sound in the computer's memory; change parameters (speed of playback); catalog a disk; and convert sound files from PCs and Macs.

The Sound F/X disk comes with several sound files, so the first thing the new user will want to do is to catalog the disk. After the directory appears on the screen, you can use the arrow keys to guide a pointer to the sound file you want to load. Then hit the "L" key to load it. After loading the sound file — the time it takes depends on the size of the file and whether you are loading from a floppy, RAMdisk or hard disk as well as whether you are using a 99/4A or a Geneve — you press any key and are returned to the main menu. Select the play option from the menu and the sound is played through the monitor speaker.

You can then modify the playback speed if you like and replay the sound over and over. To load another sound, either select the load option from the menu (you must then type in the name of the sound file), or catalog the disk and select a sound file with the pointer. I found this to be the easiest way to load sound files.

The program is entirely menu)driven, which makes operation easy. Even converting other sound files is a snap. Sound F/X converts raw sound files, including SND files for the Mac and Amiga, and Soundblaster VOC files on the PC. The conversion utility also comes in handy if you find that a sound file you are playing runs too fast. Simply run it through the converter and it will re-convert the file in such a way that it will play at a slower speed. You can even select the conversion routine from the catalog screen by press

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Review

Report Card

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

Cost : $14.95
Manufacturer: Texaments, 53 Center St., Patchogue, NY 11772; 516-475-3480
Requirements: TI99/4A, memory expansion, disk system, monitor with sound capabilities, Extended BASIC, Editor/Assembler or TI-Writer; Geneve 9640, monitor with sound capabilities

SOUND F/X—

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ing CTRL C. (This is an undocumented feature that Barry told me about.)

Sound F/X takes advantage of whatever memory you have available. The basic TI99/4A with 32K card has a 34K sound buffer. An 80-column card adds up to 160K to that amount, a Supercard adds 8K and a Superspace II adds 32K. Obviously, the larger the available memory the larger the sound file it can handle. Geneve owners will be happy to learn that the basic Geneve has 400K of memory available as a sound buffer. The addition of a Memex card will increase the buffer to up 1.7 megabytes. Typically, a sound file that fills up the buffer of a TI with 32K memory would last about 15 seconds when replayed at normal speed.

How do you know how much memory is available as a sound buffer? The parameters screen reports the amount of memory available regardless of the configuration. Sound F/X automatically uses all available memory as a sound buffer.

Suppose you've got a Geneve with a 2 meg. Memex. How do you load it with sound files from a 360K or less floppy disk? Sound F/X allows you to chain sound files from disk to disk until the entire available buffer is filled.

Other nice touches include the ability to access subdirectories from the catalog function (Sound F/X is compatible with hard drives), and the fact that the default drive is always the drive that was most recently accessed.

Also available from Texaments are several disks with F/X Sound files called Sound Bytes. These packages include two SSSD disks each and offer an array of digitized sounds, ranging from well-known expressions of cartoon characters to President George Bush. Actually, the range is greater than that. One of the Sound Bytes packages sells for $2.95.

Barry notes that Lee Bendick is marketing sound disks for Sound F/X at $1.25 each.

Documentation: There is little documentation required for this program. What is available, a single 8½ x 11 folded sheet is thoroughly adequate.

Ease of Use: If it got any easier, it would have to be automatic.

Value: For $14.95 I don't see how you can lose. In fact, it makes me want to get a better speaker in my monitor. Sound F/X is a unique piece of software for playing around with sound. What you do with it is a function of your own imagination.

User Notes

Using an HFDC with larger drives

Here's a tip from Barry Boone for readers who want to use larger hard drives with their HFDCs.

As many know, larger hard drives, those with more than eight heads, can't normally be used with the Myarc Hard & Floppy Disk Controller. However, Barry has a simple modification that will make the card compatible with virtually any non-RLL drive.

The problem has to do with the output port. The HFDC is set up to interface with an ST506 hard drive, but most drives now use an ST504 interface. Everything works fine until you hook up a drive that has more than eight heads. Then, even though it seems to format properly, you'll find that the drive doesn't work.

Here is the solution to the problem, according to Barry:

Cut a trace from pin 5 of chip U9 to pin 5 of chip U17;

Then solder a jumper from pin 12 of U9 to pin 5 of U17;

This modification will affect only the card's compatibility with the ST504 interface drives and won't have any effect on other drives using the ST506 interface. The modification changes a write current line into a head select line, Barry says.

Barry has performed the modification on his own drive and has repoted no problems. The mod will let the HFDC work with any number of heads.

Remember: Even though you read it here, any modification you make to your hardware is at your own risk.

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Multiple indices with TI-Base

This item is by Bill Gaskill. Gaskill is a former TI-Base columnist for MICROpendium.

One of the things that frustrates most TI-Base users is the time that it takes to sort data, especially when the file being sorted contains several hundred or more records. The best solution to this problem is to use TI-Sort to get the job done, instead of the resident sort routine in TI-Base, since it is many times faster. But even using TI-Sort, one is forced to re-sort a data base each time a new field of data needs to be brought into focus. So you must get out of the TI-Base program, load TI-Sort and then sort the file by the desired field. Here's another option, and it doesn't take TI-Sort to use it.

If you have a data base that does not change too often, like a mailing list or membership roster, you can sort the file by as many fields as you like and simply rename the index file for the data base as the

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User Notes

(Continued from Page 36)

name of the field that it is sorted on. For example, let's assume that you have a mailing list data base named MEMBERS, that has the following fields in it:

NAME, ADDRESS, CITY, STATE, ZIPCODE

On your data disk, two files exist for the MEMBERS data base. They are:

MEMBERS/D and MEMBERS/S

MEMBERS/D is the file that contains the actual records. MEMBERS/S is the index file for the MEMBERS data base that contains the pointers to each record and the sort order of the field that the file is sorted on. Now let's see how we can create and then use multiple indexes for the MEMBERS file.

First, type:

SORT ON NAME

to sort the file by the NAME field. Once this is done, CLOSE the file and type;

COPY MEMBERS/S NAME/S GO

You have now cloned the index file for the MEMBERS data base while it is sorted by NAME.

Next, reload MEMBERS and then type in:

SORT ON ADDRESS.

Once that is done type in;

COPY MEMBERS/S ADDRESS/S GO

You have now cloned the index file for the MEMBERS data base while it is sorted by ADDRESS.

Repeat this procedure for each field that you wish to sort the file by.

When you want to re-sort the file, you simply COPY the cloned index back over the MEMBERS/S file and Voila!, the re-sort is done. To have the file sorted by ZIPCODE (assuming you performed the above procedures for the ZIPCODE field), you would type in;

COPY ZIPCODE/S MEMBERS/S GO

To be safe, you should always do the COPYing with all slots empty, meaning that the data file should NOT be active while you are copying over its index.

Turn on printer reminder

This comes from Edward Machonis of Floral Park, New York. He writes:

Have you ever sat and waited for a program to start running only to discover later that the program was trying to OPEN a link to a printer that was not turned on? By adding the following line at the beginning of the program you will be reminded to put the printer on-line if it happens to be turned off or off-line. If the printer is on-line, the reminder will flash on the screen so briefly to be barely noticeable.

```
10 DISPLAY AT(12,6)ERASE ALL :"Turn On Printer!" :: OPEN #1:"PIO.CR" :: PRINT #1:CHR$(0):: CLOSE #1 :: CALL CLEAR
```

If you would prefer an audible indication that all is well, change CHR$(0) to CHR$(7) and a bell will ring if the printer is on-line. If you want to be sure than any prior printer configuration is cancelled, change CHR$(0) to CHR$(27);CHR$(64) which will reset the printer to its default mode.

Centering double-width text using TI-Writer

This comes from Marjorie Mountjoy, of Columbia, Maryland. She writes:

The function .CE supported by TI-Writer just does not work on double-width text. After many futile attempts to get my line centered, I ended up doing arithmetic and inserting required spaces at the beginning. There is a much simpler solution.

I now keep a file on my TIW disk containing 40 dashes preceded by CTRL U [CTRL U al CTRL U Shift N CTRL U and followed by CTRL U [CTRL U a0.

Into this I insert the text I want centered and delete superfluous dashes.

To underline simply insert CTRL U [CTRL U -1 before the word or words to be underlined and follow the underlined portion with CTRL U [CTRL U -0.

This works whether you are printing documents using the Editor or the Formatter.

Modifications to Disk Tutor

This comes from Ken Woodcock of Norfolk, Virginia. He writes:

One of my favorite parts of your magazine is Barry Traver's BASIC/Assembly articles.

His Disk Tutor program, which was presented in the September issue, was a

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Used TI Equipment Available

The **National Used Software/Hardware Club** has hundreds of TI99/4A-related software and hardware items. These include rare items, such as the GRAM Kracker and Z80/80-column cards from Morning Star Software. If you are looking to buy or sell, send a #10 SASE to NUS/HC, Dept. M12, P.O. Box 1343, Round Rock, TX 78680 for a free, no-obligation information packet. Or call 1-800-777-6632. **Annual membership is only $15/year and is refundable if you do not buy or sell anything through NUS/HC.** We also have listings for PC, Apple and Macintosh.

User Notes

(Continued from Page 37)

fine example of his programming ability. While using this program I encountered three problems (all of which can be easily fixed). Below are the problems I found and the fixes.

1. PROBLEM: Analyzing a disk with no name causes the program to abort. CURE: Add the following to the end of the line 270:

::IF M$=RPT$(" ",10)THEN 290

2. PROBLEM: Analyzing a disk with no files causes the program to abort. CURE: Add the following to the end of line 960:

::IF LEN(O$)=0 THEN 980

Then add the following to the end of line 980:

::IF VAL(E$)=0 THEN 1010

3. SYNTAX ERROR IN LINE 390. CURE: A semi-colon needs to be deleted from this line. The semi-colon is just in front of the "ELSE" statement.

With these modifications this program executes fine on my system (Geneve with Myarc HFDC, 40 meg. hard drive, 512K RAMdisk (modified for the Geneve), CorComp floppy disk controller, 3 80-track floppy drives (1 3.5-inch and 2 5.25-inch),and 1 40-track 5.25 drive.

Changing colors in Editor/Assembler

The following was written by Terry Atkinson of Nova Scotia, Canada. We found it in the TIsHUG News Digest of Redfern, New South Wales, Australia.

Some time ago, Tom Freeman provided me with a method whereby the color defaults on the E/A EDIT1 program could be changed by using the TI-Forth sector editor. Not being handy with using this elusive (to me) language, I decided to attempt to accomplish the same end by using a standard sector editor. It worked!

Why change the colors? Well, some of us are using green/orange monitors, or black and white TVs, and white letters on a blue background do not show up very well. Others may just want a change.

The theory provided by Tom is that every bit of memory space is required by the editor program and data generated by the user. Hence, he used an area of the program utilized by TI to display its copyright. In this space, he wrote a little assembly language sub-utility to produce the color change, and is in essence a VWTR to change VDP register 7.

HOW TO DO IT

First, transfer the EDIT1 file over to a freshly initialized disk. Then boot up your favorite sector editor.

Using the sector editor, got to screen 22. This sector is headed by words: 0000 1700 2000 55AA. Be certain that you got the right sector.

Now locate the word at 0024. It should read 2843. Now change this, and the next 15 consecutive words to read:

2020 C800 C01E 0200 8717 06C0 D800 8C02 06C0 D800 8C02 C020 201E C020 DDD8 045B

Write sector 22 back to the disk and call in sector 24. This sector is headed by the words 0014 0420 2D82 1000. Again, be certain you have the proper sector loaded. Now go to the word located at 00B8. It should read C020. Change this and the next word to read 06A0 2020. Write sector 24 back to the disk and that is it. You are done!

Now copy the other Editor/Assembler files to the disk with the modified EDIT1 file. (Do not copy the original EDIT1 file, of course, or you will have to start over.) Check out your work by loading the E/A Editor. You should now have a cyan screen with black lettering. If you do not like this color combination, there is nothing stopping you from selecting your own colors. Simply load sector 22 back in and change the word at 002C, which now reads 8717 to read 87xx, where xx is equal to your own preferred color combination. (See the E/A manual, page 300.) Write the sector back to disk and check it out.

Do-it-yourself parallel cable

This item appeared in several newsletters. We saw it in the newsletter of the Cin-Day (Ohio) User Group. It was written by Gene Bohot.

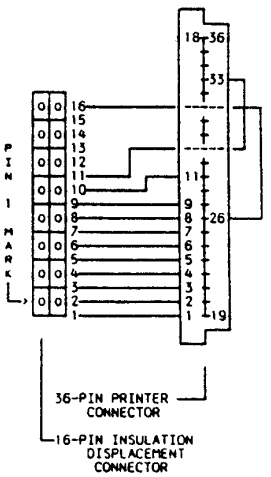
I helped one of our user group members make up a parallel printer cable for a new printer, and it turned out to be so easy that I decided to share it so you can make u$_{p}$ spare for your system.

The easiest way is to use some insulation-displacement connectors and ribbon cable so you don't have to do any soldering. But you can use hooded connectors and 12-conductor cable to make a fancier hookup. If you use 16-conductor ribbon cable, go for the multi-colored type since it's a lot easier to keep track of the lines. Six feet of it costs about $3. The 16-pin female IDC connector is about $2 and the 36-pin Centronics male connector is about $4.

All you have to do is clamp the 16-conductor ribbon in the 16-pin connector on one end, and split the wires on the other end so you can separate the 3 that don't go in order (see diagram).

Notice that the numbering scheme is different on the opposite end of the cable, but the #1 pin is marked with an arrow on the computer end, and the printer end is marked on pins 1 and 19 and pins 18 and 36. This means that on the printer end with an IDC connector you use every other wire slot for 1-9.

Be sure the wire is firmly inserted in each terminal pin so the insulation is displaced (hence the name insulation displacement connector, IDC). Or, you can use 36-connector cable and use every other wire on the 16-pin plug end for 1-9.



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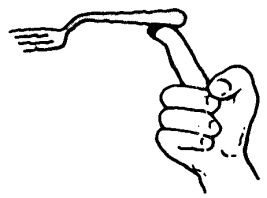

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