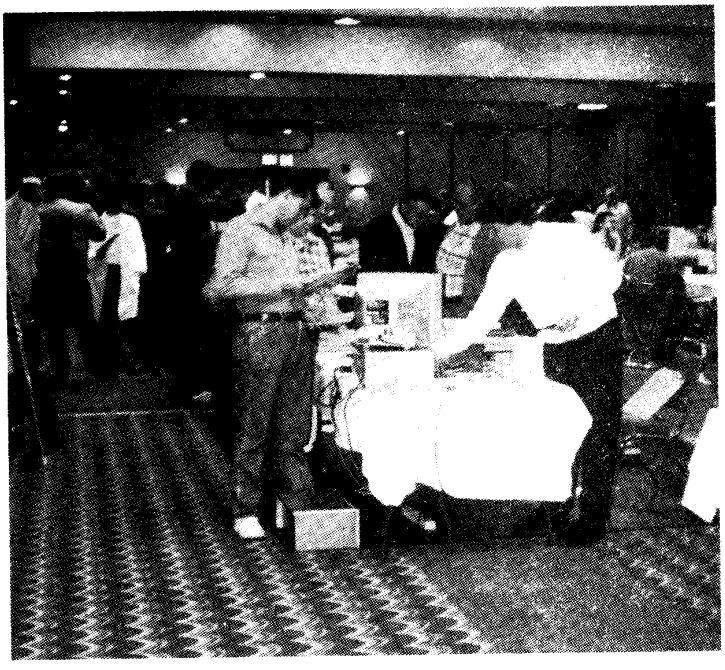
Covering the TI99/4A and the Myarc 9640

# MICROpendium

Volume 8 Number 9 October 1991 $2.50

## Chicago:

***Forget the weather, it's what's inside that counts***



## INSIDE:

Barry Traver and Disk Tutor • Jerry Stern on fancy printing
Regena on string functions • Bruce Harrison on the ins and outs of assembly

## Scanning graphics into a TI with help from a PC

**REVIEWS**

GenBench Shell
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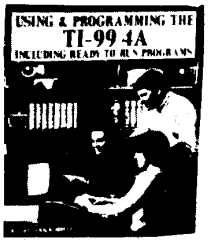

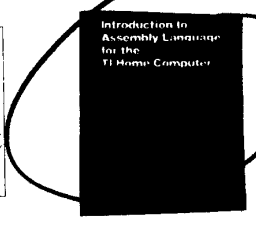

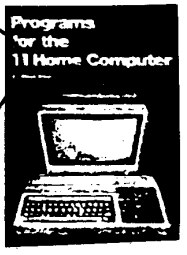


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### *READ THIS

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

# MICROpendium

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If you've been waiting for a sale on MICROpendium program disks, this is it! For a very limited time (through Nov. 31, 1991) Series 1, 2, 3 and 4 disks are available for a special price. Series 1 disks include all programs that appeared in MICROpendium from April 1988 through March 1989. Series 2 disks include all programs that appeared in MICROpendium from April 1989 through March 1990. Series 3 disks include all programs that appeared in MICROpendium from April 1990 through March 1991. Series 4 disks include all programs that appeared in MICROpendium from April 1991 through March 1992. (Series 4 disks are mailed monthly starting with the November 1991 edition, programs from April 1991 through October 1991 will be mailed as soon as the order is placed.)

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## SPECIAL BACK ISSUE OFFER

It should be noted, that in many cases use of the programs on these disks requires reference to the appropriate edition of MICROpendium. As a special offer, again limited to orders received prior to Nov. 30, 1991, back issues of MICROpendium will be available at the low rate of $1.50 each. The normal cost is $2.50 per issue. This sale is good for any back issue in our collection. The only issues that are not available are Vol. 1 Nos. 1 & 2 (Feb. & Mar. 1984) and Vol. 2 No. 1 (Feb. 1985).

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# Comments

# Cold but fun, and what's for Christmas?

The Chicago TI fair hadn't even ended when Don Jones told me that next year's fair would be held at an earlier date in hopes of taking advantage of warmer weather. This year's fair, held Nov. 2 in subfreezing temperatures, was well worth the trip. But the frigid temperatures were unexpected. But what can you expect from November in Chicago? So, as Don said, next year's fair will be held in October. October 31, to be exact. Three days can make a difference.

I finally got to try a game that made its official debut at the fair: Scud Busters by Bruce Harrison. I played it for several hours at the office before I had to get back to work. And you thought Bruce was strictly into music.

I didnt' get around much at the fair, having to man a table for nine hours, but I spoke with scores of readers and some of the vendors. Everyone seemed to be having a good time. In fact, there may have been a convert or two, including one who came over from Appleland. The following event actually happened, according to Ken Gilliland of Notung Software, at the Milwaukee fair, which was held Nov. 4.

"I had a person circle my booth about four times, intently eyeing Ray Kazmer's Star Trek: Next Generation Calendar. He finally got up some nerve and asked me if there was any way he could run the calendar on his Apple IIe. I told him no, there wasn't, unless he had a way to get his Apple to read a TI disk or had a friend with a TI machine. Discouraged, he walked away. Within the next two hours, he returned no less than three times to study the manual and calendar pages. Finally, near the close of the show, he returned once more, this time with a PE Box and used console — asking if he needed anything else to run the program! And, yes, he did get the Star Trek Calendar and a TI Casino to boot."

Either this buyer is one heck of a Trekkie, or Ray need to be charging more for his calendar.

### PC-TRANSFER AVAILABLE AGAIN

Several of Mike Dodd's programs which had been unavailable for a long time are available again from two dealers, including PC-Transfer and PC-Transfer Utilities (see Newsbytes). The Utilities, a companion disk to PC-Transfer, gives users the capability of transferring Multiplan SYLK (I/FI28) files to a PC. The program also supports transfer of binary image (D/FI28) files as well as 7 and 8 bit text files, "TIFILES" downloaded with a PC and MacPaint files.

### MICROPENDIUM SALE ENDS NOV. 30

The special sale of MICROpendium back issues (the first and last) will end on Nov. 30. If there are any nback issues you've wanted to buy, now is the time to buy them. The cost is only $1.50, down from the regular $2.50. Special prices on MICROpendium program disks will also expire on Nov. 30.

### STILL WAITING

It's been six months since I shipped my broken HFDC to Myarc, with payment of $75. And still no word. The rumor going around is that Lou Phillips has 20 HFDC's that have been repaired sitting in his garage waiting to be returned to their owners. I've heard of some people volunteering their time to get the items back to their owners. If only it were so easy. What a way to run a railroad.

### WHAT TO BUY A TI OR 9640 USER FOR CHRISTMAS?

This is a tough question to answer.There are many choices, depending on your budget.. High-end items, like the Rave PE2 expansion system, Horizon RAMdisk or MEMEX card will set you back more than $100 but can be well worth having. Those with a Horizon RAMdisk who want to upgrade to newer, bigger models can sell their existing RAMdisk and the buyer will receive a 90-day warranty on the RAMdisk from Bud Mills Services, as long as the seller buys another RAMdisk from Bud.

One item that has generated considerable interest is the TI Accelerator card. This device was highlighted in the July 1991 MICROpendium. Unfortunately, it is not available at this time. Bud Mills Services is the manufacturer.

GRAM devices, such as the GRAMulator and P-GRAM Card, GRAM Kracker are very handy for those who want to dump their cartridges to a disk and run everything out of a disk-based system. Other items to look at for those who want to cut down on the wear and tear on their console module port are so-called cartridge expanders which allow the user to plug several modules or module GROMs into a single device and switch between them via software or a switch. Among the newer models of these types of devices are are POP-cart by OPA and E/B Module Expander by William Shores.

Perhaps the hardest to get items these days are Myarc HFDCs and Geneves. You'll have to look hard to find a new HFDC or Geneve, but you can check the MICROpendium classifieds for used models.

There is so much good software available for the TI that it is impossible to list it all. Regular readers of MICROpendium can ad up the titles that debuted in 1991 but looking through the Newsbytes section, but just in the past month or so we've seen GenBench Shell, P-System, GEME, Space Champions, Cave Explorer, Train Twister, Time Guardian, Jungle Terror, Traffic Frenzy, Islander, Car Race, Submarine Revenge and Sea Terror for the Geneve. Recent releases of software that run on both the TI and the Geneve include Scud Busters, Code Breakers, Go-fer, Thumbnails, Mail Room, SGW, Sound F/X, along with three companion disks, Smart Connect, Bride of Disk of Dinosaurs and Disk of Horrors, and upgrades of MIDI-Master, TI-Casino and Filmlib. And this is by no means a complete list.

Of course, as far as I'm concerned, the one thing that I'd like most for Christmas I probably won't get. And that is my HFDC. Now, I've got to have a copy of 9640 Windows, and Sound F/X and I really need to upgrade my TI-Casino, and ....

—JK

# MICROpendium

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# Feedback

Are you afraid to look under your bed at night?

KEN GILLILAND'S

DISK of HORRORS

If You are afraid of the dark, you'll definately NOT want to get "Disk of Horrors". This package is a spine-tingling look at the 1930's Horror Pulp World with the aid of 30 TI-Artist Pictures and Instances guarranteed to put your hair on end. Also included is a HORROR font, some truly gruesome animation, a spooky slideshow, a musical nightmare, a history of the Horror Pulps, and three short stories, printable or readable onscreen, by Ken Gilliland. This three disk package with manual sells for $12 from Notung Software. Add $1.00 P&H.

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## Wants a final DOS

I *like* my Geneve and I have several TI994As doing lots of little things (and providing spare parts).

I only wish we had the final solution for MDOS. I would really like to take full advantage of my Geneve, but for now I work solely in GPL.

What can we do?

There must be *somebody* out there who can take over, or write a new DOS.

**Geoff Frusher**
**Lake Echo, Nova Scotia, Canada**

## Where's PC Transfer?

In your article on TI-PC connection you refer to a program "PC Transfer." Do you know where I can obtain this program?

**Richard S. Schultz**
**Carmichael, California**

*See below. — Ed.*

## A great guy provides PC Transfer program

In August you printed my letter. I had stated that I was in desperate need of the PC Transfer program to get my TI text files to be IBM compatible. I even said that I would settle for a pirate copy (gasp!)

On Oct. 30 I received a strange disk in the mail. I didn't know if it was a TI or PC disk. Something told me to check it on the TI computer first. Sure enough, it was the PC Transfer program! Here is the best part; I never met the sender in person, or even talked to him on the phone. I didn't even know that he existed! This disk came from a great guy, *Kurt Radowisch in Vienna, Austria!*

Kurt went through the trouble of finding my *correct mailing address,* seeing how only my name, city and state were published. Kurt didn't ask for anything in return, he only hoped I received the disk and that he would get a reply. Is this guy a 99er, or what!? The instructions weren't even in English! I had it figured out in one minute, though. I sent him a few of my own graphics programs in appreciation.

Let this be an inspiration, and a lesson that the *TI99/4A is not dead!* The users are *still* willing to help each other. Even strangers from other states!

**Frank P. DeCandia**
**Jersey City, New Jersey**

***We agree, Mr. Radowisch sounds like a great guy. However, other users need not hope that someone from Austria finds them. PC Transfer is now commercially available once again. See Newsbytes this issue for where it can be purchased.***

## Update on SAC TIBBS

You may recall that I was one of the first to operate a TIBBS BBS. I have operated SAC TIBBS since 1984 continuously and plan to continue as long as there are users interested in the TI99/4A. Over the years I have incorporated many changes and updates to the original TIBBS program. Now it is one of the two, possibly three, TIBBS BBSes that is capable of operating at 2400 baud.

It is PC Pursuit and Starlink available using 8N1 24 hours a day. Area code (916) 927-3012. Sysop is Woody Large. Instant validation permits downloading of many files and programs immediately.

At 75 years of age, I may be the oldest TI sysop.

**Woody Large**
**Sacramento, California**

## Second the motion

This refers to Stan Krajewski's report on 99 Computer Repair in the October issue. I wish to add my enthusiastic second to his favorable review. Recently my CorComp 9900 Micro-Expansion System's power supply went dead. I sent it to 99 Computer Repair, and within three weeks I had it back in good working condition. The service was good and the charge was reasonable. All owners of CorComp products should be thankful we still have a reliable source for repairs even though CorComp is now defunct.

**James B. Johnson**
**San Antonio, Texas**

***The Feedback column is a forum for TI99/4A and Geneve users. The editor will condense submissions when necessary to conserve space. We ask readers to restrict themselves to one subject for the sake of simplicity. Mail Feedback items to* MICROpendium Feedback, P. O. Box 1343, Round Rock, TX 78680.**

BASIC

# Using string functions

By REGENA

Most computing done on the TI99/4A is with numbers. However, some information can be treated as *strings*, or groups of characters that are not necessarily numbers. Since we use a lot of names or words other than numbers in everyday life, we need to be able to use strings on the computer.

One way to signal to the computer that you are using a string is to enclose characters within quotation marks. PRINT 3+5 will print the number 8, but PRINT "3+5" will print exactly what is in the quotation marks, 3+5. To use a string variable, end the variable name with the dollar sign, such as A$ or NAME$.

String expressions may contain letters, numbers and symbols, and they may be up to 255 characters long. Longer strings are truncated on the right.

Strings are combined in TI BASIC by using the ampersand, such as A$&B$ or "HELLO "&NAME$. Several functions available in TI BASIC are specifically for strings. Any function that ends with a dollar sign gives a string as a result. Some functions use strings in the argument but give a numeric result. You cannot combine string and numeric expressions.

This first sample program, STRINGS1, defines the string variable A$ as "HI" and the string variable B$ as "CINDY". Line 140 prints the two variables separated by a semicolon. Notice that the semicolon indicates the next item to be printed follows the first item immediately with no spaces. Line 150 inserts a space between the two strings. Line 160 illustrates a more grammatically correct combination of the words by inserting a comma and a space between A$ and B$. Line 170 prints A$,B$. A$ is printed, then the comma puts B$ in the next print column. Line 180 prints A$ then the colon says to go to the next line before printing B$.

```
100 REM STRINGS1
110 CALL CLEAR
120 A$="HI"
130 B$="CINDY"
140 PRINT A$;B$
150 PRINT A$;" ";B$
160 PRINT A$;", ";B$
170 PRINT A$,B$
180 PRINT A$:B$
190 PRINT
200 END
```

LEN(x$) is a string function which gives the length of the string x$, or the number of characters contained in x$. In TI BASIC you may have a null string " "; the length of a null string is zero. Leading and trailing blank spaces are counted in the number of characters for the length. In the following example, Line 150 calculates the length of the string variable A$ and assigns it to the numeric variable L. Line 160 prints L.

SEG(x$,n$,n2) is the SEGment function and is comparable to LEFT$, MID$ and RIGHT$ of other versions of BASIC. SEG$(x$,n$,n2) will return the segment of string x$ starting with the character in the nl position and continuing until the segment is n2 characters long. In the following example, Line 130 prints the segment of A$ starting with the first character and containing 5 characters. Line 140 prints the segment of A$ starting with the 7th character and containing 4 characters.

POS(sl$,s2$,n) is the POSition function. sl$ and s2$ are string expressions. The numeric expression n is evaluated and rounded to an integer. POS finds the first occurrence of s2$ within sl$, starting at character n. The value returned is the character position of the first character of s2$ in sl$. If s2$ is not found, a value of zero is returned. In the following example program, Line 170 assigns P the value of the position of the space, " ", in the string A$, starting with the first character. Line 180 prints what position that is. Lines 190 and 200 then print segments determined by that position P.

```
100 REM STRINGS2
110 A$="BRETT LYNN"
120 PRINT A$
130 PRINT SEG$(A$,1,5)
140 PRINT SEG$(A$,7,4)
150 L=LEN(A$)
160 PRINT "LEN(A$) =";L
170 P=POS(A$," ",1)
180 PRINT "POS =";P
190 PRINT SEG$(A$,1,P-1)
200 PRINT SEG$(A$,P+1,L-P)
210 PRINT
220 END
```

The third example program, STRING3, illustrates the functions ASC and CHR$. ASC (x$) returns the ASCII value of the first character of the string x$. Line 130 prints the ASC(A$), which will be the ASCII value of the first character in A$. CHR$(n) prints the character corresponding to the ASCII number n. Lines 150-170 print a number J, then the CHR$(J) or the character corresponding to that ASCII number.

```
100 REM STRING3
110 A$="RICHARD"
120 PRINT A$
130 PRINT "ASC(A$) =";ASC(A$
)
140 PRINT
150 FOR J=65 TO 70
160 PRINT J;CHR$(J)
170 NEXT J
180 END
```

I have published this subroutine before, but it fits here with the discussion of strings. If you want to print a message on the screen without scrolling, or if you want to print a message at a certain position on the screen, use this subroutine. Put the message in M$, and specify the ROW and COLumn. Lines 300-330 are the subroutine that use CALL HCHAR to place the message on the screen a character at a time. First the segment SEG$ of the message M$ is taken one character at a time, and the ASCII code of that character is needed for the CALL HCHAR command. The process is repeated for the length LEN of the message. Two example messages are printed.

```
100 REM MESSAGE
110 CALL CLEAR
120 M$="PRINTING . . ."
130 ROW=10
140 COL=5
150 GOSUB 300
160 M$="EXAMPLE"
170 ROW=15
180 COL=17
190 GOSUB 300
```

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```
200 STOP
300 FOR C=1 TO LEN(M$)
310 CALL HCHAR(ROW,COL+C,ASC
(SEG$(M$,C,1)))
320 NEXT C
330 RETURN
340 END
```

The following MONTHS program illustrates a way to correlate the names of the months with the month numbers. One way to program using months is to have an array of 12 elements, such as M$(1)="JAN", M$(2)="FEB", etc. Another way to program is to use strings.

```
100 REM MONTHS
110 CALL CLEAR
120 M$="JANFEBMARAPRMAYJUNJU
LAUGSEPOCTNOVDEC"
130 PRINT "THE MONTHS ARE"
140 FOR M=1 TO 12
150 PRINT M,SEG$(M$,M*3-2,3)
160 NEXT M
170 PRINT
180 RANDOMIZE
190 M=INT(12*RND)+1
200 PRINT "MONTH";M;"IS ";SE
G$(M$,M*3-2,3)
210 PRINT
220 A$="MAY"
230 PRINT A$;" IS MONTH";INT
((POS(M$,A$,1)+3)/3)
240 END
```

The string M$ contains the three-letter month names all combined into one string. Lines 130-160 print the 12 months in order by using the SEG$ function to pick out three letters at a time. If you still wanted to use an array, you could use Line 150 to define M$(M)=SEG$(M$,M*3-2,3). Thus lines 140-160 would define all 12 months rather than using 12 individual statements or a DATA-READ system.

Lines 180-200 illustrate how you would determine the month name later in the program using the string method if you had a month number. Lines 220-230 illustrate how you would determine the month number if you know the month name.

I have one more sample program illustrating the use of strings. This example was sent to me by Stephen Shaw of Stockport, Cheshire, England, as a recommendation to speed up the shuffling of cards in card games such as Pyramid Solitaire (MICROpendium, April 1990). My method took 18 to 30 seconds, usually about 22 seconds, from the time you press Enter to when the first card starts drawing. Using his method, shuffling took 19 seconds (constant).

Let me just mention our main discovery. The program can be run as is in TI Extended BASIC because I don't use graphics characters in sets 15 and 16. However, the shuffling time (my method) took 40 seconds the first time I timed it and 1 minute 37 seconds the second time. Of course, that's long enough never to run the program again! And long enough for Mr. Shaw to write to me. Here's a case where TI BASIC was quicker than Extended BASIC.

I have used several different methods of card shuffling in my past programs — choosing a random number from 1 to 52 and translating to a number and suit, or choosing a random number from 1 to 13 for the number and then from 1 to 4 for the suit, and making sure the card hasn't been chosen before. This method using strings is worth trying.

```
100 REM SHUFFLE
110 CALL CLEAR
120 DIM CARD(52,2)
130 C$=""
140 FOR N=1 TO 52
150 C$=C$&CHR$(N)
160 NEXT N
170 RANDOMIZE
180 FOR N=1 TO 52
190 CD=INT(RND*LEN(C$)+1)
200 @=ASC(SEG$(C$,CD,1))
210 C$=SEG$(C$,1,CD-1)&SEG$(
C$,CD+1,52)
220 SU=INT((@-1)/13+1)
230 NU=@-(SU-1)*13
240 CARD(N,1)=NU
250 CARD(N,2)=SU
260 PRINT STR$(NU)&" "&STR$(
SU)&"; ";
270 NEXT N
280 END
```

Lines 130-160 initially define a string variable C$ of 52 different characters representing the 52 cards. Line 170 randomizes the selection. Lines 180-270 shuffle the cards. Line 190 chooses a random number CD. Line 200 selects the character in the CD position and finds out the ASCII number of that character. Line 210 then creates a new C$ string deleting that character. Line 220 determines the suit SU of the card and Line 230 determines the number NU of the card depending on the ASCII number. For purposes of illustration in this example, we put the number in CARD(N,1) and the suit in CARD(N,2) and print out the card number, then suit, in Line 260. In your own program you would "draw" the card or save CARD(N,1) and CARD(N,2) for later use.

Notice that the next time you "deal" a card, Line 190 chooses a random number CD which can be 1 to the length of C$ (which decreases by 1 each time you deal). Line 200 determines which card it is, and Line 210 "squeezes" C$ to eliminate that card (character) from being chosen again.

You can use this method of selection for random numbers other than for cards. The cards have extra calculations because of the four suits available. This method would be useful for any selection in which once an object is chosen it cannot be used again.

Just one more note this month. You may have noticed an error in the program listing for Playing Notes in the September 1991 issue. The listing is correct to Line 1360, then Jerry Stern's program and mine get mixed up. Line 1370 is at the bottom of page 13, and then Lines 1380 to 1440 are on page 14. The line right after my Line 1360 is a continuation of his program Line 810 on page 13. I might mention that I believe this is only the second time in 10 years one of my published programs has had a printing error. Really, it's all there, you've just got to find it! Best wishes for another month.

Research saves lives.
WE'RE FIGHTING FOR YOUR LIFE
American Heart Association

EXTENDED BASIC

# Pretty printings of program listings

By JERRY STERN
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Each of us has our own unique style of programming. And each of us can understand a program more easily if the program listing is customized to our own special view of the programming structure. Variable names could be printed in wide print, for example. Or text inside quotation marks could be italicized, and function names and commands printed in bold double-strike characters. Of course, multiple-statement lines would be broken at each double colon, and most text would be printed in compressed print. Or, perhaps you like another combination of print effects. Fine. Whatever works for you.

This custom listing would be nearly impossible if the listing had to be created from a text listing of the program created with a statement like, LIST "DSK2.TEXTLIST". That is how programs that I've written in the past manipulated program listings. The text file was analyzed, broken long lines were reassembled, and multiple statement lines were separated. This month's program, FANCYLIST, works instead from a merge format disk file of a program, and provides a customizable program listing, matching your printout to your taste and to the abilities of your printer.

For Extended BASIC to process a disk file of a program character by character sounds slow, but FANCYLIST does manage to stay ahead of my TI Impact Printer, and after the first few lines of a listing, the program fills the printer's 2K buffer. On a faster printer, there may be some lag time between lines. Older printers print each font in a separate pass across the page, so a selection of type styles that is varied and complex for the different elements of the program may print more slowly than a simple selection. The newest printers print all fonts in the same pass, and font choices will have no effect on printing time.

Before examining FANCYLIST, let's briefly review merge format. A program listed in merge format consists of just a sequence of numbers between zero and 255. Each number is a token representing a command, like PRINT or DATA, or a symbol that identifies the numbers that follow as line numbers, or text, or numbers. For the full details of how token/merge format works, see my column in this past April's MICROpendium. FANCYLIST works by identifying each token in a program file, looking up what that number represents, and printing that command or text, along with the printer codes needed to print in italics, or double-strike, or compressed print.

Before running FANCYLIST, adapt the program to suit your printer. Begin by changing the default printer name in line 90. On line 280, change the codes 27, 78, 6 to match your printer's command to set perforation skip to one inch. In lines 180 to 210, correct the variables for each printer command to the codes used by your printer. BOLDON$ and BOLDOFF$ should contain the codes to turn bold printing on, and off, respectively. Because you will need to combine printing styles with each other, such as bold wide print, it is probably best to use double-strike for bold rather than emphasized print, which is usually not available in compressed, or 132 character per line, print. WIDEON$ and WIDEOFF$ hold the codes for wide printing, which could be compressed wide, at about 60 characters per line, or true wide characters of 40 characters per line. ITALON$ and ITALOFF$ contain codes for italics printing, which will not be available on many older printers, so you may want to substitute another type style, and COMPON$ and COMPOFF$ are for the codes controlling compressed type. For printers with more fonts available, add similar variables as needed, perhaps ROMANON$ and ROMANOFF$. All extra font variables must be placed BEFORE line 220 to have an effect on all the formulas below.

## Sample printout

```
190  WIDEON$=CHR$(14)::
     WIDEOFF$=CHR$(20)
200  ITALON$=CHR$(27)&CHR$(52)::
     ITALOFF$=CHR$(27)&CHR$(53)
210  COMPON$=CHR$(15)::
     COMPOFF$=CHR$(18)
220  GOSUB 780 ::
     DISPLAY AT(24,1):
230  CALL KEY(3,K,S)::
     DISPLAY AT(12,1) BEEP : "Name of printer?" : PR$::
     ACCEPT AT(13,1) SIZE(-24) : PR$
240  DISPLAY AT(15,1) : "Program to list?          (Must be in merge format.)" : "DSK2." ::
     ACCEPT AT(17,4) SIZE(-25) : F$
250  IF F$="" THEN 230 ELSE F$="DSK"&F$
260  OPEN #1 : F$, DISPLAY, VARIABLE 163, INPUT
```

Next, save a program for listing in merge format. For example: SAVE DSK2.MYPROGRAM, MERGE, and then run FANCYLIST.

Once you've seen what FANCYLIST can do, you can change the print styles to suit yourself. Within each of the program sections below, insert or substitute the variable names for each print style, in pairs of ON and OFF, to print each type of program element in the styles of your choice.

When FANCYLIST runs, the program will identify and decode each type of token. The first two bytes of each merge file program line identify the line number, and that number will be converted to a real number for printing. The other tokens will fill the balance of each line, including ASCII characters, which are used without a token to store variable names. When FANCYLIST finds the other tokens, it converts them into their English equivalents, so that the program simply swaps a word for each token it finds.

In lines 410 to 450, FANCYLIST pro-

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cesses variable names, which are stored as simple ASCII text, with no identifying token. To change the print style for variable names, place the ON code on line 420, and the OFF code in 450, replacing WIDEON$ and WIDEOFF$.

Text strings in quotes are processed beginning on line 470, and the printing style for these quotes can be changed by replacing ITALON$ and ITALOFF$ in lines 480 and 510. Quotation marks inside a quoted string are entered in a program line by typing a double quote, but stored in the program as a single quote, and the search and replace procedure in line 500, using the SWAP subprogram, converts those single quotes back to doubles for printing.

Next, lines 540 to 590 convert unquoted stings back to their original form. Text without quotes include numbers, comment lines, and unquoted text in DATA statements. You may change their printing style by replacing BOLDON$ and BOLDOFF$ in lines 550 and 580.

Line numbers within lines, such as GOTO 200, are converted next, and may be placed in a different style by changing line 630. For example, to print line numbers in bold, try this:

630 PRINT #9:BOLDON$; NC*256+NC2; BOLDOFF$; " ";

Next, reserved words, such as commands like DISPLAY AT, are treated starting at line 660. Since all of these are different, the variable array T$(255) is used to hold all the command names. By editing the names starting on line 790, you could customize each command differently. For example, all the commands could be translated into another language. Or "PRINT" could become "Print" or "LinePrint." As listed, I've used spaces after those commands that do not normally occur immediately before parenthesis, so CHR$ will not have a trailing space, but PRINT will. Again, change the individual tokens as you like. You could even choose to print PI (token #221) as "3.14159 ".

Finally, multiple-statement lines are broken up starting at line 700, and a TAB(8) moves the following commands and formulas out to match up with the beginning of the line listed immediately above. That is the last of the token choices that FANCYLIST uses to create its printout. But there are still more ways to customize FANCYLIST to your needs.

VARIATION 1: While debugging a program that prints a complex series of text or charts, try using a printout that emphasizes the PRINT statements.

1050 T$(156)=BOLDON$ & WIDEON$ & "PRINT " & WIDEOFF$ & BOLDOFF$

VARIATION 2: Having trouble debugging a program that crashes with an error message from file input/output? Try adding the BOLDON$ and WIDEON$ and matching OFF variables to tokens 146-INPUT, 156-PRINT, 159-OPEN, 160-CLOSE, 170-LINPUT, 222-REC, and 253-#.

VARIATION 3: When a program has an OUT OF DATA error from trying to READ past the end of the DATA statements, try adding the wide and bold treatment to tokens 147-DATA, 148-RESTORE, and 151-READ.

VARIATION 4: Trace formulas that provide incorrect answers by adding the same print variables to all the math and string functions. Emphasize tokens 182 to 197, 203 to 221, and 223 to 225.

There are more variations, but the best one is the custom printout that you design especially for your own needs and your own unique programming style.

## FANCYPRINT

```
90 PR$="RS232.DA=8.BA=4800"
! Default printer name !200
100 ! FANCYLIST !080
110 ! V. 1.0 Customizable pr
ogram lister-J Stern 11/91 !
113
120 CALL CLEAR :: CALL BLUE
!228
130 CALL TITLE2 !031
140 DISPLAY AT(8,1):"To stor
e a program file in  Merge f
ormat, type:         SAVE DS
K2.      ,MERGE":"          _
_____" !138
150 DISPLAY AT(24,1):"  Sett
ing up..." !020
160 DIM T$(255)!214
170 END$=RPT$(CHR$(255),2)!0
95
180 BOLDON$=CHR$(27)&CHR$(71
):: BOLDOFF$=CHR$(27)&CHR$(7
2)!071
190 WIDEON$=CHR$(14):: WIDEO
FF$=CHR$(20)!241
200 ITALON$=CHR$(27)&CHR$(52
):: ITALOFF$=CHR$(27)&CHR$(5
3)!087
210 COMPON$=CHR$(15):: COMPO
FF$=CHR$(18)!005
220 GOSUB 780 :: DISPLAY AT(
24,1):!114
230 CALL KEY(3,K,S):: DISPLA
Y AT(12,1)BEEP:"Name of prin
ter?":PR$ :: ACCEPT AT(13,1)
SIZE(-24):PR$ !010
240 DISPLAY AT(15,1):"Progra
m to list?           (Must
be in merge format.)":"DSK2.
" :: ACCEPT AT(17,4)SIZE(-25
):F$ !117
250 IF F$="" THEN 230 ELSE F
$="DSK"&F$ !073
260 OPEN #1:F$,DISPLAY ,VARI
ABLE 163,INPUT !090
270 OPEN #9:PR$,VARIABLE 132
,DISPLAY ,OUTPUT !031
280 PRINT #9:COMPON$;CHR$(27
);CHR$(78);CHR$(6)! Turn on
perf. skip !171
290 ! Begin main loop !039
300 IF EOF(1)THEN 750 ELSE L
INPUT #1:A$ !090
310 IF SEG$(A$,1,2)=END$ THE
N 750 !171
320 PRINT #9:ASC(A$)*256+ASC
(SEG$(A$,2,1));TAB(8);!010
330 FOR L=3 TO LEN(A$)-1 !16
6
340 NC=ASC(SEG$(A$,L,1))!238
350 IF NC>201 THEN 660 !066
360 IF NC=201 THEN 610 !014
370 IF NC=200 THEN 540 !199
380 IF NC=199 THEN 470 !145
390 IF NC=130 THEN 690 !095
400 IF NC>128 THEN 660 !074
410 ! Variable name !138
420 W$=WIDEON$ !035
430 W$=W$&CHR$(NC)!064
440 NC=ASC(SEG$(A$,L+1,1)):
 IF NC=0 THEN GOTO 450 ELSE
IF NC<127 THEN L=L+1 :: GOTO
 430 !180
450 PRINT #9:W$;WIDEOFF$;!09
```

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```
1
460 GOTO 720 !033
470 ! Quoted string !204
480 W$="""&ITALON$ !198
490 L=L+1 :: NC=ASC(SEG$(A$,
L,1))!129
500 WORD$=SEG$(A$,L+1,NC)::
CALL SWAP(WORD$,CHR$(34),CHR
$(7))::  CALL SWAP(WORD$,CHR$
(7),RPT$(CHR$(34),2))!226
510 PRINT #9:W$;WORD$;ITALOF
F$;""" ";!047
520 L=L+NC !168
530 GOTO 720 !033
540 ! Unquoted strings & num
bers !132
550 W$=BOLDON$ !027
560 L=L+1 :: NC=ASC(SEG$(A$,
L,1))!129
570 WORD$=SEG$(A$,L+1,NC)!19
8
580 PRINT #9:W$;WORD$;BOLDOF
F$;" ";!003
590 L=L+NC !168
600 GOTO 720 !033
610 ! Line numbers !071
620 NC=ASC(SEG$(A$,L+1,1))::
 NC2=ASC(SEG$(A$,L+2,1))!007
630 PRINT #9:NC*256+NC2;" ";
!224
640 L=L+2 !018
650 GOTO 720 !033
660 ! Reserved word tokens !
115
670 PRINT #9:T$(NC);!122
680 GOTO 720 !033
690 ! Multi-statement lines
!235
700 PRINT #9:"::" !141
710 PRINT #9:TAB(8);!110
720 NEXT L !226
730 PRINT #9:!080
740 GOTO 290 !114
750 CLOSE #1 :: CLOSE #9 !18
4
760 DISPLAY AT(19,1)BEEP:"Pr
int another listing?": : : :
 :!096
770 ACCEPT AT(19,25)SIZE(1)V
ALIDATE("yYnN"):X$ :: IF X$=
"Y" OR X$="y" THEN 230 ELSE
CALL CLEAR :: STOP !193
780 ! Token list initializat
ion subroutine !248
790 T$(129)="ELSE " !031
800 T$(131)="! " !013
810 T$(132)="IF " !125
820 T$(133)="GO " !133
830 T$(134)="GOTO " !043
840 T$(135)="GOSUB " !116
850 T$(136)="RETURN " !214
860 T$(137)="DEF " !195
870 T$(138)="DIM " !207
880 T$(139)="END " !205
890 T$(140)="FOR " !213
900 T$(141)="LET " !212
910 T$(142)="BREAK " !087
920 T$(143)="UNBREAK " !253
930 T$(144)="TRACE " !099
940 T$(145)="UNTRACE " !009
950 T$(146)="INPUT " !134
960 T$(147)="DATA " !016
970 T$(148)="RESTORE " !030
980 T$(149)="RANDOMIZE " !16
6
990 T$(150)="NEXT " !047
1000 T$(151)="READ " !013
1010 T$(152)="STOP " !056
1020 T$(153)="DELETE " !168
1030 T$(154)="REM " !215
1040 T$(155)="ON " !144
1050 T$(156)="PRINT " !132
1060 T$(157)="CALL " !019
1070 T$(158)="OPTION " !211
1080 T$(159)="OPEN " !043
1090 T$(160)="CLOSE " !104
1100 T$(161)="SUB " !219
1110 T$(162)="DISPLAY " !012
1120 T$(163)="IMAGE " !088
1130 T$(164)="ACCEPT " !167
1140 T$(165)="ERROR " !129
1150 T$(166)="WARNING " !016
1160 T$(167)="SUBEXIT " !031
1170 T$(168)="SUBEND " !188
1180 T$(169)="RUN " !238
1190 T$(170)="LINPUT " !208
1200 T$(176)="THEN " !039
1210 T$(177)="TO " !154
1220 T$(178)="STEP " !054
1230 T$(179)=", " !036
1240 T$(180)="; " !043
1250 T$(181)=": " !043
1260 T$(182)=") " !027
1270 T$(183)="( " !027
1280 T$(184)="& " !026
1290 T$(186)="OR " !152
1300 T$(187)="AND " !204
1310 T$(188)="XORE" !152
1320 T$(189)="NOT " !236
1330 T$(190)="= " !046
1340 T$(191)="< " !046
1350 T$(192)="> " !049
1360 T$(193)="+ " !031
1370 T$(194)="- " !034
1380 T$(195)="* " !032
1390 T$(196)="/ " !038
1400 T$(197)="^ " !086
1410 T$(202)="EOF" !166
1420 T$(203)="ABS" !163
1430 T$(204)="ATN" !177
1440 T$(205)="COS" !180
1450 T$(206)="EXP" !189
1460 T$(207)="INT" !188
1470 T$(208)="LOG" !180
1480 T$(209)="SGN" !187
1490 T$(210)="SIN" !181
1500 T$(211)="SQR" !194
1510 T$(212)="TAN" !176
1520 T$(213)="LEN" !173
1530 T$(214)="CHR$" !209
1540 T$(215)="RND " !213
1550 T$(216)="SEG$" !213
1560 T$(217)="POS" !196
1570 T$(218)="VAL" !182
1580 T$(219)="STR$" !242
1590 T$(220)="ASC" !163
1600 T$(221)="PI " !134
1610 T$(222)="REC " !201
1620 T$(223)="MAX" !181
1630 T$(224)="MIN" !180
1640 T$(225)="RPT$" !236
1650 T$(232)="NUMERIC " !007
1660 T$(233)="DIGIT " !100
1670 T$(234)="UALPHA " !176
1680 T$(235)="SIZE" !014
1690 T$(236)="ALL " !205
1700 T$(237)="USING " !125
1710 T$(238)="BEEP " !019
1720 T$(239)="ERASE " !105
1730 T$(240)="AT" !098
1740 T$(241)="BASE " !012
1750 T$(243)="VARIABLE " !06
1
1760 T$(244)="RELATIVE " !08
4
1770 T$(245)="INTERNAL " !08
6
1780 T$(246)="SEQUENTIAL " !
247
1790 T$(247)="OUTPUT " !234
1800 T$(248)="UPDATE " !189
1810 T$(249)="APPEND " !179
```

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## EXTENDED BASIC—

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```
1820 T$(250)="FIXED " !098
1830 T$(251)="PERMANENT " !1
61
1840 T$(252)="TAB" !168
1850 T$(253)="#" !243
1860 T$(254)="VALIDATE" !034
1870 RETURN !136
29095 SUB SWAP(X$,OLD$,NEW$)
!008
29100 !SEARCHES X$ AND REPLA
CES OLD$ WITH NEW$; JLS 3/90
 !171
29105 C=POS(X$,OLD$,1):: IF
C=0 THEN SUBEXIT !125
29110 IF C=1 THEN X$=NEW$&SE
G$(X$,C+LEN(OLD$),LEN(X$)-LE
N(OLD$)):: GOTO 29105 !087
29115 X$=SEG$(X$,1,C-1)&NEW$
&SEG$(X$,C+LEN(OLD$),LEN(X$)
-LEN(OLD$)-C+1):: GOTO 29105
 !192
29120 SUBEND !168
29505 SUB BLUE !149
29510 ! SWITCHES DISPLAY TO
WHITE ON BLUE; JLS 7/88 !230
29515 CALL SCREEN(5):: FOR L
=0 TO 14 :: CALL COLOR(L,16,
1):: NEXT L :: SUBEND !202
31565 SUB TITLE2 !035
31575 DISPLAY AT(1,9)ERASE A
LL:"FANCY LIST" :: CALL CHAR
(95,"00FF"):: CALL HCHAR(2,1
1,95,10)!086
31580 DISPLAY AT(4,3):"Custo
m Program Listings" !030
31590 DISPLAY AT(6,2):"Novem
ber 1991 Jerry Stern" !203
31595 SUBEND !168
```

BASIC Assembly

# At the head of the file

**By BARRY A. TRAVER**
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As we continue our series on direct disk access from TI Extended BASIC using the built-in DSRLNK utilities, we move on from an exploration of sectors 0 and 1 on a disk to taking a look at 'File Descriptor Records' (FDRs) or, as they are more commonly known, file headers.

In the future we will be looking at other DSRLNK disk utilities (so that we can do such things as rename a file or protect/unprotect a file from XB), but for now, let us follow on in the direction set in the previous article: using direct single-sector access to see how a disk is organized.

DISKTUTOR, which appeared in September's column, and this month's program (FDR/TUTOR) both use the versatile 'RAW' (single sector Read and Write) code to help us see how a disk is laid out. Next month we will finish up our focus on 'RAW' as we see some brief practical applications of 'RAW', although — as Jerry Coffey, John Johnson, Richard Mitchell, and others have discovered — these simple 'RAW' routines have lots of practical applications, more than we can even suggest in this column.

Since this month's program is fairly lengthy, I'll keep my comments in this article fairly short. To use FDR/TUTOR, you first need (as last month) to load in the 'RAW' routines. This you can do, as you know, in many ways: (1) you can do a CALL INIT and CALL LOAD('DSK1.RAW/O') to load in a 'RAW' object code file, (2) you can use Todd Kaplan's ALSAVE utility to embed the assembly routines within FDR/TUTOR before running it, or (3) you can run my XXB before running the program, just to name a few methods.

From DISKTUTOR and FDR/TUTOR, you should have a good understanding of how your computer keeps track of the files stored on a disk. With this knowledge, you'll be better able, for example, to do simple repairs. Last month we showed how you can do a number of simple 'RAW' repairs. but we did not show you how to repair sector 1 if the sector is physically damaged. You learned what to do in the case of a file missing or duplicated in the list you get when you do a disk catalog, but we didn't go beyond that.

Well, if all goes well, next month we'll have for you a program that will rebuild sector 1 for you AUTOMATICALLY! If you want, you can help it along by confirming each filename that should be added to the catalog, but you can also see whether the program can handle the task entirely on its own. Another brief program I'll have for you is one that well fix up byte 12 of the file header if it's messed up on a file someone gives you. (The MYARC hard drive controller sometimes sets a reserved bit in byte 12 of the file header; if the bit is not reset, you cannot catalog the disk from XB without your catalog program crashing on you!)

Incidentally, my pioneer ARCHIVER program was simply an Extended BASIC program with only two assembly routines added. You guessed it: 'RAW' was the key. ARCHIVER also depended upon the kind of information accessible to you in DISKTUTOR and FDR/TUTOR, so I hope you will find the kind of information contained in these tutorial programs as helpful to you as it has been to me and others.

Well, enough talking for this month. I'll let you get on with your typing (or, if you get MICROpendium on disk in addition to the hardcopy issue, to actually running FDR/TUTOR and trying it out). Until next TIme, keep on compuTIn'!

*Barry Traver published a diskazine for TI users called Genial TRAVelER..*

## DISKTUTOR

```
100 ! COPYRIGHT (C) 1991 by
Barry Traver, 835 Green Vall
ey Drive, Philadelphia, PA 1
9128 (phone: 215/483-1379) -
- ALL RIGHTS RESERVED! !187
110 GOTO 140 :: A,A$,AA$,B,B
```

(See Page 15)

# BASIC/ASSEMBLY—

(Continued from Page 14)

```
$,C,C$,D$,E,E$,F,F$,G,G$,H,H
$,I,I$,J,J$,K,K$,L,L$,M,M$,N
,N$,O,O$,P,P$,Q$,R$,S$,T$,U$
,V$,W$,X$,Y$,Z$ !121
120 CALL CHAR :: CALL CHARPA
T :: CALL COLOR :: CALL DH :
: CALL HB :: CALL HD :: CALL
 INIT :: CALL KEY :: CALL LI
NK :: CALL LOAD !086
130 CALL PAUSE :: CALL SCREE
N !149
140 !@P- !064
150 DISPLAY ERASE ALL :: CAL
L SCREEN(13):: FOR C=0 TO 8
:: CALL COLOR(C,16,1):: NEXT
 C :: DISPLAY AT(12,5):"ONE
MOMENT PLEASE...." !218
160 FOR C=9 TO 12 :: CALL CO
LOR(C,16,9):: NEXT C :: FOR
C=65 TO 97 :: CALL CHARPAT(C
,C$):: CALL CHAR(C+32,C$)::
NEXT C !132
170 CALL CHAR(124,"101010101
0001000"):: A$="1 (reserved
bit on|)" :: B$="0 ---(RESE
RVED BIT)--" :: Z$=RPT$("-",
19)!008
180 DISPLAY AT(1,1)ERASE ALL
:"FDR/TUTOR":" COPYRIGHT (C)
 1991":"  BY BARRY A. TRAVER
":"   ALL RIGHTS RESERVED" !
137
190 DISPLAY AT(7,5):"THE PRE
VIOUS ISSUE OF":"MICROPENDIU
M INCLUDED THE":"PROGRAM DIS
K/TUTOR, WHICH":"WAS A TUTOR
IAL ON SECTORS" !160
200 DISPLAY AT(11,1):"ZERO A
ND ONE.  THOSE TWO":"SECTORS
 CONTAIN THE BASIC":"""HOUSE
KEEPING"" INFORMATION":"FOR
A NORMAL TI FLOPPY." !131
210 DISPLAY AT(16,5):"LET'S
MOVE ON THEN TO A":"CONSIDER
ATION OF FILES.  ALL":"FILES
 REALLY CONSIST OF TWO":"PAR
TS:  (1) A ONE-SECTOR FDR" !
210
220 DISPLAY AT(20,1):"(FILE
DESCRIPTOR RECORD OR":"""FIL
E HEADER"") AND (2) THE":"AC
TUAL FILE CONTENTS." :: CALL
 PAUSE !169
230 DISPLAY AT(1,5)ERASE ALL
:"THE ACTUAL FILE ITSELF":"I
S ALWAYS ONE SECTOR LESS":"T
HAN THE SIZE THAT SHOWS UP"
!076
240 DISPLAY AT(4,1):"WHEN YO
U DO A DISK CATALOG,":"BECAU
SE ONE OF THE SECTORS":"IS T
HE FDR WHICH CONTAINS":"THE
BASIC INFORMATION ABOUT" !24
9
250 DISPLAY AT(8,1):"THE FIL
E.": :TAB(5);"SECTOR 1 OF TH
E DISK":"POINTS TO THE VARIO
US FDRS":"(AND IN ALPHABETIC
AL ORDER)." !137
260 DISPLAY AT(14,5):"THAT I
S, SECTOR 1 TELLS":"WHERE ON
 THE DISK THE FILE":"HEADERS
 ARE FOUND, AND THAT":"IS AL
L THAT IT TELLS ABOUT" !218
270 DISPLAY AT(18,1):"THE FI
LES!  ALL OTHER INFOR-":"MAT
ION RELATING TO THE FILES":"
(FILE TYPE, WHERE THE FILE"
!007
280 DISPLAY AT(21,1):"IS TO
BE FOUND ON THE DISK,":"ETC.
) IS IN THE FDRS." :: CALL P
AUSE !102
290 DISPLAY AT(1,6)ERASE ALL
:"SO THEN SECTOR 1 OF THE":"
DISK POINTS TO THE FDRS, AND
":"THE FDRS POINT TO THE FIL
ES" !187
300 DISPLAY AT(4,1):"(IN ADD
ITION TO PROVIDING":"ALL OTH
ER NEEDED INFORMATION":"ABOU
T THE FILES).": :TAB(6);"THE
 BEST THING AT THIS" !104
310 DISPLAY AT(9,1):"POINT I
S TO TAKE A LOOK AT":"SOME F
DRS AND ANALYZE THEIR":"STRU
CTURE.": :TAB(6);"IF YOU HAV
E A DISK THAT" !176
320 DISPLAY AT(14,1):"YOU WO
ULD LIKE TO EXPLORE,":"NOW I
S THE TIME TO PUT THAT":"DIS
K IN YOUR DISK DRIVE, OR":"I
F YOU HAVE THE MICROPENDIUM"
 !063
330 DISPLAY AT(18,1):"DISK,
USE THAT.  (IT MAY BE":"ALRE
ADY CONVENIENTLY IN THE":"DR
IVE.)": :"(PRESS ANY KEY TO
CONTINUE" !200
340 DISPLAY AT(23,1):"_AFTER
_ YOU HAVE PUT A DISK":"IN A
N APPROPRIATE DRIVE.)" !251
350 CALL KEY(3,A,B):: IF B<1
 THEN 350 !124
360 DISPLAY AT(12,6)ERASE AL
L:"DRIVE (1-9)?" :: ACCEPT A
T(12,19)VALIDATE("123456789"
)SIZE(1)BEEP:E :: CALL LINK(
"READ",E,1,D$,E$)!052
370 D$=D$&SEG$(E$,1,126):: F
OR C=1 TO 253 STEP 2 :: DISP
LAY ERASE ALL :: F$=SEG$(D$,
C,2)!126
380 F=256*ASC(SEG$(F$,1,1))+
ASC(SEG$(F$,2,1)):: IF F=0 T
HEN 1090 ELSE CALL LINK("REA
D",E,F,G$,H$):: I$=SEG$(G$,1
,10)!217
390 IF SEG$(I$,LEN(I$),1)="
" THEN I$=SEG$(I$,1,LEN(I$)-
1):: GOTO 390 !155
400 DISPLAY AT(11,1)ERASE AL
L:"WANT TO ANALYZE THE FDR F
OR ": :I$&" (Y/N)?" !131
410 ACCEPT AT(13,LEN(I$)+10)
VALIDATE("YN")SIZE(1)BEEP:J$
 :: IF J$="" THEN 410 ELSE I
F J$="N" THEN 1080 !196
420 DISPLAY AT(1,6)ERASE ALL
:"THE FIRST TEN BYTES,": :"B
YTES 0-9, REPRESENT THE": :"
TEN-CHARACTER FILENAME:" !13
6
430 K$=SEG$(G$,1,10):: DISPL
AY AT(7,1):"HEX:  >": :"ASCI
I:" :: G=7 :: GOSUB 1110 !06
7
440 DISPLAY AT(12,6):"THE NE
XT TWO BYTES,": :"BYTES 10-1
1, ARE RESERVED": :"""FOR FU
TURE EXPANSION"":" !156
450 K$=SEG$(G$,11,2):: DISPL
AY AT(19,1):"HEX:  >": :"ASC
II:" :: G=19 :: GOSUB 1110 :
: CALL PAUSE !023
460 DISPLAY AT(1,5)ERASE ALL
:"BITS 0, 1, 3, AND 7 IN": :
"THE NEXT BYTE, BYTE 12, ACT
": :"AS FILE STATUS FLAGS:"
!174
470 H$=SEG$(G$,13,1):: H=ASC
```

(See Page 16)

# BASIC/ASSEMBLY—

(Continued from Page 15)

```
(H$):: L$=STR$(H):: DISPLAY
AT(7,1):" BASE 10:  ";L$ !24
4
480 CALL DH(L$,2):: DISPLAY
AT(9,1):" BASE 16:  ";">"&L$
 :: CALL HB(L$)!163
490 DISPLAY AT(11,1):" BASE
2:   ";L$ :: DISPLAY AT(12,1
):" BITS:     76543210" !092
500 IF SEG$(L$,8,1)="1" THEN
 K$="1 PROGRAM, NOT DATA" EL
SE K$="0 DATA, NOT PROGRAM"
!079
510 DISPLAY AT(14,1):"BIT 0:
 ";K$ :: IF SEG$(L$,7,2)="10
" THEN K$="1 INTERNAL, NOT D
IS." :: GOTO 530 !196
520 IF SEG$(L$,7,2)="00" THE
N K$="0 DISPLAY, NOT INT." E
LSE IF SEG$(L$,7,2)="01" THE
N K$="0 "&Z$ ELSE K$="1 "&Z$
 !065
530 DISPLAY AT(15,1):"BIT 1:
 ";K$ :: IF SEG$(L$,6,1)="1"
 THEN K$=A$ ELSE K$=B$ !051
540 DISPLAY AT(16,1):"BIT 2:
 ";K$ :: IF SEG$(L$,5,1)="1"
 THEN K$="1 WRITE PROTECTED"
 ELSE K$="0 NOT WRITE PROTEC
TED" !121
550 DISPLAY AT(17,1):"BIT 3:
 ";K$ :: IF SEG$(L$,4,1)="1"
 THEN K$=A$ ELSE K$=B$ !053
560 DISPLAY AT(18,1):"BIT 4:
 ";K$ :: IF SEG$(L$,3,1)="1"
 THEN K$=A$ ELSE K$=B$ !054
570 DISPLAY AT(19,1):"BIT 5:
 ";K$ :: IF SEG$(L$,2,1)="1"
 THEN K$=A$ ELSE K$=B$ !055
580 DISPLAY AT(20,1):"BIT 6:
 ";K$ :: IF SEG$(L$,8,1)="1"
 THEN IF SEG$(L$,1,1)="1" TH
EN K$="1 "&Z$ ELSE K$="0 "&Z
$ !004
590 IF SEG$(L$,8,1)="0" THEN
 IF SEG$(L$,1,1)="1" THEN K$
="1 VARIABLE, NOT FIXED" ELS
E K$="0 FIXED, NOT VARIABLE"
 !084
600 DISPLAY AT(21,1):"BIT 7:
 ";K$ :: CALL PAUSE :: DISPL
AY AT(1,6)ERASE ALL:"BYTE 13
 INDICATES THE": :"MAXIMUM N
UMBER OF RECORDS" !183
610 DISPLAY AT(5,1):"PER SEC
TOR (I.E., 256 BYTES": :"DIV
IDED BY RECORD LENGTH):" !25
3
620 K$=STR$(ASC(SEG$(G$,14,1
))):: M$=K$ :: CALL DH(K$,2)
:: DISPLAY AT(9,1):"HEX:  >"
;K$: :"DEC:   ";M$ !082
630 DISPLAY AT(13,5):"BYTES
14 AND 15 TELL": :"THE TOTAL
 NUMBER OF SECTORS": :"USED
(NOT INCLUDING FDR):" !198
640 I=ASC(SEG$(G$,15,1)):: J
=ASC(SEG$(G$,16,1)):: K=256*
I+J :: K$=STR$(K):: M$=K$ ::
 CALL DH(K$,4)!017
650 DISPLAY AT(19,1):"HEX:
>";K$: :"DEC:   ";M$ :: CALL
 PAUSE !080
660 DISPLAY AT(3,6)ERASE ALL
:"BYTE 16 INDICATES THE": :"
END OF FILE OFFSET (I.E.," !
228
670 DISPLAY AT(7,1):"HOW MAN
Y BYTES ARE USED IN": :"LAST
 SECTOR OF VARIABLE" !179
680 DISPLAY AT(11,1):"LENGTH
 OR PROGRAM FILES):" :: K$=S
TR$(ASC(SEG$(G$,17,1))):: M$
=K$ :: CALL DH(K$,2)!191
690 DISPLAY AT(15,1):"HEX:
>";K$ :: IF K$="00" THEN DIS
PLAY AT(15,11):"(MEANS ALL U
SED," :: DISPLAY AT(16,11):"
SINCE >0100 = 256)" !202
700 DISPLAY AT(18,1):"DEC:
 ";M$ :: CALL PAUSE :: DISPL
AY AT(1,6)ERASE ALL:"BYTE 17
 INDICATES THE": :"RECORD LE
NGTH OF DATA FILES:" !011
710 K$=STR$(ASC(SEG$(G$,18,1
))):: M$=K$ :: CALL DH(K$,2)
:: DISPLAY AT(6,1):"HEX:  >"
;K$: : :"DEC:   ";M$ !008
720 DISPLAY AT(13,1):"(FOR V
ARIABLE LENGTH FILES,": :"TH
IS REPRESENTS THE MAXIMUM" :
: DISPLAY AT(17,1):"RECORD L
ENGTH.  FOR FIXED" !240
730 DISPLAY AT(19,1):"LENGTH
 FILES, IT REPRESENTS": :"TH
E ACTUAL LENGTH.)" :: CALL P
AUSE !130
740 DISPLAY AT(1,6)ERASE ALL
:"BYTES 18 AND 19 TELL": :
OR DATA FILES THE NUMBER OF"
: :"SECTORS USED FOR VARIABL
E" !191
750 DISPLAY AT(7,1):"FILES O
R NUMBER OF RECORDS": :"USED
 FOR FIXED LENGTH FILES:" !0
10
760 I=ASC(SEG$(G$,19,1)):: J
=ASC(SEG$(G$,20,1)):: K=256*
I+J !173
770 K$=STR$(K):: CALL DH(K$,
4):: N$=K$ :: K$=SEG$(K$,3,2
)&SEG$(K$,1,2):: O$=K$ !139
780 CALL HD(K$,0):: K=VAL(K$
):: K$=STR$(K):: DISPLAY AT(
12,1):"HEX:      >";N$ !035
790 DISPLAY AT(14,1):"REVERS
ED: >";O$ :: DISPLAY AT(16,1
):"DEC:       ";K$ !112
800 DISPLAY AT(19,1):"NOTE:
 THE BYTES MUST BE": :"REVER
SED (DON'T ASK WHY!)." :: CA
LL PAUSE !004
810 DISPLAY AT(1,6)ERASE ALL
:"THE NEXT EIGHT BYTES,": :"
BYTES 20-27, ARE RESERVED" !
:"""FOR FUTURE EXPANSION"":"
 !197
820 K$=SEG$(G$,21,8):: IF K$
=RPT$(CHR$(0),8)THEN P$=RPT$
("0",16):: GOTO 840 !010
830 P$="" :: FOR L=1 TO 8 ::
 Q$=STR$(ASC(SEG$(K$,L,1))):
: CALL DH(Q$,2):: P$=P$&Q$ :
: NEXT L !033
840 DISPLAY AT(9,1):"HEX:
>";P$: : :"ASCII:  ";K$ !011
850 DISPLAY AT(16,1):"NOTE T
HAT AS WITH RESERVED": :"BYT
ES 10 AND 11 THESE ARE": :"U
SUALLY ALL 0'S." :: CALL PAU
SE !173
860 DISPLAY AT(1,6)ERASE ALL
:"BYTES 28-255 ARE THE": :"D
ATA CHAIN POINTER BLOCKS." !
030
870 DISPLAY AT(5,1):"THEY AR
E DIVIDED INTO THREE-": :"BY
TE GROUPS, WHICH (AFTER" !16
3
880 DISPLAY AT(9,1):"SOME RE
ARRANGING OF BYTES)": :"TEL
 THE STARTING PLACE AND" !20
```

(See Page 17)

# BASIC/ASSEMBLY—

(Continued from Page 16)

```
7
890 DISPLAY AT(13,1):"OFFSET
 (SECTORS PICKED UP SO": :"F
AR). THIS INFORMATION IS" !
016
900 DISPLAY AT(17,1):"NEEDED
 ESPECIALLY WHEN YOU": :"HAV
E ""FRACTURED"" FILES WITH":
 :"SEPARATED PARTS." :: CALL
 PAUSE !018
910 DISPLAY AT(1,6)ERASE ALL
:"HERE'S HOW YOU NEED TO": :
"REARRANGE THE BYTES (AGAIN,
": :"DON'T ASK ME WHY):": :
:"ORIGINAL:  >12 34 56" !134
920 DISPLAY AT(11,1):"REVISE
D:   >4 12 56 3": : :"NOTE T
HAT THE MIDDLE BYTE" !146
930 DISPLAY AT(16,1):"GETS "
"SPLIT UP"" AND PUT ON": :"T
HE OUTSIDE.  THE RESULT IS"
!152
940 DISPLAY AT(20,1):">412 5
63." :: CALL PAUSE :: P=0 ::
 M=29 :: N=-1 !029
950 IF SEG$(G$,M,3)=RPT$(CHR
$(0),3)THEN 1040 !103
960 DISPLAY AT(1,6)ERASE ALL
:"AND HERE'S HOW IT WORKS":
:"ON THE FILE WE'RE WORKING
ON": :"FOR BYTES ";STR$(M-1)
;"-";STR$(M+1);":" !031
970 R$=STR$(ASC(SEG$(G$,M,1)
)):: S$=STR$(ASC(SEG$(G$,M+1
,1))):: T$=STR$(ASC(SEG$(G$,
M+2,1)))!228
980 CALL DH(R$,2):: CALL DH(
S$,2):: CALL DH(T$,2):: U$=R
$&S$&T$ :: DISPLAY AT(8,1):"
OLD:  >";U$ !151
990 U$=SEG$(U$,4,1)&SEG$(U$,
1,2)&SEG$(U$,5,2)&SEG$(U$,3,
1):: R$=SEG$(U$,1,3):: S$=SE
G$(U$,4,3)!110
1000 T$=R$ :: V$=S$ :: CALL
HD(T$,0):: CALL HD(V$,0):: O
=VAL(V$):: W$=STR$(VAL(T$)+(
O-N-1)):: CALL DH(W$,3):: N=
O !047
1010 DISPLAY AT(10,1):"NEW:
 >";U$;"  (>";S$;"=";V$;")":
 : :"THIS REFERS TO A GROUP
OF": :"SECTORS BEGINNING AT
>";R$ !001
1020 CALL HD(R$,0):: DISPLAY
 AT(17,1):"OR ";R$;" AND END
ING AT >";W$ :: X$=W$ !024
1030 CALL HD(X$,0):: DISPLAY
 AT(19,1):"OR ";X$;" (KEEPIN
G TRACK OF": :"RELATIVE OFFS
ET)." :: CALL PAUSE :: M=M+3
 :: GOTO 950 !227
1040 DISPLAY AT(1,6)ERASE AL
L:"AND HERE'S HOW IT WORKS":
 :"ON THE FILE WE'RE WORKING
 ON": :"FOR BYTES ";STR$(M-1
);"-";STR$(M+1);":" !031
1050 DISPLAY AT(8,1):"OLD:
>000000": :"NEW:  >000000" !
237
1060 DISPLAY AT(13,1):"THIS
MEANS THAT WE HAVE NOW": :"F
INISHED GATHERING UP THE": :
"FILE FROM WHEREVER IT WAS O
N" !131
1070 DISPLAY AT(19,1):"THE D
ISK.  WE'RE DONE WITH": :"TH
IS FILE." :: CALL PAUSE !087
1080 NEXT C !217
1090 DISPLAY AT(11,10)ERASE
ALL:"FINISHED!": :TAB(4);"AN
OTHER DISK (Y/N)?" !020
1100 ACCEPT AT(13,24)VALIDAT
E("YN")SIZE(1)BEEP:Y$ :: IF
Y$="Y" THEN 360 ELSE STOP !1
88
1110 FOR L=1 TO LEN(K$):: Z$
=SEG$(K$,L,1):: AA$=STR$(ASC
(Z$)):: CALL DH(AA$,2)!059
1120 DISPLAY AT(G,2*L+6):AA$
 :: DISPLAY AT(G+2,2*L+7):Z$
&" " :: NEXT L :: RETURN !09
7
1130 !@P+ !062
1140 SUB PAUSE :: DISPLAY AT
(24,1):"(PRESS ANY KEY TO CO
NTINUE.)" !071
1150 CALL KEY(3,A,B):: IF B<
1 THEN 1150 !159
1160 SUBEND !168
1170 SUB DH(A$,C)!191
1180 D=0 :: E=LEN(A$):: FOR
F=1 TO E :: D=D+(POS("012345
6789",SEG$(A$,F,1),1)-1)*10^
(E-F):: NEXT F :: A$="" !230
1190 G=INT(D/16):: A$=SEG$("
0123456789ABCDEF",D-16*G+1,1
)&A$ :: IF G<>0 THEN D=G ::
GOTO 1190 !143
1200 IF LEN(A$)<C THEN A$="0
"&A$ :: GOTO 1200 !154
1210 SUBEND !168
1220 SUB HB(A$)!199
1230 D=0 :: E=LEN(A$):: FOR
F=1 TO E :: D=D+(POS("012345
6789ABCDEF",SEG$(A$,F,1),1)-
1)*16^(E-F):: NEXT F :: A$="
" !135
1240 G=INT(D/2):: A$=SEG$("0
1",D-2*G+1,1)&A$ :: IF G<>0
THEN D=G :: GOTO 1240 !006
1250 IF LEN(A$)<8 THEN A$="0
"&A$ :: GOTO 1250 !138
1260 SUBEND !168
1270 SUB HD(A$,C)!191
1280 D=0 :: E=LEN(A$):: FOR
F=1 TO E :: D=D+(POS("012345
6789ABCDEF",SEG$(A$,F,1),1)-
1)*16^(E-F):: NEXT F :: A$="
" !135
1290 G=INT(D/10):: A$=SEG$("
0123456789",D-10*G+1,1)&A$ :
: IF G<>0 THEN D=G :: GOTO 1
290 !077
1300 IF C<>0 THEN IF LEN(A$)
<C THEN A$="0"&A$ :: GOTO 13
00 !238
1310 SUBEND !168
```

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## THE ART OF ASSEMBLY — PART 6

# The Ins and Outs

By BRUCE HARRISON
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As we promised, this part of our series will deal primarily with getting into and out of your Assembly program gracefully. We consider this an important topic, since it can make all the difference when you're writing entire programs in Assembly language. In one book that we used while trying to learn Assembly, a small program example was shown, but there was no way out of the program once it started except the On-Off switch. That shouldn't be.

TI's E/A book gives several ways of returning from programs, but we don't use any of them. Instead, there are two methods that we've used, each of which gets you back where you came into the program from. If you entered from E/A option 3, we'll return you to that screen that says "PRESS ENTER TO CONTINUE" at the bottom. If you entered from XB, we'll send you back to XB with the * READY * and prompt on the screen.

The means of entering a program may vary all over the place, from the very simple LWPI WS to a section of code that re-arranges the locations of tables in the VDP ram, and to even more exotic openings. All the openings have that one thing in common, setting the workspace registers to a workspace of our choosing. As we explained earlier our usual choice is to set the workspace at >20BA, which TI set aside for us to use. This can be used even when programs start from XB, so long as the program only returns to XB upon exit. Utility subroutines for use in XB programs via CALL LINK should always have a self contained workspace. We have found, for example, that the NUMASG utility will corrupt the workspace at >20BA. After returning to XB from an Assembly routine that uses NUMASG and the >20BA workspace, the XB program will break with an error.

In today's Source Code (see sidebar) there are two separate programs, with different entry and exit methods used. Program one is of course not complete, since it needs the subroutine CRSIN and its supporting smaller subroutines given in our last article. You can combine that code with this "shell" and assemble it. When you do that combination, you'll have to delete the line of REFs and the equate for STA

(See Page 19)

### TWO PROGRAMS

```
0001  * TWO PROGRAMS
0002  * PROGRAM #1
0003  *
0004  * A DEMO PROGRAM FOR THE SUBROUTINE CRSIN
0005  * (INCLUDED IN PREVIOUS ARTICLE)
0006  * THIS IS IN EFFECT A SHELL THAT ONE CAN USE TO TEST THE CRSIN SUBROUTINE
0007  *
0008  * REQUIRED REFERENCES
0009          REF     KSCAN,VMBW,VMBR,VSBW,VSBR
0010  * DEFINE PROGRAM ENTRY POINT
0011          DEF     START
0012  *
0013  * REQUIRED EQUATES
0014  STATUS EQU      >837C
0015  WS      EQU     >20BA
0016  GPLWS  EQU      >83E0
0017  *
0018  *
0019  START  LWPI     WS          LOAD  WORKSPACE
0020          LI      R0,32*8+>800SET R0 TO POINT TO SPACE CHARACTER DEFINITION
0021          LI      R1,TEMSTR   POINT R1 AT OUR TEMPORARY STORAGE
0022          LI      R2,8        EIGHT BYTES TO GET
0023          BLWP    @VMBR       GET EIGHT BYTES
0024          S       R2,R0       STEP BACK ONE CHARACTER, TO THE EDGE CHARACTER
0025          BLWP    @VMBW       WRITE EIGHT BYTES
0026          LI      R0,32*9+2   SET R0 FOR ROW 10, COLUMN 3
0027          LI      R4,20       TWENTY CHARACTERS TO ACCEPT
0028          LI      R15,RTNSTK  SET OUR RETURN STACK IN R15
0029          BL      @CRSIN      ACCEPT 20 CHARACTERS STRING
0030          LI      R0,32*14+2  SET FOR ANOTHER SCREEN LOCATION
0031          MOV     R2,R2       CHECK VALUE IN R2
0032          JEQ     SKIP        IF ZERO, JUMP AHEAD
0033          BLWP    @VMBW       ELSE WRITE THE ACCEPTED STRING HERE
0034  SKIP    LI      R4,20       RESET FOR 20 CHARACTERS
0035          BL      @CRSIN      RE-ENTER SUBROUTINE
0036          LWPI    GPLWS       LOAD GPL  WORKSPACE
0037          CLR     @STATUS     CLEAR THE STATUS
0038          B       @>006A      RETURN TO GPL INTERPRETER
0039  *
0040  * DATA SECTION FOR PROGRAM 1
0041  *
0042  TEMSTR BSS      21
0043  * THE NUMBER IN THIS BSS MUST BE ONE MORE THAN THE LARGEST STRING LENGTH
0044  * EXPECTED IN THE PROGRAM'S EXECUTION
0045  * FOR THIS TEST, IT WAS SET AT 21 FOR A TWENTY CHARACTER INPUT STRING
0046          EVEN                SET PROGRAM COUNTER TO EVEN LOCATION
0047  RTNSTK BSS      2           RETURN STACK ADDRESS AT AN EVEN LOCATION
0048          END
0049  * END OF PROGRAM #1
0050
0051
0052  * PROGRAM #2
0053  * SETS PRINTER CONNECTED TO PIO PORT
0054  * WILL AUTO-START AND RUN LABEL SKIPIT
0055  * ENTRY AT LABEL DOUBLE WILL SET PRINTER TO DOUBLE STRIKE.
0056  * REQUIRED REFERENCES
0057          REF     VMBW,DSRLNK,VSBW
0058  * DEFINE ENTRY POINTS
0059          DEF SKIPIT,DOUBLE
0060  * REQUIRED EQUATES
0061  *
0062  PABPNT EQU      >8356       POINTER LOCATION FOR DSRLNK
0063  STATUS EQU      >837C       GPL STATUS BYTE LOCATION
0064  PAB     EQU     >1000       LOCATION FOR PAB IN VDP RAM
```

# BASIC/ASSEMBLY—

**(Continued from Page 18)**

TUS, from the subroutine's code, and the line at label TEMSTR from the subroutine's Data Section. The resulting program will serve to demonstrate the subroutine. It will also illustrate the simplest possible entry and exit for your own programs. The entry simply sets the workspace pointer, then goes about its business. The exit uses a trick passed along to us by Harry Wilhelm. We set the workspace pointer back to GPLWS, clear the status byte, then B @>006A.

That exit method will work whether you entered from E/A or Extended Basic. It may not be necessary to clear the STATUS, but the only way to find out in any particular program is to run it and see whether an error is reported when you exit. If no error is reported, then you can omit CLR @STATUS from this exit.

Our normal practice is to leave that line in, just to be on the safe side. We don't like seeing error reports on the screen, and we're too lazy to go look up their meanings in the appropriate book.

The second program uses a slightly more exotic way of entering and leaving. At the opening, it stashes away the value from R11 of whatever workspace the computer was using, then restores that to R11 of the GPL workspace before doing an RT. Early in our experiences with the TI Assembly language, we discovered that when you enter your program, the computer has essentialy performed a BL operation to get into your program, so register 11 contains the return address you can use to exit. There are exceptions to this when you entered from Extended Basic, and this method from Program 2 will not always work for XB entry. The first method (B @>006A) will always work, provided only that you first load the workspace pointer with the GPL workspace (>83E0).

That brings us to a very minor point, but one that might be important in some of your programming efforts. In our music programs, we discovered that, for some reason we've not discovered, if one does NOT move R11 to someplace on entry, as in Program 2, the sending of bytes directly to the sound generator at >8400 will not work properly. We have no idea why that's so, or whether other functions might be affected, but in our music programs we use the entry method of Program 2 and the exit method of Program 1. That keeps everything working.

Both Programs are set up to be entered from

**(See Page 24)**

```
0065  PABBUF EQU   >1050          BUFFER FOR BYTES TO BE SENT (VDP RAM ADDRESS)
0066  GPLWS  EQU   >83E0          GPL WORKSPACE
0067  *
0068  * MAIN CODE SECTION FOR PROGRAM 2
0069  *
0070  DOUBLE MOV   R11,@SAV11     STASH CURRENT R11 VALUE INTO MEMORY AT LOCATIONS
AV11
0071         LWPI  >20BA          LOAD USER WORKSPACE
0072         LI    R1,DSBYTE      SET R1 TO POINT TO DOUBLE STRIKE CHARACTERS
0073         JMP   PRN0           THEN JUMP
0074  SKIPIT MOV   R11,@SAV11     STASH CURRENT R11 VALUE INTO MEMORY
0075         LWPI  >20BA          LOAD USER WORKSPACE
0076         LI    R1,PRNBYT      SET R1 TO POINT TO SKIP-OVER PERFS CHARACTERS
0077  PRN0   LI    R0,PABBUF      SET R0 TO CHARACTER BUFFER LOCATION
0078         LI    R2,3           THREE BYTES TO WRITE TO VDP RAM
0079         BLWP  @VMBW          WRITE BYTES
0080         LI    R0,PAB         SET R0 FOR PERIPHERAL ACCESS BLOCK (PAB)
0081         LI    R1,PAB2DT      POINT R1 AT DATA FOR PAB
0082         LI    R2,16          SIXTEEN BYTES TO WRITE
0083         BLWP  @VMBW          WRITE PAB TO VDP RAM
0084         AI    R0,9           ADD NINE TO POINT TO DESCRIPTOR LENGTH BYTE
0085         MOV   R0,@PABPNT     PLACE THAT VALUE AT >8356
0086  * THE FOLLOWING LINE OPENS THE FILE
0087         BLWP  @DSRLNK        PERFORM LINKAGE TO DEVICE SERVICE ROUTINE
0088         DATA  8              DATA FOR DSR LINKAGE
0089         LI    R1,>0300       PLACE WRITE OPCODE IN R1
0090         LI    R0,PAB         SET R0 FOR PAB LOCATION
0091         BLWP  @VSBW          WRITE THE "WRITE" OPCODE INTO FIRST BYTE OF PABI
N VDP
0092         AI    R0,9           ADD NINE
0093         MOV   R0,@PABPNT     PLACE AT >8356
0094         BLWP  @DSRLNK        WRITE THE BYTES FROM PABBUF TO PERIPHERAL (PIO PO
RT)
0095         DATA  8              REQUIRED DATA FOR DSRLNK
0096         LI    R1,>0100       PLACE CLOSE FILE OPCODE IN R1
0097         LI    R0,PAB         RESET R0 TO PAB
0098         BLWP  @VSBW          WRITE THE CLOSE FILE OPCODE TO PAB
0099         AI    R0,9           ADD NINE
0100         MOV   R0,@PABPNT     MOVE TO >8356
0101         BLWP  @DSRLNK        PERFORM CLOSE FILE OPERATION
0102         DATA  8              REQUIRED DATA
0103         LWPI  GPLWS          LOAD GPL WORKSPACE
0104         MOV   @SAV11,R11     PUT RETURN ADDRESS BACK AT R11 OF GPL WORKSPACE
0105         CLR   @>STATUS       CLEAR STATUS
0106         RT                   RETURN (BRANCH TO ADDRESS IN R11)
0107  *
0108  * DATA SECTION FOR PROGRAM 2
0109  *
0110  SAV11  DATA  0              PLACE TO SAVE R11 AT ENTRY
0111  * FOLLOWING TWO LINES ARE THE REQUIRED DATA FOR A PERIPHERAL ACCESS BLOCK
0112  * TO OPEN A D/V 80 FILE TO THE PIO PORT WITH THE .CR OPTION
0113  * THE NUMBER >5003 IS PRELOADED SO AS TO PRINT ONLY THREE BYTES - THIS IS
A
0114  * SHORTCUT METHOD, NOT FOR GENERAL USE
0115  *
0116  PAB2DT DATA  >0012,>1050,>5003,>0000,>0006
0117         TEXT  'PIO.CR'
0118  DSBYTE BYTE  27,71,13        BYTES FOR DOUBLE STRIKE, PLUS A CARRIAGE RETURN
0119  PRNBYT BYTE  27,78,10        BYTES TO SKIP OVER PERFS ON PRINTER
0120  * NOTE - THE LAST BYTE ABOVE, WHICH WE SET AT 10, GIVES THE NUMBER OF
0121  * LINES TO SKIP - THAT NORMALLY RANGES FROM ABOUT 4 TO 10
0122  * WE USE 10 BECAUSE WE NORMALLY START OUR PRINTER WITH THE TOP EDGE OF
0123  * THE SHEET JUST ABOVE THE PAPER BAIL TO PUT A BUILT-IN TOP MARGIN ON
0124  * EACH SHEET, THUS MUST MAKE THE NUMBER HERE LARGER
0125  *
0126         END   SKIPIT
0127  * END OF PROGRAM #2 - PLACING THE LABEL SKIPIT AFTER THE END DIRECTIVE
0128  * MAKES THE PROGRAM RUN IMMEDIATELY AFTER LOADING FROM OPTION-3 OF E/A
0129  *
```

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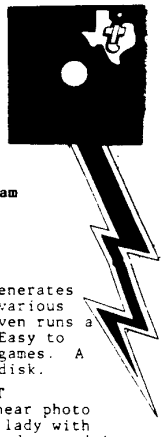

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Still more of the great ones from all over the world. The quality, graphics and speed of many of these games will make you wonder why they were never released commercially.

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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.

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This game requires a mine field to be crossed before escaping from E. Berlin. Good graphics and a real challenge.

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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!!!

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# BASIC/ASSEMBLY—

(Continued from Page 19)

E/A Option 3. In the first one, we included the code to define the edge character to look like a space, then proceeded to set up for and call our subroutine. Note that there is no screen-clearing operation here. Since this program does not auto-start, but requires you to type in the program name START at the PROGRAM NAME prompt, the screen will be cleared and set to light green for you.

After the subroutine has finished, the program takes the string just placed in TEMSTR and displays it a few lines down the screen. It then calls the subroutine again. This is done simply to give you a chance to see that the subroutine did what was intended. Pressing Enter will get you out of the program and back to the E/A prompt PRESS ENTER TO CONTINUE.

The second program is intended for you to use as a small utility. We wrote this originally for our own use, because many times when we were operating with the E/A module in place, we wanted to print a source code file, but wanted a way to set the printer to skip over the perforations while printing. Before we had a RAMDISK, we kept this program on a disk with EDIT1 and the ASSM1, ASSM2 files. Now, we keep it available all the time on a RAMDISK.

This program does nothing fancy. When it loads from Option 3, it auto-starts and runs the part starting at label SKIPIT. This sets our printer to skip over some lines at the bottom of each sheet. That happens very quickly, so you may not even see the light blink on the RS-232 card. You'll also not see anything happen at the printer, since we've opened the file to the printer with the .CR option, so no line feed or carriage return will go to the printer unless we intend to send one.

The program will do its job and simply return to E/A, which will place you back at the FILE NAME prompt. If all you wanted to do was set up for skip-over, press Function-9 to get out to the main E/A menu. This small program, however, has another entry point called DOUBLE. If you also want double strike printing, press Enter at the FILE NAME prompt, then type in DOUBLE Enter at the PROGRAM NAME prompt. This will send another three characters to your printer, putting it in double strike and sending a harmless carriage return. That carriage return is sent only so that each thing sent to the printer by this program will contain three characters. If the carriage return were not there, the 10 from the previous three character string would still be present in the VDP Ram buffer, would be sent to the printer, and would cause an unwanted line feed to occur.

The escape sequences we've put into this program will work for all models of Epson, Star Micronics, and Panasonic printers. The number of lines to skip (third byte at label PRNBYT) is ten for us, because of the way we usually have our printer's paper loaded. You may want to change that number to something less, say 5 or 6, before assembling the program. If your printer is some other make, such as an Okidata, you may need to change the escape sequences in other ways. I've run into one printer, called the Olivetti ink jet, in which sending a line feed or a carriage return, or both in either order, will always result in both a carriage return and line feed being performed. Most printers have a DIP switch setting to prevent added line feeds, but not the Olivetti.

This program incidentally introduces the new (for these articles) topic of file management. It Opens, Writes to, then Closes a file. As we've noted in the source code's annotation, there are some shortcuts we've taken here which would not generally be used in file operations. This program does, however, work nicely for its intended purpose. In a later article, we'll get deeper into file accesses, and avoid the shortcuts that were used in this program.

We promised some discussion on the ramifications of using Assembly programs that run from Extended Basic. One could nearly write a book on this topic alone. One of the big problems is this business of the character offset (>60) that one must use when operating from XB.

Strangely enough, it is possible to avoid that offset in XB. In our Word Processor, which was originally designed to run only under E/A Option 3, we avoided needing the offset by switching to the text mode and loading our character definitions starting at >800, where they are located normally when using the E/A module. To do that, we had to perform some VWTR operations, so that VDP would know where its tables were located. This operation is performed not by the Word Processor itself, but by the loader program's Assembly portion, embedded in the Extended

(See Page 25)

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# BASIC/ASSEMBLY—

(Continued from Page 24)

Basic LOAD program.

Let's digress into that subject just a bit. The actual Word Processing program is stored on the disk as a series of memory-image files. There are two loaders included in the program disk, one named LOAD, which runs from Extended Basic, and one called UTIL1, which is an Option 5 E/A program file.

Both these loaders contain code to put the VDP into the required setup for the TEXT mode, place a PLEASE STAND BY message on the screen, then load in the five memory image files that comprise the actual Word Processor.

In the Assembly part of the XB LOAD program, we set up to avoid the need for offset by performing the following:

```
        LI    R4,32*8+>800   Location of space character
        MOV   R4,@>834A      Move that value to FAC location
        BLWP  @GPLLNK        Use GPL Linkage
        DATA  >0018          Load "Small Capitals" characters
TEXMO   LI    R0,>01F0       Setup for text mode
        BLWP  @VWTR          Place VDP in text mode
        LI    R0,>074E       Setup for screen colors
        BLWP  @VWTR          Write screen colors for text mode
        LI    R0,>0401       Relocate character table to >800
        BLWP  @VWTR          By writing to VDP register 4
        MOVB  @TEXMO+3,@>83D4  Stash the text mode byte
```

This last operation, putting the byte at TEXMO+3 at >83D4, is necessary because otherwise the computer will go back to graphics mode as soon as any keystroke is accepted.

Of course the LOAD program does a host of other operations, but these are the key ones. The next-to-last two lines tell VDP to look for its character definitions at >800, and this allows us to perform reading and writing of screen characters without that nagging offset. Those who've done work involving Assembly and XB will notice that we've done a BLWP @GPLLNK. XB does not supply such a link vector. Our LOAD program supplies one of those, as well as a DSRLNK. The utility vectors (GPLLNK & DSRLNK) we use are those written and published some time ago by Craig Miller.

That leads into another topic, the use of utility vectors and routines. If a single program is to operate in both the E/A and XB environments, one must also overcome the fact that the nice easy REFs provided by E/As Option 3 are not available. If the program was designed for XB, one can arrange to provide the XB utilities when operating under E/A. Conversely, one can design so that the XB version uses the E/A utilities.

In different programs, we've used both these approaches to closing the utilty gap between XB and E/A. That's a topic we plan to explore at some length later in this series. For now, we'll just say that on a disk here at Harrison, we have a file called EAUT and a file called XBUT, so we can get the whole set of either into one of our programs.

When exiting from our WP program, we undo the things done on entry. We reset the VDP to graphics mode by putting a byte of >E0 at location >83D4, then LI R0,>01E0, and perform a BLWP @VWTR.

That's important, because E/A expects the screen to be in graphics mode when it resumes control. If you omit doing this, then return to E/A, the message PRESS ENTER TO CONTINUE, instead of being centered at the bottom of the screen, will be moved right so much that the UE of CONTINUE will be on a separate line. No real harm is done by this, but it's annoying to the user, and so we feel it should be avoided.

That's about all we'll cover today. It's a lot to digest for one sitting, anyway. For those who are serious students of Assembly, we recommend trying the two programs in today's sidebar. Should you encounter difficulty, or need help with understanding what we're doing, please feel free to call us anytime between 9 a.m. and midnight Eastern time at (301)277-3467. We'll do our best to help you over the hurdles.

In our next article, we'll get into the subject of Loaders, of the sort we mentioned in passing here. For our own programs, we make customized loaders in each case, and take some liberties with the structure of our memory image files (no file headers), so our methods may be controversial, but they do work.

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# Vendors, visitors had plenty to do at Chicago TI Faire

**Story and photos**
**By GARY W. COX**

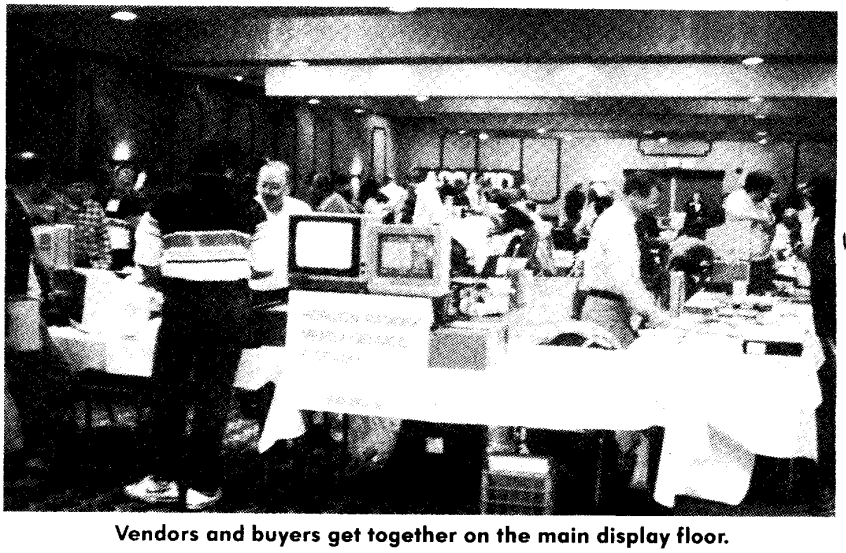
The Chicago TI Faire has once again come and gone. While I do not know the exact attendance numbers it was reported that more attended this year than last year plus I can personally say that a good crowd of TI enthusiasts was present all day long.

Many vendors reported sales from fair to good, and a few did very well. While the faire closed at 5 p.m. Saturday, sales were still being made at 7:30 p.m. that night!

The faire also brought forth many new products. Among the new products was Barry Boone's "Sound F/X" ($14.95) program sold through Texaments whom Barry Boone and Lee Bendick represented at the fair. Sound F/X allows the user to play true digital sound (recorded music, speech etc.) through a TI99/4A or Geneve 9640 without additional equipment. Sound F/X allows the playing of sound files from IBM (Sound Blaster VOC files), Macintosh or Amiga computers (SND files). The standard TI99/4A is limited to about 15 seconds of play time due to memory constraints, although optional equipment such as an 80-column card (for additional memory), Super Space or other compatible memory will increase the play time. A standard Geneve will give 400K worth of memory space. A Geneve equipped with a Memex memory expansion card will provide up to 1.7 megabytes. At any rate, this is truly a remarkable program with surprising sound quality in the playback of digital sound files.

Also available from Texaments was a selection of disks with various sounds for Sound F/X, ranging from voices of famous people and cartoon characters to science fiction characters and even some music. Other new items from Texaments were 10 games, ported over from Tomy Tutor, exclusively for use with the Geneve 9640. Included are the games Space Champions, Cave Explorer, Train Twister, Time Guardian, Jungle Terror, Traffic Frenzy, Islander & Car Race, Submarine Revenge, and Sea Terror.

New from Bud Mills of Bud Mills Services was TIM converter, which takes an RGB analog signal and converts it to composite signal. This allows the user of a previous monitor arrangement to use a composite monitor or TV with the TIM 80-column device. In addition to selling the Memex memory card for the Geneve and the Horizon RAMdisks, Mills also sells the Miller Graphics EPROMs ($35) for the CorComp disk controller which are used to enhance the operation of the disk controller. The Accelerator Card for the TI99/4A, which greatly speeds up the operation of the TI99/4A, was not available but is still in the works. No date was given for when Accelerator Card would be ready. One additional note from Bud was that he offers to anyone that sells their smaller Horizon RAMdisk to someone in order to purchase a bigger RAMdisk from him, Bud will warranty the old RAMdisk to the new owner for a period of 90 days. This applies only when someone purchases a new RAMdisk from him and sells the old one.



**Vendors and buyers get together on the main display floor.**

Gary Bowser of OPA demonstrated his digital sound adaptor which connects to the parallel port and allows the user to play back 8 bit digital sounds. This device is expected to be available by the end of the year.

Also new from OPA was POP-cart, a device containing a set of user-selected TI99 modules/programs all in one cartridge that plugs into the module port. The user selects the cartridges that he wants and it is all burned into one cartridge by OPA and accessed through a menu. For a basic unit containing 256K, programs from 5-7 cartridges can fit on one POP-cart. However, units up to 2 megabytes are available. The cost for the basic unit is $95 plus $4.50 shipping. The POP-card uses the feature built into the console called "REVIEW MODULE LIBRARY" to access the various cartridges. However, for an additional $25 a scrolling pop-up menu is available with additional features, such as the loading of assembly, object, Forth and c99 programs via the menu. Furthermore, on special request, some disk-based programs can also be burned into POP-cart, such as Rapid Copy, Disk Utilities, etc. Users can have everything they need in one regular-size cartridge which can be carried around. Furthermore, if XB and TE2 were burned into a POP-cart TE2 speech would be available in XB.

Also available from OPA is replacement GROMS 0 and 1 of the console, allowing the cataloging and loading of most programs without the need of a cartridge.

Representing 9640 News was Beery Miller displaying a variety of products for the Geneve 9640. Newly available through

**(See Page 27)**

# CHICAGO FAIRE—

(Continued from Page 26)

9640 News was GEME, a software package where multiple windows are allowed and the ability to scroll around them is possible. This package was completed by Beery Miller and Myarc has permitted its release. The only cost to users is shipping and handling of $5. Also new was PSYSTEM, which includes the P-system runtime and library file along with MDOS 0.98H and 1.15 which should only be used with the P-system. It has been reported that P-system will run all software which will run on the P-Code card by TI. Cost of P-system is $10. Distributed through 9640 News was GenBench Shell ($20), a utility that allows one to interface from MDOS to any MDOS or GPL program, providing the ability to build a menu and run anything at will. Included in this package are GenBench utilities that interface with TIC, allowing one to use a graphic mode environment to overlap windows with scrolling. Another addition through 9640 News was GenTRI ($49.95), a telecommunications, disk manager and word processor all in one package.

All the above 9640 News products are for the Geneve only. However, 9640 News is also distributing the re-release of several programs by Mike Dodd, including PC-Transfer ($25), PC-Transfer utilities ($7.50) and Identifile ($10) for the TI99/4a plus Hypercopy ($15) for the Geneve.

Mike Maksimik demonstrates his MIDI interface for the TI.

Ken Gilliland of Notung Software displayed many new software products, including the Bride of Disk of Dinosaurs ($12), Fonts and Borders (high quality TI Artist format fonts and borders, $7) and Disk of Horrors ($12) containing TI Artist art files, music and animation plus three original horror short stories by Ken Gi-lland. Updates to several products include Filmlib version 3.01 ($7) for use with TI-Base which has an enhanced menuing system, better print routines, enhanced on-screen display plus editing and appending features. Also updated is TI Casino V3.0 ($15) which now has five separate bank accounts, multiple users with password protection, enhanced craps, raised house limits, true Vegas style Baccarat plus the addition of a nightclub complete with a comedian who tells jokes! Note that updates are free, just return original disks with proper return postage and mailer.

Mike and Chris Maksimik of Crystal Software displayed their MIDI interface and a collection of songs.

Mark Van Coppenolle of CaDD Electronics displayed its GRAMulator Kit, which functions like the GRAM Kracker (in fact looks much like one). The basic kit costs $55 (must be assembled) or can be ordered assembled at an additional cost. Among other products was RICHGKXB ($24.95), which is an enhancement to the original TI Extended BASIC and requires the use of a GRAM device (GRAMulator, GRAM Kracker, etc.).

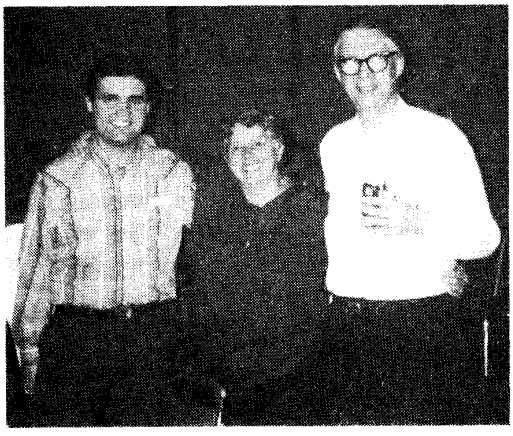
Representing Asgard Software was Larry Tippett displaying several new programs including Go-fer, Thumbnails (Geneve program utility for organizing, cataloging and converting MacPaint pictures $14.95), Mail Room and SGW (CHARAI character editor $14.95). Also at the Asgard Software table was a huge selection of other software from the company.

Bruce Harrison of Harrison Software demonstrated two new games: Scud Busters ($14.95) and Code Breakers. Another new program available was Smart Connect ($10), a program which allows the transfer of files between a TI and IBM compatible by the use of a connecting cable. Bruce Harrison's table was very busy all day with people purchasing his new products and old, including a good collection of music.

Representing L.L Conner Enterprises was Larry Conner selling products ranging from TI brand software to hard-to-find parts such as console L connectors and hexbus equipment.

Competition Computer also had a big assortment of TI brand software, cables and parts, including quite a few peripheral expansion boxes.

John McDevitt of Rave 99 demonstrated a new PE2 expansion box. Rave also displayed its speech adaptor cards and enhanced keyboards.



Gary Cox and Terrie Masters pose with Barry Traver (right), winner of the Birdwell prize.

Tom Freeman of J&P Software had sev-

(See Page 28)

# CHICAGO FAIRE—

(Continued from Page 27)

eral programs available, including Hard Back, Disk Assembler and Bugger.

MS Express Software displayed several software products and mentioned that several new products are currently in the works.

Available from several vendors was a device by William A. Shores of Suite #107, 5679 S. Transit Rd., Lockport, NY 14094 called E/B Module Expander ($25) which is said to give you the ability to have Extended BASIC and 5 other cartridge selections all in one. The device is a kit where you take the GROMs (can only use modules with 16-pin GROMs) from your old cartridges and place them into this new device, which is slightly larger than a regular cartridge, and the user may switch between the cartridges with a 6-position switch.

Ron Markus of Ramcharged Computers had various products for the TI99/4A, including a large supply of Prostick II joysticks. Barry Traver of Genial Computerware was present promoting his magazine on disk as well as Genie of which he is sysop of the TI section. Roy Hunter of Hunter Electronics was present with various TI products. Disk 'N Dat sold a variety of generic computer supplies such as paper, ribbons, surge protectors, etc.

A company named Del and Walter had a huge selection of disk drives and various other TI hardware and software. Furthermore, several user groups had tables, including Hoosier from Indianapolis, Milwaukee 99 Users Group, Will County TI users group from Romeoville, IL, and the St. Louis 99 User Group. Representatives of many other user groups across the country were present, including several people from my local users group (Mid-South Memphis TI99/4a Users Group).

Besides the new software and hardware some fantastic deals on used equipment was present at prices so low I had best not even mention it!

Also throughout the day various seminars were held by the various vendors demonstrating new hardware and software, as well as items that have been around a while.

**TRAVER RECEIVES**

**VENDORS AT THE CHICAGO FAIRE**

| | | |
|---|---|---|
| Asgard Software | P.O. Box 10306, Rockville, MD 20849 | (703) 255-3085 |
| Crystal Software | 635 Mackinaw Calumetcity, IL | (708) 891-2513 |
| Bud Mills Services | 166 Dartmouth Drive, Toledo, OH 43614 | (419) 385-5946 |
| Competition Computer Solutions | 219 S. Muskego Ave., Milwaukee, WI 53215 | (414) 672-1600 |
| Del and Walter | 185 North Post Road, Indianapolis, IN 46219 | (317) 895- 1265 |
| Disk 'N Dat | 14 South River St., Aurora, IL 60506 | |
| Genial Computerware | 835 Green Vally Dr., Philadelphia, PA 19128 | (215) 483- 1379 |
| Harrison Software | 5705 40th Place, Hyattsville, MD 20781-1727 | |
| Hunter Electronics | 4N370 Pine, Bensenville, IL 60106 | (708) 766-0566 |
| L.L. Conner Enterprises | 1521 Ferry St., Lafayette, IN 47901 | (317) 742-8146 |
| MICROpendium | P.O. Box 1343, Round Rock, TX 78680 | (512)255-1512 |
| MS Express Software | P.O. Box 498, Richmond, OH 43944-0498 | |
| 9640 News | P.O. Box 752465, Memphis, TN 38175-2465 | |
| Notung Software | 7647 McGroarty Street, Tunjunga, CA 91042 | (816) 951-2718 |
| Ramcharged Computers | 6467 E. Vancey Dr., Brookpark, OH 44142 | (800) 669-1214 |
| Rave 99 | 112 Rambling Road, Vernon, CT 06066 | (203) 871-7824 |
| Texaments | 53 Center St., Patchogue, NY 11772 | (516) 475-3480 |

**BIRDWELL AWARD**

At the close of the faire at the Saturday night banquet the John Birdwell Memorial Fund award was presented by John Birdwells wife Kathy and daughter Kelly to Barry Travler for outstanding excellence in TI and Geneve 9640 community.

As usual the Chicago TI Faire was great and my thanks go to the organizers (Hal Shanafield was in charge) who got it all together and my thanks also goes to those who from the Chicago UG donated their time and equipment to putting on such an event. Plus from what I heard the staff at the Holiday Inn did a great job keeping arrangements straight for the event. If you haven't attended a TI fair, I would highly recommend it.

# TI Source resumes operation

After being down for more than three months dues to equipment failure, the TI Source bulletin board system sponsored by Texaments has resumed operation.

TI Source is a free service featuring user-to-user messaging, program downloads, TI news, technical information and information about Texaments products. It is accessible 24-hours a day at 516-475-6463.

TI Source has logged over 50,000 calls since it went online in 1983. For information, contact Texaments at 516-475-3480.

# Guilford 99ers president dies

George William von Seth, president of the Guilford 99ers, died Oct. 28 at the Wesley Lang Community Hospital in Greensboro, North Carolina. He was 73.

A service of celebration was held Oct. 31 at the Starmount Presbyterian Church, of which he was a member. Burial was at Forest Lawn Cemetery.

According to Bob Carmany, von Seth was one of the founding members of the users group 8 years ago. "George and I were the only two left of the original members," he said.

A native of New York City, von Seth was the retired co-owner of Zimmerman-Evans Inc. He was an army veteran of World War II, a Mason and a former member of Civitan.

He is survived by his wife, Virginia Sim-mons von Seth; two daughters, Helga Carpenter of Whitsett, North Carolina, and Pat Froman of Salisbury, North Carolina; a sister, Mildred Jungen of Maywood, New Jersey; and four grandchildren.

The family asks that memorial contributions be made to the charity of the donor's choice.

# Newsbytes

## 1992 Lima fair set

The next Multi User Group Conference sponsored by the Lima, Ohio, 99/4A Users Group is scheduled for May 15 and 16 at the Ohio State University Lima Campus, according to the group's newsletter.

The conference, free to all participants and vendors, is scheduled to begin at 4 p.m. May 15 and to end at 8 p.m. May 16.

For further information, contact the Lima 99/4A Users Group, P.O. Box 647, Venedocia, OH 45894.

## 1992 Washington fair slated for September

The next annual State of Washington TI Convention is scheduled for Sept. 19 in Tacoma, according to Cynthia Becker, one of the organizers.

For further information, contact Jim Tompkins, (206) 756-0934.

## Harrison Software introduces products

Harrison Software introduced several new products at the Chicago Faire Nov. 3.

Code Breakers, written in assembly, is described as a "thinking man's" game which provides cryptograms on-screen for the player to solve. The disk contains a file of 380 puzzles, and the program has built-in capability for the user to create and edit his own puzzle files or edit the supplied file. A two-player "challenge" mode allows one player to enter a puzzle which the computer will encipher for the other player to solve. The program and puzzle file are all on one SS/SD disk, and the program will load and run from Extended BASIC, Editor/Assembler or TI-Writer. It is compatible with RAMdisk installation, according to the manufacturer. Price is $14.95, including shipping and handling.

Harrison has begun a whole new line under the J.C. Bach Music label (a unit of Harrison Software). Performed by Dolores P. Werths, the company's "resident musician," 20 pieces from Johann Sebastian Bach's Anna Magdalena's Notebook make up the first product in the line. The package is available in two forms. In memory-image form, four DS/SD disks comprise the package, selling for $15 including shipping and handling. These memory-image files are designed for use with a five-octave keyboard and for use on TI99/4A computers. For those who own Geneves, or have less than five octaves available, or who simply wish to do their own musical experimenting with the Bach pieces, the company offers the source files in SNF format on two DS/DD disks at $25. Single-sided versions are also offered on request.

The company also has produced two disks full of utilities for those who program in Extended BASIC. These are assembly subroutines which can be merged into XB programs via ALSAVE or any other method the user chooses. Annotated source code is supplied on the disk. Each disk also includes an XB program to print the source code files and instructions, so these disks can be used by those who own only the XB module. Demo programs for each utility are also supplied.

The General Purpose utilities include ones to perform special kinds of Accept At functions for string and numeric variables, plus two different forms of boot tracking so programs written in XB can "know" from which drive they were loaded.

The Random Number utilities provide quick ways to make random numbers available in XB Variables. These include Dealer, which deals a deck of up to 54 cards into any XB array, MULDEK, which deals up to five decks of 54 cards each shuffled together, and one which simply reports "tailored" random numbers in a user specified range of values into any XB array variable. This last one will fill an array of dimension 500 with such numbers in less than one second. These utilities all include Harrison's "Seed" subroutine, which will correctly seed the random number process regardless of how the program started, the manufacturer says.

These utility disks are available through Tigercub Software (156 Collingwood Ave., Whitehall, OH 43213), user groups and other sources. For those who have no access to those sources, Harrison Software will provide them for $3 each, including shipping and handling.

For any of these products, make check or money order payable to Harrison Software and write the company at 5705 40th Place, Hyattsville, MD 20781.

Bruce Harrison of the company says that a revised edition of Smart Connect, the company's TI-to-IBM data transfer product, is being sent to all customers. He says the first disk was found not to work with all PCs.

## JP Software titles available from Coffey

The following JP Software titles are now available from Jerry Coffey:

Triad is a terminal emulator, disk manager and 40-column text editor combined in a single program so everything is in memory at the same time. Both 99/4A and Geneve 9640 versions are included. Author is Wayne Stith. Price is $20.

Chainlink Solitaire is a solitaire card game by Wayne Stith and Walt Howe. It requires a TI99/4A and Editor/Assembler, TI-Writer or Extended BASIC. It sells for $12.

The following programs by Mike Dodd are available: PC Transfer v1.1 plus utilities (9940 and 99/4A), a TI-IBM data transfer program, $25; utilities only, $7.50; HyperCopy (9640-MDOS), a disk copying program, $15; and IdentiFile, a program which provides a directory including information on the types of files the disk contains (99/4A and 9640 GPL), $10.

Any of the above, as well as v1.02 of Gen-Tri at $49.95 may be ordered from Jerry Coffey, 9119 Tetterton Ave., Vienna, VA 22182.

## 9640 News selling Mike Dodd programs

9640 News is now selling programs by Mike Dodd formerly distributed solely by JP Software.

They are HyperCopy, $15; PC Transfer, $25 including utilities files (utilities alone $7.50); and IdentiFile, $10.

Beery Miller of 9640 News notes that he is not in a position to handle unfulfilled orders with JP Software. For information or to order, write 9640 News, P.O. Box

(See Page 30)

# How to scan and digitize graphics with a PC, for use on a TI, without having to use cheap waxed paper and maybe go blind

By RAY KAZMER

*(This is the first of a two-part article. Part 2 will be published in December.—Ed.)*

I won't mislead anyone. I'll say up front, this "process" requires extensive use of a PC (IBM compatible) computer. It cost me nearly two years and $2,600 to "discover" it, but you may be able to do it now, for a lot less!

This may shock some die-hard 99'ers but there are now many 99'ers who bought a flashy PC, but did not abandon their TIs. I'm one of them! You would probably recognize some of their names, If I told them to you! (But I'm no squealer!)

I've found that my TI and my PC are not only "compatible," but actually work very well together. I bought my PC-AT to use its hi-tech VGA capabilities, to create super graphics, for all our TIs.

My main objective was to be able to put any picture I could see on the TI, including any photograph, fonts, charts, maps, cartoons (Woodstock or Garfield?) videotape frames (which could be used to create stunning animations) and anything else my greedy little heart desired! (I succeeded, but it has been a challenge.)

Even before I bought my PC, I knew text files (D/V80) could be transferred between a TI and a PC, because ASCII is exactly the same on both machines. But, graphics is something else. They can be as different as a wren and an ostrich!

There are several ways to transfer data, between a TI and a PC. John Koloen outlined most of them (October 1991.) There's just one additional comment that I would like to add to John's article, regarding the use of modems. You do not need them.

Look at the back of your RS232 card (where your printer cable is hooked up.) You'll see there is also a female 25-pin connector, where most modems connect. If you already have a 25-pin modem cable (a "null modem" in computerese) just hook that sucker up, between the RS-232 card and the serial port on your PC. With a terminal program running on both machines (I used Telco on my TI and Procomm Plus on my PC) both computers think they are "talking" to a modem, even though there is no modem between them! Text can then be transferred in either direction, at an incredible 9600 baud!

There's also one new arrival to the text file transferring scene, which John forgot to mention, called Smart Connect, from Harrison Software (September 1991, page 32.) I don't know if Smart Connect will transfer a graphic file (D/Fi28),however.

**EXPERIMENTING**

At this point, I should explain how I "experiment." As soon as I have found something that works, I stop searching! Undoubtedly, there must be more ways to transfer graphics from a PC to a TI, but I'll leave finding them to someone else.

Transferred graphics can work with TI-Artist, GRAPHX, Picasso, or whatever you want, if you will first use Pix-Pro (by Jim Riess, from Asgard) to "switch" formats. Owning Pix-Pro is necessary if you intend to use my secret process.

Between all TI art programs there are some 12-15 formats. On a PC, there are hundreds of formats and some of them differ, even within their own formats. As an example, I've found about nine .MAC formats. Some will load into MACFLIX, and

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# Newsbytes

**(Continued from Page 29)**

752465, Memphis, TN 38175-2465.

## GenBench Shell announced by LGMA

LGMA (Little Green Men Associates) has produced GenBench Shell, a program for the Geneve 9640 which provides a "shell" around the MDOS file and disk management functions.

According to Al Beard of LGMA, the program is a menu-driven, mouse capable, windowing environment that layers on top of the 9640 Windows driver by Beery Miller.

Beard says that, using Shell, the user can define up to 15 programs under the utilities menu item in the menu list. The appearance and usage of the Shell is similar to Graphic User Interfaces (GUIs) for other computers.

The Shell disk contains a windows library, a collection of useful routines that enable a programmer to create, select and memorize windows. Also included are routines to allow the programmer to create menu bars, control the Myarc or Logitech mouse, and to define a set of "pick lists" within a window to allow the user to interact and enter text, integer and list data. The windows library is compatible with the upcoming release of the Full-C Compiler for MDOS, TIC, Beard says. These routines as well as the Shell itself are written in Full-C.

Shell comes with a 20-page manual, additional documentation describing the windows library routines.

Shell is available from 9640 News for a suggestion retail of $20. The product can be ordered from the 9640 News BBS, (901) 368-0112, or directly from LGMA Products by sending a check or money order for $20 to LGMA Products, 5618 Applebutter Hill Rd., Coopersburg, PA 18036.

**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.**

# SCANNERS—

(Continued from Page 30)

others will not. This is one reason it took me so long to find this process.

There's something else to consider before you rush out to buy your scanner. They're expensive, difficult to use, and work far from perfect. They must be rolled over photos or text, with a slow, steady pace, in an absolutely straight line. If your hand slips (or your heart beats) as you scan, the scan might come out "bent." You may not even notice this slight distortion on scanned photographs, but a font or text can come out looking simply awful. If you get unsatisfactory results, your only option is to re-scan your original, or in the case of a font, "clean it up," once it's on your TI. And that can be exhausting work.

It might be helpful for you to know what a hand scanner is, how it works and what sort of problems you can expect.

## HAND SCANNERS

First, the word "digitize" may not be in your ratty, old dictionary. It's a new, hi-tech word, which appeared around the time personal/home computers, became popular. It means: "turn into numbers" (or something like that.) That's what a scanner does — digitize. There are also digitizers which work with sound.

A scanner "sees" a photograph (B&W or color) as varying shades of gray, and almost instantly converts those shades into dot patterns called "dithering" as a scanner is rolled or pulled over your original. This does not harm the photos.

The "dithered" graphic file created by the scanner, can be loaded into several different PC art programs, and edited. You can change a single pixel, erase unwanted backgrounds, flip part or all of a scan on its side, stretch and compress the images, invert dot patterns and even put your ex-wife's head on your dog's body! (Generally speaking, you can screw up any scan, any way you want.)

## OPTICAL CHARACTER RECOGNITION

There's another outstanding use for a scanner. Since I made one reference to the September MICROpendium, I will make one more. Take a quick peek at page 27. You will see the start of a huge program titled, FLAGS. If you have lots of time, you could key it all in, or, if you have $4 sitting around, you could buy it on disk from MICROpendium, ready to run.

There's a third alternative, if you have a PC, a scanner and an OCR (Optical Character Recognition) program. Letters typed on a page, such as you are reading now, are called "letter tone" (pure B&W) and contain no middle-tone grays, unlike photos. Scanners have switches on them, to select the sizes and types of images you wish to scan. The problem with this is that scanners create only graphic files.

But, if you're operating a scanner through an OCR program, it creates files that can be converted into text, which can then be loaded into word processors.

Hand scanners are "glory machines." They have a great reputation, based solely on the imaginations of people who've never used one. A scanner can make a shambles of a text file, especially if you use it in a careless manner, such as daring to breathe, while creating a scan.

However, publishers of OCR programs know a scanner can not "read" as well as your basic seven-year-old and have given us a way to correct read errors. The OCR program will substitute a character for one it doesn't recognize, and it lets you select which character you want to use. (I use a "*" as my substitute.)

Let's say you've scanned the FLAGS program, and line 140 is supposed to be:

```
140 CALL KEY(0,K,S):: IF
K=83 THEN 150 ELSE 140
!228
```

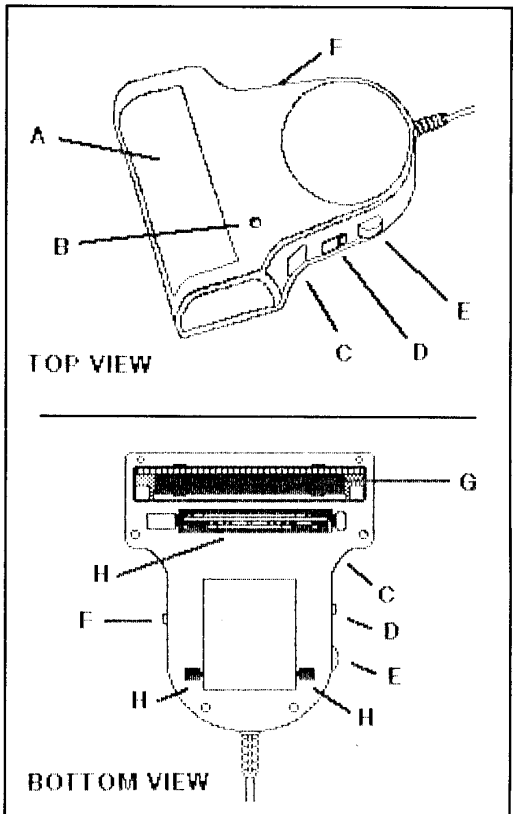
But your scan, comes out looking like:

```
140 CA*L KEY(0*K,S):: IF K=83
THEN 1*0 ELSE 140 !2*8
```

Most OCRs also have a special built-in word processor, which searches for every "*" then stops the cursor on each, so you can type a correction over it. In most cases you can easily figure it out, like the missing "L" in "CALL." But there may be a time, when you must check your original listing for a number, like that misread "5" in "150." I know this sounds hard, but it's really a lot easier and faster than keying it all in.

So what! Who needs perfectly typed text files of a program, you might ask. Once it's in this form, you can transfer it to the TI and convert it to a runnable program format, with Paolo Bagnaresi's Basic Builder. The total estimated time for a program like FLAGS would be about two hours, from start to finish. So, how long would it take you to key FLAGS in, then find and fix every error you added?

(Continued next month)




**Key to the DFI HS3000 (B&W) Hand Scanner**

A — Viewing window
B — LED speed warning light
C — Start button
D — Photo/letter selector switch
E — Brightness control wheel
F — Resolution switch
G — Scanning window
H — Rubber rollers

MICRO-REVIEWS

# Scud Busters, Code Breakers first Harrison game offerings

By STAN KRAJEWSKI

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.

By the time you read this the Chicago TI User Group International World Faire, held Nov. 2, will have passed. However, thanks to Harrison Software, I have two programs which made their official debut there.

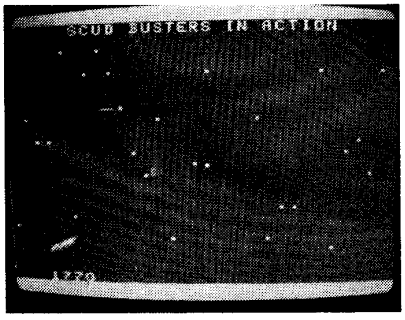
Bruce Harrison is known for his music disks, and has dabbled in applications with his word processor program. And now, with these two programs, he has entered the arena of games.

## ★★★ SCUD BUSTER

Okay game lovers, get your sights ready on this one. Scud Busters is based on a Desert Storm scenario, in which the player is manning a Patriot Missle Battery in Saudi Arabia, trying to shoot down incoming Scud missles launched from Iraq. System requirements are PEB with memory expansion, disk system, XBASIC, Editor/Assembler or TI-Writer, and joysticks. In case your're wondering why I mentioned the PEB in the system requirements, this game did not work on my Cor-Comp 9900 Micro Expansion system. Bruce Harrison believes it will work on a Geneve, as the program has built-in calibration routines. If it works on a Geneve, the game will play at the same pace as a TI, regardless of the clock speed the Geneve is set for. (Due to my RGB monitor not being back from repair yet, I was unable to run these programs on my Geneve. But I will provide an update for Geneve compatibility when I get it back.)

This game runs at a good speed due to it being written in assembly language. It takes no more than 10 seconds to load and has been programmed to be compatible with RAMdisks and to load and run from any floppy drive.

Your attention is first grasped by the Scud Busters title screen, followed by its theme music from Tchaikovsky's Arabian dance. It then asks you whether you want a one or two player game. Each player can also pick his own skill level out of the three skill levels offered. As the game proceeds you will be kept very busy as the Scuds start dropping from the top of the screen. There is a dot in the center of the screen that becomes your gunsight. You must manuever the dot into the path of the incoming Scud in order to blast it from the sky. Your timing and judgment of lining up the path the Scud will determine how well you will do.




The graphics aren't bad and the way the Patriot continues past its target if you miss is a good effect. You can see the Scud missile and the Patriots very well, as the background screen is a good choice of colors and also agrees with your eyes. This is important as this is not a short game. You only get one Patriot per Scud and, like the real thing, they really do travel fast. There are no unnecessary sound effects that would annoy you, and the sound effects that are used let you know whether you made a hit or whether the Scud made it to the ground. After playing for a while you don't need to look at the score to see if you made a hit. You will be able to determine a hit from the sound. This lets you concentrate on the next Scud to appear.

During all this action you will need a break. So, after 20 launches you will get a screen that will summarize your performance. It'll display whose turn is next, how many hits you had, how many misses, and also the percentage of hits you have had since the beginning of the game. When you are ready to continue, pressing the appropriate fire button will continue the game. During a 2-player game, the first player's score is displayed on the lower left, and the second player's score is displayed on the lower right. The player's whose turn it is is displayed in the lower middle of the screen.

For each hit a player scores 50 points. For each miss 10 points are deducted from your score. The game will continue until a player gets 10,000 points, or until a player gets minus-1000 points, resulting in losing the war. At the end of a 2-player game statistics for both players will appear on screen.

The reason I game Scud Busters three stars is that a crosshair could have been used instead of a dot as the aiming device, because it is a little hard to distinguish the dot from the background stars. Some type of second screen would have been nice to change the scenery for a long-playing game such as this. Also, a little more graphics could have been added for a better looking playing field. This, however, does not take away from the fun of this game. I found it entertaining for adults and teenagers in the family.

Scud Busters is available from Harrison Software, 5705 40th Place, Hyattsville, MD 20781. Price is $14.95, including S&H.

## ★★★ CODE BREAKERS

Code Breakers, by Harrison Software, is a program that I see as one-of-a-kind — a game that will keep you busy for hours. You don't have to wait for your weekend newspaper when you can now set up your own cryptograms anytime with the help of your computer.

Like Scud Busters, Code Breakers is a new game released during the Chicago fair. System requirements are Extended

(See Page 33)

# MICRO-REVIEWS—

(Continued from Page 32)

BASIC, E/A, or TIW, 32K and disk system. Once again, this is a fast loading assembly language program.

After the title screen, there are three options: 1. PLAY FROM DISK; 2. PLAYER CHALLENGE; 3. MAKE/EDIT FILES. After selecting on option, you may choose the skill level: Normal or Professional. It will then default to "DSK1.Puzzle," which is the one player crypogram. At this point, if you have already set up new puzzles with the Make/Edit Files selection, you may choose that. At the next prompt it will say "Solve the Puzzle." Below will be what was "Plaintext" in the file, and is now "Ciphertext," which is the encrypted file. The loading and encrypting takes only a few seconds.

While trying to solve the puzzle in the normal mode you can see punctuation and spaces where appropriate. If using the existing "Puzzle" file, these are "wise sayings" that you must encode. As you choose a letter from the alphabet, any occurrence of that letter anywhere else in the saying will also be changed to that letter. If you happen to jumble up the saying more than you expected, simply pressing FCTN 9 will put the saying back to the original encrypted order.

After you think you have solved the puzzle, you press Enter and the program will tell you whether you are right or wrong. If you were wrong, It will ask you if you give up. If you give up at this time it will reveal the saying, give the keyword used as the base of the cipher alphabet, and the remaining letters of the alphabet not contained in the keyword. When playing from a file on disk, no puzzle will be repeated during that session of play.

Now once you master the normal option, you still can get a whole new experience by trying the professional mode where all punctuation is gone and the saying is broken up into 5-letter groups of characters.

For real family fun, and if you are not ready to encode a message yourself, you can turn to the Player Challenge option. My family preferred this option as we are not regular cryptoanalysts and were able to use this option to get used to the game. It is played similarly at both levels except that one player turns his back while the other player types in his own saying. The players then take turns. In this way you can use hints as needed, such as subject, give letters away, etc.

Code Breakers is a great example of fine programming, and uses boot-tracking so that the default drive for for the puzzle file will be the drive from which the program was loaded. There is built-in error protection of existing files. Having a Make/Edit feature to customize the program with your own files is very handy. This game is fully compatible with RAMdisk and the author says it should work on the Geneve.

Code Breakersis available from Harrison Software, 5705 40th Place, Hyattsville, MD, 20781 priced at $14.95.

*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, please include postage. If you need to discuss something, for any reason, call me at 904-364-7897 EST.*

## READER TO READER

☐ Ian J. Atrill, Suite K, 237 W. 2nd St., North Vancouver, British Columbia, Canada V7M 1C9 asks:

I would like to know, specifically, how one goes about partitioning the Horizon RAMdisk into two or four drives on the Geneve. I have followed the documentation which accompanied the RAMDOS1l4F patch, but with no more than cosmetic success. Various files I have downloaded (e.g. menu batch files), prove that either others have figured out how to do this or that I am doing something wrong in the first place.

☐ Frank C. Legler, 118 Riggs Dr., Clemson, SC 29631, asks:

Has anyone discovered a way to put character numbers 199-255 into data statements other than by disk sector editing? The TI99/4A ROM does not contain this range of numbers. Direct input via the keyboard would be highly useful for fonts and other graphics programs for printers.

☐ Robert Schulz, Kirnsteinstr. 20 a, 8200 Rosenheim, Germany, writes:

At the International TI-Fair in Wiesbaden last year I purchased the program YAPP, which is distributed by Asgard. Can any of the readers tell me the control codes for the TI-850 printer, so that I can use the hardcopy of YAPP with that printer? The program works fine with an Epson FX 1050.

☐ Alfred Slovak, Fugbachgasse 18/17, A-1020 Vienna, Austria, writes:

In the August issue of MICROpendium I found a User Note to use the Break key with Extended BASIC on a Geneve. I have the same problem with Myarc BASIC V2.99A. The Break key (resp. F4, CTRLC, ALT4 or Page Down) works only if the program stops due to an INPUT or ACCEPT AT statement. Not even at a CALL KEY statement can the program be interrupted by the Break key. I helped myself by inserting: "IF KY2 THEN BREAK", but this seems not to be "the yellow of the egg," as we call it.

☐ Bill Cannon of the Victoria 99ers User Group, 2015 Casa Marcia Cres., Victoria, British Columbia, Canada, V8N 2X5 writes:

I was very impressed with one of the programs that I received from Tigercub Software, Disk 1250 CADMASTER by John Miller of 2458 Transit Ave., Anaheim, CA 92804, V1.9. It is the best CAD program that I have seen, but it doesn't have any way to send it to a printer, which means it is kind of useless for drawing purposes.

I wrote to John Miller but I have received no reply at that address (and would like) information from anyone with a later version of CADMASTER or John Miller's current address.

GenBench Shell

# Even more reason not to leave your MDOS shell

By JOHN KOLOEN

GenBench Shell,by LGMA Software, is a nicely done shell program for the Geneve that should meet the needs of most users. The program is reasonably priced and represents an improvement over other menuing and shell-type programs.

GenBench Shell,which was written by Al Beard, runs out of MDOS and is loaded through a user's AUTOEXEC file. Another MDOS program, DRIVE-WIN by Beery Miller, is also required. DRIVE-WIN comes on the GenBench Shell distribution disk. When booting the Geneve, GenBench Shell is loaded and the user is presented with a screen that includes six pull down menus at the top. The menus are labeled Project, Utilities, File, Disk, Task and Window. By using a cursor or a mouse, the user selects from these pull-down menus. To use a mouse users must have a copy of MOUSE.MOUSF, which is not included with GenBench Shell. It is available from 9640 News.

What does GenBench Shell do? It serves as a platform from which to launch MDOS-based programs, or programs that can be launched from MDOS with the use of Barry Boone's EXEC program. After you exit the program, you are returned to the shell where you can launch other MDOS programs. GenBench Shell won't let you launch programs that require use of the GPL interpreter. To do that you would simply drop out of the shell using the Task menu and selecting the label DOSPrompt. You can then load GPL in the normal way. To return to the shell, you drop out of GPL back to the DOS prompt and type EXIT. Use of the word EXIT for such operations in common in the PC world.

In addition to launching, GenBench Shell includes a range of file and disk management functions. Under file management, the program supports the following operations: Copy, UnProtect, Delete, Protect, View and Rename. Under disk management, the operations are: Directory, Label, Format, Create Directory, Remove Directory, Copy, Compare and Check Disk. While all of these functions can be useful, they are not implemented as well as in Disk Manager by Clint Pulley. Fortunately, it's easy to make DM one of the "tasks" that can be launched using the Utilities menu. When I want to do some serious disk management, I launch DM, perform the functions I want, and then jump back into GenBench Shell.

While all the File functions available in the shell are available in Disk Manager, several of the Disk menu features are unique to GenBench Shell. Among these are Compare, CheckDisk and Format. However, Format appears to work only in single-density mode. I tried using the command line to format a DSDD disk, but the process wasn't successful.

Because Myarc is still holding my HFDC hostage, despite having posted bond of $75, I wasn't able to run GenBench Shell out of a hard disk. However, it is designed to run out of a hard disk, as well as a floppy.

The real meat of the program likes in its Task menu. It is here that you define the programs that you want to launch out of the shell. You can define up to 15 programs for launching, giving them a menu identifier, which appears as its name under the Utilities menu; pathname (subdirectories on floppies are valid); command line designation, which executes the launch; screen allocation (80-column mode and window mode, which is usable by a few 9640 programs; window definition, if window mode is used; and multi-task with the shell, which gives you the option of putting the shell "to sleep" while the task is running or letting them both run at the same time. This is only partially enabled and not of much use at this time.

The only unresolved problem I encountered was the tendency for GenBench to lock up the Geneve when faced with random keystrokes. The first time this occurred was by accident when I leaned against the keyboard while trying to select items from a pull-down menu. I was able to repeat this by overloading the buffer with keystrokes while accessing on of the menus. It is because of this that I gave the program a B+ for Performance. However, while using the program with purpose, it worked flawlessly.

**Ease of Use**: I found GenBench Shell to be easy to learn. After adding a few commands to my AUTOEXEC file,I booted into the shell and, within 30 minutes, had seven launchable programs available. (GenBench Shell comes with three programs already in the Utilities list: Fractals, Transform and File View, a sector editor.) I added Telco, PC-Transfer, Archiver 3.02 and Disk Manager. The first three programs require EXEC to launch while DM is a MDOS program.

Those with 9640 Windows in their software library will find GenBench even more useful in creating menu-driven windowing environments for their applications. However, this capability is accessible only by programmers, though end users may benefit from programs created by programmers using GenBench.

**Documentation**: The documentation that comes with GenBench Shell is adequate to the task, though brief. I would like to have seen a few more examples but didn't suffer for the lack of them. No pro-

(See Page 35)

## Review

**REPORT CARD**

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

**Cost**: $20.00
**Manufacturer**: LGMA Products, 5618 Apple Butter Hill Rd., Coopersburg, PA 18036
**Requirements**: Geneve 9640, 9640 Windows optional

Thumbnails

# Thumbs up on Thumbnails

By JOHN TAYLOR

A very good TI friend of mine recently asked me if he provided the program would I catalog his Macintosh picture files, as the program would only run on a Geneve in MDOS. I said I had heard of or read of "Thumbnails" but wasn't familiar with it. A couple of weeks later he gave me the program and 65 DSDD disks of Mac pictures to catalog.

Thumbnails, by Francisco Garcia, is from Asgard Software priced at $12.95. After printing out his catalog of Mac pictures I highly recommend it to all Geneve owners. It is a pleasure to use, totally user friendly and produces an excellent catalogue of nine named pictures to each page with the path name printed at the bottom of each page if desired. This option is probably for hard disk owners but DSK1. tells a floppy user absolutely nothing of the source disk's name. This is my only complaint with the program. Possibly the Cisco Kid can remedy this in an update to help the Geneve owners who aren't owners of hard drives.

## Review

**Cost**: $12.95, plus $3 shipping
**Manufacturer**: Asgard Software, P.O. Box 10306, Rockville, MD 20849
**Requirements**: Geneve 9640, Epson-compatible printer

After reading the manual, I loaded Thumbnails as instructed; typing A:TN in MDOS and the program was off and running. The first screen is two windows, the left side the Title, which remains in view until the first thumbnail is drawn. The right side is the first of three main command menus. It has four basic commands for generating the list, plus "Quit." You must use the quit option to leave the program or the next time you run it you will wonder what's wrong. The first time I used the program in a hurry to go out I just shut off the P-box and couldn't get the program to function properly until I remembered reading "the only way to leave the program is to quit."

The heading for this window is: Directory Specification. The options are:

| | |
|---|---|
| **Path** | **Directory Mask** |
| **Compile Directory** | **Verify Path** |
| **Quit** | |

Pressing "P" requires you to enter DSK1., or whatever is required for the hard disk path name. Each must be followed by a period to function. Pressing Enter completes Path.

Having read the manual I knew the only other option I was interested in at this point was the third one. Pressing "C" you now get a taste of how fast this program is. Up comes the second command menu screen.

The heading for this screen is: Task List Developing. Options are:

| | |
|---|---|
| **Up a line** | **Down a line** |
| **Forward a page** | **Reverse a page** |
| **Top of list** | **Bottom of list** |
| **View flag** | **Print flag** |
| **New Directory** | **Check a file** |
| **Execute Task** | **Special Features** |

The first six options are self-explanatory and the dedicated cursor keys are also active.

In the other half of this window, to the right, the list of Mac picture files has been listed preceded by two columns "V" and "P," giving you the opportunity to flag individual files for viewing or printing. Having read the manual, I pressed "S" for special features, which brought up the third menu.

The heading for this screen is: Special Feature. Options for this screen are:

| | |
|---|---|
| **View Full Size** | **Print Full Size** |
| **Flag all Files** | **Mac Pic Filter** |
| **Configure Printer** | **Slide Show** |
| **Back to Task List** | |

Again with knowledge of the manual I pressed "F" to flag all files on the current list. You are automatically returned to the Task List with all files flagged "V" & "P".

Back at the Task List menu the only thing at this point I am interested in is to Execute Task, so press "E" and the right window clears. The prompt appears: Print Path Name (Y/N). Answer N.

Working on File: (Name of First Mac File printed here)

When the picture is drawn, the program calculates print data and then prints the frames. After all the files on the disk are printed out you are returned to the Task List Developing screen with the last Mac

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## GENBENCH—

(Continued from Page 34)

gramming skill is
required to use GenBench Shell. The manual's step-by- step approach is thoroughly adequate.

I find GenBench Shell to be a step above such menuing systems as Menu 80. Its interface is neat and easy to use, and debugging Task entries is straightforward. The shell gives me plenty of flexibility in which to work and at the same time lets me drop into the MDOS command line interpreter to load GPL, if I choose. Coupled with GenTri, a Geneve user can pretty much work entirely out of MDOS mode, with word processing, telecommunications and disk management functions easily available. About the only applications still missing for Geneve users that require access to GPL are a spreadsheet (Multiplan) and a database manager.

But for now, this is nice.

Software for the 99/4A & 9640

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Rockville, MD 20849

# THUMBNAILS—

(Continued from Page 35)

file still showing as a Thumbnail in the left window, where it remains until a new Mac file is drawn.

Insert a new disk in DSK1. and press "N" for New Directory. This immediately finds you back at the Directory Specification screen with the cursor at Path. Hit Enter twice, then the down arrow twice, then "C" and proceed as before.

The process goes smoothly unless you have a file that is named improperly. This is not listed in the manual but I had trouble with several files and found they each had a"/" in their make-up. A trip out of the program to rename them I replaced the slash with a hyphen and then they ran successfully. One other file had an asterisk in its name and, after doing the same change, it also ran successfully. To do the job properly I had to re-catalog these disks, so I checked closely before starting any more, but that was the lot.

The look of satisfaction when my friend viewed his catalog was a pleasure for me to see. He commented that he had never seen a lot of his pictures as he had never printed them out, but now he had a very manageable catalog he could easily use.

After completing the catalog I experimented with some of the other options which I hadn't required to complete my task. I first went to Task List Developing after compiling a directory on a disk. I flagged a file to be printed and then Executed Task. The picture printed very quickly in the top left hand corner of the page.

I then went to Special Features and flagged the same file to Print Full Size, returned to Task List Developing and "E" to Execute Task and got an excellent full page print of my Mac file. It was surprising how faithful the reduction of the Thumbnail was to the Full Size except it was darker because of the concentration. Top score for this effort!

Next I reinserted the program disk as there were nine D/F128 files on the disk. Following the procedure required I got to Special Feature window and pressed "M" for Mac Pic Filter. Returning to the Task List Developing screen the list was reduced to five Mac files which I cataloged. (See Fig. 1 for 1 of the 5 Mac files printed

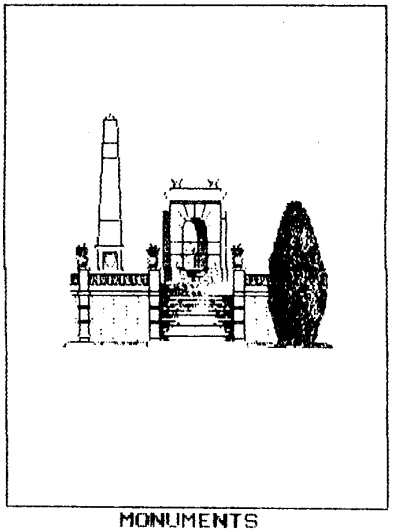


**Fig. 1**

by Thumbnails. The thumbnail is about 30 percent the size of the original.—Ed.)

Slide Show in Special Feature intigued me so I took another disk and followed the process to the pressing of "S".

File Pointer: (shows the first picture name)

The pictures are drawn off screen and after an interval the filename changes at the File Pointer and the next picture is on the screen. It is not drawn over the previous one, as is the case when viewing and printing. I found the show to be very good and will no doubt find myself using it to sort my picture files into some system before making a catalog.

Pressing a key takes you back to the Task List Developing screen.

On the Task List Developing menu there is just one option I haven't tried: Check a file. So I reloaded the Thumbnail disk because I knew it had both types of D/F128 files on it. Pressing "C" you get a three-line window in the middle of the screen with the heading: Mac Picture Verification. Here is what appeared on the screen:

Checking File for Signature

File Appears to be a Mac Pic

When I checked a file I knew wasn't a picture, the last line was "Incorrect Signature" for a Mac Pic.

Again a very quick verification process for checking a single file but I would likely use Mac Pic Filter as I did earlier, if I were going to check the complete disk.

I decided to check out the Viewing a fil function, so I flagged the first file with a "V" then pressed "E." Here is what appeared on the screen:

Working on File: (name of file)

Status: Drawing Picture

Status: (C)lip or other to cont.

When you press "C" you get the three-line window center screen as in Check File.

Clipper

Select One of the Formats:

(A)rtist

(P)age Pro

I chose Page Pro. Then this appeared:

Clipper Path

Old DSK1.

Use DSK1.

Clipper: Filename

Name: (name for Page Pro file)

When complete you are returned to Task List Developing menu.

I haven't found a way to unflag a file unless I go through the New Directory process.

I have viewed a file full-size on three different files and each time I was disappointed with this option, being much more comfortable with the thumbnail view by far on all three that I tried. Maybe I have misqueued but till I have more time I'll leave it at that.

I was so pleased with the overall operation of this excellent utility that I hope to spread the word to Geneve owners.

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

# User Notes

## Improving joystick connections

This following item comes from Ray Kazmer of Sundland, California. He writes:

Pairs of original TI joysticks have a small, light weight 9-pin connector on the ends of their extension cords, which plug into a "port" on the left side, of our consoles.

TI joysticks worked well, when they were new, but they tended to break down with strenuous use. As a result, most of us preferred "non-TI" joysticks, such as a Prostick II (if you could find one) or the Epyx 500XJ. Although these joysticks are more durable, they need a "connector converter" to attach them to a console.

Unfortunately, the 9-pin plug on a converter is a big, heavy affair, which tends to sag down with time. Eventually, this can damage the plug or the port. To prevent that from happening, bulky plugs should be supported by placing an object under it, exactly the right size to hold the plug, perpendicular to the port.

I found a perfect "plug supporter." After using up a roll of toilet paper, I simply cut about one inch off the end of the empty cardboard core, then put that, open ends up/down, under the plug. If it ever has coffee spilled on it, just snip off a new one. You will have an endless, free supply of plug supporters, and help to reduce our landfills, by "recycling."

## Using TI-Base to figure payments

This TI-Base command file will compute a monthly payment amount for an auto loan from figures that you type in for purchase price of the automoble, any down payment that you might have to make towards the purchase, the number of payments to be made in your auto loan (4

**(See Page 38)**


## MICROpendium Disks, Etc.

- ☐ **Series 1991-1992** (mailed monthly April 1991-March 1992) ..... $40.00
- ☐ **Series 1990-1991** (April 1990-March 1991, 6 disks) ..... $25.00
- ☐ **Series 1989-1990** (April 1989-March 1991, 6 disks) ..... $25.00
- ☐ **Series 1988-1989** (April 1988-March 1989, 6 disks) ..... $25.00
- ☐ **MICROpendium Index** (2 SSSD disks, XB req.) ..... $6.00
- ☐ **MICROpendium Index II** (7 SSSD disks—1 for each year, XB req.) ..... $21.00
- ☐ **TI-Forth** (2 disks, req. 32K, E/A, no documentation) ..... $6.00
- ☐ **1988 updates of TI-Writer, Multiplan & SBUG** (2 disks) ..... $6.00
- ☐ **Disk of programs** from any issue of MICROpendium between April 1988 and present ..... $4.00

### GENEVE DISKS

- ☐ **MDOS .97h** (req. SSDD or larger, used with MBASIC) ..... $4.00
- ☐ **MDOS 1.14F** (req. for MBASIC) ..... $4.00
- ☐ **Myarc BASIC 2.99A** ..... $4.00
- ☐ **MY-Word V1.21** ..... $4.00
- ☐ **Menu 80** (specify floppy or hard disk version(s), **SETCOLOR, SHOWCOLOR, FIND, XUTILS, REMIND** ..... $4.00

*(Unless specified, all disks are SSSD)* ***Texas residents add 7.75% sales tax***

### GENEVE PUBLIC DOMAIN DISKS

*(These disks consist of public domain programs available from bulletin boards. If ordering DSDD specify whether Myarc or CorComp.)*

| | SSSD | DSDD |
|---|---|---|
| ☐ Series 1 | $9.00 | $5.00 |
| ☐ Series 2 | $9.00 | $5.00 |
| ☐ Series 3 | $9.00 | $5.00 |
| ☐ Series 4 | $9.00 | $5.00 |
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# User Notes

(Continued from Page 37)

yr.=48, 5 yr.=60) and the interest you will have to pay to the institution you will be borrowing the money from.

```
* carcost
CLEAR
SET TALK OFF
SET HEADING OFF
CLEAR
LOCAL T N 9 2
LOCAL R N 9 2
LOCAL N N 9 0
LOCAL I N 9 2
LOCAL P N 9 2
LOCAL P1 N 9 2
LOCAL PP N 9 2
WRITE 2,8,"Monthly Payment for Car;
Loan"
WRITE 4,2,"PURCHASE PRICE $"
WRITE 5,2,"DOWN PAYMENT $"
WRITE 6,2,"NUM OF PAYMENTS:"
WRITE 7,2,"ANNUAL INTEREST/"
WRITE 9,2,"MONTHLY PAYMENT$"
READ 4,18 T
READ 5,18 R
READ 6,18 N
READ 7,18 I
REPLACE P1 WITH T-R
REPLACE I WITH (.01*I)/12
REPLACE P WITH P1*I/(1-1/(1+I)**N)
REPLACE PP WITH (100*P+0.5)/100
WRITE 9,18 PP
```

## 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.

### 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 information for inclusion in this standing column. Send information to MICROpendium Fairs, P.O. Box 1343, Round Rock, TX 78680.**

## Computer music

This program appeared in several user group newsletters and is by an unknown 12-year-old. Earl Raguse wrote about it in the User Group of Orange County ROM. The program is called AUTOMUSIC.

```
100! SAVE DSK1.AUTOMUSIC
105 ! from ENTER magazine
      (by a 12-year-old),
    reprinted in NEWJUG North
      Newsletter April '85,
      author not named
110 ! echo
120 DIM A(6)
130 RANDOMIZE
140 DATA 247,262,294,330,349
,392,440
150 FOR B=0 TO 6
160 READ A(B)
170 NEXT B
180 B=INT(RND*7)
190 C=B
200 D=B
210 GOTO 250
220 D=C
230 C=B
240 B=INT(RND*7)
250 CALL SOUND(-200,A(B),0,A
(C),9,A(D),19)
260 CALL KEY(0,E,F)
270 IF F=0 THEN 220
```

# Classified

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