

# MICROpendium

Volume 8 Number 12

January 1992

\$2.50

**The Tigercub 6-memory,  
6-window, 34-function,  
14-digit programmable  
calculator**

**See page 19**



**ALSO:**

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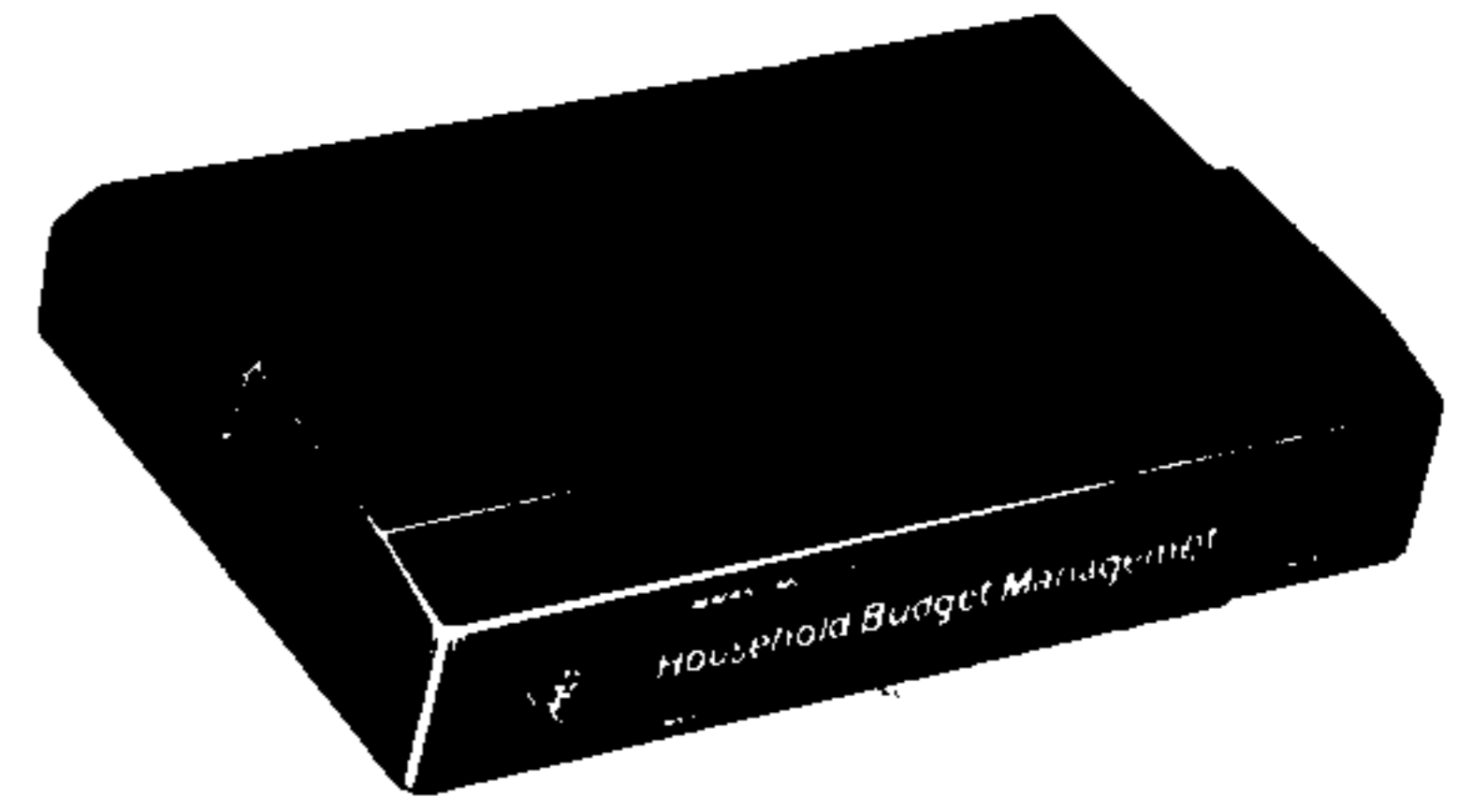
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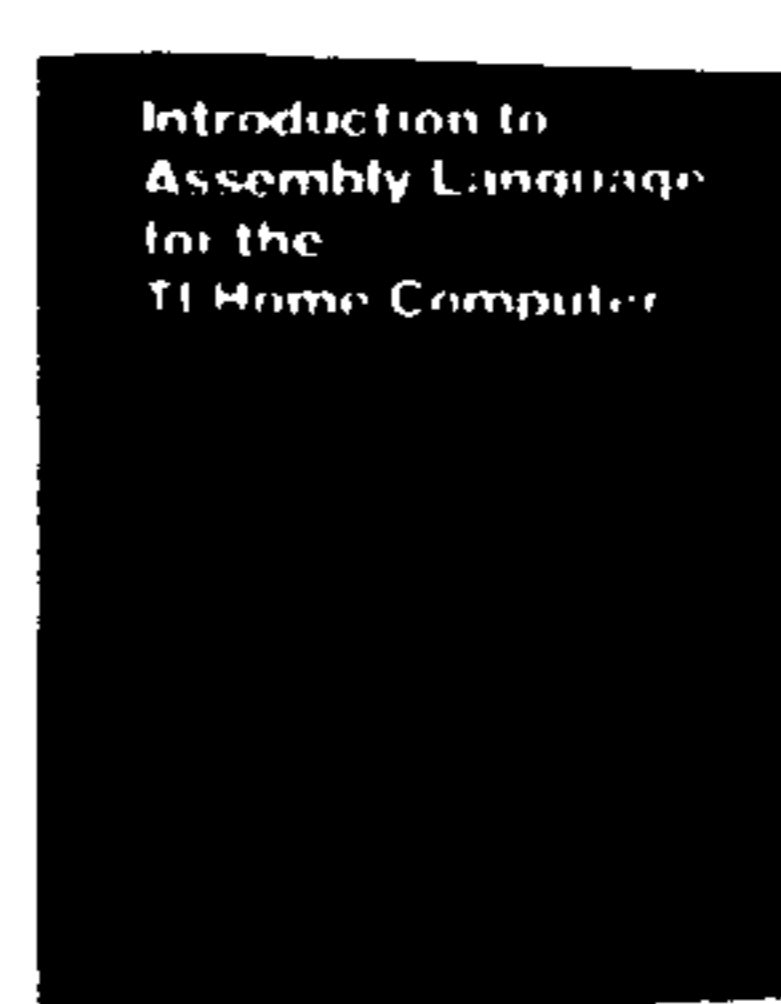
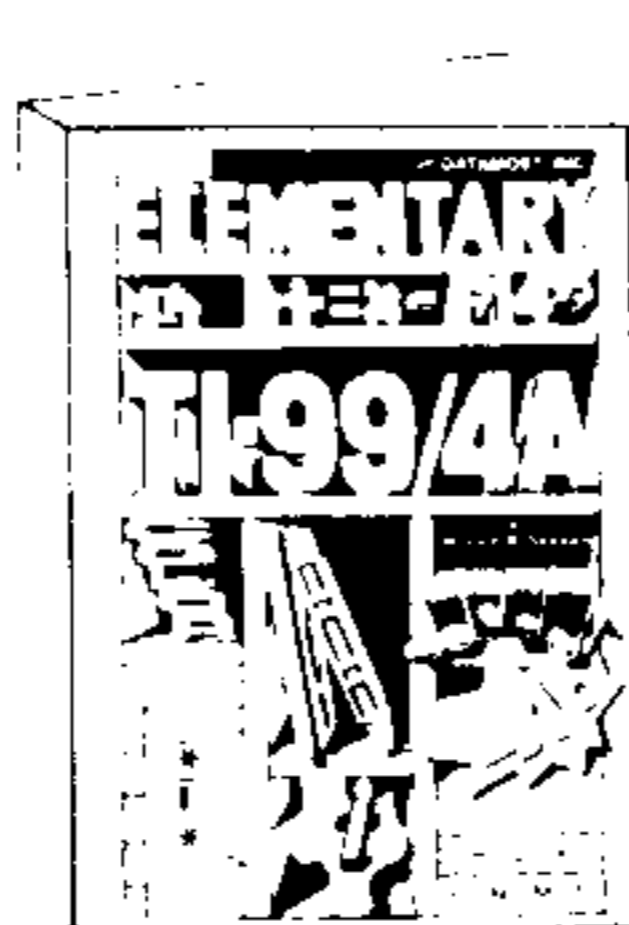
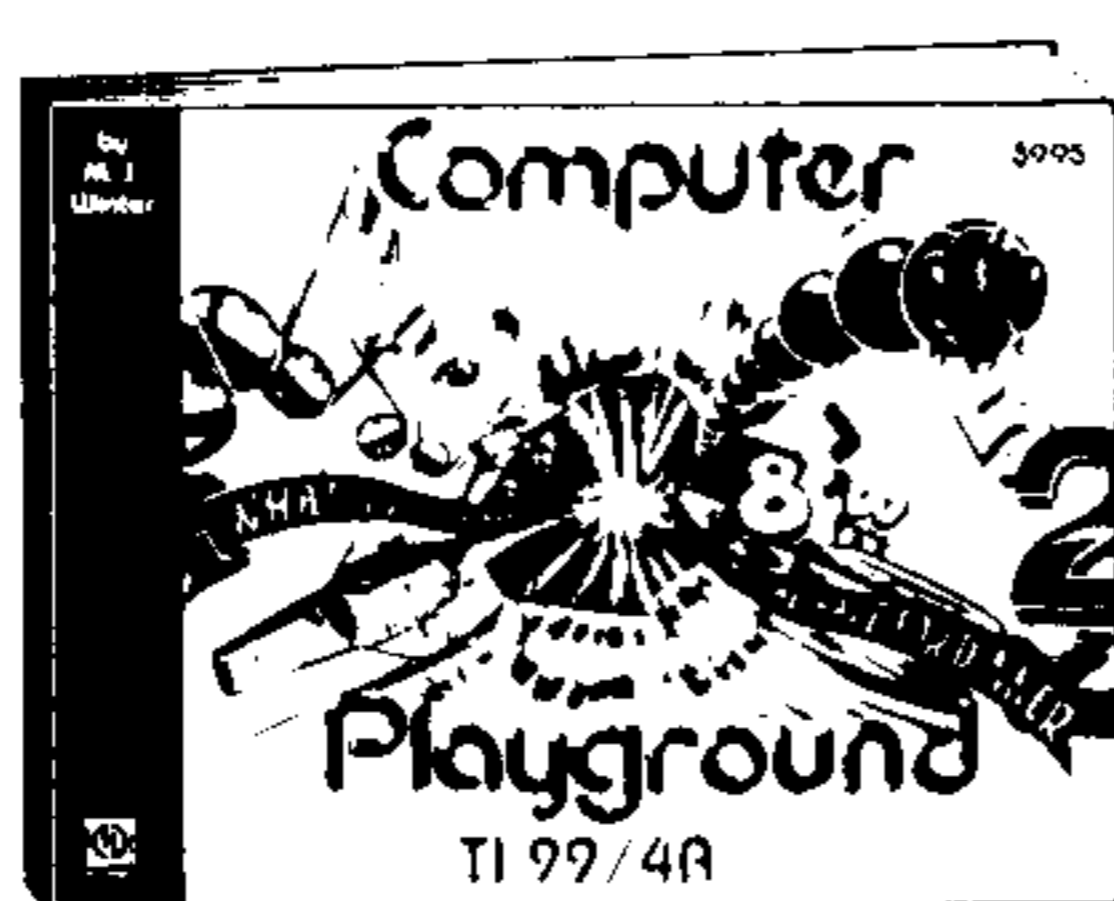
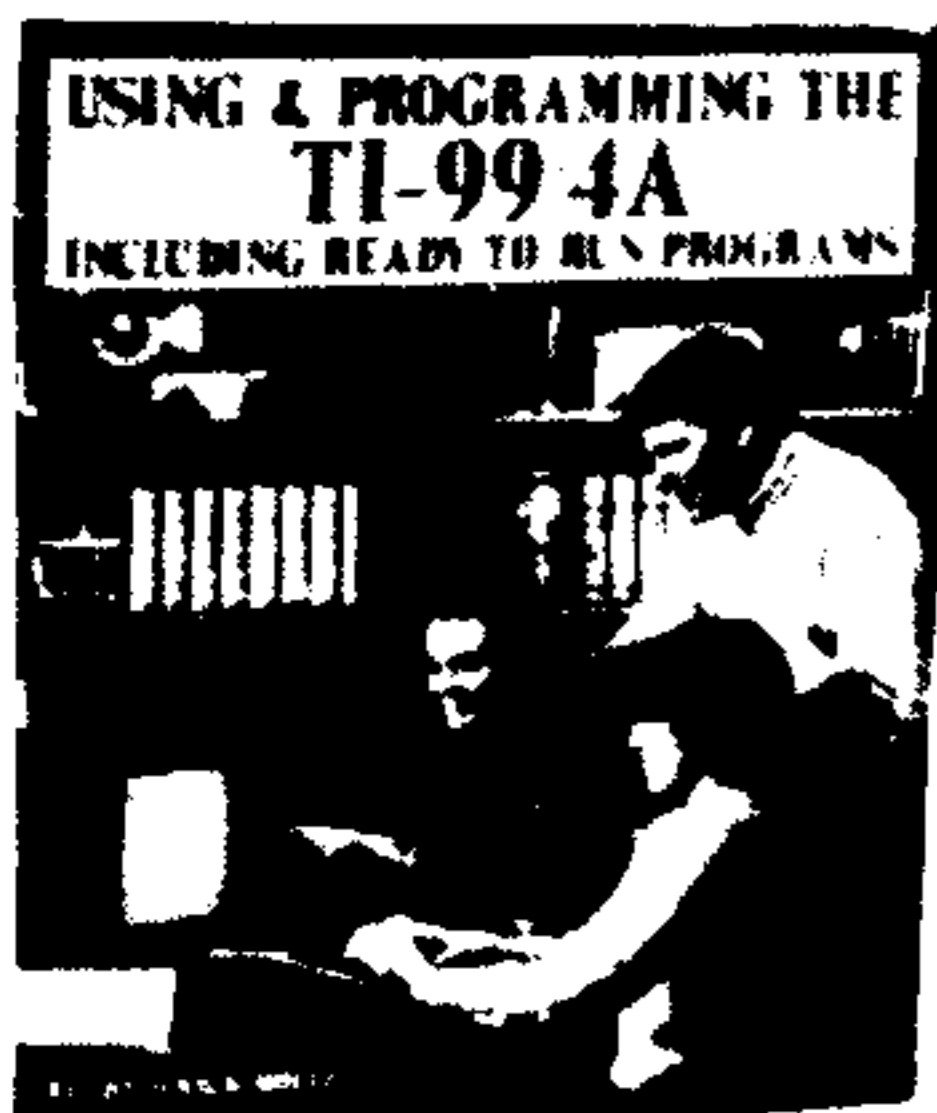
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**COMPUTER PLAYGROUND ON THE TI-99/4A**

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

**INTRODUCTION TO ASSEMBLY LANGUAGE FOR THE TI HOME COMPUTER**  
BY RALPH MOLESWORTH

This new book is a tutorial for the beginner wanting to learn TMS9900 Assembly Language. Assembly language unlocks the power of the TI Home Computer, allowing the users to write programs that run faster and more efficiently than programs written in high-level languages like BASIC. This is a step-by-step instructional text for the person who is familiar with TI BASIC but cannot understand the TI Editor/Assembler manual. There are program examples included that may be used by those with Editor/Assembler or Mini-Memory. Whether you wish to begin writing complete assembly language programs, short assembly routines, or if you just wish to have a better understanding of how your home computer works, you will get the knowledge you need from this easy-to-read guide. Edited by Steve Davis. **SPECIAL...\$4.95**

**PROGRAMS FOR THE TI HOME COMPUTER**  
BY STEVE DAVIS

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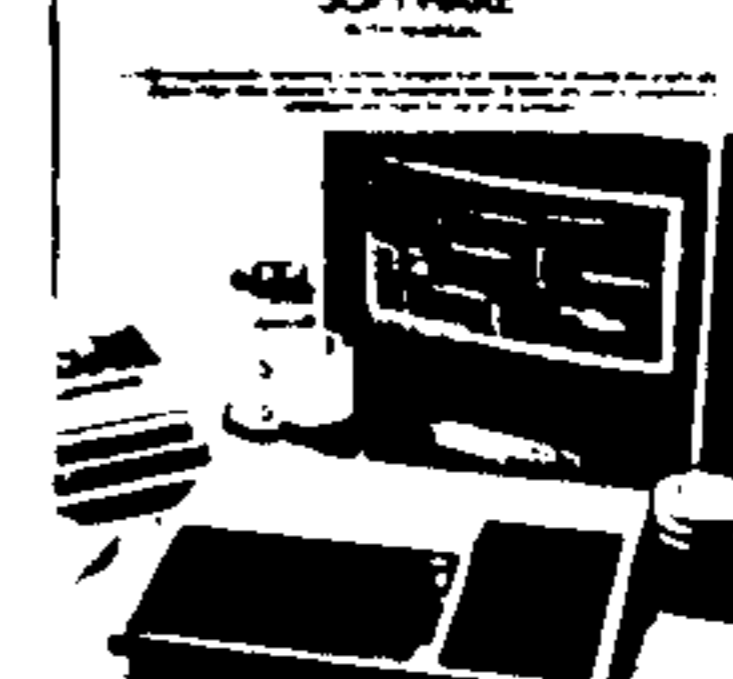
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#### **\*READ THIS**

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.



# Comments

## Myarc shipping repaired cards

I finally got my HFDC back. The blessed event occurred on Jan. 10. Unfortunately, I haven't got it up and running, yet. I'll keep you posted. The word is that Myarc is getting a number of repaired cards out the door.

### A WORD ABOUT SOFTWARE

A reader asked whether we could get someone to convert last month's Life and Automata programs converted to run with an 80-column card or the Geneve instead of with TML (The Missing Link). I'm sure that someone could convert the program for use with an 80-column device but it would take quite a bit of work since TML doesn't work on the Geneve. Unfortunately, this is one of those areas in the TI/Geneve community where the incompatibility hurts the Geneve user. TML is inexpensive and a darn nice program; and TI users are lucky to have it.

As for TI users who don't have TML, we've published several programs that require TML and plan on publishing another one in the not-too-distant future. It's a common practice with other computer systems to require certain software in order to run other software. The TI is no different. In this case, TML greatly enhances the graphics capabilities of Extended BASIC programs. So, go ahead, spend a few bucks and take advantage of programs written for TML.

### QDE AND MICROPENDIUM INDEX

Bob Stevens sent me a disk recently with QDE (a text editor by Clint Pulley for the Geneve) that he uses with our annual MICROpendium Index files. He loads the text files for each

year into memory and uses the search function of QDE to quickly locate information. QDE is extremely fast and supports keyword searches.

Speaking of the MICROpendium Index, purchasers of the MICROpendium Index II are urged to drop us a note or call us. We've discovered a problem in the query function and have a fix for it. We'll send a replacement disk out to purchasers, free of charge. Give us a call.

### THANKS FOR CARDS

We really appreciate all the cards and letters we received over the holidays. It's great to hear from readers any time of the year, but especially around Christmas.

### GEN/DIR

I received a copy of GENERIC/DIRECTORY from Norm Sellers. Sellers' program runs out of Editor/Assembler and is really one of a kind. Even though it's not a sector editor, it allows you to recover lost sectors, mark bad sectors and delete files with bad sectors. It also lets you output a directory to the screen, a printer or a disk file. In addition to the filename and file type, the directory information includes a date stamp (even on the TI), it tells you whether the program is BASIC, XBASIC, assembly imbedded in BASIC or XBASIC programs, or data file. I'll be reviewing it next month, but from my cursory examination it looks like a useful program that provides far more information about files on your disks than any other directory programs.

—JK

## 1992 TI FAIRS

### FEBRUARY

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

### MARCH

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

### APRIL

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

### MAY

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

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

### SEPTEMBER

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

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



# Feedback

## SPELLIT problems

A rather disturbing anomaly has come to light with the SPELLIT program produced by Asgard Software and written by Jim Reiss. It seems that the program will not run if loaded into a RAMdisk above >1000. While this may not seem significant, it certainly causes problems for those of us with more than one RAMdisk who want SPELLIT to run from the RAMdisk addressed above >1000. Ron Kleinschafer of the now-defunct Hunter Valley UG attacked the problem with his usual success at the request of another users' group member. He has produced a "fix" that allows it to run from any disk designation (even RAMdisks). There is a section of source code to be inserted into the original program at the appropriate point. While he was at it, he also produced an enhancement that allows SPELLIT to read and retain the marked file from Funnelweb's mailbox.

SPELLIT still does not run properly when chosen from Funnelweb without completely exiting from the Funnelweb environment. It surely is an aggravation when one wants to go directly from the editor to SPELLIT. However, I'm sure that a solution to that problem will be forthcoming as well.

For those of you who are more adventuresome, feel free to contact me and I can supply you with the "fixed" section of SPELLIT and instructions on how to insert it into the original code.

**Robert M. Carmany**  
1504 Larson St.  
Greensboro, NC 27407

## How to autoboot, dump cartridges

I purchased a new Myarc Hard and Floppy Disk Controller in October 1991 and have been reading all the back issues for info. In July 1991 John L. Teague and Robert Smith mention using MUG Boot and almost achieving an autoboot without a Horizon or PGRAM. Here is how I autoboot the system.

First sector edit boot so your menu selections are saved to WDS1; I found it necessary to do this in only one place in boot.

Boot and Boou are then stored in the root directory WDS1. Next, rename your X-BASIC loader for boot load and save to WDS1.DSK1. All requests for run DSK1.LOAD are automatically sent to this subdirectory on the hard drive. When I choose XBASIC the Load program executes bring up MUG Boot in seconds. My fourth selection on the Boot Screen is XBASIC return, simply a line of code that wipes itself out. I can load MUG Boot and return to XBASIC in less time than it takes the system to figure out there is no floppy in drive one. Another option is simply to Xrun a nonexistent XBASIC program, per another user note some time ago, or, if using Super XBASIC, hold down the space bar to bypass autoloader. In order to run programs with a DSK1.LOAD in drive one, I simply jumpered my drive one to respond to another number, in my case DSK3.

In September 1991 Col Christensen has an article on using multiple boot menus. I use this method on my hard drive too. The get and put features of boot are also well documented in the boot docs. I also created a subdirectory called BO on my hard drive where I store backup copies of Boot, Boou, Load and all my multiple menu selections just in case.

Several people have written you asking about dumping cartridges to disk and you keep telling them they need a GRAM Kracker. This is not true in all instances. In October 1991 you mention Dumpit, available from Tex-Comp. With Dumpit and a sector editor you can dump most GROM-based cartridges to disk, provided they contain four or less GROMs and no ROMs. These dumps can then be run from XBASIC. However, I recommend running Dumpit from drive two instead of drive one as the docs suggest. Running from drive one increments a counter that activates a harmless but (at 2 a.m.) startling virus that simulates an explosion and gives the message "Another Would Be Hacker Bites the Dust." Also, if you have a Super Cart and the program CVAC you can dump ROM only cartridges to disk and run them from the title screen as the third selection using the Super Cart. Even the Plato interpreter is available on disk and can be run from a Super Cart.

The most difficult cartridges to dump are

those containing both ROM and GROM mixed or more than four GROMs. With cartridge expander by William A. Shores (\$25, December 1990 MICROpendium), you can have XBASIC, E/A, Multiplan, Logo, etc., for a total of six cartridges plugged in and available at once and virtually everything else on disk you could possibly need. As to Mr. Shores' kit, if I can build it anyone can. It was my first attempt at any soldering project and — with a lot of phone calls to Mr. Shores — works flawlessly.

Another program available from Germany will supposedly let you dump any cartridge, but I haven't been able to find any docs for it and the screen is all German. If you check the users' group libraries of any large club you can find almost all the TI cartridges already on disk. Another source for these disks is TI House of Computers, 515 Newport Ave., So. Attleboro, MA 02703. You can write for a free catalog on disk which prints out around 50 pages.

I would like to let readers in South Carolina know of the Midlands 99ers user group. Meetings are held in Columbia the third Tuesday each month. Don't say that's too far, we have members all over the state; I personally drive more than 100 miles one way. For directions or more info please contact any club officer: Terry Johnson, president, (803) 791-4708; Dan O'Quinn, vice president, (803) 538-3376; Gordon Mcaa, secretary, (803) 438-1332.

**Dan O'Quinn**  
Walterboro, South Carolina

## Adding a drive

I have an original TI Disk Controller (Mod.# PHP 1240) in my P-box. I would like to add an external disk drive (Teac FD-55GFR) with its own power supply. I would like to use the existing disk controller to drive both the existing disk drive in the P-box as well as the external Teac drive. Do you know of any literature that will help me make this addition? I would also like to obtain technical data other than the original TI booklet I have that came with the controller. As you can imagine, I am heavily dependent on my disk controller and

(See Page 7)



# Feedback

(Continued from Page 6)

ould it go down, I will have major problems, since I currently have only one drive.

Ronald A. Kowach Sr.  
New Stanton, Pennsylvania

The booklet that came with the disk controller has all the information you need to connect an external drive to the controller. We have published a number of disk drive tutorials over the years, including a two-part series on setting jumpers (July and August, 1990) by Merle Vogt. If you follow the instructions in the manual, you should have no problem getting your second drive up and running.

Mail Feedback to MICROpendium  
Feedback, P.O. Box 1343, Round Rock,  
TX 78680.

## READER TO READER

Dan O'Quinn, Rt. 4, Box 565, Walterboro, SC 29488, writes:

Can anyone help me with a schematic to install a Supercart type ROM chip in William Shores' Module Expander?

John Williams, P.O. Box 165, Honeoye Falls, NY 14472 needs a source for a parallel printer cable to connect a TI99/4A RS232 card to an Okidata 92 printer. It needs to have the electronic circuitry to interface the printer properly. The cable was formerly available from Tenex (#10036).

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

To enable me to interface my TI99/4A with a Video Brain computer, I need a schematic diagram and layout of the now extinct Video Brain Family Computer model 101 or 101A made by Video Brain Computer Co., Santa Clara, California, around 1977. Can anyone help me?

R.W. Zink, 4217 Molokai Dr., Naples, FL 33962, writes:

Last August, "Reader to Reader" helped me with my trashed DSDD disk problems. I received helpful suggestions by letter and even a phone call from Dr. Charles Good, Lima Users Group. Perhaps someone can also help me with my latest problem.

I recently purchased a CorComp DSDD Controller to replace an "iffy" Myarc Controller. Now, I can't access my P-GRAM+ menu. Formerly, pressing F9 from the Horizon RAMdisk menu brought up all four pages. I called Bud Mills who said to change address of the P-GRAM card. No luck.

Has anyone had this problem?

Has anyone successfully used Spell-It! on the Horizon RAMdisk?

James Wayne, 14624 N. 25th Dr., Phoenix, AZ 85023, writes that he has the Rave speech card for the Geneve and needs help getting it to work.

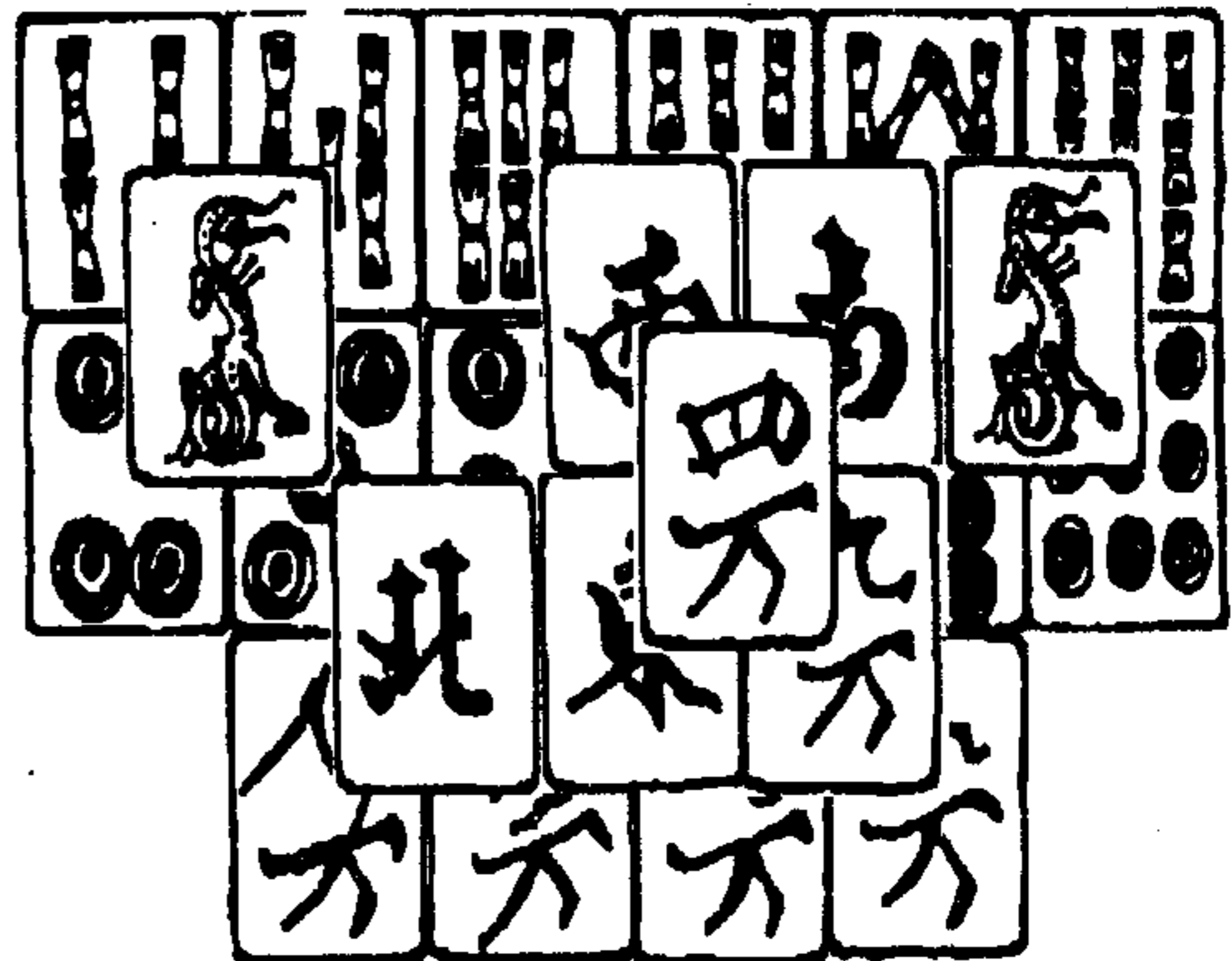
(See Page 8)

# TI Pei

*TI-Pei*, by William Reiss, is the first mahjongg game for the TI-99/4A and Myarc Geneve 9640. This faithful rendition of the ancient Chinese "Solitaire with tiles" is a strategy game that will occupy for hours on end. Hard to describe - the object is to remove matching pairs of tiles from the 3D pile on the screen with the cursor controlled by the

keyboard, an *Asgard Mouse*, or a 9640/9938 mouse.

Easier said than done, you can only remove tiles in the right places, and selecting the wrong pair can make the puzzle insolvable! A classic game. *TI-Pei* requires Extended BASIC, 32K and a disk system. *Asgard Mouse* optional.



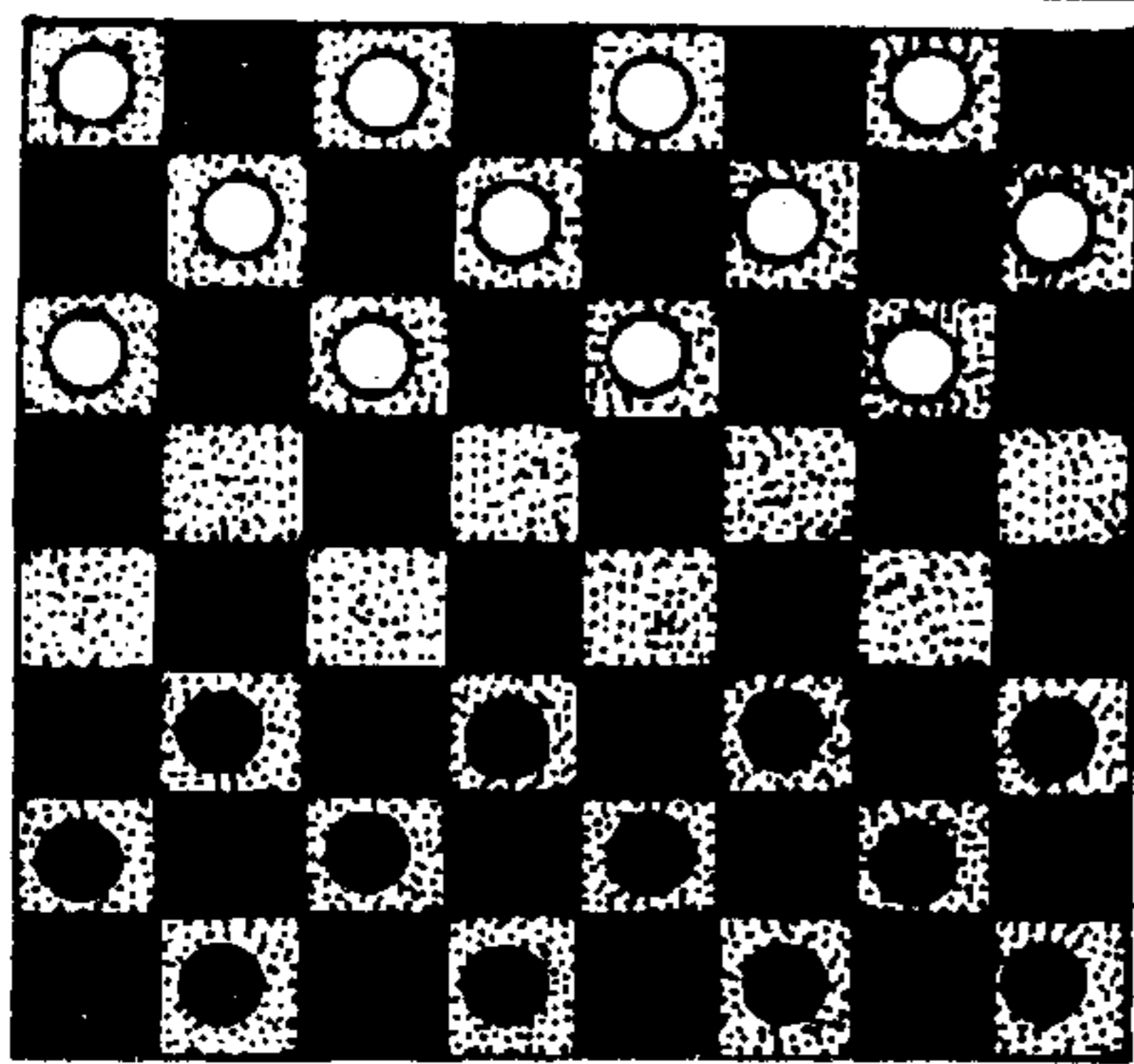
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## CLASSIC CHECKERS

Checkers, one of the oldest games still played today, is often derided as a game for children. Checker enthusiasts, however, know that people who think this confuse complexity with depth. Checkers can be a war of attrition, a blitzkrieg, or a game of stealth. It is elegant in its simplicity.

*Classic Checkers*, by Chris Bobbitt, is also elegant in its simplicity - it allows you to play checkers with a minimum of effort.

Beautifully designed with large, colorful graphics, *Classic Checkers* lets you control your pieces with the keyboard, joysticks or an *Asgard Mouse*. To move a piece simply select it and point to where it should go. Hours can be spent playing against the computer, or two people can play against each other using the computer as a game board (two joysticks are recommended).

*Classic Checkers* requires Extended BASIC or Editor/Assembler, a TI-99/4A with 32K and a disk system. The *Asgard Mouse* is optional.

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# Twister hits Tex-Comp, most TI inventory safe

By LAURA BURNS

The bad news is the damage done by a twister followed by rainstorms at Tex-Comp. But the

good news is that almost all Tex-Comp's TI inventory was in another unit.

Jerry Price of Tex-Comp says that "between my insurance claim and my landlord's insurance claim" damage at the California company amounted to approximately \$100,000 following the weather-related destruction the weekend after Christmas.

He says customers of the company should experience little or no interruption in service because of the event.

"I stopped there Sunday afternoon and thought I'd left the light on," Price says. "Then I saw daylight through the ceiling."

The apparent twister knocked down some big trees in the parking lot.

The damaged Tex-Comp unit contained some of his business computers, telephone equipment and packing equipment, he says.

After he saw the damage to the roof, Price went out and bought some plastic tarps to cover the equipment in the building. When he returned, it had already begun to rain, and he realized he did not have enough plastic, so he called the fire department.

Soon, he says, "there were about 40 firemen inside, putting plastic over the equipment. They did a really good job. A lot of people think of firemen just for fires, but they're set up for floods."

Price notes, "Our TI equipment, once we dried it out and plugged it in, did much better than a couple of IBM computers we had. It took a licking and kept on ticking."

He adds that, "in case someone wants to know why we have IBM computers" that Tex-Comp uses them to run its UPS shipping program as well as a few other things. The main business programs for the company are run on a TI, he says.

**Jerry Price of Tex-Comp thought the light was on. Then he realized what he saw was daylight coming through the ceiling.**

A number of fairware disks were soaked, he notes, but the company has backups.

Also damaged were some model trains he collects.

"The trains still run but the boxes were damp, so that lowers their value to collectors," he explains.

"I was touched by the customers who called or came to see if we're OK," Price says, noting that a number of individuals saw him on the TV news. "I heard from people I hadn't heard from for years. My landlord has really been nice. Everyone has been nice."

His landlord has given him another building to use while his is being repaired, and, Price notes "we may stay there. They are alike, it's just a lot of identical units in an industrial park."

## READER TO READER

(Continued from Page 7)

Stan Krajewski, Rt. 6, Box 568-15, Live Oak, FL 32060, wants Caverns 1 and Caverns 2 E/A file, Rock Hopper from an earlier MICROpendium issue, and Checksum files from MICROpendium. "Typing in programs is not my specialty," he writes.

The Checksum programs by Tom Freeman are available on disk from MICROpendium for \$4. They appeared in the October 1987 edition. Documentation for the programs is in the October 1987 MICROpendium and is not included on the disk.

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



## BASIC

# Learning German

By REGENA

Last month I presented suggestions for printing a calendar. If you would like a complete calendar for 1992, Mel Bragg and David Mischler of the Ogden TI99/4A Users Group have designed a wonderful calendar as a fundraiser for their group. The newsletter for the SLAVE and OTIUG has always had my vote for the best computer graphics for a newsletter. Their artwork is carried on in the calendar. Each month has an 8½x11-inch page so you can write on the dates, a though is printed and the facing page has a computer-drawn picture. Send orders to Mel Bragg, 1396 Lincoln, Apt. #B, Ogden, UT 84404 and enclose \$5.

My oldest son and his bride went to Germany for their honeymoon this summer. Members of our family had a renewed interest in speaking German. I felt a little left out because my husband and several of my children are able to speak German and I had never learned. My daughter gave me a set of German language tapes for my birthday, so I can begin to learn. This month's program is an additional learning tool.

Years ago I wrote a program drawing a simple picture and using several German words in a quiz (in my *COMPUTE!* book). The program this month doesn't use graphics but uses the Terminal Emulator 2 command module and the TI Speech Synthesizer so you can hear and see German words and phrases.

With the Terminal Emulator 2 command module in place, press for TI BASIC. You may then type in the program or load it and run it. To allow speech, Line 150 "opens" the file:

```
150 OPEN #1:"SPEECH", OUTPUT
```

Later, any words can be spoken by using a PRINT #1 statement. I use the method of spelling the words phonetically to try to get the sounds. An example is PRINT #1:"HELLO". In this program, I print the string S\$ with PRINT #1:S\$ in Line 400.

You may choose the following German words or phrases.

1. Numbers (numbers 1 through 10)
2. Days of Week (Monday through Sunday)
3. Months of Year (January through December)
4. Colors
5. Alphabet
6. Phrases (several common phrases)

The program still has plenty of room for additional words and phrases. If you would like to add your own, simply add additional options on the menu screen, and add subroutines after Line 1070.

Each subroutine RESTOREs the proper DATA statements. The first data element is the number of words or phrases in the particular option. Then, for each word, the first element is a tabulat-

or number and the second element is the diacritical mark. The third element is the string to be printed on the screen, and the last element is the string to be spoken (spelled phonetically).

Lines 160 and 170 redefine Character 95 to be an umlaut (two dots over a vowel) and Character 96 to be an accent. These are actually printed using TAB(T) on the line above the printed German word or phrase. In the DATA statements, if no diacritical marks are needed, I read 1 for T and "", the null string, for the string to be printed.

Lines 180-280 print the menu screen and instructions. Lines 290-320 receive the option and go to the corresponding subroutine which will retrieve the proper DATA statements.

Line 330 reads N, the number of words or phrases in the particular category. Lines 340-460 contain the process for each word or phrase. The German word or phrase is printed on the screen, then it is spoken. You may then press the space bar to continue, R to repeat the German speech or Q to quit and return to the main menu screen.

Lines 490-520 are the numbers, Lines 530-570 are the days of the week and Lines 580-630 are the months. Lines 640-800 are used for the colors and also include character definitions and color set definitions so the colors can be printed on the screen. The data in Lines 770-790 contain some "lowercase" letters that must be typed with Alpha Lock off. These are the letters that are redefined to be printed as colored squares when they appear on the screen.

Lines 810-850 contain the German alphabet — our same letters, but pronounced differently. Lines 860-1070 contain the 20 phrases I chose to include in this program. You may change the phrases here or add your own, or add more categories with more phrases.

Lines 1080-1090 CLOSE #1 and END the program.

I tried to mimic the sound I heard on my German language tapes, but some of the sounds are different from the dialect my husband uses and are also different from my daughter-in-law's speech. You may also want to experiment with the spelling to get different sounds.

Of course — you can completely revamp this program and use the general idea to make a program of your own for any language.

**If you wish to save typing effort, you may have a copy of this program by sending \$4 to REGENA, 918 Cedar Knolls West, Cedar City, UT 84720. Be sure to specify whether you want cassette or diskette and that you need GERMAN2 for the TI.**

## GERMAN2

```

100 REM GERMAN2 !198          026          000024")!188
110 REM BY REGENA !071       140 REM REQUIRED !059       170 CALL CHAR(96,"0000000000
120 REM TERMINAL EMULATOR 2 150 OPEN #1:"SPEECH",OUTPUT 06186")!155
    !113                       !122                       180 CALL CLEAR !209
130 REM SPEECH SYNTHESIZER ! 160 CALL CHAR(95,"0000000000       (See Page 10)

```



## REGENA ON BASIC —

(Continued from Page 9)

```

190 PRINT " GERMAN": :!240
200 PRINT "1 NUMBERS" !250
210 PRINT "2 DAYS OF WEEK"
!022
220 PRINT "3 MONTHS OF YEAR
" !198
230 PRINT "4 COLORS" !178
240 PRINT "5 ALPHABET" !036
250 PRINT "6 PHRASES" !249
260 PRINT "7 END PROGRAM" !
247
270 PRINT : : : "AFTER EACH W
ORD IS SPOKEN, PRESS 'R' TO
REPEAT" !185
280 PRINT "PRESS 'Q' TO QUIT
," : "PRESS <SPACE> TO CONTINU
E." : : : !209
290 CALL KEY(3,K,S)!190
300 IF (K<49)+(K>55)THEN 290
!059
310 CALL CLEAR !209
320 ON K-48 GOSUB 490,530,58
0,640,810,860,1080 !165
330 READ N !229
340 FOR J=1 TO N !141
350 READ T,T$ !022
360 PRINT TAB(T);T$ !133
370 READ P$,S$ !053
380 PRINT P$: :!122
390 S$="^"&S$&". " !056
400 PRINT #1:S$ !191
410 CALL KEY(3,K,S)!190
420 IF K=32 THEN 460 !002
430 IF (K=82)+(K=114)THEN 40
0 !208
440 IF (K<>81)+(K<>113)=-2 T
HEN 410 !213
450 GOTO 470 !038
460 NEXT J !224
470 CALL COLOR(9,2,1)!179
480 GOTO 180 !003
490 RESTORE 500 !082
500 DATA 10,1,, " 1 EINS",EY
ENS,1,, " 2 ZWEI",TSWIE,1,, "
3 DREI",DRY,1,, " 4 VIER",
FEAR,6,, " 5 FUNF",FOONF !0
61
510 DATA 1,, " 6 SECHS",ZECH
S,6,`, " 7 SIEBEN",ZEEBEN,1,
, " 8 ACHT",AUKT,1,, " 9 NEU
N",NOYN,1,,10 ZEHN,TSAYN !2
39
520 RETURN !136
530 RESTORE 540 !123
540 DATA 7,2,`,MONTAG,MOAN T
OK,2,`,DIENSTAG,DEENSTOK,2,`,
,MITTWOCH,MITT VOKE !239
550 DATA 2,`,DONNERSTAG,DONN
ERSTOK,4,`,FREITAG,FRY TOK !
001
560 DATA 2,`,SAMSTAG,ZOMSTOK
,2,`,SONNTAG,ZONNTOK !144
570 RETURN !136
580 RESTORE 590 !173
590 DATA 12,2,`,JANUAR,YAN U
R,2,`,FEBRUAR,FEB RU R,2,`,
MARZ,MARE TS !041
600 DATA 4,`,APRIL,APRIL,2,`,
,MAI,MAI,2,`,JUNI,YUNEE,2,`,
JULI,YULEE !022
610 DATA 4,`,AUGUST,OW GOOST
,5,`,SEPTEMBER,ZEPTEMBER,4,`,
,OKTOBER,OKTOE BER !168
620 DATA 4,`,NOVEMBER,NO FEM
BUR,4,`,DEZEMBER,DAY TSEMBUR
!082
630 RETURN !136
640 CALL CHAR(104,"")!206
650 CALL CHAR(105,"FFFFFFFF
FFFFFFFF")!063
660 CALL COLOR(10,7,5)!229
670 CALL CHAR(112,"")!205
680 CALL CHAR(113,"FFFFFFFF
FFFFFFFF")!062
690 CALL COLOR(11,3,12)!017
700 CALL CHAR(120,"")!204
710 CALL CHAR(121,"FFFFFFFF
FFFFFFFF")!061
720 CALL COLOR(12,15,16)!0
730 CALL CHAR(103,"A55AA55AA
55AA55A")!141
740 CALL COLOR(9,13,10)!023
750 CALL CHAR(64,"FFFFFFFF
FFFFFF")!018
760 RESTORE 770 !098
770 DATA 8,1,,hh BLAU,BL OW
,1,,ii ROT,ROTE,1,,pp GELB
,GELB !215
780 DATA 7,_,qq GRUN,GROON,
1,,xx WEISS,WISE,1,,@ SCH
WARZ,SHVARTS !030
790 DATA 1,,gg BRAUN,BROWN,
1,,yy GRAU,GR OW !117
800 RETURN !136
810 RESTORE 820 !148
820 DATA 26,1,,A,AW,1,,B,BAY
,1,,C,TSAY,1,,D,DAY,1,,E,A,1
,,F,F,1,,G,GAY,1,,H,HAW,1,,I
,EE !188
830 DATA 1,,J,YOTT,1,,K,KAW,
1,,L,L,1,,M,M,1,,N,N,1,,O,O,
1,,P,PAY,1,,Q,KOO,1,,R,ERR,1
,,S,S,1,,T,TAY !128
840 DATA 1,,U,OO,1,,V,FOW,1
,W,VAY,1,,X,IKS,1,,Y,OOP SE
LAWN,1,,Z,TSETT !036
850 RETURN !136
860 RESTORE 870 !198
870 DATA 20,1,,GUTEN MORGEN!
,GOOTN MORGEN !041
880 DATA 1,,GUTEN TAG,GOOTN
TOG !088
890 DATA 1,,GUTEN ABEND,GOOT
N _AWBUND !018
900 DATA 1,,GUTE NACHT,GOO T
UH NAWKT !171
910 DATA 1,,WIE GEHT ES IHNE
N?,VEE >GATE ES _E NEN !237
920 DATA 1,,SEHR GUT,ZARE GO
OT !020
930 DATA 1,,BITTE,BITT UH !1
70
940 DATA 10,_,DANKE SCHON,DO
NG KUH SHERN !118
950 DATA 1,, "SPRECHEN SIE LA
NGSAM, BITTE.",SHPRESHUN Z L
ANGZAM BITT UH !078
960 DATA 1,,HABEN SIE WASSER
?,HAW BUN Z VOSSR !005
970 DATA 6,_,ICH MOCHTE EIN
GLAS WASSER.,ISH MERSHTUH EY
(See Page 11)

```

### QUIET DISK DRIVES AND FANS FOR P-BOX

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## E X T E N D E D B A S I C

# Wallet automation

By **JERRY STERN**

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Ever search your checkbook, trying to find out when you paid the phone bill? Or who paid you \$79. in March? There is really no excuse for not automating your checkbook, and the new tax season provides the ideal excuse for getting all the numbers into your computer. This month's program is CHECKBOOK, a checking account tracker, and it will get rid of that messy little paper register in your checkbook. CHECKBOOK will track your checks, cash withdrawals, deposits, bank charges, and interest.

At any given time, your bank account has two balances. One is the actual balance that you calculate by adding and subtracting deposits and checks as they occur, just like in a paper checkbook. The other balance is the statement balance. It includes only the items that have cleared the bank.

CHECKBOOK keeps track of both of these totals, and it is the statement balance that you will use for balancing your account when the monthly statement arrives.

But first, you'll need to adapt the program to your system. All the defaults are before line 100. In line 70, set the variable DN equal to your choice for the data disk drive number. In 80, set P\$ to the name of your printer, and set P2\$ in line 90 to the ASCII codes for condensed print, plus any other printer functions you would like on your checking statements. On an Epson-compatible printer or a TI 99/4A Impact Printer, try using P2\$ = CHR\$(15) & CHR\$(27) & CHR\$(78) & CHR\$(6), for condensed print, with six lines (1") skipped at each perforation. No other changes are needed for most users, but if you use a ramdisk that is called by a drive letter other than DSK1, 2, or 3, change the validation string in line 300's CALL KEY-AT statement to allow your drive choice. No other changes should be needed for other systems.

When you run CHECKBOOK, the first prompt will ask you to select a disk drive to search for bank account files. After you have a file started, you will just press a drive number at the first prompt to display a list of the available checking accounts, but the first time you run CHECKBOOK, just press the space bar at the directory prompt, and then press Enter at the "Choose an account to update:" prompt. Next, enter the drive number and filename for the new account, such as "2.FIRST-NATL" or "1.JOINTACCT", and enter the starting balance. The main menu will appear.

Once an account has been started and saved to disk, loading it is very easy; at the directory prompt choose the drive to search, and then choose the account to load by pressing the letter next to the filename. Only the first 26 account files will be displayed on this menu, so if there are more than 26 account files (Wow! Can I borrow some cash?), then enter the file name manually rather than using the directory feature. Again, once the file is loaded, the main menu will appear.

On all the menu screens, the bottom line will display the account filename and the current actual balance of the account. From the main menu, you may choose to add an item, go to the find transaction menu, or go to the menu for printing, saving, and quitting. Let's enter a check first. Press 5 for Post checks. The screen will be rewritten to look like a blank check; just enter the information in each blank as you would on a real check. But be careful—CHECKBOOK will check your work for logic and reject an impossible date, or a check with a blank "Paid to:" line, or a negative amount. Once you've entered yes or no at the "Cleared?" prompt, you will be returned to the main menu to decide on your next action.

The find menus are easy to use; choose which item to search for, enter the data to search for, and the program will display the first matching transaction it finds. Once you've found the item you want, you may choose an action from the bottom line menu. Choose Begin-function 5 to return to the main menu, or Proceed-function 6 to view the next item. Aid-function 7 will let you edit the item, and Redo-function 8 or Back-function 9 will take you back one item in the check register.

To balance the checkbook with your bank statement, first post the interest from the main menu, and be sure to mark it as cleared. Next, choose "Check uncleared items." CHECKBOOK will display each transaction that has not yet been cleared by the bank. To change an item to cleared, press Aid, and enter "Y" at the prompt, and then press Proceed to go on to the next uncleared item. When all the items on the bank statement have been entered, the statement balance on screen should match the last balance listed on the bank statement. If those two amounts don't match, you've probably made an error when entering an item during the month, so try going to the find menu, and searching for an item with an amount equal to the amount of the difference between the statement and the balance, or equal to double that amount. Searching for one of those

(See Page 12)

## REGENA—

(Continued from Page 10)

```

EN GLOSS VOSSER !037
980 DATA 1,,WO IST ES?,VO IS
T S !029
990 DATA 1,,ES IST NICHT HIE
R.,S IST NISHT HERE !089
1000 DATA 1,,ICH BIN AMERIKA
NER.,IHGK BIN AMERIKANR !043
1010 DATA 1,,SPRECHEN SIE DE
UTSCH?,SHPRESHN Z DOYTCH !24
4
1020 DATA 1,, "NEIN, ICH SPRE
CHE NICHT DEUTSCH.",9 IS
H SHPRESHA NISHT DOYTCH !168
1030 DATA 1,,SCHREIBEN SIE E
S.,SHRYE BN Z S !245
1040 DATA 1,,ICH HABE HUNGER
.,IHGK HAW BUH HUNGER !127
1050 DATA 1,,KOMMEN SIE HER.
,KOMMEN Z HERE !204
1060 DATA 1,,AUF WIEDERSEHEN
!,AUF V DER ZAYN !083
1070 RETURN !136
1080 CLOSE #1 !151
1090 END !139

```



# EXTENDED BASIC—

(Continued from Page 11)

amounts will find most errors.

The other menu options are easy. On the Save menu, you may choose to print a statement, save the file to disk, clear everything and load a new file, or go back to the main menu. To make a backup of your account file, just change disks before saving, or change the account name and save a second copy of the file.

The programming in CHECKBOOK is fairly straightforward. The only unusual technique I've used is the function key menu for choosing an action at the item display screens. If you would like to use the "Begin, Proceed, Aid, Redo, Back" prompt in another program, copy the sub-program AID, starting at line 29475, and save it as a separate file (use merge format—SAVE DSK1.AID, MERGE) for adding to other projects.

Now that we're starting our taxes, and finding how badly our accounting was mangled last year, it's time to resolve that, this year, we'll start early to keep our finances organized. CHECKBOOK should help keep the books balanced this year. But for deciphering last year's numbers, you're on your own.

## CHECKBOOK

```

70 DN=2 ! Default drive !237
80 P$="RS232.DA=8.BA=4800" !
Default printer !149
90 P2$=CHR$(15)! Code for co
ndensed print !124
100 ! CHECKBOOK V 1.0 1/92
JL Stern !062
110 ! I:Active item # !148
120 !AB=Actual balance;SB=St
atement balance;S(1-5)=Depos
its, interest, withdrawals, cha
rges, checks ytd;FB=Forwarded
balance !204
130 ON WARNING NEXT !215
140 M4$="Save file with chan
ges Abandon file & restart P
rint statement          Main m
enu                      Quit progra
m" !171
150 M$="Post deposits
Post interest          Po
st withdrawals        Post fe
es                      Post checks
" !126
    
```

```

160 M$=M$&"Check uncleared i
tems Find transaction
Save, Print, or Quit" !147
170 M2$="Transaction type
Amount D
ate Check
number Payee
Memo
" !117
180 M3$="Deposit
Interest W
ithdrawal Fee
Check
Page through all
" !245
190 M2$=M2$&"Main Menu
" :: M3$=M3$&"Main Me
nu " !139
200 DIM C$(500,2),D(500,1),F
$(26),S(5)!CK data, account
names,account sums !067
210 ABC$=" ABCDEFGHIJKLMNOPQ
RSTUVWXYZ" !137
220 I=0 !000
230 IMAGE ##### $###
##.## !167
240 DEF W(X)=INT(ABS(X))! Tr
ansaction type !058
250 DEF CK(T)=(ABS(T)-W(T))*
10000 !234
260 DEF DAY(T)=31+(T=2)*2+(T
=4)+(T=6)+(T=9)+(T=11)!055
270 CALL CHAR(124,"FFFFFFFFF
    
```

```

FFFFFFFF"!064
280 CALL CLEAR :: CALL BLUE
:: CALL TITLE !082
290 DISPLAY AT(8,1):"Directo
ry of Disk?(123..):" (Lea
ve blank for none.)" !244
300 CALL KEYAT(8,27,Z,"123 "
):: T$=CHR$(Z):: IF T$=" " T
HEN 330 !186
310 X=VAL(T$):: CALL CAT2(X,
F$()): IF X=0 THEN DISPLAY
AT(11,1):"No account files o
n DSK";T$ :: GOTO 290 !101
320 FOR L=1 TO X :: DISPLAY
AT(10+L+(L>13)*13,1-(L>13)*1
4):CHR$(L+64);" ";F$(L):: NE
XT L !195
330 DISPLAY AT(8,1):"Choose
an account to update:" (
Space for new account)" !147
340 IF T$=" " THEN DISPLAY A
T(12,1):"DSK" ELSE DN=VAL(T$
):: GOTO 360 !086
350 ACCEPT AT(12,4)SIZE(-12)
VALIDATE(DIGIT,UALPHA,"_"):
T$ :: IF SEG$(T$&" ",3,1)
" " THEN CALL HCHAR(12,1,32,
32):: GOTO 370 ELSE S$="DSK"
&T$ :: GOTO 380 !162360 L=X
:: CALL KEYAT(9,2,L,SEG$(ABC
$,1,L+1)):: IF L>32 THEN S$=
"DSK"&STR$(DN)&"
."&F$(L-64):: GOTO 380 !098
    
```

(See Page 13)

Sample Statement					
Statement of Account 'DSK2.SAMPLE_CKS'					
	Check C	Debits	Credits	Actual	Statement Paid to or Rec'd From
	#			Balance	Balance
July31,'91	Interest	C	61.53	\$ 11841.84	\$ 11841.84 July Interest
Aug 30,'91	Interest	C	62.64	\$ 11904.48	\$ 11904.48 August
Sept05,'91	Deposit	C	987.65	\$ 12892.13	\$ 12892.13 Deposit paycheck of 9/5 for week ending 8/30
Sept07,'91	Deposit	C	111.27	\$ 13003.40	\$ 13003.40 deposit refund ck from state 1990 return
Sept14,'91	Withdrawal	C	120.00	\$ 12883.40	\$ 12883.40 Auto teller machine-cash muffler repair
Sept19,'91	Fee	C	11.95	\$ 12871.45	\$ 12871.45 Check printing 200 checks
Sept20,'91	Check	1281 C	425.00	\$ 12446.45	\$ 12446.45 First National Bank mortgage payment
Sept21,'91	Check	282 C	97.55	\$ 12348.90	\$ 12348.90 Con Edison Gas & Electric utilities bill of 9/14
Oct 01,'91	Deposit	C	987.65	\$ 13336.55	\$ 13336.55 Deposit paycheck of 9/26 week ending 9/20
Sept30,'91	Interest	C	53.76	\$ 13390.31	\$ 13390.31 interest-September
Oct 02,'91	Check	7 C	291.56	\$ 13098.75	\$ 13098.75 Second National Bank MC bill of 9/20
Oct 03,'91	Check	17 C	31.22	\$ 13067.53	\$ 13067.53 Telephone Company toll call for work \$2.33
Oct 05,'91	Check	217	67.54	\$ 12999.99	\$ 13067.53 Safeway groceries
Oct 09,'91	Check	2139	100.00	\$ 12899.99	\$ 13067.53 Cash trip money
Oct 20,'91	Withdrawal		200.00	\$ 12699.99	\$ 13067.53 ATM cash at hotel vacation
	Deposit		\$ 2086.57		
	Interest		\$ 177.93		
	Withdrawal		\$ 320.00		
	Fee		\$ 11.95		
	Check		\$ 1012.87		
	Balance forwarded:		\$ 11780.31		
	Statement Balance:		\$ 13067.53		
	Actual Balance :		\$ 12699.99		



# EXTENDED BASIC—

(Continued from Page 12)

```

370 S$=STR$(DN)&"." :: CALL
NEWACT(S$,FB):: SB=FB :: AB=
FB :: GOTO 430 !179
380 OPEN #1:S$,INTERNAL,FIXE
D 85,SEQUENTIAL,INPUT !060
390 INPUT #1:FB,AB,SB,S(1),S
(2),S(3),S(4),S(5)!111
400 IF EOF(1)THEN 420 ELSE I
=I+1 !095
410 INPUT #1:C$(I,0),D(I,0),
D(I,1),C$(I,1),C$(I,2):: GOT
O 400 !023
420 CLOSE #1 !151
430 DISPLAY AT(1,1)ERASE ALL
:"Main Menu":RPT$(CHR$(94),2
8):: DISPLAY AT(24,1):USING
230:SEG$(S$,6,LEN(S$)-5),AB
!216
440 CALL MENU(M$,X)!135
450 ON X GOTO 460,460,460,46
0,480,500,600,1730 !210
460 !post all but checks !15
8
470 CALL DEPOSIT(X):: I=I+1
:: D(I,1)=-X :: GOSUB 1420 :
: GOSUB 1480 :: GOTO 430 !08
9
480 !post checks !218
490 CALL DEPOSIT(5):: I=I+1
:: D(I,1)=-5 :: GOSUB 1420 :
: GOSUB 1440 :: GOTO 430 !12
5
500 !check statement !118
510 I2=I :: FOR I=1 TO I2 !1
89
520 IF D(I,1)>=0 THEN 590 !1
07
530 IF W(D(I,1))=5 THEN CALL
DEPOSIT(5):: GOSUB 1320 ::
GOTO 550 !066
540 CALL DEPOSIT(W(D(I,1))):
: GOSUB 1340 !111
550 CALL AID(L):: ON L GOTO
590,570,590,580,560,560 !153
560 I=I-2 :: GOTO 590 !046
570 I=I2 :: GOTO 590 !163
580 X=W(D(I,1)):: GOSUB 1660
!213
590 NEXT I :: GOTO 430 !095
600 !find transaction !234
610 DISPLAY AT(1,1)ERASE ALL
:"Search Menu":RPT$(CHR$(94)
,28):: DISPLAY AT(24,1):USIN
G 230:SEG$(S$,6,LEN(S$)-5),A
B !171
620 CALL MENU(M2$,X)!185
630 ON X GOTO 640,770,880,99
0,1100,1210,430 !194
640 !find by type !001
650 DISPLAY AT(1,1)ERASE ALL
:"Find Menu":RPT$(CHR$(94),2
8):: DISPLAY AT(24,1):USING
230:SEG$(S$,6,LEN(S$)-5),AB
!212
660 CALL MENU(M3$,X)!186
670 IF X=8 THEN 1730 ELSE IF
X=7 THEN 430 !031
680 I2=I :: FOR I=1 TO I2 !1
89

```

(See Page 14)

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## EXTENDED BASIC—

(Continued from Page 13)

```

690 IF W(D(I,1))=0 THEN 760
ELSE IF X=6 THEN 700 ELSE IF
W(D(I,1))<>X THEN 760 !036
700 IF W(D(I,1))=5 THEN CALL
DEPOSIT(5):: GOSUB 1320 ::
GOTO 720 !236
710 CALL DEPOSIT(W(D(I,1))):
: GOSUB 1340 !111
720 CALL AID(L):: ON L GOTO
760,740,760,750,730,730 !149
730 I=I-2 :: GOTO 760 !216
740 I=I2 :: GOTO 760 !077
750 IF W(D(I,1))=5 THEN GOSU
B 1440 ELSE GOSUB 1480 !238
760 NEXT I :: GOTO 430 !095
770 !find by amount !211
780 DISPLAY AT(22,1):"What a
mount?:" :: ACCEPT AT(22,14)
VALIDATE(DIGIT, "."):T !189
790 I2=I :: FOR I=1 TO I2 !1
89
800 IF W(D(I,1))=0 THEN 870
ELSE IF D(I,0)<>T THEN 870 !
232
810 IF W(D(I,1))=5 THEN CALL
DEPOSIT(5):: GOSUB 1320 ::
GOTO 830 !091
820 CALL DEPOSIT(W(D(I,1))):
: GOSUB 1340 !111
830 CALL AID(L):: ON L GOTO
870,850,870,860,840,840 !047
840 I=I-2 :: GOTO 870 !071
850 I=I2 :: GOTO 870 !188
860 IF W(D(I,1))=5 THEN GOSU
B 1440 ELSE GOSUB 1480 !238
870 NEXT I :: GOTO 430 !095
880 !find by date !221
890 DISPLAY AT(22,1):"What d
ate? (yymmdd):" :: ACCEPT AT
(22,20)VALIDATE(DIGIT):T$ !0
75
900 I2=I :: FOR I=1 TO I2 !1
89
910 IF W(D(I,1))=0 THEN 980
ELSE IF C$(I,0)<>T$ THEN 980
!011
920 IF W(D(I,1))=5 THEN CALL
DEPOSIT(5):: GOSUB 1320 ::
GOTO 940 !201
930 CALL DEPOSIT(W(D(I,1))):
: GOSUB 1340 !111
940 CALL AID(L):: ON L GOTO
980,960,980,970,950,950 !195
950 I=I-2 :: GOTO 980 !181
960 I=I2 :: GOTO 980 !042
970 IF W(D(I,1))=5 THEN GOSU
B 1440 ELSE GOSUB 1480 !238
980 NEXT I :: GOTO 430 !095
990 !find by check # !128
1000 DISPLAY AT(22,1):"What
check#?:" :: ACCEPT AT(22,14)
VALIDATE(DIGIT):T !161
1010 I2=I :: FOR I=1 TO I2 !
189
1020 IF W(D(I,1))=0 THEN 109
0 ELSE IF CK(D(I,1))<>T THEN
1090 !158
1030 IF W(D(I,1))=5 THEN CAL
L DEPOSIT(5):: GOSUB 1320 ::
GOTO 1050 !056
1040 CALL DEPOSIT(W(D(I,1))
):: GOSUB 1340 !111
1050 CALL AID(L):: ON L GOTO
1090,1070,1090,1080,1060,10
60 !093
1060 I=I-2 :: GOTO 1090 !036
1070 I=I2 :: GOTO 1090 !153
1080 IF W(D(I,1))=5 THEN GOS
UB 1440 ELSE GOSUB 1480 !238
1090 NEXT I :: GOTO 430 !095
1100 !find by payee !083
1110 DISPLAY AT(22,1):"What
payee?:" :: ACCEPT AT(22,14)
:T$ !099
1120 I2=I :: FOR I=1 TO I2 !
189
1130 IF W(D(I,1))=0 THEN 120
0 ELSE IF SEG$(C$(I,1),1,LEN
(T$))<>T$ THEN 1200 !0371140
IF W(D(I,1))=5 THEN CALL DE
POSIT(5):: GOSUB 1320 :: GOT
O 1160 !166
1150 CALL DEPOSIT(W(D(I,1))
):: GOSUB 1340 !111
1160 CALL AID(L):: ON L GOTO
1200,1180,1200,1190,1170,11
70 !241
1170 I=I-2 :: GOTO 1200 !146
1180 I=I2 :: GOTO 1200 !007
1190 IF W(D(I,1))=5 THEN GOS
UB 1440 ELSE GOSUB 1480 !238
1200 NEXT I :: GOTO 430 !095
1210 !find by memo !237
1220 DISPLAY AT(22,1):"What
memo?:" :: ACCEPT AT(22,12):
T$ !250
1230 I2=I :: FOR I=1 TO I2 !
189
1240 IF W(D(I,1))=0 THEN
0 ELSE IF SEG$(C$(I,2),1,LEN
(T$))<>T$ THEN 1310 !0041250
IF W(D(I,1))=5 THEN CALL DE
POSIT(5):: GOSUB 1320 :: GOT
O 1270 !020
1260 CALL DEPOSIT(W(D(I,1))
):: GOSUB 1340 !111
1270 CALL AID(L):: ON L GOTO
1310,1290,1310,1300,1280,12
80 !139
1280 I=I-2 :: GOTO 1310 !001
1290 I=I2 :: GOTO 1310 !118
1300 IF W(D(I,1))=5 THEN GOS
UB 1440 ELSE GOSUB 1480 !238
1310 NEXT I :: GOTO 430 !095
1320 !DISPLAY DATA RECORD !1
78
1330 DISPLAY AT(7,7)SIZE(4):
STR$(CK(D(I,1)))!166
1340 ! DISPLAY DATA RECORD F
OR DEPOSITS !100
1350 GOSUB 1870 !165
1360 DISPLAY AT(7,18)SIZE(2)
:SEG$(C$(I,0),3,2);!012
1370 DISPLAY AT(7,22)SIZE(2)
:SEG$(C$(I,0),5,2)!085
1380 DISPLAY AT(7,27)SIZE(2)
:SEG$(C$(I,0),1,2)!086
1390 DISPLAY AT(11,1):C$(I,1)
)!087
1400 DISPLAY AT(13,19):USING
"#####.##":D(I,0)!039
1410 DISPLAY AT(17,1):C$(I,2)
)!094
1420 DISPLAY AT(21,19)SIZE(-
1):SEG$("NNY",SGN(D(I,1))+2,
1)!225
1430 RETURN !136
1440 ! Change data !163
1450 GOSUB 1870 !165
1460 ACCEPT AT(7,7)SIZE(-4)V
ALIDATE(DIGIT):T$ :: IF T$="
" THEN I=I-1 :: GOTO 430 ELS
E IF VAL(T$)=0 THEN CALL GUN
:: GOTO 1460 !146
1470 D(I,1)=SGN(D(I,1))*(W(D
(I,1))+VAL(T$)/10000)!231
1480 ! Change data-deposits
!059
1490 GOSUB 1870 !165
1500 ACCEPT AT(7,18)SIZE(-2,
VALIDATE(DIGIT):T1 :: IF T1=
0 OR T1>12 THEN I=I-1 :: GOT

```

(See Page 15)



## EXTENDED BASIC—

(Continued from Page 14)

```

O 430 !052
1510 ACCEPT AT(7,22)SIZE(-2)
VALIDATE(DIGIT):T2 :: IF T2=
0 OR T2>DAY(T1)THEN CALL GUN
:: GOTO 1500 !077
1520 ACCEPT AT(7,27)SIZE(-2)
VALIDATE(DIGIT):T3 !140
1530 IF (T2=29)AND(T1=2)AND(
T3<>INT(T3/4)*4)THEN CALL GU
N :: GOTO 1500 !246
1540 IF LEN(STR$(T3))=1 THEN
T$="0"&STR$(T3)ELSE T$=STR$
(T3)!056
1550 IF LEN(STR$(T1))=1 THEN
T$=T$&"0"&STR$(T1)ELSE T$=T
$&STR$(T1)!146
1560 IF LEN(STR$(T2))=1 THEN
C$(I,0)=T$&"0"&STR$(T2)ELSE
C$(I,0)=T$&STR$(T2)!0551570
ACCEPT AT(11,1)SIZE(-28):C$
(I,1):: IF C$(I,1)=" " THEN 1
500 !086
1580 ACCEPT AT(13,19)SIZE(-9)
VALIDATE(DIGIT,". "):T4 ::
IF T4=D(I,0)THEN 1650 !112
1590 X=W(D(I,1))!129
1600 L=T4*100 :: IF L<>INT(L)
)THEN CALL GUN :: GOTO 1580
!015
1610 AB=AB+SGN((X>2)+.5)*(T4
-D(I,0))!081
1620 S(X)=S(X)-D(I,0)+T4 !15
9
1630 IF SGN(D(I,1))>=0 THEN
SB=SB+SGN((X>2)+.5)*(T4-D(I,
0))!005
1640 D(I,0)=T4 :: IF T4=0 TH
EN D(I,1)=0 !063
1650 ACCEPT AT(17,1)SIZE(-28)
):C$(I,2)!174
1660 ACCEPT AT(21,19)SIZE(-1)
)VALIDATE("YNyn"):T$ !026
1670 T1=SGN(D(I,1)):: T2=(T$
="N")+ (T$="n")!065
1680 IF T1=T2 THEN 1720 !132
1690 IF T2 THEN SB=SB-SGN((X
>2)+.5)*D(I,0):: GOTO 1710 !
254
1700 SB=SB+SGN((X>2)+.5)*D(I
0)!190
1710 D(I,1)=-D(I,1)!206
1720 RETURN !136
1730 DISPLAY AT(1,1)ERASE AL
L:"Save Menu":RPT$(CHR$(94),
28):: DISPLAY AT(24,1):USING
230:SEG$(S$,6,LEN(S$)-5),AB
!226
1740 CALL MENU(M4$,X)!187
1750 ON X GOTO 1760,2140,188
0,430,1830 !183
1760 DISPLAY AT(24,1):"SAVE
TO FILE:";S$ :: ACCEPT AT(24
,14)SIZE(-15):S$ !007
1770 IF S$="" THEN 1730 !193
1780 OPEN #1:S$,INTERNAL,FIX
ED 85,SEQUENTIAL,OUTPUT :: P
RINT #1:FB,AB,SB,S(1),S(2),S
(3),S(4),S(5),I !152
1790 FOR L=1 TO I !138
1800 IF D(L,1)=0 OR D(L,0)=0
THEN 1810 ELSE PRINT #1:C$(
L,0),D(L,0),D(L,1),C$(L,1),C
$(L,2)!224
1810 NEXT L !226
1820 CLOSE #1 :: GOTO 1730 !
048
1830 DISPLAY AT(24,1)BEEP:"A
re you sure? Quit now? N" !2
46
1840 CALL KEYAT(24,25,Z,"YN"
):: IF Z=78 THEN 1730 !049
1850 CALL CLEAR :: STOP !235
1860 ! Display balance !095
1870 DISPLAY AT(1,4)SIZE(22)
:USING " BALANCE $#####.#
#":AB :: DISPLAY AT(2,4)SIZE
(22):USING " CLEARED $#####
###.##":SB :: RETURN !025
1880 ! print statement !197
1890 DISPLAY AT(22,1):"Is pr
inter ready?":P$ !228
1900 ACCEPT AT(23,1)VALIDATE
(UALPHA,DIGIT,".=")SIZE(-23)
:P$ !039
1910 OPEN #7:P$,DISPLAY ,VAR
IABLE 132,OUTPUT :: PRINT #7
:P2$ !065
1920 TA,TS=FB :: FOR L=1 TO
5 :: S(L)=0 :: NEXT L !159
1930 PRINT #7:"Statement of
Account `";S$;"'": !122
1940 PRINT #7: :TAB(24);"Che
ck C Debits Credits";TAB
(57);"Actual Statement";TA
B(76);"Paid to or Rec'd From
":TAB(26);"# 1";!252
1950 PRINT #7:TAB(56);"Balan
ce Balance": !208
1960 I2=I :: FOR I=1 TO I2 :
: IF D(I,1)=0 THEN 2070 !184
1970 CALL DATE2(C$(I,0),T$):
: PRINT #7:T$;" ";SEG$(M3$,W
(D(I,1))*23-22,11);!047
1980 IF W(D(I,1))=5 THEN PRI
NT #7:CK(D(I,1));TAB(30);ELS
E PRINT #7:TAB(30);!098
1990 ! IF W(D(I,1))=5 THEN P
RINT #7:RPT$(" ",4-LEN(STR$(
CK(D(I,1)))));CK(D(I,1));" "
;ELSE PRINT #7:" "; !1
31
2000 IF SGN(D(I,1))>0 THEN P
RINT #7:"C ";ELSE PRINT #7:"
";!140
2010 IF W(D(I,1))>2 THEN PRI
NT #7,USING "#####.##
":D(I,0);ELSE PRINT #7,
USING " #####.## "
:D(I,0);!109
2020 L=W(D(I,1)):: L=(L<3)*-
D(I,0)+(L>2)*D(I,0):: TA=TA+
L :: TS=TS-(SGN(D(I,1))=1)*L
!030
2030 S(W(D(I,1)))=S(W(D(I,1)
))+D(I,0)!123
2040 PRINT #7,USING "$#####
###.##":TA;!150
2050 PRINT #7,USING " $#####
###.## ":TS;!234
2060 PRINT #7:C$(I,1);TAB(10
5);C$(I,2)!021
2070 NEXT I :: SB=TS :: AB=T
A :: I=I-1 !065
2080 FOR L=1 TO 5 :: PRINT #
7:SEG$(M3$,L*23-22,19);!116
2090 PRINT #7,USING "$#####
###.##":S(L):: NEXT L !189
2100 PRINT #7,USING "Balance
forwarded: $#####.##":FB
!198
2110 PRINT #7,USING "Stateme
nt Balance: $#####.##":SB
!202
2120 PRINT #7,USING "Actual
Balance : $#####.##":AB
!189
2130 CLOSE #7 :: GOTO 1730 !
054
2140 ! Reset !166
2150 FOR L=1 TO I :: D(I,0),
D(I,1)=0 :: NEXT L !039
2160 FOR L=1 TO 5 :: S(L)=0

```

(See Page 16)



## EXTENDED BASIC—

(Continued from Page 15)

```

:: NEXT L :: GOTO 220 !149
19900 SUB NEWACT(T$,FB)!081
19910 DISPLAY AT(8,1):" New
Account Name?":"DSK";T$ :: A
CCEPT AT(9,4)VALIDATE(UALPHA
,DIGIT,"./")SIZE(-12):T$ ::
IF LEN(T$)<3 THEN 19910 !18
5
19920 T$="DSK"&T$ :: DISPLAY
AT(8,1):"Carryover Balance?
$":!140
19930 ACCEPT AT(8,21)VALIDAT
E(DIGIT,".")SIZE(-9):S$ :: I
F S$="" THEN CALL GUN :: GOT
O 19930 !035
19940 T=POS(S$,".",1):: IF T
>0 THEN IF POS(S$&" ", ".",T+
1)>0 THEN CALL GUN :: GOTO 1
9920 !221
19950 L=VAL(S$)*100 :: IF L<
>INT(L)THEN CALL GUN :: GOTO
19930 ELSE FB=VAL(S$)!191
19960 SUBEND !168
21000 SUB DEPOSIT(T)!073
21010 CALL CLEAR :: CALL SCR
EEN(16):: A$="Deposit Inte
rest WithdrawalCharges Ch
eck# " !053
21020 CALL HCHAR(20,1,124,32
0)!062
21030 DISPLAY AT(7,1):SEG$(A
$,T*10-9,10)&" Date:m d
y`" !115
21040 IF T=5 THEN DISPLAY AT
(8,7):"^^^^ ^ ^ ^
^" ELSE DISPLAY AT(8,18):"^^
^^ ^^" !119
21050 IF T=5 THEN DISPLAY AT
(9,2):"Pay to:" ELSE DISPLAY
AT(9,2):"Comments:" !018
21060 DISPLAY AT(12,1):"^^^^
^^^^^^^^^^^^^^^^^^^^^^^^^^^^" !1
85
21070 DISPLAY AT(13,10):"Amo
unt $" !104
21080 DISPLAY AT(14,19):"^^^
^^^^^^" !232
21090 DISPLAY AT(15,2):"Memo
" !235
21100 DISPLAY AT(18,1):"^^^^
^^^^^^^^^^^^^^^^^^^^^^^^^^^^" !1
91
21110 DISPLAY AT(21,11)SIZE(
-9):"Cleared: " !182
21120 SUBEND !168
28040 SUB KEYAT(R,C,X,V$)!21
7
28045 ! KEYAT(Row, Column, A
SCII Return variable, Valida
tion string) JLS 2/91 !033
28050 ! Combines cursor flas
h with single key entry, val
idation !111
28055 C=C+2 :: CALL GCHAR(R,
C,N(0)):: N(1)=N(0):: N(2),N
(3)=30 !163
28060 CALL HCHAR(R,C,N(Y-INT
(Y/4)*4)):: Y=Y+1 !209
28065 CALL KEY(3,X,S):: IF S
<1 THEN 28060 !095
28070 IF POS(V$,CHR$(X),1)=0
THEN 28060 !120
28075 CALL HCHAR(R,C,X)!144
28080 CALL KEY(5,Z,Z1):: SUB
END !049
29455 SUB DATE2(T$,N$)!200
29460 ! Given (T$:"YYMMDD",r
eturn string) returns 10 cha
r string for date JLS 9/88 !
169
29465 D$="Jan Feb Mar Apr Ma
y JuneJulyAug SeptOct Nov De
c " !033
29470 N$=SEG$(D$, (VAL(SEG$(T
$,3,2))-1)*4+1,4)&SEG$(T$,5,
2)&`,`&SEG$(T$,1,2):: SUBEN
D !032
29475 SUB AID(X)!255
29480 ! Returns option codes
:2-BEGIN,3-PROCEED,4-AID,5-R
EDO,6-BACK,1-ENTER JLS 8/88
!196
29485 CALL CHAR(125,"0C183F1
90D612143"):: DISPLAY AT(24,
1):"Begin,Proceed,Aid,Redo,B
ack}" !024
29490 CALL KEY(5,X,S):: IF S
<1 THEN 29490 ELSE IF X>15 T
HEN 29490 !104
29495 IF (X>11)+(X=1)+(X=6)T
HEN 29500 ELSE 29490 !205
29500 X=POS(".131412010615",
RPT$("0",- (X<7))&STR$(X),1)/
2 :: SUBEND !151
29505 SUB BLUE !149
29510 ! SWITCHES DISPLAY TO
WHITE ON BLUE; JLS 7/88 !230
29515 CALL SCREEN(5):: FOR L
=0 TO 14 :: CALL COLOR(L,1
5):: NEXT L :: SUBEND !206
29545 SUB CAT2(X,F$())! crea
tes list of files on disk X
of specific type !209
29550 ! A:1=DIS/FIX :: 2=DIS
/VAR:: 3=INT/FIX :: 4=INT/VA
R ::5=PROGRAM !232
29555 OPEN #5:"DSK"&STR$(X)&
".",INPUT ,RELATIVE,INTERNAL
:: INPUT #5:A$,J,J,K !182
29560 X=0 :: FOR L=1 TO 127
:: INPUT #5:A$,A,J,K !079
29565 IF LEN(A$)=0 THEN CLOS
E #5 :: SUBEXIT !086
29570 IF ABS(A)<>3 THEN 2958
0 !240
29575 IF K=85 THEN X=X+1 ::
F$(X)=A$ !113
29578 IF X>25 THEN L=127 !23
6
29580 NEXT L :: CLOSE #5 ::
SUBEND !041
30595 SUB MENU(A$,X)!127
30600 ! A$ is list of option
s, each 23 characters long
115
30605 ! X : return variable
for choice !109
30610 CALL SCREEN(5):: FOR L
=1 TO LEN(A$)/23+.9 !229
30615 DISPLAY AT(4+L,2+(L>9)
):L;SEG$(A$, (L-1)*23+1,23)!0
09
30620 NEXT L !226
30635 DISPLAY AT(22,3):"CHOI
CE?" !073
30640 CALL SOUND(200,-1,4)!2
20
30645 CALL KEY(0,X,S):: IF S
<1 OR X>L+47 OR X<49 THEN 30
645 ELSE X=X-48 !130
30650 CALL CLEAR !209
30655 SUBEND !168
30820 SUB PAUSE !236
30825 FOR D=1 TO 100 :: NEXT
D !241
30830 DISPLAY AT(24,2):"PRES
S ANY KEY TO CONTINUE" !088
30835 CALL KEY(0,K,S):: IF S
<1 THEN 30835 !049
30840 SUBEND !168
31530 SUB TITLE !240
31540 DISPLAY AT(1,9):"Check
(See Page 17)

```



## THE ART OF ASSEMBLY — PART 8

## File handling tips

By BRUCE HARRISON  
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This month's column will offer a few useful tips and hints drawn from our experience with file handling in Assembly language.

There are some fundamental decisions that must be made in any file structure you're going to use in a program. Perhaps the most fundamental is whether to use a Fixed or Variable record size. This of course brings implications along for the ride. With Fixed record length, you get the ability to access any record in the file without reading those that came before it. In a game program that we wrote some time ago, we used a fixed record length so that we could take a random number and use that to read a record in the file selected at random. In another case, for our Golf Score Analyzer, we used a fixed record length of 56 bytes, which corresponded to the records in memory relating to each round of golf entered. This made our whole file-access problem much easier to deal with than it could have been.

Variable record length is, in general, more efficient in use of disk space, because the disk controller will squeeze as many records as possible into each sector of the disk. Thus if your file organization is Variable 80, there could be twenty such records in a single 254 byte sector on the disk, provided the actual length of the records was quite short. You can't, of course, put more than eighty characters in any record.

In either case, this choice of fixed or variable is not to be taken lightly, as the choice made will have implications later on. We've had occasion to regret some decisions we've made along this line, and so advise a lot of "thinking through" for this decision.

By far the worst "killer" in file handling operations is error handling. Errors generally fall into two major categories. The first is the case in which the file failed to open. One common cause for this kind of error is a mistake of one kind or another in the device name. If the user types in "DKSI" instead of "DSKI", the file will not open. We have found one reliable way of detecting that this kind of error has occurred. If an invalid device name is used, the status register will have its bit two set. We have found that, at least with TI's built-in DSRLNK routine, the status byte at >837C does not get bit two set. (Page 298 of the E/A manual

says that the byte at >837C does get bit 2 set.) Thus one must examine the status register upon return from an Open File operation to discover whether or not such an error has happened. In source code:

```
BLWP @DSRLNK   Use DSR link to open file
DATA 8         Required data for DSRLNK
STST R14      Store the status register in R14
ANDI R14, >2000 Mask all but bit 2 in R14
JEQ NEXTOP    If zero, file has opened - proceed
B @OPNERR     Else file has not opened, report
```

error

NEXTOP (program continues)

We have run extensive tests using this method, and have not found it to fail to detect a "bad device name". It will, when used in combination with the error reporting scheme shown below, also detect errors of other kinds when opening a file, such as "bad attribute" errors. Using a special program we prepared just for testing, we found we could type in such errors as DKS1, SR232, POI, and so forth, and the OPEN would always indicate a bad device name using the above code. This will also report the same error if, for example, you type DSK6 when you only have DSK1 thru DSK5 on your system (including RAMDISKS).

When an open error has been detected, you can branch to the error reporting code at OPNERR and produce a screen message such as "BAD DEVICE NAME" or "BAD ATTRIBUTE", to alert the user.

There are other errors that will be reported when opening a file, such as the case where your external Drive 2 is turned off, or the drive door is open. These will report "DEVICE ERROR" using the source code included here.

Once a file has been opened, there are other possible errors that can be found by attempting to read or write records in the file. The only way we've found to properly report such errors is as follows:

```
BLWP @DSRLNK   Attempt to read or write
DATA 8         Required data for DSR
LI R0, PAB+1   Point to second byte in PAB
BLWP @VSBRLNK Read that into left byte R1
```

(See Page 18)

## EXTENDED BASIC—

(Continued from Page 16)

```
Book" :: CALL CHAR(94, "00FF
") :: CALL HCHAR(2, 11, 94, 10) !
053
31545 DISPLAY AT(3, 2): "Bank
Account Record Keeper" !163
31555 CALL CHAR(92, "1F306744
```

```
4467301FF018CC0404CC18F0") ::
DISPLAY AT(5, 1): "\]Copyrigh
t1992 Jerry Stern": " ~All
Rights Reserved~" !015
31560 SUBEND !168
32575 SUB GUN !086
32580 ! GUN SOUND EFFECT SIN
```

```
GLE SHOT JLS- 12/85 !152
32585 CALL SOUND(100, 110, 0, 1
30, 5, 34000, 30, -8, 0) :: FOR L=
0 TO 30 STEP 15 :: CALL SOUN
D(-100, 110, 30, 110, 30, 3400, 30
, -8, L) :: NEXT L :: SUBEND !1
42
```



## ART OF ASSEMBLY—

(Continued from Page 18)

SRL R1,13 Shift R1 right by 13 bits  
 JEQ CONTOP If zero, operation OK  
 B @FILERR Else branch to error report  
 CONTOP (program continues)

The Editor/Assembler book gives definitions for the errors you can find by this method, on page 299. Note that the first given applies only in the case of a bad device name, and that must actually be found in the OPEN operation. This snippet of source code assumes you have a Peripheral Access Block (PAB) in the VDP Ram at address PAB. When a write or read error has been found on an opened file, you can construct a lookup table in your error reporting scheme, and report errors in plain English on screen. This is preferable to simply reporting errors by code numbers, since it gives the user a clue to what may be wrong. There will be cases, of course, that fall into the catchall "OTHER FILE ERROR" category, and that message won't help much.

Here's the source code for a lookup table method to report file errors in a reasonably user-friendly fashion, assuming the errors have been detected as we've shown above:

```
OPNERR LI R0,22*32+2 row 23, column 3 of screen
        L R1,FNOMSG Point to message string
        BL @DISSTR Use subroutine to display
        LI R0,PAB+1 Point to PAB+1
        BLWP @VSBR Read into left byte R1
        SRL R1,13 Shift R1 right 13 bits
FILERR SLA R1,1 Double number in R1
        AI R1,LUT Add lookup table address
        MOV *R1,R1 Get address of text string
        LI R0,23*32+2 Row 24, column 3
        BL @DISSTR Use subroutine to display
        BL @KEYLOO Stop at key loop for reading
        B (somewhere else in program)
```

The line BL @KEYLOO is simply a means of stopping anything from happening so the user can read the message on the screen. The subroutine KEYLOO was included in Part 2 of this series, and may be used as shown there.

In the data section, include the following:

```
BADDEV BYTE 15
        TEXT 'BAD DEVICE NAME'
WRPROTBYTE 15
        TEXT 'WRITE PROTECTED'
BADATT BYTE 13
        TEXT 'BAD ATTRIBUTE'
ILLOP BYTE 17
        TEXT 'ILLEGAL OPERATION'
OUTSP BYTE 19
        TEXT 'OUT OF BUFFER SPACE'
ENDFIL BYTE 11
        TEXT 'END OF FILE'
DEVERR BYTE 12
        TEXT 'DEVICE ERROR'
FILBAD BYTE 16
        TEXT 'OTHER FILE ERROR'
LUT DATA BADDEV,WRPROT,BADATT
```

```
DATA ILLOP,OUTSP,ENDFIL
DATA DEVERR,FILBAD
FNOMSGBYTE 17
TEXT 'FILE DID NOT OPEN'
```

You'll also need the small subroutine which we've called DISSTR to display the appropriate string on the screen. For example:

```
DISSTR MOVB *R1+,R2 Get length into left byte R2
        SRL R2,8 Right justify byte in R2
        JEQ DISX If R2 zero, get out
        BLWP @VMBW Write text to screen
DISX RT Return
```

We'll digress for just a moment here to discuss that line JEQ DISX in this subroutine. The utility VMBW does not check to see whether R2 is zero before performing its job, so we must do that before calling the utility. In the code we've shown here, R2 would never be zero at this point, but this subroutine can be used for other purposes, and might encounter a null string to display. If one calls VMBW with R2 zero, the utility will attempt to write 65,535 bytes into VDP Ram, with disastrous results.

There will be situations where you'll want to do something different about an end of file error, rather than reporting that to the screen. If you are reading the entire file into memory, you may want an error where R1 is five to simply return to a menu or go on to some other place in the program. You could, after each read operation, insert a CI R1,5 after the line JEQ CONTOP, then jump or branch to somewhere else if R1=5.

There are some things said in the TI E/A manual that, to borrow a phrase from Gershwin, "Ain't necessarily so!" We mentioned one of those earlier, concerning the status byte at >837C. Here's another. The book says that the Status test only applies if the three leftmost bits of the byte at PAB+1 are all zero. Not true! For Open operations, we recommend that you first test for the Status register, then check the PAB+1 byte, as we did at OPNERR. There will be instances, for example, when this second test will indicate "BAD ATTRIBUTE" when a file did not open.

Our tests have been as exhaustive (and exhausting) as we could manage in preparing for this article. Our system has a Horizon Ramdisk with Drives 3, 4, and 5 thereon, plus floppy drives 1 and 2, connected to a TI Controller. We have even tried writing to a full disk, and sure enough when we opened a file for Output to that disk, we got a "FILE DID NOT OPEN" message plus the "OUT OF BUFFER SPACE" message. We did find instances where the RAMDISK reports a different error than the TI controller does for the same situation.

There was one peculiar thing that we found on Ramdisk. Our test program was set up for D/V 80 files. The disk catalog file (e.g. DSK1.) is not that kind of file, and the TI Controller will dutifully give you a BAD ATTRIBUTE indication and will not open the file when you try it as a D/V 80 file. The Ramdisk, however, will open the file DSK5. and allow you to read from it, even though the attributes in our PAB clearly do not match that file. In other cases, such as trying to open a D/F 80 file with a PAB set up for D/V 80, the Ramdisk does report errors correctly.

This is of course not something you'd normally do on purpose,  
 (See Page 19)



## ART OF ASSEMBLY—

(Continued from Page 18)

but it did confuse us to see the Ramdisk catalog being accessed as a D/V 80 file. Maybe Gary Bowser planned it that way, but in any case it won't bother the average user.

Incidentally, there's nothing really magic about the messages we've used in today's source code. You could make your messages shorter or more elaborate. "OUT OF BUFFER SPACE" could just as well read "OUT OF DISK SPACE", since that's the more likely cause for this kind of error. For our own convenience, we made each message in the form of a string, with its length byte first, then content in a TEXT line. That allowed us to use a rather simple subroutine (DISSTR) to display any message chosen from the lookup table. This simple subroutine will not work with XB, but does just fine in E/A Option 3 programs like the one we used to do testing for this article. We also tested this error reporting

scheme using the GPLLNK and DSRLNK shown in last month's sidebar, with results identical to those using TI's DSRLNK under the E/A Option 3.

Yes, we've gone on forever about the business of error checking without even showing all the steps required to open a file, let alone read or write to one.

We believe, however, that with a little patience studying the E/A manual, one can learn fairly quickly how to manage those steps, but the business of error trapping and reporting has caused us much anguish, so we thought it deserved lots of "ink".

In our next installment, we'll continue with more pointers on file handling, including some of the common types of files such as D/V 80, D/F 80, and Memory Image files (a.k.a. Program files). We'll open, read, write, and close some files, too.

## The Tigercub 6-memory, 6-window, 34-function, 14-digit programmable calculator

By **JIM PETERSON**  
Tigercub Software

I always wanted a calculator with more than one memory, and a window to display the contents of each one. The computer has plenty of memory, and the monitor screen has plenty of room for windows, so I wrote a 6-memory 6-window calculator.

Recently I decided to go back and upgrade that old program. By the time I got through I had a 6-memory 6-window 34-function 14-digit display programmable calculator with many other features.

It was necessary to write this program to accept either numeric or alphabetic data and then sort it out. For this reason, it does not respond as instantly as a calculator. However, I think it does some things that few if any calculators can do.

When you boot this program, the screen displays 6 memory areas marked U through Z, and you are asked if you want to label them. That will help a great deal in keeping track of what you are using them for. The computer will force you to unlock the alpha lock and label them in lower case, which will make them stand out nicely in inverse video.

Next you are asked if you want a 14-digit

display. Unlike the 8-bit PCs, the TI calculates to 14 digits of accuracy, but normally rounds them off to 10 digits for screen display. This option will display the full 14 digits, if it is not more than 9,999,999,999 or less than -9,999,999,999.

You are required to depress the Alpha Lock again to answer this prompt, and it must stay depressed thereafter.

Then you are asked if you want to use conventional or straight-line mode. Conventional mode is much like you would use with an ordinary calculator - you must press Enter after you input each value, but not after each function. For instance, 77 (Enter) + 81 (Enter) = .

In straight-line mode you simply type 77+81= (Enter), which is a bit faster but the computer then pauses for a few seconds to decipher the input before giving the answer.

If you want to enter large numbers in exponential notation, you must use the conventional mode.

To switch from one mode to the other, just enter J. The mode you are in is displayed in the upper right of the screen. Entering JJ will clear the memory labels and irretrievably clear all memories; Q will

terminate the program.

If you use the =, the result is simply displayed on screen, but if you use a memory name (U through Z) the result is placed in that memory and displayed in its window. For instance, 77+81X puts 158 in memory and window X.

You can also enter a memory name to calculate with the value it contains. For instance, U (Enter) + 81 (Enter) V adds 81 to the value from U and puts the result in V. W+XY adds the values in W and X and puts the result in Y. U+UU would double the value of U.

To poke a value into a memory, just enter a value and a memory name, such as 77 (Enter) U, or in straight-line 77U.

The four basic functions are + (located on Shift =) for adding, - (located on Shift /) for subtracting, / for dividing and \* (located on Shift 8) for multiplication. All that shifting is a nuisance, especially if you are using one hand to keep track in a column of figures. To make it easier, you can use P (plus) for +, M (minus) for -, D (divide) for division, and T (times) for multiplication. The correct symbols will still appear on screen.

(See Page 24)



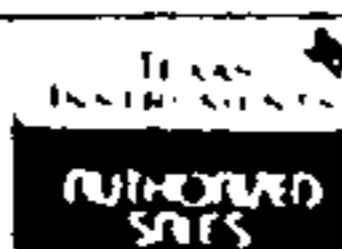
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#### #1. THE SINGING TI-99/4A SPEECH & MUSIC DISK

This is the disk everyone is talking about. The computer voice actually sings to animated graphics. Includes routines by master programmer Ken Gilliland. Bert & Earnie, Maltilda & much much more. 2 disk sides, speech & 32 K req. Exbasic autoloader.

#### #2. WHEEL OF FORTUNE, BLACKJACK & JOKER POKER

Three fantastic freeware programs on one disk. Professional quality and the best "wheel" game around at any price. Vanna would love it!

#### #3. DUMPIT

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

#### #4. PRINTART

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

#### #5 ORIGINAL TI SALES DEMO DISK WITH TI-TREK GAME

This disk is packed full of assorted files of all types. Graphics, speech etc. Contains complete TI-TREK game for Speech Editor or TE-II module.

#### #5A. TI MUSIC/GRAPHICS

A great collection of music and matching graphics. Great examples of music & sprite programming.

#### #6. EXBASIC MUSIC

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

#### #7. SPACE SHUTTLE MUSIC/GRAPHICS

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

#### #8. LOTTO PICKER

This program randomly generates numbers for use in the various state lotto games and even runs a simulated lotto game. Easy to modify for pick 5 etc. games. A great learning and fun disk.

#### #9. MONA LISA PRINT OUT

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

#### #10. GOTHIC PRINT

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

#### #11. ANIMATED CHRISTMAS CARD "WOODSTOCK"

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

#### #12. TI-99 OLOPY

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

#### #13. STRIP POKER (PG RATED)

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

#### #14. FIGURE STUDY (PG RATED)

A collection of Playboy type centerfolds that can be printed out at your command. Use with any printer.

#### #15. STAR/EPSON PRINTER DEMO

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

#### #16. SIDEWAYS PRINTOUT

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

#### #17. TI FORTH DEMO

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

#### #18. TI DIAGNOSTIC

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

#### #19. TI WRITER/MULTIPLAN UPGRADE

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

#### #20. ACCOUNTS RECEIVABLE

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

#### #21. DATA BASE DEMO DISK

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

#### #22. ASTROLOGY

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

#### #23. WILL WRITER

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

#### #24. ENGINEERING CALCULATIONS

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

#### #25. MEDICAL ALERT

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

#### #26. R RATED GAME

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

#### #27. KIDS LEARNING

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

#### #28. LOADERS AND CATALOGERS

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

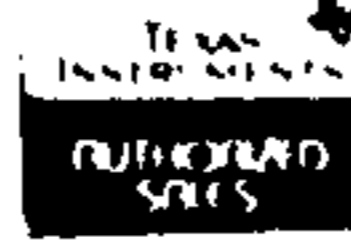
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## #29. LABEL MAKER I

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

## #30. HOUSEHOLD BUDGET PRINTOUT

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

## #31. MORSE CODE TRAINER DISK

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

## #32. EXBASIC XMAS MUSIC

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

## #33. CHECKERS & BACKGAMMON

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

## #34. SOLITAIRE & SCRABBLE

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

## #35. PROGRAMMING AIDS & UTILITIES I

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

## #36. STRICTLY BUSINESS

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

## #37. LAPD COOKBOOK

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

## #38. GREAT 99/4A GAMES VOL. I

A collection of professional games in assembly and exbasic that all load from a menu in exbasic. Includes a great ski game where you dodge the trees in a fast downhill run. We have included only the best.

## #39. GREAT 99/4A GAMES VOL. II

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

## #40. ARTIFICIAL INTELLIGENCE

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

## #41. VIDEO GRAPHS MODULE BACKUP DISK

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

## #42. FUNNELWEB FARM UTILITY

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

## #43. BEST OF BRITAIN, VOL I

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

## #44. LABEL MAKER I GRAPHICS

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

## #45. BEST OF BRITAIN, VOL II

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

## #46. SUPER TRIVIA 99

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

## #47. INFOCOM RAPID LOADER

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

## #48. GHOSTMAN (from England)

This Pacman/Munchman type game starts at a slow pace and slowly speeds up to a break-neck pace. A totally new experience.

## #49. DEMON DESTROYER (from France)

This great assembly game starts where Invaders leaves off. Add features like descending aliens and closing walls. Hours of great arcade action.

## #50. OH MUMMY (from Germany)

Move through the chambers of a Pyramid in search of hidden treasure. Fantastic graphics and great entertainment.

## #51. BERLIN WALL (from Canada)

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

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**BUY TEN DISKS GET THREE FREE**  
**BUY FIFTEEN DISKS GET FIVE FREE**

## #52. ANIMATION 99 (from Germany)

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

## #53. HACKER/CRACKER

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

## #54. ASTRONOMY

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

## #55. SCREEN DUMP

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

## #56. SPREAD SHEET

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

## #57. TELCO

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

## #58. PR BASE

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

## #59. GRAPH MAKER

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

## #60. FREDDY

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

## #61. THE MINE

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

## #62. DISK MANAGER II MODULE BACKUP

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

## #63. ASTROBLITZ/MAZOG

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

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- #64. MAJOR TOM/SPACE STATION PHETA**  
A pair of great space games. These two are going to keep you in front of the 99/4A for hours. Great!
- #65. PERFECT PUSH**  
An all new space game where you assemble and launch a rocket ship in outer space while avoiding a space monster. This one is professional in very way. graphics, speed and action!!!
- #66. HEBREW TYPEWRITER**  
This program converts your TI-99/4A keyboard into a typewriter that displays Hebrew letters on the screen. Can also be printed when used in conjunction with screen dump program (included). Great for religious training or making your copy of the dead sea scrolls or ten commandments!
- #67. GENEALOGY**  
Now you can set up your family tree and store or print out the records. Great for keeping track of family relationships and records.
- #68. CHESS**  
The original computer chess game Sargon has been reprogrammed for the TI-99/4A. Now play chess with your computer. Documentation included. Exbasic autoloader.
- #69. COMPUTER PLAYER PIANO/KEYBOARD CHORD ANALYSIS**  
A unique music program which displays a piano on the screen and actually plays your selections.
- #70. TI RUNNER II**  
The very latest (and best) "runner" game based on TI Runner and Star Runner. Great action, graphics and entertainment.
- #71. KIDS LEARNING II**  
Two more disk sides loaded with the best in educational programs. Kids improve their math, spelling and comprehension skills while having fun.
- #72. CERBERUS**  
Fantastic space game from Germany. Pilot your ship through narrow and crooked channels in space without colliding. Great graphics and music.
- #73. CRYPTO (gram)**  
One of the best word games we have seen for any computer. Set up like a TV game show with great screen displays.
- #74. LABEL MAKER II**  
Make labels for holidays and special events. You compose the text and select the resident graphics for the occasion.
- #75. DISK CATALOGER**  
Now you can organize your disk files with this great utility. Files, sorts, and prints your records. Easy to use.
- #76. PROGRAMMING AIDS AND UTILITIES II**  
A collection of very useful material. Includes a program to convert basic to exbasic so your old basic programs will load & run in exbasic, even with graphics. Also includes two on screen diagnostic programs to test your keyboard and processor. A great merge utility is also on this disk.
- #77. MICROdex 99**  
A database program by Bill Gaskill which files and retrieves data such as magazine articles. A sample database is included.
- #78. ARTCON+ BY RAY KAZMER**  
**ATTENTION GRAPHX AND TI ARTIST USERS!!!**  
This program lets you convert Exbasic graphics to TI Artist and Graphx pictures. Also contains a new MAC-RLE (2) for converting from Artist to Graphx.
- #79. DM1000 V3.5**  
One of the most popular disk managers for the TI-99/4A. Originally a rip-off of the CorComp manager, it has been improved and refined by talented users all over the world. This version is deemed the most reliable to date and is far advanced over the TI Disk Manager II. Distributed by permission from CorComp.
- #80. BIRDWELL DISK UTILITY**  
A must if you are into programming and software development. Besides being a great disk manager, it has provision for copying sectors, comparing files and is menu driven. Complete with documentation.
- #81. HOME ACCOUNTING SYSTEM**  
A complete family & small business accounting system including a checkbook manager, budget analysis, mailing list and an inventory program. Complete with documentation. Easy to modify for specific needs.
- #82. CROSSWORD PUZZLES**  
This program from Australia creates a different puzzle each time you run it. Self contained with definitions and vocabulary taken from a leading crossword dictionary. Great crossword fun.
- #83. HOME APPLICATION PROGRAMS**  
A two disk side collection of useful programs for the home. Includes banking, cooking, home bar guide, utility records, and much much more. Something for everyone.
- #84. GALACTIC BATTLE/SPY ADVENTURE**  
A pair of great commercial quality games from EB Software of TI Runner fame. Galactic Battle is a space "trek" type strategy game for one or more players. Spy Adventure is an adventure game that will keep you guessing for hours.
- #85. AUTOBOOT UTILITY**  
This utility which can be installed on a disk loads and runs or displays most files. Now you can have a disk with exbasic programs, Editor Assembler programs and TI Writer files and run or display them all from exbasic.
- #86. COLUMN TEXT III V3.2**  
A very useful utility for printing TI Writer and 99 Writer II files in separate spaced columns. Saves hours in producing a newsletter. Complete with documentation.
- #87. ARCHIVER III**  
This utility allows you to "pack" or combine several files into one for space utilization. A number of boards are sending files packed to save transmission costs. This utility will let you pack and/or unpack these files.
- #88. AUSSIE GAMES VOL 1**  
A collection of games from our friends down under. Includes a great card game and board game. Hours of fun and entertainment. Includes Matchmaker & TILO.
- #89. PROCALC**  
This is an on screen calculator for decimal/hexidecimal conversions and much more. A must for the serious programmer.
- #90. JET CHECKBOOK MANAGER**  
This checkbook manager is considered the ultimate with every feature you can think of for keeping track of your checking account and keeping records of your spending for budget and tax purposes. Complete with documentation.
- #91. "THE MAZE OF GROG"(St. Valentine)**  
Ray Kazmer has created a great maze game with fantastic graphics and the characters from his now legendary "Woodstock" disk. Fun for all!!!
- #92. HOUSEHOLD INVENTORY**  
Written by 99/4 programming great Charles Ehninger, this prize winner originally sold for \$59.95. Keeps track of household, business or personal items by category and provides automatic updating for inflation etc. A must for tax and insurance records!
- #93. THE 1989 KGB GIRLIE CALENDAR**  
This latest offering from programming master Ken Gilliland prints out a jumbo 12 month calendar with a knock-out centerfold pinup for each month. If you like our #14 Figure Study disk, you will flip over this one. For Adults Only!! Exbasic & d/m printer.
- #94. GREAT 99/4A GAMES VOL. 111**  
If you have seen vols. 1 & 2 of this series you know we only provide the very best. This latest volume is also filled with a collection of great ones!
- #95. WEATHER FORECASTER**  
The weather predictions are amazingly reliable and accurate! A great game "Lawnmower" and a mini database are also included to make this disk a fantastic value.
- #96. STATISTICS & SORTING**  
Two great assembly utilities by John Clulow. STAT is a set of statistic routines for use in exbasic. SORT allows sorting by two separate fields and a choice of two types of sorts.
- #97. MEMORY MANIPULATOR**  
This powerful utility lets you explore the entire memory in your 99/4A system and take apart what you find. User friendly!
- #98. DAYS OF EDEN & DOORS OF EDEN**  
Two bible games (non-fiction) that work with the TI Adventure Module.
- #99. GREAT 99/4A GAMES VOL. IV**  
This disk features the works of J. Peter Hoddie. All of these games are of commercial quality and well worth the donation requested!
- #100. ASSULT THE CITY (T. of DOOM)**  
An exciting game for use with the Tunnels of Doom module. Several Exbasic bonus games are included.
- #101. ENCHANCED DISPLAY PACKAGE**  
This screen enhancement utility lets you do 40 columns, windowing, reverse scrolling, clock/alarm, and a whole host of other great tricks in exbasic. Fully documented.
- #102. COLOSSAL CAVES ADVENTURE**  
This classic adventure now available for the 99/4A is what led to the Zork series. Hours of text adventuring.
- #103. SORGAN, THE 99/4A ORGAN**  
This program which is currently selling for big bucks on module turns your 99/4A into an electronic organ. Sound effects, different instruments and voices, chord forms, color graphics with complete control of all.
- #104. C99 COMPILER AND LIBRARY**  
This two-sided (flippy) disk gets you into C programming with your 99/4A. Comes with a great collection of utilities such as text & graphics. (E/A)
- #105. KING'S CASTLE+**  
A great arcade style assembly game formerly offered on module. Also includes an EB "Trek" game and a collection of sprite & graphics from Tigercub's Jim Peterson.
- #106. QUEST (Dungeons & Dragons)**  
One of the best D&D games around! You must destroy the Dark Lord to free your homeland! Complete with documentation on disk.
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Ken Gilliland's music and graphics version of the TV theme and the three motion pictures. (Exbasic)
- #108. FUNLPLUS BY JACK SUGHRUE**  
Fantastic disk packed with Funnelweb (#42) templates, utilities and prog. to augment and configure Funnelweb. Unbelievable collection of fantastic aids to make the best even better!
- #109. TI-WRITER MINI MANUAL**  
This disk prints out a five page TI Writer manual with everything you need to know to use TI Writer or the many clones such as 99Writer II. Additional aids for using this powerful word processor are included.
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A powerful disk sector editor formerly sold for \$20. Menu Driven and easy to use.
- #111. POP MUSIC & GRAPHICS**  
This exciting disk from Germany features music/graphics written in 100% assembly and what comes from the TI sound chip is sure to astound you.
- #112. INVOICE PACK**  
An excellent invoice preparation and printing program with instructions on how to modify it for your own business.
- #113. LABEL MAKER 3**  
A collection of label programs to create mailing and disk envelopes, disk labels and much more!



## #114. PANORAMA

A drawing and illustration program that compliments Graphx and TI Artist. A must for the serious 99/4A artist!

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A complete system for creating graphic screens in full color for your programs by J. Peter Hoddie. Fully documented.

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A lesson in FORTH programming on how to create graphics.

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This powerful utility written in Forth allows disassembly of programs off disk in any format, in memory, and even off of P-Box cards. Very complete with some very unique features.

## #118. FAST TERM

One of the most popular and recommended of the 99/4A terminal emulator programs. Supports TE-II, ASCII, and X-Modem transfers, print spooling and more. Loads from Exbasic or E/A.

## #119. RAG LINKER

A utility for converting DIS/FIX 80 assembly object code files to PROGRAM image. This allows files to load faster and take up less space on disk. Full Doc

## #120. BITMAC

The original BITMAC is now available at \$4.95 with all original documentation. A powerful graphics program for the 4A which lets you print where you want...even over pre-existing text. Create great graphics in 16 colors, print text sideways, mirror image, upside down etc. etc. A must for anyone into 99/4A graphics. Comes with second bonus disk with utilities such as sign & banner makers. Even can computer generate your own signature!

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If you like Yahtzee this disk is for you. A great version written in high speed assembly. Also included is another version of Wheel of Fortune which also lets you create your own puzzles with a puzzle edit program included.

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#172 DEADLINE

#173 CUTTHROATS

#174 SUSPENDED

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#177 HOUSEHOLD BUD.MGT.

#30 H.B.M.DATA PRINOUT

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#180 QUEBERT

#181 METEOR BELT

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## CALCULATOR—

(Continued from Page 19)

Other available functions are  $\hat{\quad}$  (power),  $\%$  (percent), and  $\sqrt{\quad}$  (root).  $10$  (Enter)  $\hat{\quad} 2$  (Enter) = will give you 100, which is 10 to the power of 2.  $10$  (Enter)  $\% 100$  (Enter) = gives 10 which is 10% of 100.  $3$  (Enter)  $\sqrt{64}$  (Enter) = gives the 3rd root of 64, or 4.

FCTN U, which is  $\pi$ , will give you the value of pi.  $\pi$  (Enter)  $\times 10$  (Enter) = multiplies pi by 10.

When you enter a problem the name of the function you used, such as "addition" is highlighted in inverse video at the bottom of the screen, so you will know if you made a mistake.

### 34 FUNCTIONS

With this calculator, you can even enter a series of calculations. In conventional mode  $67$  (Enter)  $+$   $33$  (Enter)  $/$   $2$  (Enter)  $\times 5$  (Enter) U or in straight-line mode  $67+33/2*5$ U (Enter) will add 33 to 67, display the result, divide by 2, display the result, multiply by 5 and put the value in U. You are limited only by the line length of 28 characters. But I said this calculator has 34 functions. Where are the other 26? TI BASIC has a few other math functions, and in Appendix K of the Extended BASIC Manual you will find the algorithms for 20 advanced math functions. I have no idea what those do, but I programmed them into my calculator. Here they are:

CTRL A atn

CTRL B	cosine
FCTN A	exponent
FCTN B	log
CTRL E	sine in radians
CTRL F	tangent
CTRL G	secant
CTRL H	cosecant
CTRL I	cotangent
CTRL J	inverse sine
CTRL K	inverse cosine
CTRL L	inverse secant
CTRL M	inverse cosecant
CTRL N	inverse cotangent
CTRL O	hyperbolic sine
CTRL P	hyperbolic cosine
CTRL Q	hyperbolic tangent
CTRL R	hyperbolic secant
FCTN F	hyperbolic cosecant
CTRL T	hyperbolic cotangent
CTRL U	inverse hyperbolic sine
CTRL V	inverse hyperbolic cosine
FCTN G	inverse hyperbolic tangent
CTRL X	inverse hyperbolic secant
CTRL Y	inverse hyperbolic cosecant
FCTN W	inverse hyperbolic cotangent

To use one of these, enter a value, then a FCTN or CTRL and = or a memory name.  $8$  (Enter) FCTN A U will put the exponent of 8 in memory U. Be warned that entering invalid values in some of these will cause a numeric overflow or underflow and, since I have turned off ON WARNING to avoid spoiling the screen display, you will not be informed.

### REPROGRAM FUNCTIONS

You don't have any use for those? Well then, you can reprogram them for any functions you do need. They are in lines 760 through 1080, with the CTRL or FCTN key to access them listed in a REM. Be sure to use A for the value being input, C for the result.  $C=A-.1*A+.06*A$  will return the value of A minus a 10% discount, plus a 6% sales tax. If you need additional variables, put their values in your memories and reference them in your equation, using M(1) through M(6) for memories U through Z.  $C=A*M(1)/M(6)$  will multiply A by the value in U and divide it by the value in Z. You can write multiple-statement equations, even multiple-line equations. Use J as a loop counter; if you need other internal variables, use some that are not in the prescan list in line 110, and add them to that list. When you type

the name you want displayed, use lowercase letters, and use FCTN C rather than the space bar for spacing. You can easily customize this calculator with a couple of dozen formulas for whatever field you are working in.

Sometimes you might want to total the values in all memories. Just enter & to total and display .

To clear all the memories, enter C. To clear memory X, for instance, enter CX (in either mode).

E is the oops! key. Enter E to restore the last previous values in all memories, or EU, for instance, to restore the last previous value in U.

Sometimes you may just want to add up a series of numbers. Enter A= if you just want the totals displayed, or AU, for instance, to accumulate the total in U. You are now in cumulative mode and each value you enter will be added to the total. Enter Q to get out of this mode. C and E are not active in this mode, and you cannot enter memory names.

### HARDCOPY PRINTOUTS

If you want a hard copy of your work, enter FCTN 0 and the memory labels, names and values will be output to your printer. If you selected the 14-digit option, the printout will also be in 14-digit format.

To save your work, enter I to save all memories, or IU, for instance, to save a specific one. You will be prompted for a disk drive/filename. To retrieve the data, enter O for all memories or OV, for instance, for a specific one.

I said this was a programmable calculator, and I was not just referring to the fact that you could reprogram those 26 functions listed above. This calculator lets you enter an equation; the program then rewrites itself while it is running, and uses the equation to solve whatever values you give it.

To get into programming mode, enter #. You will be prompted to enter a formula. This must be in the form of a valid Extended BASIC statement, using A for the value to be determined and B through F, as many as you need, for the values you will be prompted to input. All math functions are supported. For instance,  $A=B \hat{\quad} C-INT(SQR(C))$ . The program pauses to to-

(See Page 25)

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# CALCULATOR—

(Continued from Page 24)

kenize your input and then prompts you for values to use for, in this instance, A, B and C. You are then prompted for a memory name in which to store and display the answer.

Remember the mathematical heirarchy — if you want to add or subtract before multiplying or dividing, use parentheses —  $A=(B-C)*D/(E-F)$ .

If your formula is not a valid X BASIC statement, it will be rejected. If it is valid but incorrect for its purpose, it will give erroneous results; for instance, if you use X as a variable name, you will not be prompted for its value, which will be 0.

To exit the programmed formula, enter 0 at all prompts.

Finally, this calculator contains a programmable iterative calculator to solve such difficult problems as  $A=B^{\sqrt{B}}$  or  $B=\sqrt{A}$ , where A is the known value. These can only be solved by trial and error.

To access this mode, enter @. You will be prompted for a formula, which must be in the  $A=B$  format. The computer pauses to write the equation into itself, prompts you for a value of A, and goes through a series of trial and error calculations which are displayed on screen. Then you are prompted for a memory to receive the result.

To exit this mode, give A a value of 0.

If you would like to decrease initialization time by about 6 seconds, add this line to the program -

```
145 OPEN #1:"DSK1.DATA",VARIABLE 163 :: PRINT #1:CHR$(0)
&CHR$(165)&"FX$"&CHR$(190)&CHR$(199)&CHR$(26)&FX$&CHR$(0)
):: PRINT #1:CHR$(255)&CHR$(255):: CLOSE #1 :: STOP
```

Run the program, then enter MERGE DSK1.DATA, then delete lines 130, 140, 145 and 150 and in line 100 change the GOTO 140 to GOTO 170.

I hope you find this program useful. I am releasing it to the public domain; I won't even bother to put a fairware donation request on it. However, if you do find it useful, would you spend 19 cents for a postcard to tell me so? The few remaining

TI programmers are getting tired of releasing programs and never hearing a word about them.

Write to Jim Peterson at 156 Collingwood Ave., Columbus, OH 43213.

## CALCULATOR

```
100 CALL CLEAR :: CALL INIT
:: CALL LOAD(-31806,16):: GO
TO 140 !058
110 A,B,C,D,E,F,G,J,K(),M(),
N,P,R,S,T,W,X,Y,Z,A$,B$,C1$(
),C2$( ),D$,F$,FX$,K$,L$( ),M$,
N$,P$( ),Q$,QQ$,S$,T$,X$,Z$
!091
120 CALL KEY :: CALL COLOR :
: CALL SCREEN :: CALL SOUND
:: CALL BOOP :: CALL CHAR ::
CALL CHARPAT :: CALL PEEK :
: CALL LOAD :: CALL REWRITE
:: CALL D !074
130 DATA 129,130,124,190,133
,134,135,136,137,138,139,140
,141,142,143,144,145,146,123
,148,149,150,125,152,153,126
!052
140 !@P- !064
150 FOR J=1 TO 26 :: READ N
:: FX$=FX$&CHR$(N):: NEXT J
!071
160 DATA 63,125,54,123,45,12
6,43,80,45,77,47,68,42,84 !0
12
170 !@P- !064
180 FOR J=1 TO 3 :: READ A,B
:: CALL CHARPAT(A,Q$):: CAL
L CHAR(B,Q$):: NEXT J :: ON
WARNING NEXT !236
190 FOR J=1 TO 4 :: READ A,B
:: CALL CHARPAT(A,C1$(J))::
CALL CHARPAT(B,C2$(J)):: CA
LL CHAR(B,C1$(J)):: NEXT J !
235
200 CALL CHAR(95,"00F494F484
848484"):: CALL CHARPAT(82,C
2$(5)):: C1$(5)="0000000FD02
0" :: CALL CHAR(82,C1$(5))!0
82
210 S$="+-/*PMDT" :: CALL CH
AR(96,"0")!068
220 FOR S=0 TO 8 :: CALL COL
OR(S,2,8):: NEXT S :: FOR S=
9 TO 12 :: CALL COLOR(S,16,2
```

```
:: NEXT S :: CALL SCREEN(5)
:: M(7)=PI !086
230 DISPLAY AT(2,1)ERASE ALL
:"tigercub`{~memory`{~window
":`programmable`calculator`
`" ! by Jim Peterson for th
e public domain !214
240 FOR J=85 TO 90 :: DISPLA
Y AT(J*2+4,2):["&CHR$(J)&"]
" :: K(J-84),M(J-84)=0 :: NE
XT J !226
250 DISPLAY AT(23,1)BEEP:"la
bel`memories} Y/N Y" :: CALL
CALLKEY(23,21,"YNyn",Q$)::
IF Q$="N" OR Q$="n" THEN 290
!184
260 ACCEPT AT(5,1)BEEP:L$(1)
:: IF L$(1)=" " THEN 260 ELSE
IF ASC(L$(1))>96 THEN 280 !
182
270 FOR J=1 TO 10 :: DISPLAY
AT(5,10):"release`alpha`loc
k" :: DISPLAY AT(5,10):" " ::
NEXT J :: GOTO 260 !182
280 FOR J=2 TO 6 :: ACCEPT A
T(J*2+3,1)BEEP:L$(J):: NEXT
J !096
290 DISPLAY AT(23,1)BEEP:"14
~digit`display} Y/N Y" :: CA
LL CALLKEY(23,23,"YNyn",Q$):
: IF Q$="Y" OR Q$="N" THEN D
$=Q$ :: GOTO 310 !231
300 FOR J=1 TO 10 :: DISPLAY
AT(23,1):"depress`alpha`loc
k" :: DISPLAY AT(23,1):" " ::
NEXT J :: GOTO 290 !233
310 DISPLAY AT(21,1):"use} "
:"(c)onventional`input":(s)
traight`line`input" :: ACCEP
T AT(21,6)SIZE(1)VALIDATE("C
Scs")BEEP:QQ$ :: IF QQ$="" T
HEN 310 !101
320 DISPLAY AT(21,1):""::""::
"" :: DISPLAY AT(4,27):CHR
$(ASC(QQ$)+32):: IF QQ$="C"
THEN 550 !090
330 ACCEPT AT(22,1)VALIDATE(
"AECUVWXYZ_&R&^%",S$,NUMERIC
,FX$,CHR$(188),"OI@#JQ")BEEP
:M$ :: IF M$="J" THEN DISPLA
Y AT(21,1):"":: GOTO 250
!227
340 IF M$="JJ" THEN CALL HCH
AR(4,1,32,560):: GOTO 240 EL
(See Page 26)
```



# CALCULATOR—

(Continued from Page 25)

```

SE IF M$="Q" THEN CALL CLEAR
  :: STOP !075
350 X=POS("UVWXYZ_C&EA"&CHR$(188)&"OI@#",SEG$(M$,1,1),1)
  :: ON X+1 GOSUB 370,360,
360,360,360,360,360,360,1150
,1190,1200,1090,1230,1290,13
60,1540,1460 :: GOTO 330 !17
1
360 A=M(X):: M$=SEG$(M$,2,25
5):: IF LEN(M$)=0 THEN CALL
BOOP :: RETURN ELSE GOTO 410
!110
370 IF SEG$(M$,1,1)="-" THEN
A$="-" :: M$=SEG$(M$,2,255)
!062
380 Y=Y+1 :: IF POS("0123456
789.",SEG$(M$,Y,1),1)<>0 AND
Y<LEN(M$) THEN A$=A$&SEG$(M$
,Y,1):: GOTO 380 !254
390 ON ERROR 400 :: A=VAL(A$
):: A$="" :: M$=SEG$(M$,Y,25
5):: Y=0 :: IF LEN(M$)=0 THE
N CALL BOOP :: RETURN ELSE 4
10 !250
400 Y=0 :: CALL BOOP :: RETU
RN 330 !073
410 F=POS("UVWXYZ"&S$&"^%R"&
FX$,SEG$(M$,1,1),1):: IF F=0
THEN CALL BOOP :: RETURN !2
34
420 IF F<7 THEN K(F)=M(F)::
M(F)=A :: CALL D(D$,F*2+4,6,
A):: DISPLAY AT(24,1):"poke"
:: RETURN ELSE F=F-6 !181
430 M$=SEG$(M$,2,255):: IF F
>4 AND F<9 THEN F=F-4 !049
440 IF F>11 THEN 500 !036
450 X=POS("UVWXYZ_",SEG$(M$,
1,1),1):: IF X=0 THEN 470 !1
07
460 B=M(X):: M$=SEG$(M$,2,25
5):: GOTO 500 !007
470 Y=Y+1 :: IF POS("0123456
789.-",SEG$(M$,Y,1),1)<>0 AN
D Y<LEN(M$) THEN A$=A$&SEG$(M
$,Y,1):: GOTO 470 !134
480 ON ERROR 490 :: B=VAL(A$
):: A$="" :: M$=SEG$(M$,Y,25
5):: Y=0 :: GOTO 500 !115
490 Y=0 :: A$="" :: CALL BOO
P :: RETURN 330 !181
500 IF SEG$(M$,1,1)="=" THEN
GOSUB 540 :: CALL D(D$,18,1
,C):: Y=0 :: RETURN !155510
X=POS("UVWXYZ"&S$&"^%R"&FX$,
SEG$(M$,1,1),1):: IF X=0 THE
N CALL BOOP :: RETURN ELSE I
F X>6 THEN 530 !183
520 GOSUB 540 :: K(X)=M(X)::
M(X)=C :: DISPLAY AT(18,1):
" " :: CALL D(D$,X*2+4,6,C)::
RETURN !124
530 GOSUB 540 :: A=C :: F=X-
6 :: DISPLAY AT(18,1):A :: M
$=SEG$(M$,2,255):: GOTO 450
!235
540 ON F GOSUB 760,770,780,7
90,760,770,780,790,800,810,8
20,830,840,850,860,870,880,8
90,900,910,920,930,940,950,9
60,970,980,990,1000,1010,102
0,1030,1040,1050,1060,1070,1
080 :: RETURN !210
550 A$="" :: ACCEPT AT(22,1)
VALIDATE("AECUVWXYZ_&",NUMER
IC,CHR$(188)&"OI@#=JQ")BEEP:
M$ :: IF M$="" THEN CALL BOO
P :: GOTO 550 ELSE IF M$="Q"
THEN CALL CLEAR :: STOP !11
2
560 IF M$="J" THEN DISPLAY A
T(21,1):"" :: GOTO 250 EL
SE IF M$="JJ" THEN CALL HCHA
R(4,1,32,560):: GOTO 240 !24
5
570 ON ERROR 580 :: A=VAL(M$
):: GOTO 630 !209
580 P=POS("UVWXYZ_",SEG$(M$,
1,1),1):: IF P=0 THEN RETURN
590 ELSE A=M(P):: RETURN 63
0 !049
590 P=POS("&CEA"&CHR$(188)&"
OI@#",SEG$(M$,1,1),1):: IF P
=0 THEN CALL BOOP :: GOTO 55
0 ELSE IF P<3 THEN 610 !159
600 ON P-2 GOSUB 1200,1090,1
230,1290,1360,1540,1460 :: G
OTO 550 !204
610 IF LEN(M$)>1 AND POS("UV
WXYZ=",SEG$(M$,2,1),1)=0 THE
N CALL BOOP :: GOTO 550 !116
620 ON POS("&C",SEG$(M$,1,1)
,1)GOSUB 1190,1150 :: GOTO 5
50 !116
630 DISPLAY AT(22,1+LEN(M$))
BEEP !060
640 CALL CALLKEY(22,LEN(M$)+
1,"UVWXYZ"&S$&"^%R"&FX$,K$)
: F=POS("UVWXYZ"&S$&"^%R"&FX
$,K$,1)!081
650 IF F<7 THEN K(F)=M(F)::
M(F)=A :: DISPLAY AT(24,1):"
poke" :: CALL D(D$,F*2+4,6,A
):: GOTO 550 ELSE F=F-6 !164
660 IF F>11 THEN B$="" :: GO
TO 700 !224
670 ACCEPT AT(22,2+LEN(M$))V
ALIDATE("UVWXYZ_",NUMERIC)BE
EP:T$ :: IF T$="" THEN CALL
BOOP :: GOTO 670 !105
680 ON ERROR 690 :: B=VAL(T$
):: GOTO 700 !141
690 P=POS("UVWXYZ_",T$,1)::
IF P=0 THEN CALL BOOP :: RET
URN 670 ELSE B=M(P):: RETURN
700 !075
700 DISPLAY AT(22,28)BEEP !0
02
710 CALL CALLKEY(22,LEN(M$&T
$)+2,"UVWXYZ="&S$&"^%R"&FX$,
K$):: X=POS("UVWXYZ="&S$&"^%
R"&FX$,K$,1)!016
720 IF X>7 THEN 740 ELSE GO
UB 540 !234
730 IF X=7 THEN CALL D(D$,18
,1,C):: GOTO 550 ELSE K(X)=M
(X):: M(X)=C :: DISPLAY AT(1
8,1):" " :: CALL D(D$,X*2+4,6
,C):: GOTO 550 !071
740 GOSUB 540 :: A=C :: DISP
LAY AT(18,1):A :: M$=M$&T$&"
" :: F=X-7 :: GOTO 670 !140
750 DISPLAY AT(24,1):B$ :: R
ETURN !001
760 C=A+B :: B$="addition" :
: GOSUB 750 :: RETURN !210
770 C=A-B :: B$="subtraction
" :: GOSUB 750 :: RETURN !05
6
780 C=A/B :: B$="division" :
: GOSUB 750 :: RETURN !238
790 C=A*B :: B$="multiplicat
ion" :: GOSUB 750 :: RETURN
!124
800 C=A^B :: B$="to`the`powe
r`of" :: GOSUB 750 :: RETURN
!215
810 C=A/100*B :: B$="percent
`of" :: GOSUB 750 :: RETURN
!208

```

(See Page 27)



## CALCULATOR—

(Continued from Page 26)

```

820 C=B^(1/A):: B$="root`of"
  :: GOSUB 750 :: RETURN !173
830 C=ATN(A):: B$="atn" :: G
OSUB 750 :: RETURN !CTRL A !
019
840 C=COS(A):: B$="cosine" :
: GOSUB 750 :: RETURN ! CTRL
  B !118
850 C=EXP(A):: B$="exponent"
  :: GOSUB 750 :: RETURN ! FC
  TN A !094
860 C=LOG(A):: B$="logarithm
" :: GOSUB 750 :: RETURN ! F
  CTN B !184
870 C=SIN(A):: B$="sine`in`r
  adians" :: GOSUB 750 :: RETU
  RN ! CTRL E !046
880 C=TAN(A):: B$="tangent"
  :: GOSUB 750 :: RETURN ! CTR
  L F !242
890 C=1/COS(A):: B$="secant"
  :: GOSUB 750 :: RETURN ! CT
  RL G !054
900 C=1/SIN(A):: B$="cosecan
  t" :: GOSUB 750 :: RETURN !
  CTRL H !016
910 C=1/TAN(A):: B$="cotange
  nt" :: GOSUB 750 :: RETURN !
  CTRL I !135
920 C=ATN(A/SQR(1-A*A)):: B$
  ="inverse`sine" :: GOSUB 750
  :: RETURN ! CTRL J !018
930 C=ATN(A/SQR(1-A*A))+PI/2
  :: B$="inverse`cosine" :: G
  OSUB 750 :: RETURN ! CTRL K
  !068
940 C=ATN(SQR(A*A-1))+(SGN(A
  )-1)*PI/2 :: B$="inverse`sec
  ant" :: GOSUB 750 :: RETURN
  ! CTRL L !168
950 C=ATN(1/SQR(A*A-1))+(SGN
  (A)-1)*PI/2 :: B$="inverse`c
  osecant" :: GOSUB 750 :: RET
  URN ! CTRL M !059
960 C=PI/2-ATN(A):: B$="inve
  rse`cotangent" :: GOSUB 750
  :: RETURN ! CTRL N !136
970 C=(EXP(A)-EXP(-A))/2 ::
  B$="hyperbolic`sine" :: GOSU
  B 750 :: RETURN ! CTRL O !12
  )
980 C=(EXP(A)+EXP(-A))/2 ::
  B$="hyperbolic`cosine" :: GO
  SUB 750 :: RETURN ! CTRL P !

```

```

076
990 C=-2*EXP(-A)/(EXP(A)+EXP
  (-A))+1 :: B$="hyperbolic`ta
  ngent" :: GOSUB 750 :: RETUR
  N ! CTRL Q !060
1000 C=2/(EXP(A)+EXP(-A))::
  B$="hyperbolic`secant" :: GO
  SUB 750 :: RETURN ! CTRL R !
  075
1010 C=2/(EXP(A)-EXP(-A))::
  B$="hyperbolic`cosecant" ::
  GOSUB 750 :: RETURN ! FCTN F
  !010
1020 C=2*EXP(-A)/(EXP(A)-EXP
  (-A))+1 :: B$="hyperbolic`co
  tangent" :: GOSUB 750 :: RET
  URN ! CTRL T !082
1030 C=LOG(A+SQR(A*A+1)):: B
  $="inverse`hyperbolic`sine"
  :: GOSUB 750 :: RETURN ! CTR
  L U !185
1040 C=LOG(A+SQR(A*A-1)):: B
  $="inverse`hyperbolic`cosine
  " :: GOSUB 750 :: RETURN ! C
  TR L V !143
1050 C=LOG((1+A)/(1-A))/2 ::
  B$="inverse`hyperbolic`tang
  ent" :: GOSUB 750 :: RETURN
  ! FCTN G !250
1060 C=LOG((1+SQR(1-A*A))/A)
  :: B$="inverse`hyperbolic`se
  cant" :: GOSUB 750 :: RETURN
  ! CTRL X !217
1070 C=LOG((SGN(A)*SQR(A*A+1
  )+1)/A):: B$="inverse`hyperb
  olic`cosecant" :: GOSUB 750
  :: RETURN ! CTRL Y !207
1080 C=LOG((A+1)/(A-1))/2 ::
  B$="inverse`hyperbolic`cota
  ngent" :: GOSUB 750 :: RETUR
  N ! FCTN W !254
1090 IF LEN(M$)=1 THEN CALL
  BOOP :: RETURN ELSE DISPLAY
  AT(24,1):"cumulative`additio
  n" :: T=0 :: X=POS("UVWXYZ="
  ,SEG$(M$,2,1),1):: IF X=0 TH
  EN CALL BOOP :: RETURN !117
1100 IF X<7 THEN K(X)=M(X)!0
  43
1110 ON ERROR 1130 :: ACCEPT
  AT(22,1)VALIDATE("Q",NUMERI
  C):M$ :: A=VAL(M$):: T=T+A :
  : IF X=7 THEN CALL D(D$,18,1
  ,T):: GOTO 1110 !077
1120 M(X)=T :: CALL D(D$,X*2

```

```

+4,6,T):: GOTO 1110 !144
1130 RETURN 1140 !201
1140 IF M$="" THEN 1110 ELSE
  IF ASC(M$)<>81 THEN 1110 EL
  SE DISPLAY AT(24,1):" " :: RE
  TURN !116
1150 DISPLAY AT(24,1):"clear
  `memory" :: IF LEN(M$)>1 THE
  N 1170 !230
1160 FOR J=1 TO 6 :: K(J)=M(
  J):: M(J)=0 :: DISPLAY AT(J*
  2+4,6):0 :: NEXT J :: RETURN
  !212
1170 X=POS("UVWXYZ",SEG$(M$,
  2,1),1):: IF X=0 THEN CALL B
  OOP :: RETURN !015
1180 K(X)=M(X):: M(X)=0 :: D
  ISPLAY AT(X*2+4,6):0 :: RETU
  RN !234
1190 DISPLAY AT(24,1):"total
  `memories" :: C=0 :: FOR J=1
  TO 6 :: C=C+M(J):: NEXT J :
  : CALL D(D$,18,1,C):: RETURN
  !008
1200 DISPLAY AT(24,1):"resto
  re" :: IF LEN(M$)=1 THEN 122
  0 ELSE P=POS("UVWXYZ",SEG$(M
  $,2,1),1)!053
1210 IF P=0 THEN CALL BOOP :
  : RETURN ELSE T=M(P):: M(P)=
  K(P):: K(P)=T :: CALL D(D$,P
  *2+4,6,M(P)):: RETURN !098
1220 FOR J=1 TO 6 :: T=M(J):
  : M(J)=K(J):: K(J)=T :: CALL
  D(D$,J*2+4,6,M(J)):: NEXT J
  :: RETURN !001
1230 GOSUB 1440 :: DISPLAY A
  T(22,1):"printer} PIO" :: AC
  CEPT AT(22,10)SIZE(-18)BEEP:
  Q$ :: OPEN #1:Q$ :: IF D$="Y
  " THEN 1250 !068
1240 FOR J=1 TO 6 :: PRINT #
  1:TAB(6);L$(J):TAB(10);"["&C
  HR$(J+84)&"]";M(J):: NEXT J
  :: CLOSE #1 :: GOSUB 1450 ::
  RETURN !066
1250 FOR J=1 TO 6 :: X$=STR$(
  M(J)):: P=POS(X$,".",1):: I
  F M(J)>9999999999 OR M(J)<-9
  999999999 THEN PRINT #1:M(J)
  :: GOTO 1280 !225
1260 IF P=0 THEN PRINT #1:M(
  J):: GOTO 1280 !093

```

(See Page 28)



## CALCULATOR—

(Continued from Page 27)

```

1270 PRINT #1,USING RPT$("#"
,P-1)&". "&RPT$("#",14-P):M(J
)!119
1280 NEXT J :: CLOSE #1 :: G
OSUB 1450 :: RETURN !132
1290 GOSUB 1440 :: DISPLAY A
T(22,1):"output`file DSK"&F$
!177
1300 ACCEPT AT(22,16)SIZE(-1
2)BEEP:F$ :: ON ERROR 1320 :
: OPEN #1:"DSK"&F$,INTERNAL,
RELATIVE 6,OUTPUT !178
1310 FOR J=1 TO 6 :: PRINT #
1,REC J:0 :: NEXT J :: A$=M$
:: IF LEN(A$)=1 THEN 1340 E
LSE 1350 !008
1320 CALL BOOP :: RETURN 133
0 !163
1330 GOSUB 1450 :: RETURN !0
09
1340 FOR J=1 TO 6 :: PRINT #
1,REC J:M(J):: NEXT J :: CLO
SE #1 :: GOSUB 1450 :: RETUR
N !237
1350 P=POS("UVWXYZ",SEG$(M$,
2,1),1):: IF P=0 THEN CALL B
OOP :: GOSUB 1450 :: RETURN
ELSE PRINT #1,REC P:M(P):: C
LOSE #1 :: GOSUB 1450 :: RET
URN !216
1360 GOSUB 1440 :: DISPLAY A
T(22,1):"input`file DSK"&F$
:: ACCEPT AT(22,15)SIZE(-12)
BEEP:F$ :: ON ERROR 1380 ::
OPEN #1:"DSK"&F$,INTERNAL,RE
LATIVE,INPUT !058
1370 A$=M$ :: IF LEN(A$)=1 T
HEN 1400 ELSE 1410 !192
1380 CALL BOOP :: RETURN 139
0 !223
1390 GOSUB 1450 :: RETURN !0
09
1400 FOR J=1 TO 6 :: K(J)=M(
J):: INPUT #1,REC J:M(J):: C
ALL D(D$,J*2+4,6,M(J)):: NEX
T J :: CLOSE #1 :: GOSUB 145
0 :: RETURN !012
1410 P=POS("UVWXYZ",SEG$(A$,
2,1),1)!147
1420 IF P=0 THEN CALL BOOP :
: GOSUB 1450 :: RETURN ELSE
K(P)=M(P):: INPUT #1,REC P:M
(P):: CALL D(D$,P*2+4,6,M(P)
):: CLOSE #1 :: GOSUB 1450 :
: RETURN !238
1430 DATA 80,77,68,84,82 !10
7
1440 RESTORE 1430 :: FOR J=1
TO 5 :: READ X :: CALL CHAR
(X,C2$(J)):: NEXT J :: RETUR
N !101
1450 DISPLAY AT(22,1):" " ::
RESTORE 1430 :: FOR J=1 TO 5
:: READ X :: CALL CHAR(X,C1
$(J)):: NEXT J :: RETURN !06
0
1460 DISPLAY AT(24,1):"progr
ammable`calculator" :: A$=""
:: GOSUB 1440 :: DISPLAY AT
(21,1):"formula}" :: ACCEPT
AT(22,1)BEEP:F$ :: GOSUB 165
0 !220
1470 W=0 :: IF POS(A$,"B",1)
<>0 THEN DISPLAY AT(21,1):"B
=?" :: ACCEPT AT(21,5)BEEP:B
:: W=W+B !158
1480 IF POS(A$,"C",1)<>0 THE
N DISPLAY AT(21,1):"C=?" ::
ACCEPT AT(21,5)BEEP:C :: W=W
+C !018
1490 IF POS(A$,"D",1)<>0 THE
N DISPLAY AT(21,1):"D=?" ::
ACCEPT AT(21,5)BEEP:D :: W=W
+D !022
1500 IF POS(A$,"E",1)<>0 THE
N DISPLAY AT(21,1):"E=?" ::
ACCEPT AT(21,5)BEEP:E :: W=W
+E !026
1510 IF POS(A$,"F",1)<>0 THE
N DISPLAY AT(21,1):"F=?" ::
ACCEPT AT(21,5)BEEP:F :: W=W
+F !030
1520 IF W=0 THEN DISPLAY AT(
21,1):"::"::"::"::"::"::" :: GOSUB 1
450 :: RETURN !150
1530 CALL REWRITE(A,B,C,D,E,
F):: IF F=99 THEN GOSUB 1620
:: GOTO 1460 ELSE GOSUB 163
0 :: GOTO 1470 !002
1540 DISPLAY AT(24,1):"itera
tive`calculator" :: A$="" ::
GOSUB 1440 :: DISPLAY AT(20
,1):"formula}" :: ACCEPT AT(
21,1):F$ :: GOSUB 1650 :: GO
TO 1550 !162
1550 DISPLAY AT(20,1):"A=?"
:: ACCEPT AT(20,5)BEEP:C ::
IF C=0 THEN DISPLAY AT(20,1)
:RPT$(" ",140):: GOSUB 1450
:: RETURN !107
1560 B=1 :: CALL REWRITE(A,B
,0,0,0,F):: IF F=99 THEN GOS
UB 1620 :: GOTO 1540 !037
1570 IF A<C THEN CALL D(D$,2
1,12,B):: Y=B :: B=B*2 :: CA
LL REWRITE(A,B,0,0,0,0):: GO
TO 1570 ELSE 1590 !234
1580 IF A>C THEN CALL D(D$,2
3,12,B):: Y=B :: B=B/2 :: CA
LL REWRITE(A,B,0,0,0,0):: GO
TO 1580 !114
1590 IF A=C OR A=G THEN DISP
LAY AT(21,12):" " :: DISPLAY
AT(23,12):" " :: CALL D(D$,22
,12,B):: A=B :: GOSUB 1630 :
: GOTO 1550 ELSE G=A :: Z=(A
BS(B-Y))/2 :: Y=B !156
1600 IF A<C THEN B=B+Z :: CA
LL D(D$,21,12,B)ELSE B=B-Z :
: CALL D(D$,23,12,B)!033
1610 CALL REWRITE(A,B,0,0,0,
0):: GOTO 1590 !238
1620 DISPLAY AT(23,1):"inval
id`formula" :: CALL SOUND(50
,110,0,-4,0):: RETURN !201
1630 DISPLAY AT(24,1):"outpu
t`to} (UVWXYZ=)" :: ACCEPT A
T(24,22)SIZE(1)VALIDATE("UVW
XYZ=")BEEP:Q$ :: P=POS("UVWX
YZ=",Q$,1)!220
1640 IF Q$="" THEN 1630 ELSE
IF P=7 THEN CALL D(D$,18,1,
A):: RETURN ELSE K(P)=M(P)::
M(P)=A :: CALL D(D$,P*2+4,6
,A):: RETURN !058
1650 DATA ),182,(,183,=,190,
+,193,-,194,*,195,/ ,196,^,19
7,ABS,203,ATN,204,COS,205,EX
P,206,INT,207,LOG,208 !006
1660 DATA SGN,209,SIN,210,SQ
R,211,TAN,212,PI,221,MAX,223
,MIN,224,<,191,>,192,"",179
!087
1670 RESTORE 1650 :: FOR J=1
TO 24 :: READ X$,W !101
1680 P=POS(F$,X$,1):: IF P<>
0 THEN F$=SEG$(F$,1,P-1)&CHR
$(W)&SEG$(F$,P+LEN(X$),255) :
: GOTO 1680 !023
1690 NEXT J :: J=0 !099
1700 IF J=LEN(F$)THEN 1730 :
: J=J+1 :: Z$=SEG$(F$,J,1)::

```

(See Page 29)



# CALCULATOR—

(Continued from Page 28)

```

IF POS("-.0123456789",Z$,1)
=0 THEN A$=A$&Z$ :: GOTO 170
0 !036
1710 N$=N$&Z$ :: IF J=LEN(F$
)THEN 1720 :: J=J+1 :: Z$=SE
G$(F$,J,1):: IF POS("-.01234
56789",Z$,1)<>0 THEN 1710 !1
21
1720 A$=A$&CHR$(200)&CHR$(LE
N(N$))&N$&Z$ :: N$="" :: GOT
O 1700 !227
1730 A$=A$&CHR$(130)&CHR$(16
8)&CHR$(0)!059
1740 CALL PEEK(-31952,A,B)::
CALL PEEK(A*256+B-65534,A,B
):: C=A*256+B-65534 !106
1750 FOR J=1 TO LEN(A$):: CA
LL LOAD(C+J-3,ASC(SEG$(A$,J
,1))): NEXT J :: RETURN !038
1760 !@P+ !062
    
```

```

1770 SUB BOOP :: CALL SOUND(
100,110,5,-4,5):: SUBEND !23
3
1780 SUB CALLKEY(R,C,V$,K$)!
121
1790 CALL HCHAR(R,C+2,30)::
FOR T=1 TO 3 :: CALL KEY(0,K
,S):: IF S<>0 THEN 1820 !146
1800 NEXT T :: CALL HCHAR(R,
C+2,32):: FOR T=1 TO 3 :: CA
LL KEY(0,K,S):: IF S<>0 THEN
1820 !000
1810 NEXT T :: GOTO 1790 !19
1
1820 IF POS(V$,CHR$(K),1)=0
THEN 1790 ELSE K$=CHR$(K)::
IF K<127 THEN DISPLAY AT(R,C
):K$ ELSE DISPLAY AT(R,C):"!
!152
1830 SUBEND !168
1840 SUB D(D$,R,C,X):: IF D$
    
```

```

="N" THEN 1870 ELSE X$=STR$(
X):: P=POS(X$,".",1):: IF X>
9999999999 OR X<-9999999999
THEN DISPLAY AT(R,C):X :: SU
BEXIT !146
1850 IF P=0 THEN DISPLAY AT(
R,C):X :: SUBEXIT !184
1860 DISPLAY AT(R,C):USING R
PT$("#",P-1)&". "&RPT$("#",14
-P):X :: SUBEXIT !170
1870 DISPLAY AT(R,C):X :: SU
BEND !126
1880 SUB REWRITE(A,B,C,D,E,F
):: ON ERROR 1890 :: GOTO 19
10 !085
1890 RETURN 1900 !196
1900 F=99 :: SUBEXIT !105
1910 SUBEND !*****
*****
!057
    
```

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	SSSD	DSDD	DSDD
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<input type="checkbox"/> Series 2.....	\$9.00.....	\$7.00.....	\$5.00
<input type="checkbox"/> Series 3.....	\$9.00.....	\$7.00.....	\$5.00
<input type="checkbox"/> Series 4.....	\$9.00.....	\$7.00.....	\$5.00
<input type="checkbox"/> Series 5.....	\$9.00.....	\$7.00.....	\$5.00
<input type="checkbox"/> Series 6.....	\$9.00.....	\$7.00.....	\$5.00

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## DUMPIT

# Software that dumps cartridges to a disk

By **RANDY A. COOK**

©1992 R.A. Cook

The solid state command module has proven to be both a blessing and a curse for the TI 99/4A computer system.

On the positive side, it has made available a vast selection of software titles ranging from home finance to arcade games. Most of these require nothing more than the original TI computer console and a TV. They have allowed the masses to enjoy quality, affordable software.

Now for the negative side. The weakest link in the complete TI computer system is the cartridge port. The constant plugging and unplugging of those miraculous software storehouses takes its toll on the computer by weakening the port's connections to the point of making the computer nearly non-functional.

For those who are nuts-and-bolts oriented, the solution is to simply go in and repair the damage. For those who are not so technically inclined, a preventative measure might be best.

A straightforward method would be to transfer the programs from modules to diskettes, eliminating the need to use the module, thus reducing wear and tear on your computer. One software package to do this is Dumpit, available from Tex-Comp.

**Performance:** First of all, Dumpit should be viewed as a process, and not just a single software package. It is a method of dumping modules to disk that involves several different programs, all of which come on a SS/SD disk. These programs include a memory editor, a disk sector editor, and loader programs.

The Bugout Machine Language Monitor by Gregg Wonderly is the core of the Dumpit package. This memory editor allows you to look into the microchips of various cartridges and then dump them as files to a disk. This alone is an incredibly educational experience.

Disko is the diskette sector editor included with the package. It works like any other sector editor by allowing you to lo-

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## Review

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### REPORT CARD

<b>Performance</b> .....	<b>A</b>
<b>Ease of Use</b> .....	<b>C</b>
<b>Documentation</b> .....	<b>B</b>
<b>Value</b> .....	<b>A</b>
<b>Final Grade</b> .....	<b>B</b>

**Cost:** \$4.95

**Distributor:** Tex-Comp, P.O. Box 33084, Granada Hills, CA 91344

**Requirements:** TI 99/4A, memory expansion, disk system, Navarone Cartridge Expander (Widget), Editor/Assembler module, Disk Manager software (TI Disk Manager II, DM 1000, or similar program), and the module to be dumped

cate, read, write, or rewrite any sector on a disk. It also works with DS/DD diskettes. Disko is used after the module has been dumped to modify the GROM chips files to run out of RAM. The loader programs are necessary to make the GROM files work together.

Dumped modules can be loaded and run using any of the following command modules: Extended BASIC, TI-Writer, or Editor/Assembler. The GRAM Kracker, P-GRAM card, or any other GRAM device is not needed to make use of the module software dumped using this package. No other hardware or software is required.

Here is a list of the cartridges that have been successfully dumped and run: Adventure, The Attack, Blasto, Car Wars, Connect Four, Hunt the Wumpus, Personal Record Keeping, Home Financial Decisions, Household Budget Management, TI Disk Manager II, Tax/Investment Record Keeping, Personal Real Estate, Music Maker, Terminal Emulator II, Physical Fitness, and Early Learning Fun.

Not all command modules can be copied to disk and made runnable using Dumpit. I have been unable to run modules that contain ROM chips, or more than four

GROM chips.

TI modules that have been unsuccessful include: TI/Writer, Multiplan, Editor/Assembler, A-Maze-Ing, Parsec, Munchman, and TI Invaders. Third party modules like those produced by Atarisoft or Funware cannot be run using Dumpit.

Please keep in mind that these lists are by no means complete and were limited to the modules I had available.

**Ease of Use:** This is not an easy package to use. You do not simply press a button and dump a module's contents to disk. This involves several programs and careful attention must be given to details. Tex-Comp suggests that the user have some programming ability. Although this would be helpful, it is not mandatory. A serious study of the manual will reveal everything needed to dump a module.

**Documentation:** The manual is included on disk as two D/V80 files that can be printed out using an Extended BASIC printing program included on the disk. This program autoloads and gives you the option to print the documents to screen or printer. It's a bit primitive, but it gets the job done. The first file is a very technical explanation of the process, and at a glance it can be quite intimidating. The second file is considerably more friendly and uses a simple step-by-step approach showing the user exactly how to dump a module. It includes sample screens with examples. If you can read and follow directions, you will be able to use this package.

**Value:** Virtually anyone who is interested in saving wear and tear on his console will profit from this product. It offers users the convenience of disk-based versions of some of their favorite modules without the need for additional hardware. It is unfortunate that the dumpable modules are limited only to those that use GROM chips. Considering the convenience this package offers, and the low cost, it is a very good buy.

As a final note, I would like to add that Dumpit should only be used to make back

(See Page 31)



## MICRO-REVIEWS

## Great buys from Notung

By STAN KRAJEWSKI

I hope everyone had a Merry Christmas and a Happy New Year. Did everyone get the TI program they wanted?

I was reading an article on hard drives. Do you know that the most wear and tear on a hard drive is caused by the first start-up or booting of the computer, where the drive has to really work to reach its operating RPM. Being that I have been using other versions of MDOS to run new programs for the Geneve, I decided that my removing the 34-pin connector cable from the slide connector on the HFDC card was not the best way to keep my hard drive from booting its MDOS. I had started to notice the wear the connector was getting and know this would have lead to problems in the future. I still like to keep the older MDOS 1.14 on my hard drive because I like to use Myarc Disk Manager 5, and the later versions don't support it.

Anyway, I took a typical toggle switch, not too large, but large enough not to get it lost behind the PEB, and disconnected the second terminal from the bottom of the power connector to the hard drive. I then put the toggle switch in line to this connector. This stops power from going to the hard drive when the switch is in the off position. I ran the wire, 18 gauge or so, up through the casing that house the drives in the PBox, and out the rear of the PBox. Now if I use onother version of MDOS, I boot it from disk with the switch set in the off position. The hard drive will not even start up, saving wear and tear on the motor from having to start up when you don't need to use it.

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

## DUMPIT—

(Continued from Page 30)

copies of your own modules for personal use. Any other use would constitute a copyright infringement and a violation of federal law.

★ Leave it alone, back to the drawing board.

★★ Needs improvements, but workable.

★★★ A good program, worth trying.

★★★★ Send your money and buy it.

★★★★

## Disk of Pyrates

If you thought that said Pirates, you're right. The title is the old English spelling. These programs come with 4 SS/SD disks or 2 flippies. I received 4 disks, and the documentation says 2 flippies. System requirements are; Extended BASIC, 32K RAM, disk drive, and TI-Artist or one of its clones. However, to play the game you do not need TI-Artist. These disks will work with the Geneve, except for the animated features, which also will not work with the Myarc disk controller.

When you first get this package, like others from Notung Software, you see that it's packaged well. The disks come in a plastic Ziploc bag with the manual, which has a cardboard cover with graphics and titles. The way I'll go through the disks are not necessarily the order they appear in the manual.

The first disk is Games, Music, and Pictures. Every program on this disk is auto-loaded through Extended BASIC, as it has a load program on it. The "Pirate Adventure Game" appears first on the menu. No, it's not one of those text games that first comes to mind when we see or hear Adventure. This one puts you on an island looking for treasure. You move your captain around, finding as much treasure as you can, by pressing the arrow keys for each pace. You can get hints, and you must watch out for Captain Flint, who either bargains for your treasure or just makes you walk the plank. The game continues as long as you want, until you return to your ship.

Pirate Music Sing-a-long is second on the menu. Two options let you select volume and speed. This plays music with the words on the bottom of the screen. Pirate Picture Show is next on the menu. You have options of setting foreground

and background colors. Displayed on the same screen are numbers and colors for easy identification. Also you may let the Picture Show continue by keypress or adjustable time delay.

Last on this disk is "Convert Instance" This has got to be the most exiting thing I have seen in utilities. This program can actually convert an Artist Instance into a runnable Extended BASIC program. Right in front of your eyes you see the program being made. The options here for creating a program are too numerous to mention.

The second disk has has two animated drawings. They are Origin of the Buccaneers and Sentenced to be Marooned. Each of them gives a short description about itself, while the pictures are moving. The third disk is filled with instances and two fonts. The forth disk has more Instances, plus the text files containing histories such as, Pirate Captains & History, 13 such D/V files. The Disk of Pyrates is available from Notung Software, 7647 McGroarty St., Tujunga, CA 91042. Price is a fabulous \$10. S&H is \$1 for the first item, 50 cents for each additional item.

★★★★

The Bride  
of Disk of Dinosaurs

Just when we thought we were safe from these prehistoric reptiles, we now find more comming out of hiding. Just what would cause Ken Gilliland to search for the Bride of Dinosaurs, when we already experienced the Son of Dinosaurs? Well, his enthusiasm as well as the wealth of information on the subject permits him to continue to satisfy our love and curiosity of these enormous reptiles.

This two SS/SD disk set runs on the 99/4A. It runs on the Geneve except for the animated feature, which also will not work with a Myarc disk controller. System requirements are 32K, Extended BASIC, disk drive, and TI-Artist, RLE or equivalent program. Although RLE will not per

(See Page 32)



## MICRO-REVIEWS—

(Continued from Page 31)

mit you to view the Instances, TI-Artist or clones will.

The first disk starts out with Dinosaur Facts. You have the selection screen that permits you to change screen color, typeface color, and font type. After your selections, the next menu title is Text about Dinosaurs. The first subject is:

A. Disk of Dinosaur Index. This lists dinosaur names and what set of disks to find them on.

B. Dinosaur Museum Addresses is the next selection. This an extensive list of museums world-wide.

C. Lets you reconfigure the options.

D. lets you return to the main menu.

Next on the main menu is, "How Fossils are Made". This is a picture file with five steps on how fossils form. Dinosaur Attack and Defense is next on the main menu. You may set your foreground and background colors, along with a keypress or time delay feature for this slide show.

Last on this disk is Thug Throws a BBQ Cartoon. This is a really good look at what man and dinosaur might have looked like, if they would have co-existed. Most features on this disk are menu driven and return to the main menu. To leave the animated feature, you have to press Fctn Quit.

The second disk is filled with both Picture\_\_P and Instance\_\_I format files of more dinosaurs.

The manual enclosed with the program is not needed to run the programs. But it

tells you how to run it, has pictures of the Instances, tells you why Ken created it, and why it doesn't run with the Geneve. The Bride of Disk of Dinosaurs is available from Notung Software, 7647 McGroarty St., Tujunga, CA 91042. Priced at \$12, plus \$1 S&H for the first item, .50 cents for each additional item. Disk of Dinosaurs, Son of Dinosaurs, and The Bride of Disk of Dinosaurs may be purchased as a set for \$25 plus S&H.

★★★★

### Disk of Horrors

Another fine graphic program from Notung Software. If this is starting to sound like a commercial for Notung Software, it is not. If Ken Gilliland is turning out these many programs for us, I have to share it with you, and let you know it's there for us. So journey with me as I prepare to take you into the macabre.

System requirements for this three SS/SD disk set include TI or Geneve with at least 32K, disk drive, Extended BASIC, and TI-Artist or equivalent program. The animated feature will not work with the Geneve or Myarc disk controllers.

Upon powering up with Extended BASIC, the autoloader feature will bring up a picture introducing the disk, followed by the main menu. First on the menu is A. Pulp Facts & Fiction. When you select "A," it will prompt you to insert disk C. From there you have the screen color, character color and font style options. Af-

ter your screen selections, you have a choice of three Short Stories by Gilliland, and an informative History of Pulp. This is where you can find where "Pulp" got its name, and many other facts.

Each program runs out of each other where you never have to leave the program, except for the animated feature Signor's of the Night, which is the next selection. This is not for the weak-at-heart, as this gruesome scene will show. Yes, it happens in the dark depths of a dungeon.

C. Spooky Slideshow lives up to its name. There is sure to be a picture there to tingle your spine, or send you to the wall to turn up the lights. Once again you have the options of colors and timed delay or keypresses.

The final option is Musical Interlude, which plays a song that was Ken's first TI program. This might be a reason itself to get this program as it might be a classic soon. You never know (grin).

Finally, a Horror Font is included to create your own chilling text.

Disk of Horrors is available from Notung Software, 7647 McGroarty St., Tujunga, CA 91042 for \$12 plus \$1 S&H, 50 cents for each additional item.

If you would like your software or hardware reviewed in this column, send it to: Stan Krajewski, Route 6 Box 568-15, Live Oak, FL 32060. If you would like it returned, include postage. If you need to discuss something, for any reason, you may call me at 904-364-7897 E.S.T.

## Newsbytes

### Ramcharged has all Prosticks, adapters

Ramcharged Computers has taken over all remaining stocks of the Prosticks and adapters for the TI originally manufactured by Newport Controls and relieved all parties involved of any warranty obligations, according to Ron Markus of Ramcharged Computers.

Originally, the Prostick sold for \$24.95 each and the TI adapters for \$9.95. Ram-

charged is offering them for \$14.95 each plus \$3 shipping and handling for one unit and \$5 shipping and handling for two. A five-year warranty is included. A TI joystick adapter will be included at no additional cost with each pair purchased, Markus says, but persons placing the orders need to specify that they need the TI adapter. The TI adapter may be ordered separately for \$6.95 plus \$2 shipping and handling.

The Prostick II was reviewed in the August 1987 MICROpendium.

Items can be ordered by check or money order or C.O.D. (requires \$4.25 extra charge) from Ramcharged Computers, P.O. Box 81532, Cleveland OH 44181. Phone number is (216) 243-1244 or (800) 669-1214.

### French group offers drawing program

FANATI, created by a member of the  
(See Page 33)



# Newsbytes

**?** (Continued from Page 32)

French TI Club, is offered as fairware. According to Jean Louis Cangy of the group, the program is "nearly the same as TI Artist."

Version 1.2 is available in English. V1.3 is available in French and will be available soon in English, according to Cangy.

Write Cangy at 465 bat J cite Enrilise, 85000 La Roche Sur Yon, France.

## Rave 99 offers kits, expansion chassis

Rave 99 is offering a new kit form of its Speech Synthesizer Adapter, including all parts and instructions for \$35 plus 5 percent for shipping and handling.

Rave also offers a Professional Expansion Chassis, referred to as PE/2, to replace the TI P-box. The PE/2 Chassis has a 200 watt power supply, which the manufacturer says provides more than enough power for the computer, P.E. Box cards and five disk drives. The chassis has eight expansion slots for TI-type P.E. Box cards. The front panel has a power switch, key lock, reset switch, turbo switch, power LED, hard disk LED and a turbo LED. The PE/2 Chassis comes in three models.

Model PE/2A is designed to work with the Geneve 9640 only. This system costs \$309 plus 5 percent shipping and handling.

Model PE/2B is designed to work with the TI99/4A only. In this version, the TI99/4A motherboard is located in the chassis to reduce the amount of desk space needed. This system requires the Rave 99 Keyboard interface card to complete the system, not included in the cost of \$379 plus 5 percent shipping and handling.

In Model PE/2C, both the Geneve and TI99/4A fit into the same chassis at the same time, allowing the keyboard and monitor to be shared. A switch on the front panel selects which computer is connected to the BUS, keyboard and monitor. This system costs \$399 plus 5 percent shipping and handling.

The PE/2 is also available in kit form to allow the user to select his own computer case and install Rave 99's assembled and tested boards into it. The Basic PE/2 Kit

comes with an eight-position backplane, front and back sheet metal card guides, standoffs and assembly manual. This system costs \$150 plus 5 percent shipping and handling. The Advanced PE/2 Kit includes all the parts in the basic kit plus the Rave 99 Flex-Card and various cables required to connect the TI99/4A to the chassis. This system costs \$240 plus 5 percent shipping and handling.

For further information or to order, contact Rave 99 Company, 112 Rambling Rd., Vernon, CT 06066, (203) 871-7824.

## Artist Cardshop program released

Artist Cardshop by Paul Coleman is being distributed through Comprodine.

According to Coleman, the program was more than two years in the making and is an all-assembly, two-disk package. Patterned after "Signmaker" in the author's previous Artist Printshop package, Cardshop offers the following features, according to Coleman:

- Loads TI-Artist Fonts and instances without conversion
- Uses two fonts and up to four different instances on each side of the card (outside and inside)
- Allows printing on the back cover of the card (any instance up to 27 columns by 24 rows)
- Saves each card creation to disk for printout or future editing
- Supports single- or double-density printing and multiple printouts
- Prints each card in as little as three minutes (includes font and instance loading time)

The package includes 25 borders as well as an assembly-language utility, Border Maker, which allows the user to create borders with the use of TI-Artist. The program has a menu-driven format and the package includes a 28-page printed manual.

Cost is \$20 plus \$1.50 shipping and handling. The program requires a minimum of Extended BASIC, 32K, one disk drive and an Epson-compatible printer. Orders may be placed through Comprodine, 1949 Evergreen Ave., Fullerton, CA 92635, or

sent directly to the author, Paul Coleman, 3971 S.E. Lincoln, Portland, OR 97214.

## TI-Casino updated

TI-Casino has been updated to V3.3. The program was reviewed in the July 1991 MICROpendium. The program is available for \$15 plus \$1 postage from Notung Software, 7647 McGroarty St., Tujunga, CA 91042.

The company is conducting the TI-Casino Challenge, according to Ken Gilliland of Notung. Since TI-Casino will print a list of player's winnings, any TI-Casino check for more than \$25,000 will be honored as a 50-percent-off coupon on any ordered Notung Software package until Apr. 1 (limit one offer per owner of TI-Casino). In addition, the highest TI-Casino check received will win additional prizes at the close of the contest, Gilliland says.

## Harrison releases public domain disks

Harrison Software has released all its existing catalog of assembly music concerts to public domain. User groups may now distribute copies in any manner they choose, according to Bruce Harrison of the company. The programs are also available from the PD-Catalog of Tigercub Software, 156 Collingwood Ave., Whitehall, OH 43213.

Harrison says the company has also released another disk of assembly utilities for Extended BASIC programmers. This SS/SD disk, called Volume 2, has mostly utilities for using DATA statements that are part of the XB program.

"Included are a very fast menu driver, routines for very quickly assigning strings and numeric values to array variables, plus a boot-tracking loader for loading E/A Option 5 program files from Extended BASIC," Harrison says. "Demo XB programs for each utility are also supplied. The disk provides capability to print instructions for using the utilities and complete annotated source code for everything except the loader."

The disk is available through Tigercub; (See Page 34)



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(Continued from Page 33)

Barry Traver, 835 Green Valley Dr., Philadelphia, PA 19128; or the Lima Users' Group, P.O. Box 647, Venedocia, OH 45894. Harrison will provide copies for anyone who cannot get them through these sources for \$3, including shipping and handling.

Parts 1 through 8 of the series *The Art of Assembly*, which appeared in *MICROpendium*, is available in D/V80 format on a DS/SD disk for \$3, including shipping and handling. A floppy format will be provided for those who request a single-sided version. The disk includes the tutorials plus all the source code that ac-

companied these articles.

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

## Son of Airtaxi issued

Don Shorock has released *Son of Airtaxi* on disk. This is a followup to his game *Airtaxi*, which is a game for one to eight players based on a map of North America. Each copy of *Airtaxi* is customized to begin at the user's home town. *Airtaxi* sells for \$15.

*Son of Airtaxi* takes the same game, with minor modifications according to the

author, and applies it to eight other maps of the world, Europe, Africa, South America, the West Indies, the Far East and Australia. The maps are smaller than the one found on the original *Airtaxi*, but Shorock says bigger versions of the map would have required some sacrifice in accuracy.

The entire *Son of Airtaxi* collection is available for \$10, or \$1.25 per program, from Shorock at P.O. Box 501, Great Bend, KS 67530-0501.

To reach thousands of TI users, send your product and service announcements to: **MICROpendium Newsbytes, P.O. Box 1343, Round Rock, TX 78680.**

# Yes, you can repair your Extended BASIC cartridge

*We found this in the April 1990 Spirit of 99 newsletter. It was reprinted from Marty's Mind Dump of the NorthCoast 99ers.—Ed.*

By **MARTIN SMOLEY**

If you have an Extended BASIC cartridge that has gone bad for some reason, this info may help. I killed my XBASIC. While soldering some new "pieces parts" on my console main board, I crossed some wires. "I'm always in a hurry." When I turned the power on I already had the XBASIC in the GROM port. "Mistake!" I fed some current directly back into the cartridge and zapped it. After a severe anxiety attack, and real depression, I thought, "Hey, this is the beginning of another project." Well, the project has been about two months in the making and I'm ready to let you all know the results. Extended BASIC cartridges are fixable and the parts may not cost a lot, depending on how bad you crashed it and if you can solder. One other consideration is this. If you have to replace all the chips in the cartridge it will cost around \$30. You can probably pick up a used cartridge for around \$20-\$30.

### AT YOUR OWN RISK

Note: You're doing this at your own risk. If you have any problems arising from this article, I don't want to hear about

it.

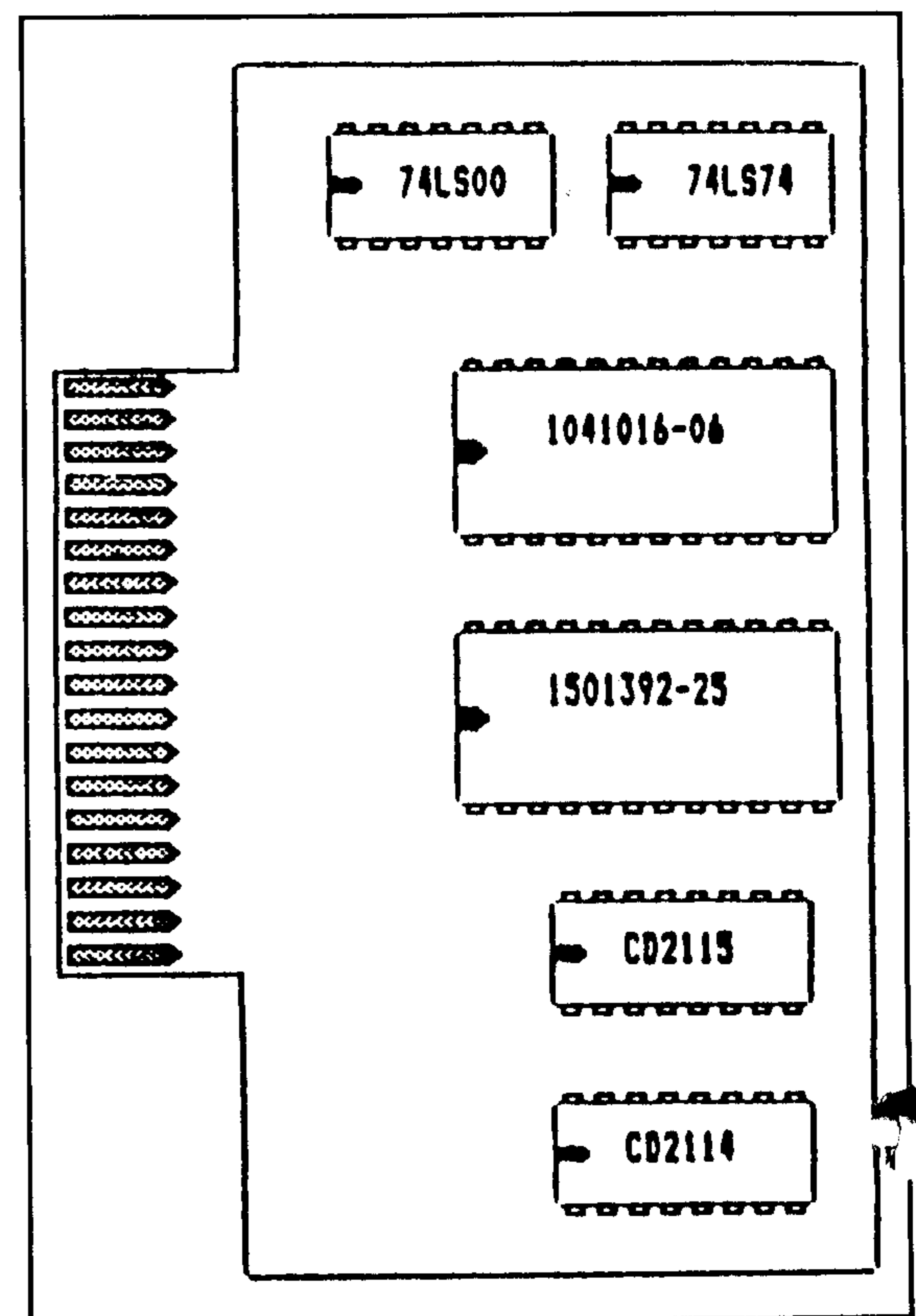
Try to open the cartridge as neatly as possible. You can glue it back together later, but it would be better if the original snaps worked. When you get the PC board out you'll see eight chips. There are two piggyback chips at one end of the board you won't see unless you have to unsolder them.

The next thing to do is check the PC board and every solder joint to make sure that all the connections are good. If you find a cracked line or a poorly soldered leg on one of the chips, repairing it may solve all your problems. If we haven't accidentally found the problem so far, we'll move on to the heavier stuff.

There should be a 74LS00 and a 74LS74 at one end of the board. If you are lucky, replacing these will put you back in business. Just de-solder them, pick up two new ones at your local electronics supply (they should cost less than 50 cents each), and solder the new chips back in. Then, without bothering with the cartridge case, plug the board back into the console and see how lucky you are.

In my case this was no help at all.

The next step in this project is to replace the two large chips on the board. These are ROM chips and appear to be quick to fail in any adverse situation (static charge,   
(See Page 35)





## EXTENDED BASIC REPAIRS—

**P** (Continued from Page 34)  
 etc.). The chip closest to the 74LS74 is listed as ROM,EXT.BASIC part number 1041016-0006, and the one next to it is ROM,EXT.BASIC part number 1501392-0025. Their prices are \$6.80 and \$5.60, respectively. These parts and others can be ordered from TI by calling (806) 741-2265 or (806) 741-2268.

Replacing these two chips fixed my problem, and, after doing a small amount of investigation, plus analyzing my own situation, it is my uneducated guess that replacing these four chips will fix the cartridge in at least 80 percent of the cases. I put a substantial charge of current back through the cartridge and did not hurt the piggyback GROM chips at the other end of the board. So, replace the two large ROM chips and see if the cartridge works.

### GROM REPLACEMENT

I really hope it worked because we are now passing into the area where it would have been cheaper to pick up a good used XBASIC. If it still doesn't work, it's time to replace the GROMs. They are available from TI at the same phone number and they sell for \$3.60 each. The way they are tied together, if one has been damaged they are probably all damaged. Toward the ROM, the top GROM is 2115, this is TI

GROM,EXT.BASIC 1015960-3115. The one it is piggybacked over is 2122 (TI GROM,EXT.BASIC 1015960-1122). The top GROM next to it is 2114 (TI GROM,EXT.BASIC 1015960-1114), and the chip it is piggybacking is 2113 (TI GROM,EXT.BASIC 1015960-1113). If you are replacing the GROM chips, I recommend you do them all at once. If you try to add in one new chip at a time to isolate the problem, the soldering and desoldering could damage your new chips and you'll never find the problem. The resistor, and capacitors you see scattered around the printed circuit board will practically never fail, so don't worry about replacing that stuff.

### TIPS ON SOLDERING

Here are some tips for electronic work: Use a low-power soldering iron (15 watt). Hold chips or a PC board by the edges, like a photograph. Try to not put your fingerprints all over the circuits or chip legs. Do not wear clothing that has caused you to get a static shock from the refrigerator door in the past. There is a notch or mark at one end of a chip to designate pin one, or the chip direction. Be sure you do not put a chip in backwards. Whenever you remove chips from a PC board use a vacuum type desoldering tool to remove all the solder from around the chip legs. There have

been times when I desoldered a leg, resoldered it, and then desoldered it again, in order to get a clean desolder job. Use long-nose pliers to wiggle and loosen every chip leg. If the legs are not all free and you pry the chip off the board, you will damage the board. The chip should be loose enough to almost pick it off with your fingers.

When soldering any electronic part, do not heat the part with your iron and feed in the solder, this will overheat the chips. You should keep your iron clean. Hold the iron in one hand and the solder roll in the other, with the item to be soldered on the table in front of you. Putting the end of the solder roll against the hot iron, accumulate a very small drop of molten solder on the end of the iron (don't do this directly over your project, place the iron against the part to be soldered for one or two seconds or until you see the molten solder flow around the wires or parts to be soldered). Do not hold the iron against the parts you are soldering any longer than necessary, and do not reheat a chip leg over and over.

If you must replace the piggyback GROM chips, squeeze the legs of the top chip together until they fit tightly over the bottom chip, and then solder the chips together first. At that point solder the pair of chips to the board.

## Western Horizon Technologies offers prototyping and equipment repair

Western Horizon Technologies has opened to serve the TI99/4A community with prototype development and repair services for the 99/4A and peripherals, according to a message on the TI-NET on Delphi.

Don O'Neil of the company says it offers PAL/PLD burning as well as EPROM programming for DSRs and modules. He says the company has a full prototyping lab for manufacturing custom PC boards in small quantities as well as schematics and layouts.

The company is still working on the Accelerator, and O'Neil says that once it is completed, a companion product, 4A Memex, will be produced. This is a memory expansion program that fits into the P-box and gives the user up to four megabytes of program space. The card is also planned to have

RAMdisk features for temporary disk usage areas for running programs like Archiver quickly. Release date is not yet available.

The company also offers sound digitizing, with the ability to sample sounds at up to 44Khz for realistic CD quality sound playback through the Digi-Port (under development) or Sound F/X package, according to O'Neil. Pricing is \$5 per disk (DSDD, 360K, or four SSSD, 2 DSDD, add \$2.50 for 720K, plus 50 cents shipping and handling). Disks can be filled with whatever the user wishes; customers should send a cassette tape with instructions.

For information or to order, contact Western Horizon Technologies, Don O'Neil, 10225 Jean Ellen Dr., Gilroy, CA 95020, (408) 848-5947.



# Planning for your retirement

Ms.

## XBASIC program calculates financial needs

By JOHN WOESTMAN

This program will provide a means of exploring the needed performance of an investment to provide a monthly income to supplement Social Security or to plan such a supplement for retirement.

The same equations are used for all results, but a choice can be made for which quantity is to be the solution. There are four variables:

**P** — The principal, which is the total amount invested.

**I** — The interest paid on the principal. Actually, this quantity is what is commonly called the "total return." Total return on an investment consists of the dividends plus the distributions. These may not always be paid on a monthly basis, but the total return is commonly stated on an annual basis. In this program it is assumed that the interest (I) is paid monthly, but it is entered as the rate of annual interest.

**Q** — The amount withdrawn monthly.

**Y** — The number of years over which interest is accumulated and over which monthly withdrawals are made.

The four options of the program provide answers to each of the four variables given the other three.

Readers who like this program are encouraged to write the author at 1036 Nissley Rd., Lancaster, PA 17601. He is a member of the York 99ers User Group.

### USER GROUP UPDATE

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

#### Kansas

KC99ers, c/o W. Blood, 2032 N. 32nd St., Kansas City, KS 66104 (new address).

#### Ohio

Cleveland Area 99/4A Users Groups, c/o Harry Hoffman, 1925 Trowbridge Ave., Cleveland, OH 44109 (new address).

### RETIREMENT

```

100 CALL CLEAR !209
110 REM REGULAR WITHDRAWALS
FROM AN INVESTMENT THAT EARN
S COMPOUND INTEREST !099
120 DISPLAY AT(1,3):"THIS PR
OGRAM CAN BE USED TO DETERMI
NE THE MONTHLY AMOUNT OF A RE
GULAR WITHDRAWAL THAT CAN BE
MADE FROM AN INVESTM
ENT EARNING COMPOUND" !226
130 DISPLAY AT(7,3):"INTERES
T AT A SPECIFIED ANNUAL
RATE GIVEN THE NUMBER OF WITH
DRAWALS PER YEAR AND THE NUM
BER OF YEARS THE" !129
140 DISPLAY AT(12,3):"PRINCI
PAL IS TO LAST; OR IT CAN BE
USED TO DETERMINE WHAT P
RINCIPAL AMOUNT IS" !101
150 DISPLAY AT(16,3):"NEEDED
TO BE ABLE TO MAKE A SPECIF
IED NUMBER OF MONTHLY WITHDR
AWALS OVER A SPECIFIED" !188
160 DISPLAY AT(20,3):"NUMBER
OF YEARS AND AT A SPECIF
IED ANNUAL COMPOUND INTERE
ST RATE." !127
170 INPUT "PRESS ENTER":W1$
:: IF W1$=CHR$(13) THEN 180 !
254
180 CALL CLEAR !209
190 DISPLAY AT(8,3):"FOR MON
THLY WITHDRAWAL AMOUNT
ENTER 1." !080
200 DISPLAY AT(11,3):"FOR NE
EDED PRINCIPAL AMOUNT
ENTER 2." !225
210 DISPLAY AT(15,1):"FOR YE
ARS TO LAST
ENTER 3." !100
220 DISPLAY AT(18,1):"FOR AM
OUNT LEFT AFTER N YEARS
ENTER 4." !016
230 INPUT WW !064
240 ON WW GOTO 250,340,480,6
20 !170
250 INPUT "INITIAL INVESTMEN
T ?":P !008
260 INPUT "ANNUAL INTEREST R
ATE ? E.G. .045 FOR 4.5% ANN
UAL INTEREST RATE":I !024
270 N=12 !057
280 INPUT "NUMBER OF YEARS O
VER WHICH WITHDRAWALS ARE TO
BE MADE ?":Y !017
290 MI=I/N :: TMI=1+MI :: EN
Y=N*Y :: PIF=TMI^ENY-1 !054
300 PF=MI/PIF+MI :: R=P*PF !
031
310 PRINT USING 440:R !018
320 INPUT "MORE? PRESS Y/N "
:WW3$ :: IF WW3$=CHR$(89) THE
N 330 ELSE STOP !124
330 GOTO 180 !003
340 REM MINIMUM INVESTMENT F
OR REGULAR WITHDRAWAL !083
350 INPUT "AMOUNT OF REGULAR
WITHDRAWAL (R) ?":R !118
360 N=12 !057
370 INPUT "ANNUAL INTEREST
ATE EG .05 ?":I !203
380 INPUT "NUMBER OF YEARS ?
":Y !249
390 MI=I/N :: TMI=1+MI :: EN
Y=N*Y :: DP=TMI^ENY :: RDP=1
/DP !167
400 PP=1-RDP :: P=PP*R/MI !1
59
410 PRINT USING 450:P !026
420 INPUT "MORE ? (Y/N) ":WW
4$ :: IF WW4$=CHR$(89) THEN 1
80 ELSE STOP !168
430 GOTO 180 !003
440 IMAGE AMOUNT OF REGULAR
WITHDRAWAL=$####.## !195
450 IMAGE MINIMUM INVESTMENT
=$#####.## !120
460 END !139
470 REM !154
480 REM NUMBER OF WITHDRAWAL
S. !208
490 INPUT "INITIAL AMOUNT EA
RNING INTEREST ? ":P !0
84
500 INPUT "INTEREST RATE EG
.05 FOR 5% ? ":I !142
510 INPUT "AMOUNT WITHDRAWN
MONTHLY ?":QM !028

```

(See Page 37)



## RETIREMENT—

(Continued from Page 36)

```

520 Q=QM*12 !157
530 SF=P*I/Q !200
540 IF SF>.999 THEN 510 !250
550 DF=1-SF :: NF=1/DF !185
560 TN=2.302585*LOG(NF)!091
570 TD=2.302585*LOG(1+I)!193
580 N=TN/TD !010
590 PRINT USING 720:N !039
600 INPUT "MORE ? Y/N ":WW5$
   :: IF WW5$=CHR$(89) THEN 180
   ELSE STOP !087
610 STOP !152
620 REM AMOUNT LEFT AFTER N

```

```

WITHDRAWALS !067
630 INPUT "INITIAL AMOUNT EA
RNING INTEREST ? ":P !0
84
640 INPUT "INTEREST RATE EG
.05 FOR 5% ? ":I !142
650 INPUT "AMOUNT OF MONTHLY
WITHDRAWAL ?":QM !020
660 Q=QM*12 !157
670 INPUT "NUMBER OF YEARS W
ITHDRAWALS ARE MADE ?":N !15
6
680 TIR=(1+I)^N :: T1P=P*TIR
!072

```

```

690 NTIR=TIR-1 :: T2P=Q*NTIR
/I !026
700 AN=T1P-T2P !186
710 PRINT USING 730:AN !114
720 IMAGE NUMBER OF YEARS TO
EXHAUST PRINCIPAL IS :###.
# !115
730 IMAGE AMOUNT LEFT AFTER
N WITHDRAWALS IS:$#####.## !
093
740 INPUT "MORE ? Y/N ":WW6$
   :: IF WW6$=CHR$(89) THEN 180
   ELSE STOP !089
750 END !139

```

## User Notes

### Keeping up with TI-Writer files

This item is by Paul E. Scheidemantle. We are reprinting it from the newsletter of the Johnson Space Center TI99 User Group.

To tell you the truth, once upon a time my TI-Writer files were a total disaster! I couldn't find anything without a long drawn out process. Sometimes spending hours going through all those disks really was a hassle. And then one day I told myself this has got to stop.

One of the first problems to overcome was file names that were limited to ten characters. I decided that a menu program of some kind was in order. This way I could have file names that were as long as I wanted them to be. Also, it would be great if all I had to do was change two letters of the menu file name to load any file. So, here is a simple method that I use for keeping my TI-Writer files from getting out of hand.

The first file of each disk will be called 00\_\_WF\_\_00. By making a menu file we can then have file descriptions longer than ten characters because we read the menu instead of the disk directory. This is especially good if you run TI-Writer from a loader other than the TI-Writer module.

We can save all the menu files to a disk for quick searches.

Setup two disks as follows:

1. File disk #1 — for menu files only. Name this disk "WTRFILE\_\_00". We will save a copy of our menus to this disk for easy access. This way we only have to access one disk to find where the file is located.

2. File disk #2 — first of 99 file disks available. Name this disk "WTRFILE\_\_01".

Setup a menu program as follows:

1. Name this file "00\_\_WF\_\_01"

00 = Menu

WF = Writer file

01 = File disk #1

2. Keep the menu file simple or as complex as you would like it.

3. Example of file:

Line 1 — Menu file name:

00\_\_WF\_\_01

Line 2 — Blank line

Line 3-4 — Header:

FILE NO.	DESCRIPTION
-----	-----
Line 5-? — Your directory:	
00__WF__01	MENU
01__WF__01	CALLLOADS
02__WF__01	DISK INFO

Line 5-? — Your directory:

00\_\_WF\_\_01 MENU

01\_\_WF\_\_01 CALLLOADS

02\_\_WF\_\_01 DISK INFO

The above descriptions can be as long as you wish.

After loading a menu file, you can search for a file by using the Find String function. Load a file after you find it by simply doing the following:

FCTN 9

LF (Enter)

(See Page 38)

### Electronic tax filing with TI available from Parsons

Parsons Tax Services has reached an agreement with TI-TAX to bring electronic filing and direct deposit to the TI99/4A.

Direct deposit from an electronically-filed tax return goes into the taxpayer's account in as little as 12 to 18 days, compared to 6-8 week processing on normal returns from paper tax filings.

The procedure involves sending a diskette copy of the completed individual tax return prepared using the TI-TAX templates and MicroSoft Multiplan spreadsheet to Parsons, which reformats the data to IRS requirements and files it electronically, charging \$25 for this service.

Electronic filing packages will be included with any purchase of TI-TAX. For additional information and a list of all electronically filable forms, send an SASE to TI-Transmissions, Parsons Tax Services, 1615 Chess, Parsons, KS 67357.



# User Notes

(Continued from Page 37)

And change the first two characters of the file name displayed. Be sure to put the right diskette in the drive.

Now, go find those files.

## Cracking the code

This article appeared in the TIsHUG News Digest, the newsletter of TIsHUG, of Redfern, New South Wales, Australia. It was written by a programmer whose nom de plume is Cracker Jack. Required equipment include memory expansion, disk system, Editor/Assembler and XBASIC.

Another disk has slipped into my hot little hands, this time a bunch of XBASIC programs. Some good, some bad and what looks to be an interesting graphics program. But this graphics program has no help screen to show what keys to press. No problem, we will LIST the program and look for the INPUT, ACCEPT and CALL KEY statements. So LIST and Enter, but now something terrible happens. What we get is a multi-colored display followed by a computer lockup. This is no electronic quirk, no accidental folly, but rather a deliberate attempt by the software author to suppress extortion. Looks like a job for C-R-A-C-K-E-R J-A-C-K.

First thing to do is to powerup the computer and reload the graphics program. This time a memory editor program is used to inspect the graphics program in memory to see why it will not list. Sure enough, the value for the length of each BASIC line has been set to zero. (Refer to Tips from the Tigercub No. 58 by Jim Peterson.) This simple routine at the beginning of a BASIC program will reset line length values, preventing it from being LISTED or edited.

```
1 CALL INIT :: CALL PEEK(-
31952,A,B,C,D) :: SL=C*256+D-
65539 :: EL=A*256+B-65536
2. FOR X=SL TO EL STEP -4 :: CALL
PEEK(X+2,G,H) :: CALL LOAD(G*25
6+H-65537,0) :: NEXT X
```

Fortunately, if you just wish to view the program listing, then it is very easily done by poking large line length values back into the program. To do this, type in in immediate mode (i.e. without line numbers)

the two multi-statements above. However, change the CALL LOAD statement to CALL LOAD(G\*256+H-65537,255).

Now we have a program that will list but cannot be edited. For example, if we were to try to delete a line, we would delete 255 bytes of BASIC code even though in reality that particular line was much shorter. This is clearly not good enough. Also, my vanity insists that I am able to edit in a line, such as DISPLAY "Program Cracked by ... etc."

The last stage, hence, is to rebuild the line length values to their correct values. For this we require a short assembly language routine. After typing in the following code and assembling it (I suggest an object code file named "MATEY"), go back to Extended BASIC. Load that offensive BASIC program that causes your computer to lockup when you try to list it. Then type CALL INIT :: CALL LOAD("DSK1.MATEY") Enter. When the cursor reappears on the screen you will be able to LIST or edit the program to your heart's content. I suggest you look at the start of the program to see if those few lines listed earlier are still there. If so, then delete these lines before you re-save the program, otherwise it will reset line length values each time you run the program.

\* This program re-enters the  
\* line length values within  
\* a BASIC program.

\*  
\* For use when a program is  
\* corrupted or protected by  
\* having false line length  
\* values.

```
*
DEF MATEY
*
AORG >2500
*
MATEY LWPI USRWS
MOV @>8330,R1
MOV @>8332,R2
C R1,R2
JHE FIN
*
INC R2
S R1,R2
SRL R2,1
CI R2, BUFMAX
```

```
JGT FIN
*
SRL R2,1
MOV R2,@BUFLEN
INCT R1
LI R4,BUFF
*
LOOP MOVB *R1+,*R4+
MOVB *R1+,*R4
DEC R4
DEC *R4
INCT R4
INCT R1
DEC R2
JNE LOOP
LI R5,>FFE8
AGAIN MOV @BUFLEN,R3
LI R2,ZERO
LI R1,BUFF
DECT R1
*
NEXT INCT R1
C *R1,*R2
JL SKIP
MOV R1,R2
SKIP DEC R3
JNE NEXT
*
MOV *R2,R6
MOV *R1,*R2
S R6,R5
DEC R5
SWPB R5
MOVB R5,*R6
MOV R6,R5
DEC @BUFLEN
JNE AGAIN
*
*
FIN LWPI >83E0
CLR R0
MOVB R0,@>837C
RT
*
*
USRWS BSS 32
BUFLEN BSS 2
ZERO DATA >0000
BUFMAX EQU >1800
BUFF BSS BUFMAX
*
*
END
```



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