
Covering the TI99/4A and the Myarc 9640

MICROpendium

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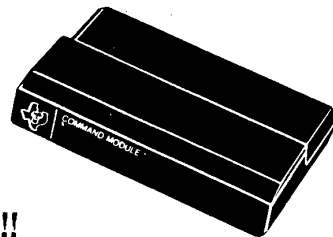
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*READ THIS

Here are some tips to help you when entering programs from MICROpendium:

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

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Comments

Fax/modem for the TI/Geneve studied Accelerator bites dust, but ...

I got a call from a Tier who's giving serious consideration to producing a fax/modem for the TI99/4A and Geneve. The device he is looking at would be an external unit running at up to 2400 baud as a modem and up to 9600 baud as a fax. Software would be included to allow Geneve users to print faxes to the screen to preview them before dumping them to a printer. The TI doesn't have enough memory to be able to do this. The fax/modem would run out of an RS232 port. The cost is in the range of \$175 and \$200. More on this later, if something develops.

PLEASE PAY FOR THOSE MP DISKS

We know that not everyone who receives the MICROpendium monthly disk pays for it. And that's unfortunate because the money we earn from disk sales helps to support the magazine. Disk sales have helped to keep us at 40 pages the past couple of months and we're appreciative of those subscribers who pay for what they want. All we ask is if you want the disks, please pay for them. It'll help us keep the size of MICROpendium up. Incidentally, we have bulk rates for user groups that order multiple copies for their members. Call or write for information.

ACCELERATOR ON HOLD

The accelerator card for the TI is on indefinite hold, according to Bud Mills. Problems with trying to get a production model together simply won't go away. But, I've been told about another project involving the modification of the TI console itself that could accomplish similar goals. It's in the initial stages at this point so there's nothing concrete to report.

STARTING OUR NINTH YEAR

This issue of MICROpendium marks the beginning of our ninth year of publication. We owe it all to our loyal readers and look forward to starting our tenth year next February. Thanks for your support.

JERRY STERN BON VOYAGE

Jerry Stern, our Extended BASIC columnist for the past three years or so, is bidding adieu to his MICROpendium chores, having found honest work as a full-time freelance writer. Jerry spent many hours each month writing programs for his column and then explaining the programs in his articles. He is now writing for Word Perfect Magazine and other publications. Jerry's final column appears this month. Starting next month Barry Traver will replace Jerry as our Extended BASIC columnist. Good luck, Jerry.

REVIEWS I HAVEN'T DONE

This month I had every intention of reviewing some of

Texaments' Geneve games but simply ran out of time and space. We're also planning some reviews of new Asgard products, and version 3.0 of IWD Plus!, a program by Joseph Syzdek for use with the Geneve and the ImageWise Video Digitizer. We're going to try to get them in next month.

CHICAGO FAIR DATE SET

The Chicago TI User Group, responding to the complaints about the cold November weather at last year's fair, has decided to schedule the 1992 fair during a warmer month. This year's fair will be held in October, Oct. 31 to be exact, and in honor of Halloween those who attend the post-fair banquet are invited to wear costumes. The fair site will be at the Elk Grove Holiday Inn, same as last year.

And speaking of fairs, Fest West was held this month in Phoenix, Arizona, starting another year of these events which have become TI traditions since that first one in Chicago. Fest West is unique in that it is held in a different city each year, with a different user group from one of the western states as host group each time.

GENEVE NOTES

Al Beard is involved with a 2-pass assembler (called T-Assembler) for the Geneve that supports 9955, 99105 and 9910A chips, according to sources. Porting of software would be a matter of typing it up. Beery Miller is rewriting the video XOPs for the Geneve. Chris Faherty is the author of the original XOPs.

Myarc has been catching up on repairs, though there's no word as to whether the company will ever go into production again. I hope it does. I know there's a market for Hard & Floppy Disk Controllers and Geneve's. These items go fast, even when they're used and despite the problems Myarc has had getting repairs done.

I've heard discussion of a third-party setting up to do repairs of Myarc's HFDC, but nothing's definite. It would be nice.

COMPUSERVE FOLLOWS GENIE'S FOOTSTEPS

CompuServe is offering a fixed-rate plan similar to GENIE's Basic Services approach. For a fixed monthly fee of \$7.95 per month members could gain access to a suite of basic services, not including access to computer forums, most financial services, etc. I think it's a good idea for Prodigy users but for computer users it leaves something to be desired. Okay, now disagree with me. I didn't like GENIE's plan when it first came online and found out I was in the minority.

—JK

Feedback

Happy birthday

I am writing to wish MICROpendium a happy eighth birthday and thank John Koloen and Laura Burns for making it all possible. I would also like to express my appreciation for MICROpendium having published more than 350 articles, raised or made comments on more than 300 editorial issues, printed more than 500 of the letters received, given us more than 1,000 newsbytes, printed more than 350 programs/routines, more than 350 tutorials and more than 600 user notes in the last eight years. That's a ton of support!

I am sincerely hoping for at least another eight years of support to and support from the TI community. If MICROpendium were to cease publication the TI community would virtually cease to exist for many 99ers like me. Your universally recognized forum for communication, new ideas, new products and help in general is simply irreplaceable.

Bill Gaskill
Grand Junction, Colorado

Lurking problems

Let us be alerted to one of the lurking areas for problems in TI99/4A systems that apparently has been overlooked by many. Much of what I have to say was worked out in conjunction with conversations with Mr. Bud Mills, and then confirmed from other sources. I, as many, have the philosophy of "If it ain't broke, then don't fix it," and as a result was not aware that at least some 99 units were designed for operation at 100 or 110 volts (or above 200). This can be deadly to people who have utility supply voltages that exceed 120 volts.

Industry-wide, too many systems are designed to operate at excess voltages. Where regulators like 7805 series *do* require possibly five volts in excess of their output voltages for stable operation, under no circumstances should this voltage be more than perhaps seven volts over the output voltage. The power that must be dissipated in the regulator at any output current level is, of course, proportional to that voltage difference and can cause adjacent components as well as the regulator to drift or fail. (IBM and many others use too high a source

voltage, with resulting excessive failure rates.)

This can have caused problems for all designers of boards for the PE Box as well as the console. And it particularly troubles people whose line supply voltages are higher than the design value for these units, typically 100 or 110 volts. When line voltage tends to run at the 120 to 130 volt range, these problems are compounded. (I have been told that many TI units will operate successfully with as few as 80 volts.)

The common failure of makers to give adequate specifications on their equipment compounds the problem. (I have seen *no* such specifications on *any* of the components of the TI99/4A segments.) The only warning one has is the system getting flakey after several hours of use.

Fortunately, several simple solutions can be used, individually or together. Probably the most important change is to make up a "tap changer" for supplying the console and the PE Box. Radio Shack sells the parts needed for this. One gets a transistor power transformer rated at 12 to 24 volts, center-tapped output at about two amperes, and wires the secondary to reduce the effective line voltage. Where the line voltage is 115 volts, a six-volt transformer is ideal; 120, at least 12 volts, etc. The goal is to get the line voltage reduced to about 108 to 110 volts with the 110 volt tap. But be sure the unit is fused.

A useful second step is to apply heat dissipators on critical components like the 9901 microprocessor and the special chips like the IC Nos. 6 and 12 on the CorComp disk controller card. A hint on which chips need it is the ones that are socketed. Wise design is to socket the critical chips! You can buy heat dissipators, or make them from light aluminum sheet. Since the chip itself is in the center of the respective ICs, anything that will help dissipate the heat more uniformly to the air can help. These sinks can be glued on the chips themselves. (The regulators are best protected by the voltage reducers described above.)

It is fortunately at long last possible to get the CorComp cards repaired, after an extended hiatus. I really do not fault the designers of the cards themselves for this problem, although they could have gotten better information on the PE Box and as-

sured more effective heat dissipation. But this has led to excessive board failures which hurt CorComp's viability and perhaps led to their other problems.

Another hint: When my latest controller card failure occurred, my small Horizon RAMdisk turned on and its contents were wiped out. My system only operated in standard BASIC. It turned out that my 9901 chip had failed. My system test unit indicated that the console was OK and the printer functional. As soon as I attempted to shift to Extended BASIC, the LED lit and nothing worked at all. The drive motors would run, however.

When I replaced the 9901 chip, the system once again was operational. The cause was almost certainly thermal, resulting at least indirectly from the excessive voltage. The changes above are obvious possible corrective actions. Needless to say, several chips now have heat sinks glued on them!

Keats A. Pullen Jr.
Kingsville, Maryland

P-Box card ideas

Some ideas for P-Box cards that might change the tide (stop me if you've heard this before) —

1. Since IBM (ugh) 8-bit cards are smaller (half the size) of our peripheral cards, how about an adapter? With a DSR RAM and the appropriate interface circuitry, a world of off-the-shelf cards — including hard drive controllers — become available. Even those using DMA to beam data directly to/from memory could use a relatively small buffer on the adapter.

2. How about an SCSI card? SCSI is used on the Atari and Amiga computers, and increasingly on the IBMs to interface hard drives, laser printers, plotters, scanners, etc. with a standard protocol. With the ready-made LSI circuit components and appropriate DSR software, the mass storage barrier could be broken.

I'd go for either of these. How about it, hardware hackers? Asgard? Rave? Bud Mills?

David Ormand
SW 99ers
Tuscon, Arizona
(See Page 8)

Feedback

(Continued from Page 7)

Answer those letters

In looking over some of my back issues I noted in a couple of places the mention of a series of articles on assembly written by Mac McCormick. I would like to find out what back issues I would need to order to obtain these articles and would also like to know if there are any plans for future assembly tutorials.

This aside, I would like to mention a problem I have observed in the TI community which seems to be slowly growing. What I am referring to is a lack of replies to letters sent requesting information.

In some cases, repeated contact is necessary. Several years ago, for example, I wrote to one of the larger companies asking for comparison information. About two months later I finally called and asked if my letter had been received. A couple of weeks later I received my *original* letter back with the words, "Answer this one, he called," written across the top and a few lines written at the bottom of the letter that "kind of" answered my questions.

More recently I wrote and ordered cSHELL99 from Joe Ross (payment was enclosed). He *did* send the software after a second letter along with a letter apologizing for the delay and saying he had been rewriting a part of the software and describing some new software he was designing that sounded promising. I wrote back to him asking for more information. I am still waiting for a reply.

Even more recently (around March or April '91) after calling and talking to Barry Traver over the phone, I sent a money order and was to receive XXB from him (object code only as I was wanting to see what his "diskazine" was all about). I had still not received this when his Graphicomp program was completed in your magazine. After typing in this last installment, I noted a problem, called him and told him about it and at the same time asked him about the disk. He said he would send it right along and requested my address which I gave him. A month or so later I called *again* and asked about the disk. He told me he would send it right along and mentioned finding the problem with his Graphicomp program

and that he would send the corrected version along with the XXB and again asked my address which I again gave him. Now I no longer have a phone and can't call him. I have sent several letters to him and have not received a reply of any kind and *still* have no XXB. I realize we're only talking \$3 but

These are only three examples out of countless. I often find myself wondering if there's anyone out there or if it's an oil painting.

In all fairness, I have to point to the other end of the scale, though. I recently ordered and received Screen Preview from Asgard Software and after working with it sent them a kind of "minireview" noting what I felt were good points and areas where I thought changes might be made. Shortly after that I received a letter from Chris Bobbitt thanking me for my input. I was *highly* impressed with this.

As far as a straightforward request for information is concerned, probably the most impressive reply came from Rave 99. I wrote asking about a comparison between MX01 Memory Cards and other cards on the market. What I received was a clear and concise two-page letter from John McDevitt describing their cards *in detail* plus four pages of material describing *all* their products.

These last two examples are the kind of attention that is going to be needed more and more as time passes if the TI is going to continue. Without this attention, our computer system is unfortunately destined for the closet while the space is filled by a newer system.

**Phil Martin
Keizer, Oregon**

For assembly tutorials, we'd suggest you catch up with the current series by Bruce Harrison. Mack McCormick's articles ran in October, November and December of 1985 and February of 1986. (Our index is handy for individuals wanting to know what was in back issues, by the way.) In regard to our own policy on answering our mail, we fill orders fast here, ourselves (persons with orders unfilled or unacknowledged from us more than six weeks old should contact us, because something has gone wrong), but requests for information, etc., often get put on the

back burner, as we must give priority to filling orders and putting out a magazine in a timely fashion. — Ed.

Cartridges on disk

Memo to Randy A. Cook. There may be three schemes floating around out there to put cartridges onto disk. At least, I seem to have gotten three kinds of stuff in some disks with a system I bought last year. No. 1 is a disk file which loads in Extended BASIC, then resets the console, then the program comes up a Selection 3 on the main menu. No. 2 does a straight Load and Run. No. 3 will not run, but, since the XB loader code is different, I suspect another version. Also, non-TI stuff seems to be disk-able. For example, I have Espial, Pole Position, Pin Ball, Shamus and others.

**Merle Vogt
Von Ormy, Texas**

Myarc software info sought by reader

I would like more information as to the contents of the Geneve public domain disks offered by MICROpendium. Could you please supply a list of program names, with type of program and general description?

Also, do you know if Myarc ever released the following software mentioned in their newsletter and warranty questionnaire?: BASIC Compiler, MY-Number Spreadsheet, MY-Data Base, MY-Pro-Word Processor, Windows and Electronic Publishing. If they did, please let me know how I might obtain them.

**Kyle Magnuson
Garvin, Minnesota**

The Geneve public domain software we distribute is available from electronic bulletin board services. We provide them only as a service to those who do not frequent a BBS. We do not list the program names because we are not in the business of selling public domain software and do not wish to compete with those who do.

To date, Myarc has released none of the software you mentioned. 9640 News, a diskazine, has published a windows-type program. Contact them at P.O. Box 752465, Memphis, TN 38175-2465

BASIC

Basketball Statistics

By REGENA

This basketball season I have been helping spot or keep statistics at some of the university basketball games (besides attending my 11-year-old son's league games). We keep statistics the "old-fashioned" way, or the way it probably has been done for decades. Several times I have thought a computer would certainly make the job easier.

For example, on the play-by-play you could type in the time, then the player number and type of basket, free-throw or personal foul. The computer could then print out the details along with a running score or the number of personal fouls and team fouls. If you type in a team time-out, the computer would print which time-out and how many are left. At the end of the half and at end of the game you could get individual statistics totals and team totals. Of course you could add time for substitutes, attempted goals and rebounds.

I'm sure such a program exists (perhaps not on the TI), so I haven't written one. However, I started a skeleton program this month for basketball using the TI99/4A.

The first program is PLAYER and creates a player list — simply a player number and name. You can add to or delete from the list or edit names. The roster can then be saved onto disk. Later programs could then use the player roster previously saved so you don't need to type in the numbers and names each time.

The first time you use this program, select "1" to start a new list. Type in the player number and the player name for each person on the team. When you have completed the list, enter "99" for the next player number to end the input procedure. Save the data. If you have a change in the roster, you can run this program again and select "2" to load a previously saved list. You could then edit the list.

You may enter the numbers and names in any order. Lines 520-880 use a "quick sort" to arrange the players in ascending order of numbers. The list is saved in numerical order. Be sure to use a file name that fits the requirements for disk file names. For example, I used "SUU" to save the roster for Southern Utah University and "DIEGO" to save the roster from San Diego State University for a recent game.

The second program this month is called STATS and is a statistical summary for a team. Run the PLAYER program first to get a team list, then run this program. This team only uses the statistics that are usually printed in a game summary in the newspaper. If you would like, you could easily add personal fouls and rebounds.

SUU	2-PT	PCT	3-PT	PCT	FT	PCT	TOTAL
4 ROBERTS	0-2	.00	1-1	1.00	0-0	.00	3
5 FOX	0-0	.00	0-0	.00	0-0	.00	0
10 DIXON	3-5	.6	0-0	.00	2-4	.5	8
12 PETERSEN	2-3	.66	3-3	1.00	4-4	1.00	17
14 MARCELIC	7-12	.58	4-7	.57	6-8	.75	32
20 CHRISTENSEN	0-0	.00	0-0	.00	0-0	.00	0
22 ACHTZEHN	7-13	.53	0-0	.00	6-10	.6	20
30 SHERWOOD	1-4	.25	0-0	.00	2-2	1.00	4
32 BLACKNER	0-0	.00	0-0	.00	0-0	.00	0
34 BARTON	0-1	.00	1-3	.33	0-0	.00	3
40 BRIMHALL	0-2	.00	0-0	.00	0-0	.00	0
44 JACKSON	0-0	.00	0-0	.00	0-0	.00	0
	20-42	.47	9-14	.64	20-28	.71	87

The first time you use this program, select "1" to enter new stats. You will be asked for a team name. This is the roster you have previously saved from the PLAYER program. The player numbers and names will be loaded in and listed on the screen. You may then enter statistics.

As each player's name is listed, enter information for the number of two-point field goals made, the number of two-point field goals attempted, the number of three-point field goals

made, the number of three-point field goals attempted, the number of free throws made, and the number of free throws attempted. The computer will calculate the number of points the player made. If the information is correct, press ENTER to continue. If you need to change the information on that particular player, press "R" for REDO.

After the information is entered for each player, you will be asked if you want a printed copy. Press "Y" for yes, or press "N" for no. If you do want a printed copy, be sure you have your correct printer configuration in Line 720 as you type in this program. The "N" answer will print the statistics on the screen only.

Only the printed copy will show the individual percentages for field goals and free throws. The screen shows the team percentages on the last line of statistics.

After the statistics are printed, you may SAVE the stats onto disk by specifying another file name (not the same as the player list). Later, if you run this program again, you may load the statistics and print another copy.

Other programs could utilize the player list. For example, one program might keep track of the substitutions and how much time each player is in the game. Another program could keep track of the rebounds. Another could keep track of the field goals made and attempted (for the shot chart), and another could write the play-by-play.

I wrote this program for disk only, but you could change it to a cassette system by changing the appropriate OPEN statements.

If you would like copies of these two programs, you may send \$4 to REGENA, 918 Cedar Knolls West, Cedar City, UT 84720. Be sure to specify that you need Basketball Stats for the TI.

(See program listing, Page 10)

REGENA ON BASIC —

```

100 REM STATS SUMMARY !183
110 REM BY REGENA !103
120 DIM PL(20),NAME$(20),FG2
(20),FG2A(20),FG3(20),FG3A(2
0),FT(20),FTA(20),POINTS(20)
!054
130 CALL CLEAR !209
140 PRINT "BASKETBALL STATIS
TICS": : !151
150 PRINT "1 ENTER NEW STAT
S" !029
160 PRINT : "2 LOAD SAVED DA
TA" !137
170 PRINT : "3 END PROGRAM"
!168
180 CALL KEY(3,K,S)!190
190 IF (K<49)+(K>51)THEN 180
!200
200 CALL CLEAR !209
210 ON K-48 GOTO 220,1630,18
80 !196
220 PRINT "TEAM NAME:" !015
230 INPUT N$ !004
240 IF N$="" THEN 220 !208
250 A$=SEG$(N$,1,8)!059
260 PRINT : "..LOADING TEAM..
" !037
270 OPEN #1:"DSK1."&A$,INTER
NAL,INPUT ,FIXED 192 !118
280 INPUT #1:T$,J !179
290 CALL CLEAR !209
300 PRINT T$ !020
310 FOR C=1 TO J !130
320 INPUT #1:PL(C),NAME$(C)!
050
330 PRINT PL(C);TAB(5);NAME$
(C)!172
340 NEXT C !217
350 CLOSE #1 !151
360 PRINT : "ENTER STATISTI
CS? Y/N": : !223
370 CALL KEY(3,K,S)!190
380 IF (K=78)+(K=110)THEN 18
80 !159
390 IF (K<>89)+(K<>121)=-2 T
HEN 370 !180
400 FOR C=1 TO J !130
410 PRINT PL(C);TAB(5);NAME$
(C): !022
420 INPUT "2-POINT FIELD GOA
LS: ":FG2(C)!239
430 INPUT "ATTEMPTED: ":FG2A
(C)!203
440 PRINT !156
450 INPUT "3-POINT FIELD GOA
LS: ":FG3(C)!241
460 INPUT "ATTEMPTED: ":FG3A
(C)!204
470 PRINT !156
480 INPUT "FREE THROWS MADE:
":FT(C)!036
490 INPUT "FREE THROWS ATTEM
PTED: ":FTA(C)!251
500 POINTS(C)=2*FG2(C)+3*FG3
(C)+FT(C)!115
510 PRINT : "POINTS =";POINTS
(C)!155
520 PRINT : "PRESS 'R' TO R
EDO;": "PRESS <ENTER> TO CONT
INUE": !096
530 CALL KEY(3,K,S)!190
540 IF K=13 THEN 560 !102
550 IF (K=82)+(K=114)THEN 41
0 ELSE 530 !056
560 TFG2=TFG2+FG2(C)!020
570 TFG2A=TFG2A+FG2A(C)!215
580 TFG3=TFG3+FG3(C)!023
590 TFG3A=TFG3A+FG3A(C)!218
600 TFT=TFT+FT(C)!165
610 TFTA=TFTA+FTA(C)!104
620 TP=TP+POINTS(C)!084
630 CALL CLEAR !209
640 NEXT C !217
650 PR=0 !089
660 PRINT "WANT A PRINTED CO
PY? Y/N" !220
670 CALL KEY(3,K,S)!190
680 IF (K=78)+(K=110)THEN 75
0 !048
690 IF (K<>89)+(K<>121)=-2 T
HEN 670 !225
700 PR=1 !090
710 REM PRINTER CONFIGURATIO
N !246
720 OPEN #1:"RS232.BA=600" !
222
730 PRINT #1:TAB(10);T$: : :
!039
740 PRINT #1:TAB(17);"2-PT
PCT 3-PT PCT
FT PCT TOT
AL": !226
750 CALL CLEAR !209
760 PRINT TAB(8);"2-PT 3-PT
FT TOT": !086
770 FOR C=1 TO J !130
780 N$=SEG$(NAME$(C),1,3)!19
8
790 P$=STR$(PL(C))!198
800 IF PL(C)>9 THEN 820 !066
810 P$=" "&P$ !070
820 PRINT P$;" ";N$;!134
830 MADE=FG2(C)!068
840 ATT=FG2A(C)!087
850 GOSUB 1360 !165
860 PRINT TAB(7);S$;!228
870 IF PR=0 THEN 890 !211
880 PRINT #1:P$;" ";NAME$(C)
;TAB(16);S$;TAB(25);PCT$;!05
9
890 MADE=FG3(C)!069
900 ATT=FG3A(C)!088
910 GOSUB 1360 !165
920 PRINT TAB(13);S$;!018
930 IF PR=0 THEN 950 !015
940 PRINT #1:TAB(34);S$;TAB(
43);PCT$;!206
950 MADE=FT(C)!031
960 ATT=FTA(C)!050
970 GOSUB 1360 !165
980 PRINT TAB(19);S$;!024
990 PNT$=STR$(POINTS(C))!169
1000 IF POINTS(C)>9 THEN 102
0 !075
1010 PNT$=" "&PNT$ !138
1020 PRINT TAB(25);PNT$ !000
1030 IF PR=0 THEN 1050 !116
1040 PRINT #1:TAB(54);S$;TAB
(63);PCT$;TAB(77);PNT$: !116
7
1050 NEXT C !217
1060 PRINT !156
1070 MADE=TFG2 !232
1080 ATT=TFG2A !251
1090 GOSUB 1360 !165
1100 P1$=PCT$ !110
1110 PRINT TAB(7);S$;!228
1120 IF PR=0 THEN 1150 !216
1130 PRINT #1:!072
1140 PRINT #1:TAB(16);S$;TAB
(25);PCT$;!206
1150 MADE=TFG3 !233
1160 ATT=TFG3A !252
1170 GOSUB 1360 !165
1180 P2$=PCT$ !111
1190 PRINT TAB(13);S$;!018
1200 IF PR=0 THEN 1220 !030
1210 PRINT #1:TAB(34);S$;TAB
(43);PCT$;!206
1220 MADE=TFT !195
1230 ATT=TFTA !214
1240 GOSUB 1360 !165

```

(See Page 11)

REGENA ON BASIC—

(Continued from Page 10)

```

1250 PRINT TAB(19);S$;!024
1260 P3$=PCT$ !112
1270 X=1 !016
1280 IF TP<99 THEN 1300 !181
1290 X=0 !015
1300 IF PR=0 THEN 1330 !141
1310 PRINT #1:TAB(54);S$;TAB
(63);PCT$;TAB(75+X);TP !226
1320 CLOSE #1 !151
1330 PRINT TAB(23+X);TP !165
1340 PRINT TAB(8);P1$;TAB(14
);P2$;TAB(20);P3$ !169
1350 GOTO 1480 !028
1360 M$=STR$(MADE)!142
1370 A$=STR$(ATT)!084
1380 IF MADE>9 THEN 1400 !08
3
1390 M$=" "&M$ !064
1400 S$=M$&" "&A$ !112
1410 PCT$=" .00" !066
1420 IF MADE=0 THEN 1470 !14
2
1430 IF ATT=0 THEN 1470 !096
1440 PCT$=" "&STR$(INT(100*(
MADE/ATT)+.005)/100)!173
1450 IF PCT$<>" 1" THEN 1470
!100
1460 PCT$="1.00" !083
1470 RETURN !136
1480 PRINT : "SAVE STATS? Y/
N" !091
1490 CALL KEY(3,K,S)!190
1500 IF (K=78)+(K=110)THEN 1
880 !159
1510 IF (K<>89)+(K<>121)=-2
THEN 1490 !024
1520 PRINT : "DISK FILE NAME:
";!226
1530 INPUT B$ !248
1540 IF B$="" THEN 1520 !221
1550 B$=SEG$(B$,1,8)!048
1560 OPEN #1:"DSK1."&B$,INTE
RNAL,OUTPUT,FIXED 192 !220
1570 PRINT #1:T$,J !189
1580 FOR C=1 TO J !130
1590 PRINT #1:PL(C),NAME$(C)
,FG2(C),FG2A(C),FG3(C),FG3A(
C),FT(C),FTA(C),POINTS(C)!19
5
1600 NEXT C !217
1610 CLOSE #1 !151
1620 GOTO 1880 !174
1630 PRINT "FILENAME FOR STA
TS:" !167
1640 INPUT B$ !248
1650 B$=SEG$(B$,1,8)!048
1660 TFG2=0 !202
1670 TFG2A=0 !011
1680 TFG3=0 !203
1690 TFG3A=0 !012
1700 TFT=0 !165
1710 TFTA=0 !230
1720 TP=0 !091
1730 OPEN #1:"DSK1."&B$,INTE
RNAL,INPUT ,FIXED 192 !119
1740 INPUT #1:T$,J !179
1750 PRINT T$ !020
1760 FOR C=1 TO J !130
1770 INPUT #1:PL(C),NAME$(C)
,FG2(C),FG2A(C),FG3(C),FG3A(
C),FT(C),FTA(C),POINTS(C)!18
5
1780 TFG2=TFG2+FG2(C)!020
1790 TFG2A=TFG2A+FG2A(C)!215
1800 TFG3=TFG3+FG3(C)!023
1810 TFG3A=TFG3A+FG3A(C)!218
1820 TFT=TFT+FT(C)!165
1830 TFTA=TFTA+FTA(C)!104
1840 TP=TP+POINTS(C)!084
1850 NEXT C !217
1860 CLOSE #1 !151
1870 GOTO 650 !219
1880 END !139

```

PLAYER LIST

```

100 REM PLAYER LIST !003
110 REM BY REGENA !071
120 DIM PL(20),NAME$(20)!080
130 CALL CLEAR !209
140 PRINT "BASKETBALL PLAYER
LIST" !151
150 PRINT : "1 START NEW LI
ST" !034
160 PRINT : "2 LOAD PREVIOUSL
Y SAVED LIST" !215
170 PRINT : "3 END PROGRAM" !
135
180 CALL KEY(3,K,S)!190
190 IF (K<49)+(K>51)THEN 180
!200
200 ON K-48 GOTO 210,210,175
0 !165
210 PRINT : : !187
220 PRINT "ENTER TEAM NAME"
!120
230 INPUT T$ !010
240 IF LEN(T$)=0 THEN 220 !0
74
250 IF LEN(T$)>8 THEN 280 !1
45
260 A$=T$ !155
270 GOTO 290 !114
280 A$=SEG$(T$,1,8)!065
290 CALL CLEAR !209
300 ON K-48 GOTO 310,1650 !0
88
310 J=0 !001
320 PRINT : "FOR EACH PLAYE
R, LIST NUMBERAND NAME." !17
0
330 PRINT : "ENTER '99' FOR P
LAYER NUMBERWHEN FINISHED.":
: !102
340 INPUT "NUMBER: ":N !135
350 IF N=99 THEN 500 !058
360 IF (N<56)+(N>=0)+(INT(N)
=N)<>-3 THEN 320 !225
370 PRINT !156
380 INPUT "NAME: ":N$ !001
390 IF N$="" THEN 370 !103
400 PRINT :N;N$ !197
410 PRINT : "IS THIS CORRECT?
Y/N": !241
420 CALL KEY(3,K,S)!190
430 IF (K=89)+(K=121)THEN 45
0 !007
440 IF (K=78)+(K=110)THEN 32
0 ELSE 420 !112
450 J=J+1 !013
460 PL(J)=N !095
470 NAME$(J)=N$ !044
480 GOTO 340 !164
490 REM !186
500 CALL CLEAR !209
510 PRINT T$: : !051
520 N=J !086
530 NN(1)=1 !187
540 NN(2)=N !016
550 T=1 !012
560 IF T=0 THEN 890 !133
570 T=T-1 !034
580 U=2*T !037
590 L=NN(U+1)!035
600 M=NN(U+2)!037
610 X=PL(L)!107
620 X$=NAME$(L)!056
630 JJ=L !158
640 K=M+1 !017
650 K=K-1 !016
660 IF K=JJ THEN 760 !148

```

(See Page 12)

REGENA ON BASIC—

(Continued from Page 11)

```

670 IF X<=PL(K) THEN 650 !178
680 PL(JJ)=PL(K) !175
690 NAME$(JJ)=NAME$(K) !001
700 JJ=JJ+1 !161
710 IF K=JJ THEN 760 !148
720 IF X>=PL(JJ) THEN 700 !04
6
730 PL(K)=PL(JJ) !175
740 NAME$(K)=NAME$(JJ) !001
750 GOTO 650 !219
760 PL(JJ)=X !179
770 NAME$(JJ)=X$ !128
780 IF M-JJ<2 THEN 830 !155
790 U=2*T !037
800 NN(U+1)=JJ+1 !038
810 NN(U+2)=M !037
820 T=T+1 !033
830 IF K-L<2 THEN 560 !066
840 U=2*T !037
850 NN(U+1)=L !035
860 NN(U+2)=K-1 !223
870 T=T+1 !033
880 GOTO 560 !129
890 PRINT !156
900 FOR C=1 TO J !130
910 PRINT PL(C);TAB(5);NAME$(C) !172
920 NEXT C !217
930 PRINT : "IS THIS CORRECT? Y/N" !060
940 CALL KEY(3,K,S) !190
950 IF (K=89)+(K=121) THEN 970 !017
960 IF (K=78)+(K=110) THEN 1100 ELSE 940 !137
970 PRINT : "TEAM NAME TO BE SAVED:" !130
980 INPUT X$ !014
990 IF X$="" THEN 970 !203
1000 T$=X$ !178
1010 A$=SEG$(T$,1,8) !065
1020 OPEN #1:"DSK1."&A$,INTERNAL,OUTPUT,FIXED 192 !219
1030 PRINT #1:T$,J !189
1040 FOR C=1 TO J !130
1050 PRINT #1:PL(C),NAME$(C) !060
1060 NEXT C !217
1070 CLOSE #1 !151
1080 GOTO 1860 !154
1090 REM EDIT !000
1100 PRINT : "1 ADD PLAYER S" !085
1110 PRINT "2 DELETE PLAYER S" !217
1120 PRINT "3 EDIT PLAYERS" !075
1130 PRINT "4 END PROGRAM" !244
1140 CALL KEY(3,K,S) !190
1150 IF (K<49)+(K>52) THEN 1140 !141
1160 CALL CLEAR !209
1170 ON K-48 GOTO 320,1190,1420,1750 !249
1180 REM !186
1190 PRINT : "PRESS 'D' TO DELETE PLAYER" !169
1200 PRINT "PRESS <ENTER> TO SAVE" !047
1210 JJ=J !156
1220 FOR C=1 TO J !130
1230 IF (PL(C)=PL(JJ+1))+(NAME$(C)=NAME$(JJ+1))=-2 THEN 1380 !146
1240 PRINT : PL(C);TAB(5);NAME$(C) !097
1250 CALL KEY(3,K,S) !190
1260 IF K=13 THEN 1370 !147
1270 IF (K<>68)+(K<>100)=-2 THEN 1250 !033
1280 FOR CC=C TO JJ-1 !020
1290 PL(CC)=PL(CC+1) !151
1300 NAME$(CC)=NAME$(CC+1) !233
1310 NEXT CC !028
1320 FOR CC=JJ TO J !095
1330 NAME$(CC)="" !189
1340 NEXT CC !028
1350 JJ=JJ-1 !162
1360 C=C-1 !000
1370 NEXT C !217
1380 CALL CLEAR !209
1390 J=JJ !156
1400 GOTO 890 !204
1410 REM !186
1420 FOR C=1 TO J !130
1430 PRINT : "PRESS 'E' TO EDIT" !039
1440 PRINT "PRESS <ENTER> TO SAVE" !047
1450 PRINT : PL(C);NAME$(C) !070
1460 CALL KEY(3,K,S) !190
1470 IF K=13 THEN 1610 !132
1480 IF (K<>69)+(K<>101)=-2 THEN 1460 !246
1490 PRINT : "PRESS <ENTER> TO KEEP AS IS" !005
1500 PRINT : "PLAYER NUMBER:";PL(C) !055
1510 INPUT "NUMBER: ":N$ !171
1520 IF N$="" THEN 1570 !028
1530 N=VAL(N$) !197
1540 IF (N<0)+(N>55) THEN 1500 !193
1550 IF INT(N)<>N THEN 1500 !053
1560 PL(C)=N !088
1570 PRINT : "NAME: ";NAME$(C) !247
1580 INPUT "NAME: ":N$ !001
1590 IF N$="" THEN 1610 !068
1600 NAME$(C)=N$ !037
1610 NEXT C !217
1620 CALL CLEAR !209
1630 GOTO 500 !068
1640 REM !186
1650 OPEN #1:"DSK1."&A$,INTERNAL,INPUT,FIXED 192 !118
1660 INPUT #1:T$,J !179
1670 CALL CLEAR !209
1680 PRINT T$: !126
1690 FOR C=1 TO J !130
1700 INPUT #1:PL(C),NAME$(C) !050
1710 PRINT PL(C);TAB(5);NAME$(C) !172
1720 NEXT C !217
1730 CLOSE #1 !151
1740 GOTO 1100 !159
1750 CALL CLEAR !209
1760 IF J=0 THEN 1870 !083
1770 PRINT "SAVE BACKUP COPY? Y/N" !013
1780 CALL KEY(3,K,S) !190
1790 IF (K=78)+(K=110) THEN 1860 !139
1800 IF (K<>89)+(K<>121)=-2 THEN 1780 !059
1810 PRINT : "SAVE AS WHAT FILE NAME?" !038
1820 INPUT T$ !010
1830 IF T$="" THEN 1810 !019
1840 A$=SEG$(T$,1,8) !065
1850 GOTO 1020 !078
1860 CALL CLEAR !209
1870 END !139

```

**Attend a
★ TI Fair ★**

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

Subindex Two

The Search for Tokens

By JERRY L. STERN

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All sequels have to search for something. Really, just check your local video rental shop — *Ghostbusters II* searched for more spirits, *Star Trek III* sought Spock, and *Batman II* will search for the Penguin and box office bonanzas. But it's not just movies; computer program sequels continually explore strange new algorithms, seek out new printouts and new file formats, and boldly compute where no one has computed before.

When I started writing this series of columns more than three years ago, the first program listed was SUBINDEX, a program that read a disk of subprograms and created a printed index of those subprograms as an aid to programming. I've accumulated enough subprograms now that I wanted more power in SUBINDEX, so this month's program is the new, improved version, SUBINDEX II.

The original program would read the disk directory, identify all the subprograms, and print out the first line, all the comment lines, and the line number of the last line. Each line was printed by decoding the token format used in the disk file. (One more time — token format is the storage method used to hold Extended BASIC programs on disk. Every programming command and statement has a number assigned to it, and we can decode a disk file by looking up the numbers in a table, and doing a few calculations to decipher the line numbers and text strings.) Because of the complexity of decoding all the tokens in a subprogram, the original SUBINDEX only converted the commands SUB, SUBEND, !, and REM. The last line printed for each subprogram was always just the line number and the SUBEND statement, even when the actual program line was a multiple-statement line.

SUBINDEX2 doesn't have those limitations. It has all the index-creation abilities of the old SUBINDEX, plus the complete program-decoding capabilities of November's FANCYLIST program. Every pro-

gram line can be completely decoded, and the print style can be changed and customized to suit your needs, using the instructions for FANCYLIST in November's MICROpendium. And now there are three different printouts available from SUBINDEX2. The original printout of first and last lines and comment lines is available as option 2 on the menu. Option 3 will print only the full first line and the ending line number of each subprogram, and option 1 will print every line of every subprogram. This last printout is useful when a program is already loaded, and you don't quite remember whether you need to merge in the subprogram SORT1 or the other version, SORT2.

Let's back up some. Why should every Extended BASIC programmer accumulate subprograms on a separate disk from other work? Well, first, each of us programmers uses the same routines over and over again, whether it is a routine that pauses until a key is pressed or changes the screen colors to white on a blue background, or sorts a set of words or numbers. Subprograms allow us to type those routines just once, and then use them over and over again. Those of you who have read this column since the original SUBINDEX was printed have seen the subprograms PAUSE, BLUE, MENU, TITLE and MACCEPT many times. I couldn't possibly write a program every month if I had to rewrite and retype these routines for every project. Second, having these repeated functions in subprograms allows far more powerful programs to be assembled out of smaller pieces. And finally, keeping the subprograms together on a disk, each in its own merge file, saves time. The subs are all together, and there is no searching for them.

Starting a library disk of subprograms is easy. First, separate each subprogram for the collection from its accompanying program. Add comment lines as needed to identify clearly what the program does, what input it needs and what output it will create. You could also include the source

or author, date and version number. Next, resequence the subprogram to a very high set of line numbers. My own file started at 30000, and ran out of room at 32767, so I now have worked my way down to 27600. I suggest starting at 25000. Each subprogram should have a different, and non-overlapping, set of line numbers, so that it is never necessary to resequence the subprogram before merging it into a main program. To help keep track of the line numbers you already have in use, the last line of the SUBINDEX2 printouts will state the highest and lowest line number already in use. (When you add to your file disk, write down each new file name and its associated line numbers so that you will know what line numbers to use if you save another subprogram before printing out a new index.) Finally save the subprogram in merge format, like so: SAVE DSK1.PAUSE, MERGE

Use the program name as the file name, so that you will be able to merge the subprogram later without having to read a disk directory. That choice for file names will also force you to never repeat a name for a subprogram. Multiple versions of a subprogram can be saved with numbers, such as HEADER, HEADER2, and so on. Since Extended BASIC does not allow multiple subprograms with identical names in a program, this limitation forces us to choose reasonable subprogram/file names when we first write and save our subprograms.

Once you have some subprograms on disk, you'll be ready to start using SUBINDEX2, but first you'll need to set the program defaults to match your own systems. In line 80, set DR\$ to the drive number, in quotes, that you will use for your subprogram disk. In line 90, change "RS232.DA=8..." to match your printer's name. In line 130, change SET\$ as you like to match the start-up codes to be sent to your printer. The choices currently in SET\$ are ASCII codes 27 and 48 for eight lines per inch, codes 27, 67, 88 to set

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the page length to 88 lines so that each page will be filled at the eight-lines-per-inch density, and codes 27, 78, 3 to set the automatic skip perforation to pass by three blank lines at each perforation.

Next, adjust the printer style codes as needed for BOLDON\$ and BOLDOFF\$, and wide and italics codes, in lines 160 to 190. After you run the program, you can also go through the PRINT commands, and add the WIDEON\$ and other print commands, and their matching OFF commands before and after each printing choice. For example, you could print the SUB statement double width, by changing line 1220 to read: 1220 TS(161)=WIDEON\$ & "SUB " & WIDE-OFF\$

Done? OK, start the program. At the first prompt, confirm the printer name and press ENTER. At "Drive to Index?" type the drive number, or press ENTER to accept the default choice. Finally, choose the printout style: 1 for full listings, which will take quite a while — a full SSSD disk of about 80 subprograms took about two hours, but the printout is 23 pages long. Options of first, last and comment lines will take, on average, about one-quarter as long, and option 3, of first line and ending line number, will be the fastest and shortest printout.

SUBINDEX2 is a simple program to understand. After the setup and title screen, a loop in lines 250 to 300 opens the disk directory, also known as the file with no name, and reads in the filenames and their specifications. All the files that are in Display/Variable 163 format are entered in the array A\$(). Starting at line 320, each file is opened, the first line is analyzed to confirm that the file is really and truly a subprogram, and not a full program stored in merge format. Files that aren't subprograms are skipped over. The remaining lines, up to 450, decide which lines to print for each of the three print options, and send those lines, as C\$, to the subprogram starting on line 460. That subprogram is the old program FANCYLIST, simplified to work without doing any file input of its own.

Finally, three subprograms are in SUBINDEX2. Each time I use TITLE2 I

modify it for the new program, but SWAP and BLUE stay the same every time they're used. Type them in and save them separately from SUBINDEX2, in merge format, and you'll have the beginnings of your subprogram library. Then you can start a new search of your own; start looking for the routines that occur in all of your programs, and add them to your collection. Pretty soon, you'll find that a collection of subprograms will save you so much time that you'll have more time to watch those movie sequels, and more time to show off your finished software.

SUBINDEX2

```
80 DR$="1" ! Default drive !
019
90 PR$="RS232.DA=8.BA=4800"
!Default printer !231
100 ! SUBINDEX2 !055
110 ! V. 1.0 Enhanced subpro
gram indexer and lister; JL
Stern 2/92 !140
120 CALL CLEAR :: CALL BLUE
:: CALL TITLE2 !133
130 SET$=CHR$(27)&CHR$(48)&C
HR$(27)&CHR$(67)&CHR$(88)&C
HR$(27)&CHR$(78)&CHR$(3) !099
140 DIM T$(255),A$(127):: ON
WARNING NEXT !025
150 END$=RPT$(CHR$(255),2) !0
95
160 BOLDON$=CHR$(27)&CHR$(71
):: BOLDOFF$=CHR$(27)&CHR$(7
2) !071
170 WIDEON$=CHR$(14):: WIDEO
FF$=CHR$(20) !241
180 ITALON$=CHR$(27)&CHR$(52
):: ITALOFF$=CHR$(27)&CHR$(5
3) !087
190 COMPON$=CHR$(15):: COMPO
FF$=CHR$(18) !005
200 GOSUB 900 !215
210 DISPLAY AT(8,1):"Printer
Name?":PR$ :: ACCEPT AT(9,1
)VALIDATE(UALPHA,DIGIT,"./"
)SIZE(-28):PR$ !120
220 DISPLAY AT(11,1):"Drive
to Index?":DSK"&DR$&". " ::
ACCEPT AT(12,4)VALIDATE(DIGI
T)SIZE(-1):DR$ !111
230 DISPLAY AT(14,1):"Choose
printout:":"1 All lines":"2
```

```
First, last & comments":"3
Filenames and line numbers"
:: ACCEPT AT(19,1)VALIDATE("
123")SIZE(1):CH !004240 DISP
LAY AT(22,1):"Date or Title?"
:: ACCEPT AT(23,1)SIZE(28)
:Q$ !089
250 OPEN #1:"DSK"&DR$&".",IN
PUT ,RELATIVE,INTERNAL !171
260 I=1 :: HI=0 :: LW=40000
!111
270 INPUT #1:A$(I),X,Y,Z ::
IF A$(I)="" THEN 300 ELSE IF
ABS(X)<>2 THEN 270 !096280
TM$=" "&STR$(Z):: IF SEG$(TM
$,LEN(TM$)-2,3)="163" THEN I
=I+1 !216
290 GOTO 270 !094
300 CLOSE #1 :: OPEN #9:PR$,
DISPLAY ,VARIABLE 132,OUTPUT
:: PRINT #9:COMPON$;SET$ !1
90
310 PRINT #9:Q$ !197
320 FOR N=1 TO I-1 :: OPEN #
3:"DSK"&DR$&". "&A$(N),INPUT
,DISPLAY ,VARIABLE 163 !096
330 LINPUT #3:C$ :: IF ASC(S
EG$(C$,3,1))<>161 THEN 430 E
LSE GOSUB 480 :: LW=MIN(LW,A
SC(C$)*256+ASC(SEG$(C$,2,1)
)):: GOTO 340 !106
340 IF EOF(3)THEN 420 ELSE L
INPUT #3:C$ !021
350 IF C$=RPT$(CHR$(255),2)T
HEN 420 !109
360 TM=ASC(SEG$(C$,3,1)) !176
370 IF (TM=154)+(TM=131)THEN
GOSUB 460 :: GOTO 340 !149
380 TM=POS(C$,CHR$(168),3) !0
27
390 IF TM>0 THEN GOSUB 460 :
HI=MAX(HI,ASC(C$)*256+ASC(
SEG$(C$,2,1))):: GOTO 420 !1
10
400 IF CH=1 THEN GOSUB 460 :
HI=MAX(HI,ASC(C$)*256+ASC(
SEG$(C$,2,1))) !225
410 GOTO 340 !164
420 IF CH=3 THEN PRINT #9:"E
nds on ";ASC(C$)*256+ASC(SEG
$(C$,2,1))ELSE PRINT #9: !176
430 CLOSE #3 :: NEXT N :: PR
```

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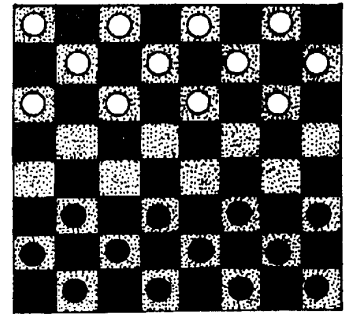
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```

INT #9: : "SUBPROGRAMS ON DIS
K RANGE FROM ";LW;" TO ";HI
!200
440 CLOSE #9 !159
450 STOP !152
460 ! FANCYLIST subroutine !
192
470 IF CH=3 THEN RETURN !001
480 PRINT #9:ASC(C$)*256+ASC
(SEG$(C$,2,1));TAB(8);!014
490 FOR L=3 TO LEN(C$)-1 !16
8
500 NC=ASC(SEG$(C$,L,1))!240
510 IF NC>201 THEN 820 !227
520 IF NC=201 THEN 770 !175
530 IF NC=200 THEN 700 !103
540 IF NC=199 THEN 630 !050
550 IF NC=130 THEN 850 !000
560 IF NC>128 THEN 820 !235
570 ! Variable name !138
580 W$=BOLDON$ !027
590 W$=W$&CHR$(NC)!064
600 NC=ASC(SEG$(C$,L+1,1))::
IF NC=0 THEN GOTO 610 ELSE
IF NC<127 THEN L=L+1 :: GOTO
590 !248
610 PRINT #9:W$;BOLDOFF$;!08
3
620 GOTO 880 !194
630 ! Quoted string !204
640 W$="""&ITALON$ !198
650 L=L+1 :: NC=ASC(SEG$(C$,
L,1))!131
660 WORD$=SEG$(C$,L+1,NC)::
CALL SWAP(WORD$,CHR$(34),CHR
$(7)):: CALL SWAP(WORD$,CHR$
(7),RPT$(CHR$(34),2))!228
670 PRINT #9:W$;WORD$;ITALOF
F$;" "" ";!047
680 L=L+NC !168
690 GOTO 880 !194
700 ! Unquoted strings & num
bers !132
710 W$=BOLDON$ !027
720 L=L+1 :: NC=ASC(SEG$(C$,
L,1))!131
730 WORD$=SEG$(C$,L+1,NC)!20
0
740 PRINT #9:W$;WORD$;BOLDOF
F$;" ";!003
750 L=L+NC !168
760 GOTO 880 !194
770 ! Line numbers !071
780 NC=ASC(SEG$(C$,L+1,1))::
NC2=ASC(SEG$(C$,L+2,1))!011
790 PRINT #9:NC*256+NC2;" ";
!224
800 L=L+2 !018
810 GOTO 880 !194
820 ! Reserved word tokens !
115
830 PRINT #9:T$(NC);!122
840 GOTO 880 !194
850 ! Multi-statement lines
!235
860 PRINT #9:"::" !141
870 PRINT #9:TAB(8);!110
880 NEXT L :: PRINT #9:!180
890 RETURN !136
900 ! Token list initializat
ion subroutine !248
910 T$(129)="ELSE " !031
920 T$(131)="! " !013
930 T$(132)="IF " !125
940 T$(133)="GO " !133
950 T$(134)="GOTO " !043
960 T$(135)="GOSUB " !116
970 T$(136)="RETURN " !214
980 T$(137)="DEF " !195
990 T$(138)="DIM " !207
1000 T$(139)="END " !205
1010 T$(140)="FOR " !213
1020 T$(141)="LET " !212
1030 T$(142)="BREAK " !087
1040 T$(143)="UNBREAK " !253
1050 T$(144)="TRACE " !099
1060 T$(145)="UNTRACE " !009
1070 T$(146)="INPUT " !134
1080 T$(147)="DATA " !016
1090 T$(148)="RESTORE " !030
1100 T$(149)="RANDOMIZE " !1
66
1110 T$(150)="NEXT " !047
1120 T$(151)="READ " !013
1130 T$(152)="STOP " !056
1140 T$(153)="DELETE " !168
1150 T$(154)="REM " !215
1160 T$(155)="ON " !144
1170 T$(156)="PRINT " !132
1180 T$(157)="CALL " !019
1190 T$(158)="OPTION " !211
1200 T$(159)="OPEN " !043
1210 T$(160)="CLOSE " !104
1220 T$(161)="SUB " !219
1230 T$(162)="DISPLAY " !012
1240 T$(163)="IMAGE " !088
1250 T$(164)="ACCEPT " !167

```

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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.

\$14.95

U.S. add \$3.00 S&H
Can. add \$3.50 S&H
Air, add \$7.00 S&H

Asgard Software
P.O. Box 10306
Rockville, MD 20849

EXTENDED BASIC—

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```

1260 T$(165)="ERROR " !129
1270 T$(166)="WARNING " !016
1280 T$(167)="SUBEXIT " !031
1290 T$(168)="SUBEND " !188
1300 T$(169)="RUN " !238
1310 T$(170)="LINPUT " !208
1320 T$(176)="THEN " !039
1330 T$(177)="TO " !154
1340 T$(178)="STEP " !054
1350 T$(179)="," " !036
1360 T$(180)=";" " !043
1370 T$(181)=":" " !043
1380 T$(182)=")" " !027
1390 T$(183)="(" " !027
1400 T$(184)="&" " !026
1410 T$(186)="OR " !152
1420 T$(187)="AND " !204
1430 T$(188)="XOR " !152
1440 T$(189)="NOT " !236
1450 T$(190)="=" " !046
1460 T$(191)="<" " !046
1470 T$(192)=">" " !049
1480 T$(193)="+" " !031
1490 T$(194)="-" " !034
1500 T$(195)="*" " !032
1510 T$(196)="/" " !038
1520 T$(197)="^" " !086
1530 T$(202)="EOF" !166
1540 T$(203)="ABS" !163
1550 T$(204)="ATN" !177
1560 T$(205)="COS" !180
1570 T$(206)="EXP" !189
1580 T$(207)="INT" !188
1590 T$(208)="LOG" !180
1600 T$(209)="SGN" !187
1610 T$(210)="SIN" !181
1620 T$(211)="SQR" !194
1630 T$(212)="TAN" !176
1640 T$(213)="LEN" !173
1650 T$(214)="CHR$" !209
1660 T$(215)="RND " !213
1670 T$(216)="SEG$" !213
1680 T$(217)="POS" !196
1690 T$(218)="VAL" !182
1700 T$(219)="STR$" !242
1710 T$(220)="ASC" !163
1720 T$(221)="PI " !134
1730 T$(222)="REC " !201
1740 T$(223)="MAX" !181
1750 T$(224)="MIN" !180
1760 T$(225)="RPT$" !236
1770 T$(232)="NUMERIC " !007
1780 T$(233)="DIGIT " !100
1790 T$(234)="UALPHA " !176
1800 T$(235)="SIZE" !014
1810 T$(236)="ALL " !205
1820 T$(237)="USING " !125
1830 T$(238)="BEEP " !019
1840 T$(239)="ERASE " !105
1850 T$(240)="AT" !098
1860 T$(241)="BASE " !012
1870 T$(243)="VARIABLE " !06
1
1880 T$(244)="RELATIVE " !08
4
1890 T$(245)="INTERNAL " !08
6
1900 T$(246)="SEQUENTIAL " !
247
1910 T$(247)="OUTPUT " !234
1920 T$(248)="UPDATE " !189
1930 T$(249)="APPEND " !179
1940 T$(250)="FIXED " !098
1950 T$(251)="PERMANENT " !1
61
1960 T$(252)="TAB" !168
1970 T$(253)="#" !243
1980 T$(254)="VALIDATE" !034
1990 RETURN !136
29095 SUB SWAP(X$,OLD$,NEW$)
!008
29100 !SEARCHES X$ AND REPLA
CES OLD$ WITH NEW$; JLS 3/90
!171
29105 C=POS(X$,OLD$,1):: IF
C=0 THEN SUBEXIT !125
29110 IF C=1 THEN X$=NEW$&SE
G$(X$,C+LEN(OLD$),LEN(X$)-LE
N(OLD$)):: GOTO 29105 !087
29115 X$=SEG$(X$,1,C-1)&NEW$
&SEG$(X$,C+LEN(OLD$),LEN(X$)
-LEN(OLD$)-C+1):: GOTO 29105
!192
29120 SUBEND !168
29505 SUB BLUE !149
29510 ! SWITCHES DISPLAY TO
WHITE ON BLUE; JLS 7/88 !230
29515 CALL SCREEN(5):: FOR L
=0 TO 14 :: CALL COLOR(L,16,
1):: NEXT L :: SUBEND !202
31565 SUB TITLE2 !035
31575 DISPLAY AT(1,8)ERASE A
LL:"SUBINDEX II" :: CALL CHA
R(95,"00FF"):: CALL HCHAR(2,
10,95,11)!157
31580 DISPLAY AT(4,5):"Subpr
ogram Indexing" !180
31590 DISPLAY AT(6,2):"Febru
ary 1992 Jerry Stern" !206
31595 SUBEND !168

```

Comprodine releases program for users with color printers

Rodger Merritt of Comprodine has released a new program for use with color printers. "Color Banner Maker" is an all-assembly language program that, like its predecessor Banner Maker (found in ARTIST Printshop) uses TI-Artist fonts and pictures.

According to the manufacturer, every picture (instance) in a banner can be any of the seven colors supported by the color printer. The text itself can be either all one color; a "rainbow" effect, whereby each successive character changes to the next printer color; or an "alternate" effect, with two col-

ors alternating throughout the message.

As with Banner Maker, pictures and text can be as large as the printer will handle, the manufacturer says.

Color Banner Maker is written for the Star NX-1000 Rainbow Printer and all compatibles.

Cost is \$10 plus \$1.50 shipping and handling. Send order either to Paul Coleman, 3971 S.E. Lincoln, Portland, OR 97214, or to Comprodine, c/o Rodger Merritt, 1949 Evergreen Ave., Fullerton, CA 92635.

THE ART OF ASSEMBLY — PART 9

More file handling tips

By BRUCE HARRISON
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Last month we spent most of our space dealing with file errors. This month we'll get into ways to deal with the normal situation of files that do open and get read or written.

Since space is limited, we'll concentrate on commonly used file types, like Display/Variable 80, Display/Fixed 80, and so-called Program files, also known as Memory Image files. After you've read this article, you should know how to change the source code to handle other file types.

One of the primary requirements for doing anything with files on the TI is to set aside some space in the VDP RAM for your Peripheral Access Blocks (PABs) and the Buffers you'll need to send or receive data from your files. To some extent, you are free to use many different locations in VDP, but must take care not to overlap areas important to your program's execution. If you're operating in Graphics Mode on the VDP (this is the normal mode when you enter from E/A Option 3) you'll find that any address above >1000 and below >37D7 can be used. In many cases we've put our PAB at >1000 and our buffer at >1050. It's important to insure that the buffer won't overlap either the PAB or >37D7. For most devices, the entire PAB, including the file descriptor, will not exceed 25 bytes in length. If, however, you're dealing with Hard Drive files, the descriptor may occupy many more bytes, including directory and sub-directory names.

If you are operating in TEXT mode on the VDP, another area in VDP RAM is open for your use, between >400 and >800. In our Word Processor, which operates in TEXT mode, we use that area for four separate PABs and their associated buffers.

If only one file at a time is opened, you can "recycle" and use the same PAB and Buffer area for any and all files you use. Otherwise, you'll need a separate PAB and Buffer for each file open simultaneously.

The practice for establishing PABs is fairly simple. The fixed data for the first 10 bytes are placed in the data area of our source code, with a small area (usually 15 bytes) reserved beyond that for the file descriptor, which comes from user-entered data. An example is shown in the sidebar at label PABIDT. This PAB data is preset for opening a D/V 80 file type. The code at label START shows how one might use our subroutines CRSIN and MOVSTR (given in previous articles of this series) to get the name of the file in place as a user input. In this case, the full version of CRSIN should be

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```
* SOME CODE FRAGMENTS FOR FILE HANDLING OPERATIONS
* THESE ARE BITS AND PIECES TO BE INTEGRATED INTO PROGRAMS
* TO PERFORM FILE OPENINGS, READING, WRITING, AND CLOSINGS
* ALL PUBLIC DOMAIN SOURCE CODE
*
* REQUIRED REFERENCES
  REF VMBW,VMBR,VSBW,VSBR
  REF DSRLNK
*
* REQUIRED EQUATES
STATUS EQU >837C
WS EQU >20BA
GPLWS EQU >83E0
PAB1 EQU >1000
BUF EQU >1050
PABPNT EQU >8356
*
*
* CODE AT LABEL START COULD BE USED TO GET A FILE NAME INPUT FROM THE
* USER. IT USES SUBROUTINES WE'VE SUPPLIED PREVIOUSLY
*
START LI R15,RTNSTK SET STACK FOR HIGH LEVEL SUBROUTINE
      LI R0,3 ROW 1, COLUMN 4
      LI R4,15 15 CHARACTERS WILL BE ACCEPTED
      BL @CRSIN USE CRSIN SUBROUTINE
      LI R9,TEMSTR POINT AT TEMPORARY STRING
      LI R10,PABIDT+9 POINT R10 AT FILE DESCRIPTOR LENGTH BYTE
      BL @MOVSTR MOVE STRING FROM TEMSTR TO PAB DATA
*
* TWO WAYS TO OPEN ARE SHOWN
* USE ONLY ONE OF THESE, DEPENDING ON YOUR NEED
* FIRST IS THE LONG AND ACCURATE METHOD
* SECOND IS A SHORTCUT
OPNF1 MOV @INMD,@PABIDT+1 OPEN WILL BE INPUT MODE
      LI R0,PAB1 SET WRITE ADDRESS IN R0
      MOV @PABIDT+9,R2 GET DESCRIPTOR LENGTH BYTE INTO LEFT BYTE R2
      SRL R2,8 RIGHT JUSTIFY SO R2 IS A WORD OF LENGTH
      AI R2,10 ADD 10 TO INCLUDE THE PABIDT LINE PLUS DESCRIPTOR
      LI R1,PABIDT POINT R1 AT PAB DATA
      BLWP @VMBW WRITE BYTES TO PAB LOCATION IN VDP RAM
      AI R0,9 ADD NINE TO ADDRESS IN R0
      MOV R0,@PABPNT PLACE THAT ADDRESS AT >8356
      CLR @STATUS CLEAR GPL STATUS
      BLWP @DSRLNK USE DSRLNK UTILITY
      DATA 8 REQUIRED DATA
      STST R14 STORE STATUS REGISTER IN R14
      ANDI R14,>2000 MASK ALL BUT BIT #2 IN R14
      JEQ RDF1 IF ZERO, GO AHEAD TO READ FILE
      B @OPNERR ELSE TO OPNERR (SHOWN IN LAST ARTICLE)
* SHORTCUT METHOD FOR FILES OTHER THAN HARD DISK OR RS232 TYPE
OPNF1 MOV @INMD,@PABIDT+1 OPEN WILL BE INPUT MODE
      LI R0,PAB1 SET WRITE LOCATION
      LI R1,PABIDT SET SOURCE FOR PAB DATA
      LI R2,25 25 BYTES - MAX FOR MOST PURPOSES
      BLWP @VMBW WRITE DATA TO VDP
      AI R0,9 ADD NINE
      MOV R0,@PABPNT MOVE TO >8356
      CLR @STATUS CLEAR STATUS
      BLWP @DSRLNK USE LINKAGE VECTOR
      DATA 8 REQUIRED DATA
      STST R14 STORE STATUS REGISTER IN R14
      ANDI R14,>2000 MASK ALL EXCEPT BIT 2
      JEQ READF1 IF ZERO, PROCEED TO READ
      B @OPNERR OPNERR SHOWN LAST ARTICLE
RDF1 MOV @READF,R1 MOVE READ OPCODE INTO LEFT BYTE R1
      LI R0,PAB1 PAB ADDRESS IN VDP
      BLWP @VSBW WRITE ONE BYTE INTO PAB
      AI R0,9 ADD NINE
```

ART OF ASSEMBLY—

(Continued from Page 17)

used, including the lowercase to uppercase conversion lines, so the user won't have to worry about having Alpha Lock engaged to enter a file name with all uppercase letters. One note of caution - after the call to CRSIN, it's wise to see whether the user has left the input blank, and issue him an error message if he has. CRSIN leaves the length of the input string in R2, so a simple MOV R2,R2 followed by a JEQ to jump somewhere and report an error will do the trick.

The code at label OPNF1 shows how to load that data into the PAB area in VDP, and then open the file. First, the file mode must be placed in the PABIDT area. We've shown in the example a file to be opened for INPUT by moving a byte called INMD to PABIDT+1. Incidentally, we don't recommend using UPDATE mode for Variable record length files. It is too easy to create an unusable file by trying to write to such a file in UPDATE mode. For Fixed record length files, UPDATE will allow you to modify records in the file at random without messing up the rest of the file.

It's important at this stage that the first byte in this PAB be 00, so that the file will OPEN. Next, to write this data into VDP at the correct place, and insure that the right number of bytes are written to include the complete file descriptor. The first example in the sidebar shows the right way to do this, so that the actual descriptor length is used to write all the necessary bytes into the VDP. If you're not dealing with the longer descriptors needed for Hard Drives or RS232, you can use the second, or shortcut, method, which writes 25 bytes regardless of descriptor length (25 bytes will include the 10 of the PAB, plus 5 for the device name and period, plus 10 for the maximum acceptable file name length).

Once the PAB has been written to the VDP, one needs to place the address PAB1+9 at location >8356, which we call PABPNT. The DSRLNK must have this address in that location so it can find the file descriptor in VDP RAM. We normally include a CLR @STATUS before calling DSRLNK, but we're not sure it's necessary. In some cases, we've forgotten to do it with no ill effects. Be brave, and leave that line out.

In all cases, the BLWP @DSRLNK line must be followed by a line reading DATA 8. Maybe there was supposed to be another use for DSRLNK in which some number other than 8 would be used, but we don't know about that. In any case, forgetting the DATA 8 will cause DSRLNK to fail. We've shown here the steps necessary to detect an error on opening the file, and that branches to the code we included in last month's column.

Given that the file opens, we can read records from the file using the code at label RDF1. The bytes (See Page 19)

```

MOV R0,@PABPNT    MOVE TO >8356
CLR @STATUS        CLEAR GPL STATUS
BLWP @DSRLNK       USE DSRLNK
DATA 8             REQUIRED DATA
LI R0,PAB1+1       SET TO SECOND BYTE OF PAB IN VDP
BLWP @VSBRR        READ INTO LEFT BYTE R1
SRL R1,13          SHIFT R1 RIGHT BY 13 BITS
JEQ READON         IF ZERO, NO ERROR IN DSR OPERATION
CI R1,5            IF ERROR = 5, END OF FILE HAS BEEN REACHED
JEQ CLSF1          IF SO, CLOSE THE FILE
B @FILERR          ELSE SOME OTHER ERROR, REPORT THAT TO USER
READON LI R0,PAB1+5 POINT AT PAB+5 IN VDP RAM
BLWP @VSBRR        READ THAT BYTE INTO LEFT BYTE R1
* FOR D/V FILES, THE BYTE AT PAB+5 IS THE LENGTH OF THE RECORD JUST READ
MOVB R1,R2         MOVE BYTE INTO R2
SRL R2,8           RIGHT JUSTIFY LENGTH IN R2
MOVB R1,@TEMSTR    MOVE BYTE TO TEMSTR
LI R0,BUF          POINT TO BUFFER LOCATION IN VDP
LI R1,TEMSTR+1     CONTENT GOES TO TEMSTR+1
BLWP @VMBR         READ CONTENT OF RECORD FROM VDP BUFFER
* CODE WOULD BE INSERTED HERE TO MOVE THE RECORD FROM TEMSTR, OR DISPLAY
* THE RECORD ON THE SCREEN, OR ANY OTHER OPERATION YOU DESIRE
JMP RDF1           JUMP BACK TO READ NEXT RECORD
CLSF1 LI R0,PAB1    POINT TO PAB ADDRESS
MOVB @CLOSEF,R1    GET CLOSE OPCODE IN LEFT BYTE R1
BLWP @VSEW         WRITE OPCODE TO PAB
AI R0,9            ADD NINE
MOV R0,@PABPNT     PLACE AT >8356
CLR @STATUS        CLEAR STATUS
BLWP @DSRLNK       CALL DSRLNK
DATA 8             REQUIRED DATA
* FROM HERE, GO ON TO NEXT PROGRAM OPERATION
*
* CODE BELOW OPENS A D/V 80 FILE FOR WRITING, THEN WRITES THE RECORD STASH
* AT TEMSTR TO THE FILE
*
OPNF2 MOV @OUTMD,@PABIDT+1 OPEN WILL BE OUTPUT MODE
LI R0,PAB1         SET WRITE ADDRESS IN R0
MOVB @PABIDT+9,R2  GET DESCRIPTOR LENGTH BYTE INTO LEFT BYTE R2
SRL R2,8           RIGHT JUSTIFY SO R2 IS A WORD OF LENGTH
AI R2,10           ADD 10 TO INCLUDE THE PABIDT LINE PLUS DESCRIPTOR
LI R1,PABIDT       POINT R1 AT PAB DATA
BLWP @VMBW         WRITE BYTES TO PAB LOCATION IN VDP RAM
AI R0,9            ADD NINE TO ADDRESS IN R0
MOV R0,@PABPNT     PLACE THAT ADDRESS AT >8356
CLR @STATUS        CLEAR GPL STATUS
BLWP @DSRLNK       USE DSRLNK UTILITY
DATA 8             REQUIRED DATA
STST R14           STORE STATUS REGISTER IN R14
ANDI R14,>2000     MASK ALL BUT BIT #2 IN R14
JEQ WRTF2          IF ZERO, GO AHEAD TO WRITE FILE
B @OPNERR          ELSE TO OPNERR (SHOWN IN LAST ARTICLE)
WRTF2 MOV @TEMSTR,R1 GET LENGTH OF RECORD IN LEFT BYTE R1
LI R0,PAB1+5       POINT TO RECORD LENGTH BYTE OF PAB
BLWP @VSEW         WRITE LENGTH TO PAB
MOVB R1,R2         PLACE LENGTH IN LEFT BYTE R2
SRL R2,8           RIGHT JUSTIFY LENGTH IN R2
LI R1,TEMSTR+1     POINT TO STRING CONTENT
LI R0,BUF          POINT AT BUFFER IN VDP
BLWP @VMBW         WRITE RECORD CONTENTS TO VDP
MOVB @WRITEF,R1    GET WRITE OPCODE IN R1
LI R0,PAB1         POINT TO START OF PAB
BLWP @VSEW         WRITE THE OPCODE BYTE TO VDP
AI R0,9            ADD 9
MOV R0,@PABPNT     MOVE TO >8356
CLR @STATUS        CLEAR GPL STATUS BYTE
BLWP @DSRLNK       CALL DSR LINKAGE
DATA 8             REQUIRED DATA
LI R0,PAB1+1       POINT TO SECOND BYTE OF PAB
BLWP @VSBRR        READ THAT BYTE INTO R1
SRL R1,13          SHIFT R1 RIGHT 13 BITS
JEQ WRTON          IF ZERO, NO ERROR, SO GO ON
B @FILERR          ELSE BRANCH TO ERROR HANDLING
WRTON
* THIS LABEL WOULD GET ANOTHER RECORD READY AT TEMSTR, THEN BRANCH BACK TO
* WRTF2, OR ELSE IF FINISHED WOULD BRANCH BACK TO CLSF1 TO CLOSE THE FILE

```

ART OF ASSEMBLY—

(Continued from Page 18)

READF, WRITEF and CLOSEF will work for any kind of file except Memory Image type, in which they're not needed.

For illustrative purposes only, we've parked the contents of each record we read at location TEMSTR, which in this case has been set to a block of 81 bytes, one for the length of the record, plus 80 for the maximum possible record length. In a real application, you'd want to move that string to somewhere else before reading the next one from the file.

Here we've also included the error detection needed for read operations, but made the exception for error code 5, End Of File. If we've reached the end of file, we simply jump ahead to the close file operation at CLSF1. We should mention for those skilled in Extended BASIC programming that this End of File error does not work exactly like the EOF function in XB. XB reports EOF when the last record in the file is read, while this error does not report until you try to read a record beyond the last record. Let's say, for example, the file opened as #1 contained 40 records, and we're reading with XB. As soon as we've read the fortieth, XB will report EOF(1). In our Assembly case, Error 5 will not be reported until we try reading the forty-first record.

Incidentally, the XB Manual states that the EOF function will not work for Fixed Record length files. That's wrong. EOF works just the same for Fixed or Variable in XB. Error 5 in Assembly also works for both Fixed and Variable record lengths.

While we're at comparisons to XB, we should say that the method we've shown for reading into a string (TEMSTR) is essentially equal to a LINPUT function in XB, in that it places the entire contents of the record at location TEMSTR. This may be important if you've created the file with more than one variable stored in the same record, as you'll have to sort out the contents of the record for yourself after they're dumped into TEMSTR. In a later article, we'll try to give some pointers on how to separate different variables in such a case. We've done that when reading the Catalog file of a disk for our Word Processor, and it's not really difficult.

The final step in file operations is to close the file. The code to accomplish that is shown at CLSF1. We normally recommend that you close files as soon as you've finished reading or writing them. Possible exceptions exist, such as the case of a Fixed record length file in which you want to skip around and read random records. In that case, you can with reasonable safety leave the file open while other functions are performed, then close it when exiting your program.

Trying to close a file that hasn't opened will in gen-

(See Page 23)

```
* THIS FILE, SINCE IT'S USING THE SAME PAB AND BUFFER, CAN'T BE OPEN WHILE
* FILE 1 IS ALSO OPEN
*
* REQUIRED DATA SECTION
* THE FOLLOWING DATA SOURCE LINES ARE REQUIRED
*
* THIS PAB DATA AND MODE BYTES APPLY TO D/V 80 FILES
PAB1DT DATA >0014,BUF,>5000,>0000,>000F
      BSS 15
INMD  BYTE >14      BYTE FOR INPUT OF DISPLAY/VARIABLE FILE
OUTMD  BYTE >12      BYTE FOR OUTPUT OF DISPLAY/VARIABLE FILE
APPMD  BYTE >16      BYTE FOR APPEND OF DISPLAY/VARIABLE FILE
UPDAMD BYTE >10      BYTE FOR UPDATE MODE OF D/V FILE -NOT RECOMMENDED
WRITEF BYTE 3        OPCODE FOR WRITE OPERATION
READF  BYTE 2        OPCODE FOR READ OPERATION
CLOSEF BYTE 1        OPCODE FOR CLOSE OPERATION
*
* THE DATA BELOW IS A PAB SETUP PLUS THE MODE BYTES
* FOR A D/F 80 FILE
*
PAB2DT DATA >0001,BUF,>5050,>0000,>000F
      BSS 15
FINMD  BYTE >05      INPUT MODE BYTE FOR DISPLAY/FIXED FILE TYPE
FOUTMD BYTE >03      OUTPUT MODE BYTE FOR D/F FILES
FAPPMD BYTE >07      APPEND MODE BYTE FOR D/F FILES
FUPDMD BYTE >01      UPDATE MODE BYTE FOR D/F FILES
*
* BELOW IS CODE AND DATA SAMPLE FOR MAKING MEMORY IMAGE FILES
* DERIVED FROM OUR GSA PROGRAM
*
      AORG >B000      THIS CODE STARTS AT >B000
INSTDT DATA >0500,>1020,0,ENINST-SAVDT,>000C
      TEXT 'DSK1.INSTALL'
SAVBYT BYTE 6
LDDBYTE BYTE 5
* THIS SECTION IS USED TO LOAD THE INSTALL CODE WHEN NECESSARY
GETINS
      MOVB @LDBYTE,@INSTDT PUT LOAD OPCODE IN FIRST BYTE OF PAB DATA BLOCK
      LI  R0,PAB1      POINT TO PAB LOCATION
      LI  R1,INSTDT     POINT R1 AT DATA BLOCK
      LI  R2,22         22 BYTES IN PAB
      BLWP @VMBEW      WRITE TO VDP
      AI  R0,9          ADD 9
      MOV R0,@PABPNT   TO >8356
      CLR @STATUS      CLEAR STATUS
      BLWP @DSRLNK     LOAD FILE INTO VDP BUFFER
      DATA 8          REQD DATA
      LI  R0,>1020      POINT AT BUFFER
      MOV @INSTDT+6,R2  LENGTH OF FILE INTO R2
      LI  R1,SAVDT      FILE STARTS AT LOCATION SAVDT
      BLWP @VMBR       GET CODE INTO MEMORY
      B   @INSTAL      THEN BRANCH TO NOW-INSTALLED INSTALL CODE
ENDAUX EQU $
* SAVER - STASHES PROGRAM
* AS MEMORY IMAGE FILE
* 15 JUN 89
      DEF SAVIT        DEFINED ENTRY POINT
SAVDT  DATA >0600,>1020,0,ENMAIN-GPLLNK,>000D
      TEXT 'DSK1.GOLFCODE'
SAVDT1 DATA >0600,>1020,0,ENDAUX->A000,>000E
      TEXT 'DSK1.GOLFCODE1'
SAVIT
      MOV R11,@>8300    STASH REGISTER 11
      LWPI WS          LOAD OUR WS
      LI  R15,RTINSTK   SET R15 TO RETURN ADDRESS
      BL  @CLS         CLEAR SCREEN
      LI  R9,INSTDT+9   DISPLAY FILE DESCRIPTOR
      LI  R0,SCRWID*5+4 AT ROW 6, COLUMN 5
      BL  @DISLI       USING SUBROUTINE
      MOV @INSTDT+6,R5  BRING LENGTH OF INSTALL SECTION INTO R5
      LI  R0,SCRWID*7+15 SCREEN LOCATION ROW 8, COLUMN 16
      BL  @INTDI1      DISPLAY INTEGER NUMBER ON SCREEN
      MOVB @SAVDT,@INSTDT SET FOR SAVING INSTALL PART
      MOV @INSTDT+6,R2  GET LENGTH IN R2
      LI  R1,SAVDT     POINT TO START OF CODE TO BE SAVED
      LI  R0,>1020      BUFFER ADDRESS
```

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#2. WHEEL OF FORTUNE, BLACKJACK & JOKER POKER

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

#3. DUMPIT

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

#4. PRINTART

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

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

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

#5A. TI MUSIC/GRAPHICS

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

#6. EXBASIC MUSIC

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

#7. SPACE SHUTTLE MUSIC/GRAPHICS

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

#8. LOTTO PICKER

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

#9. MONA LISA PRINT OUT

This disk prints out a near photo quality picture of that lady with the 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 CATALOGS

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 autoloader...

#42. FUNNELWEB FARM UTILITY

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

#43. BEST OF BRITAIN, VOL. I

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

#44. LABEL MAKER I GRAPHICS

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

#45. BEST OF BRITAIN, VOL. II

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

#46. SUPER TRIVIA 99

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

#47. INFOCOM RAPID LOADER

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

#48. GHOSTMAN (from England)

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

#49. DEMON DESTROYER (from France)

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

#50. OH MUMMY (from Germany)

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

#51. BERLIN WALL (from Canada)

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

#52. ANIMATION 99 (from Germany)

THIS IS THE ONE!!! A demo disk filled with computer animation routines like you have never seen before on any computer. See famous cartoon figures move with more realism 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.C. 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/HAZOG

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 PIANO/KEYBOARD CHORD ANALYSIS**
A unique music program which displays a piano on the screen and actually plays your selections.
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The very latest (and best) "runner" game based on TI Runner and Star Runner. Great action, graphics and entertainment.
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- #77. MICROdex 99**
A database program by Bill Gaskill which files and retrieves data such as magazine articles. A sample database is included.
- #78. ARTICON+ BY RAY KAZMER**
ATTENTION GRAPHIX AND TI ARTIST USERS!!!
This program lets you convert Exbasic graphics to TI Artist and Graphix pictures. Also contains a new MAC-RLE (2) for converting from Artist to Graphix.
- #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.
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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.
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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 GROC" (St. Valentine)**
Ray Kazmer has created a great maze game with fantastic graphics and the characters from his now legendary "Woodstock" disk. Fun for all!!!
- #92. HOUSEHOLD INVENTORY**
Written by 99/4 programming great Charles Ehninger, this prize winner originally sold for \$59.95. Keeps track of household, business or personal items by category and provides automatic updating for inflation etc. A must for tax and insurance records!
- #93. THE 1989 KBGB GIRLIE CALENDAR**
This latest offering from programming master Ken Gilliland prints out a jumbo 12 month calendar with a knock-out centerfold pinup for each month. If you like our #14 Figure Study disk, you will flip over this one. For Adults Only!! Exbasic & d/m printer.
- #94. GREAT 99/4A GAMES VOL. III**
If you have seen vols. I & 2 of this series you know we only provide the very best. This latest volume is also filled with a collection of great ones!
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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.
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This powerful utility lets you explore the entire memory in your 99/4A system and take apart what you find. User friendly!
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Two bible games (non-fiction) that work with the TI Adventure Module.
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This disk features the works of J. Peter Hoddie. All of these games are of commercial 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.
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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 Tiger Cub's Jim Peterson.
- #106. QUEST (Dungeons & Dragons)**
One of the best D&D games around! You must destroy the Dark Lord to free your homeland! Complete with documentation on disk.
- #107. STAR TREK MUSIC ALBUM**
Ken Gilliland's music and graphics version of the TV theme and the three motion pictures. (Exbasic)
- #108. FUNNPLUS 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 HINT MANUAL**
This disk prints out a five page TI Writer manual with everything you need to know to use TI Writer or the many clones such as 99Writer II. Additional aids for using this powerful word processor are included.
- #110. DISK + AID**
A powerful disk sector editor formerly sold for \$20. Menu Driven and easy to use.
- #111. POP MUSIC & GRAPHICS**
This exciting disk from Germany features music/graphics written in 100% assembly and what comes from the TI sound chip is sure to astound you.
- #112. INVOICE PACK**
An excellent invoice preparation and printing program with instructions on how to modify it for your own business.
- #113. LABEL MAKER 3**
A collection of label programs to create mailing and disk envelopes, disk labels and much more!

ART OF ASSEMBLY—

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eral do no harm, but will result in an error. We haven't bothered to show detection or handling of that error. We recommend that the error trapping that shows a file has not opened should also cause the program not to try closing it. The adept student will no doubt invent a simple way to do this.

Now that you know how to open a file and read it, you'll easily determine how to open one for output and write to it. The sample code shown at OPNF2 will serve well. Studying that annotated code should give you all you need, so we won't dwell on it here. Also in today's sidebar are PAB setups and mode bytes for D/F 80 type files.

Our final topic for today is the special kind of files called Memory Image files, or, as they list in a disk catalog, Program files. The first thing you should know about them is that the name PROGRAM is often a misnomer. In our Word Processor, we use a file called WPCCHARACT, which will list on a disk catalog as PROGRAM, but is in reality a character set which we read into VDP directly at >808 to set up character definitions for characters from 1 through 144.

True PROGRAM files, such as those made by the XB SAVE operation or by the TI SAVE utility, have file headers so the computer can detect what kind of files they are, and where they belong in memory. Thus, if you try to load in and run an XB program under E/A Option 5, you'll get an error once the E/A loader reads the file header information from the file.

We often use the dangerous practice of creating memory image files without bothering to place headers on them, since they're used in ways that don't need headers. It isn't really dangerous unless some thoughtless user tries to load them as XB or Option 5. Disaster may then ensue.

We just made a little experiment along that line, and it turns out that, while XB is forgiving, and reports I/O ERROR 50 for our "headerless" files, E/A Option 5 simply goes bonkers given a "program" file that isn't one. Maybe not always, but it just did that in two out of two tries with memory image but non-type 5 files. We must include that subject at more length in a future article, which we plan to subtitle "Off the End of the World."

In Part 7, we showed some source code used in our Word Processor's E/A Option 5 loader, which should serve as a good example of how we can bring our headerless memory image files into memory, then branch into the program placed in memory that way.

Today's sidebar contains the inverse case, showing how the "saver" part of our Golf Score Analyzer works to save that program into two memory image files. Like the Word Processor, the GSA's object file can only be loaded initially by the CALL LOAD process under Extended Basic. (We suffer the tiresome delay, so

```

BLWP @VMEW      WRITE TO BUFFER
LI  R0,PAB1     SET TO WRITE PAB
LI  R2,22       22 BYTES
LI  R1,INSTDT   PAB DATA FOR INSTALL SECTION
BLWP @VMEW      WRITE TO PAB IN VDP RAM
AI  R0,9        ADD 9
MOV  R0,@PABPNT AT >8356
CLR  @STATUS    CLEAR
BLWP @DSRLNK    PERFORM WRITING OF FILE INSTALL TO DSK1
DATA 8          DATA

SAVPT2
LI  R9,SAVDT+9  GET DESCRIPTOR FOR GOLFCODE FILE
LI  R0,SCRWID*9+4 ROW 10, COLUMN 5
BL  @DISLI      DISPLAY FILE DESCRIPTOR
MOV  @SAVDT+6,R5 GET LENGTH OF LOW-MEMORY CODE SECTION IN R5
LI  R0,SCRWID*11+15 ROW 12, COLUMN 16
BL  @INTDI1     DISPLAY INTEGER
LI  R0,>1020     POINT TO BUFFER
LI  R1,GPLINK   GPLINK IS AT START OF PROGRAM'S LOW MEM PORTION
LI  R2,ENMAIN-GPLINK ENMAIN IS END OF LOW MEM PART OF CODE
BLWP @VMEW      WRITE TO BUFFER
LI  R0,PAB1     SET FOR PAB
LI  R1,SAVDT    POINT TO DATA
LI  R2,23       23 BYTES
BLWP @VMEW      WRITE PAB TO VDP
AI  R0,9        ADD 9
MOV  R0,@PABPNT TO >8356
CLR  @STATUS
BLWP @DSRLNK    WRITE FIRST SECTION OF CODE TO FILE
DATA 8
LI  R9,SAVDT1+9 GET DESCRIPTOR FOR SECOND FILE
LI  R0,SCRWID*15+4 SCREEN ROW 16, COLUMN 5
BL  @DISLI      DISPLAY THE DESCRIPTOR
MOV  @SAVDT1+6,R5 GET LENGTH OF HIGH MEMORY SECTION IN R5
LI  R0,SCRWID*17+15 ROW 18, COLUMN 16
BL  @INTDI1     DISPLAY LENGTH (AS DECIMAL NUMBER)
LI  R0,>1020     POINT TO BUFFER
LI  R1,>A000     START OF HIGH MEMORY
LI  R2,ENDAUX->A000 LENGTH OF HIGH MEM PORTION
BLWP @VMEW      WRITE INTO BUFFER
LI  R0,PAB1     SET FOR PAB
LI  R1,SAVDT1   POINT TO PAB DATA
LI  R2,24       24 BYTES TO WRITE
BLWP @VMEW      WRITE PAB TO VDP
AI  R0,9        ADD 9
MOV  R0,@PABPNT
CLR  @STATUS
BLWP @DSRLNK    WRITE FILE GOLFCODE1 TO DISK
DATA 8
GEXIT LWPI GPLWS  LOAD GPL WORKSPACE
MOV  @>8300,R11  REPLACE R11
RT    RETURN

INSTALL
* THE CODE FOR THE INSTALLATION PROCESS FOLLOWS HERE (NOT SHOWN)
* IT ENDS AT A LABEL CALLED ENINST
TEMSTR BSS 81    TEMPORARY STORAGE LOCATION FOR RECORD
* THE NUMBER IN THIS BSS MUST BE ONE MORE THAN THE LARGEST STRING LENGTH
* EXPECTED IN THE PROGRAM'S EXECUTION
RTNSTK DATA 0   RETURN ADDRESS STACK NEEDED BY CRSIN

```

our users won't have to.) Once we've done that, we can CALL LINK ("SAVIT"), and thus exercise the code shown at that label in the sidebar. SAVIT first saves our INSTALL program for the GSA, which is part of the code when loaded from the object file by XB. That part gets used as an overlay into the memory normally reserved for user data, and performs steps necessary to install GSA on a RAMdisk. Next, SAVIT takes the part of GSA that resides in Low memory and saves that in a file called

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DSK1.GOLFCODE, and then takes the part residing in High memory into a file called DSK1.GOLFCODE1. It also tells us on-screen the length of each part as it's being saved. We use that information to update the two loaders that we supply with GSA, one for XB, the other for E/A or TIW. In GSA's normal use, all High memory from >B000 through >FFE6 is set aside for user data.

The setup in the PAB for these memory image operations is simple. There's no need for record size or file type data. The only bytes that count in the PAB data are the first one, which is 06 for a save and 05 for a load, the third and fourth, which point to the buffer in VDP RAM, and bytes six and seven, which must contain the number of bytes to be saved in the file. From byte 9 onward, things are the same as for any other file type, with the length of the descriptor in byte 9, followed by the descriptor itself.

It is important to transfer the stuff you're saving from its memory location into the buffer in VDP RAM, and to make sure there's not more than the buffer area can handle. If our buffer were at >1020, for example, we could save no more than 10,167 bytes in a file, since any more would overwrite data at VDP RAM address >37D7, which is needed by the computer.

Once that's been done, and the PAB data written to VDP at some lower location than >1020, and the PAB+9 address passed to >8356, just a DSRLNK call makes the file on the disk. No OPEN operation or CLOSE operation is necessary.

The code section we've shown for the Golf Score Analyzer's SAVIT is somewhat convoluted. It also calls a subroutine called INTDII, which has not been in any of our articles so far. We'll pass that along soon. The saving code is not saved as part of the

main program, but as part of the INSTALL program. This is done so that INSTALL can make changes in the main program itself, then save the two main files to a RAMDISK drive with the modifications in place. The part called GETINS is saved as part of the main program, but is only used when the user performs an installation process. Otherwise, the part at GETINS is overwritten by user data. OK, so that was clear as mud, but it all works the way it was intended to, and that's what really counts.

Information for dealing with other file types, such as Internal, is available in the E/A Manual in pages 291 through 304. The setup information for byte 1 of the PAB, on page 293, is given bit-by-bit, so one must do some tedious work to figure out what the correct HEX code for that byte should be. We use a hand-held calculator from Radio Shack that converts binary to octal or hex or decimal at the press of a key, and that comes in handy. (Ours is model EC-4030, which is probably out of production by now.)

None of the code in today's sidebar is complete, nor will the whole thing even assemble correctly, but it's a series of pieces you can use in your own programs. All of what's shown is taken from real programs we've written, and it worked when integrated into those programs.

We're not sure just yet what our next column will cover. We are writing these things many months ahead of publication, so maybe we'll take a vacation from writing until more of them have appeared in print. (As we write this, Part 2 has not yet appeared.) Perhaps we'll have some reader feedback questions to cover in Part 10. Then again, maybe we'll get into that rather amusing topic of "Off the End of the World," in which we'll relate some of the funny things that can happen when programming in Assembly.

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 (Der-

byshire, 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.

NOVEMBER

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

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

READER TO READER

• Robert Larsen, 4454 N. Morris Blvd., Shorewood, WI 53211-1549, writes:

In December I bought a Geneve 9640. After some setup problems, I transferred my carts to disk and started to use the new machine. I checked my disk versions of my carts, and all worked but the Cor-Comp 99 Home Sentry, which told me to check the connection between the Joystick port and the X-10 Powerhouse unit. I called one of the members of the TI Milwaukee Club, and he said the joystick port commons (or grounds) are reversed, so I made a short extension that reverses pin 2 and 7, but I still get the same message. I would like to know if anyone out there in 9640 land has a Home Sentry hooked up to his 9640 and if it works.

• Dennis Mackey, 846A England St., Mayport, FL 32227, writes:

I have TI-Base and I need to know if there is a way to access the P-GRAM Clock from the command file SETUP or if that would have to be accomplished by rewriting and reassembling the main program. It would be nice if it would read the clock and give the current day as default for the prompt DATE. That way you could change to any day you prefer, or press Enter and use the current date.

• Lyle Hill, 400 Amberwood Rd., Roseville, CA 95678, writes:

I have both a Personality Card and the Dijit 80-column card. Does anyone else experience Personality Card Disk Manager conflicts with the Dijit and know of a solution to the problem (in the form of a better manager program or new eproms for either or both! Anything!)?

• Mark Wacholtz, 2141 NW 64th Ave., #15, Sunrise, FL 33313-3950, writes:

As I was reading back issues of MICROpendium I saw several articles on modules I'd like to get my hands on. I'd like the modules Stargate, Robontron: 2084, Super Storm and Joust. Vol. 1, No.3 (Home Computer Companion), page 6, mentions a Sierra-Disney pact. No titles were available, but subjects astronomy, chemistry and language arts were mentioned. The astronomy is the Peter Pan's Space Odyssey which I have and have written simple docs for. The others I need. Rumor has it that there were 21 titles that Disney was supposed to have about ready. Any information on any or all of these would be most appreciated. Even better, the programs themselves!

• Edgar Denoncourt, 8120 DuMail Ave., Montreal, Quebec, Canada H1K 1Z2, says he "wants desperately the Operation Manual (or a copy) for the Star NX-1000 II printer. I am willing to pay. Help!"

• David P. Johnson, 1319 142nd Pl., S.E., Bellevue, WA 98007 writes:

Around nine years ago when I moved to disk drive, I bought "Companion" word processor from Intelpro. Not being as experienced then, I failed to purchase a backup.

It is a fine program and I use it constantly in a variety of ways. It is so familiar I just have not made the effort to learn TI-Writer which I have, although this means I cannot use programs like Funnelweb.

For several years I have tried many sources to find a copy of "Companion" without success. I am so dependent on my copy I do not want to risk removing its protection to try to make a copy.

I would like to know if anyone has a copy of "Companion" to sell, or someone who has the program and is confident enough to make a copy. I would be willing to pay a reasonable price for either. Mine is marked Version 2.0, serial number 2008.

• Jeff Smith, P.O. Box 582, Valliant, OK 74764-0582, writes:

I need instructions on how to connect my TI99/4A to a Wang Interactive work station I was given by my company. It's a model 2236=DE. The connectors are a 25-pin and a 36-pin.

I also acquired a model 510-7105 vpu interface module (TI) which has a 37-pin connector and a 25-pin connector. I need to identify this module and learn how it can be used in my assembly. As you can see by my questions, I really am a beginner.

I plan to connect this assembly to a wide carriage Epson 9-pin dot matrix printer I got free, also.

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.

MAIL ROOM



Business and personal communications begin in the mailroom, or the address book. MAIL ROOM is the beginning of a system of programs designed for the small business, user group, or anyone that wants true flexibility and organization for their address files. It's not just another address program, look at these features:

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**Asgard Software • P.O. Box 10306
Rockville, MD 20849**

TRIALS OF A c99 BEGINNER

A fast sort routine

By CHARLES E. KIRKWOOD JR.

Would you like to have a program that will sort 50 numbers (or character strings) so fast that it is difficult to time with a stop watch (less than a second), sort 100 in about 2 seconds, and sort 200 in about five seconds? Well, here it is!

I wish that I could accept credit for this routine, but I can't. The sort is a c99 function translated from Jerry Stern's XB QUICK sort (May 1991 (MICROpendium)). This new sort function replaces the sort function in the October 1988 MICROpendium. Jerry's QUICK sort routine is truly fast when written in c99.

After reading Jerry's article All Sorts of Sorts I began to think about the times for the different sort routines. The sort routine in the October issue was similar to Jerry's Delayed Replacement Sort. It was used because it was a good example for explaining loops, if statements and arrays. An Extended BASIC version of this sort was added to the sorts in Jerry's article along with another one to compare them with those in Jerry's article. This second one first searches for the smallest and also the largest number. The smallest is swapped with the first number and the largest is swapped with last number in the array. The array is searched starting at the second value and goes to the next to last value, searching for the second lowest and second highest values. Each pass searches two less, rather than one. This second method was disappointing since it did not perform as well as expected. The two sorts were named NONAME and ANOTHERONE. Using a stop watch this order (from best to worst) was obtained: QUICK, METZNER, INSERT, ANOTHERONE, NONAME, DELAYED REPLACEMENT, SHELL, and BUBBLE. The time varied from about 10 seconds (QUICK) to about 45 seconds (BUBBLE) for 50 numbers. Times will vary with the order of the numbers taken.

The October 1988 c99 sort routine was timed. A great improvement was expected, but that was not the case. It took approximately 6 seconds for 50 numbers. Now for the challenge — to rewrite Jerry's QUICK sort in c99 with no GOTOs.

Jerry started his arrays with subscript 1, while the c99 sort started with subscript 0. Since something new was being tackled, the c99 program was rewritten to start with subscript 1 also. Make the following changes in the sort program in October 1988.

```
change #define dim 25
      to #define d2 16

add   #define d1 251

change int i,m,n,c,d,df,f,in,col;
      to int i,m,n,c,d,df,f,in;

change char a[251][dim],buff[dim];
      to char a[d1][d2],buff[d2];

add   puts("          SORT15\n\n");
      puts("      Charles E. Kirkwood, Jr\n");
      puts("          Box 1241\n");
      puts("      Clemson, SC 29633\n\n");
      puts("      Modification of SORT PROGRAM\n");
      puts("          See MICROpendium\n");
      puts("          Oct 1988\n\n");
      puts("Program sorts character strings.\n\n");
      puts("Numbers must be padded with zeros
or\n");
      puts("blanks so that the decimal points\n");
      puts("line up.\n\n");

delete col=dim;
      n=n-1;
```

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for the TI99/4A and TI-Tax
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TRIALS OF A c99 BEGINNER—

(Continued from Page 26)

```
change
all for(i=0;i<n;++i)
to for(i=1;i<n;++i)

change fgets(&a[i][0],col,in);
to fgets(&a[i][0],d2,in);
```

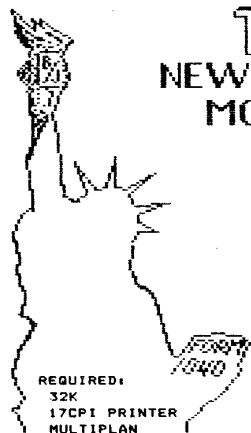
replace the SORT function with the new SORT function.

Some experimentation can be made to determine the maximum sizes of the arrays. The two #define statements at the beginning make it possible for you to change the array dimensions without having to search all the way through the program. To save memory and compile time delete #include DSK1.CONV and #include DSK1.STRING and copy only the functions needed: strcmp(sl,s2), strcpy(sl,s2) and atoi(s). By copying only the

functions actually needed it was possible to increase dl to at least 351. A name sort of 30 characters can be made by changing d2 to 31 and dl to 201. This will take about a second longer to sort 200 names. Timing would be much more accurate with a built-in clock. For you Geneve users this should really be fast!

```
/*CHARACTER STRING SORT*/
/*c99 Version of Jerry Stern's QUICK sort*/
sort(n,x)
int n;
char x[][d2];
{
    int w,k,i,a,b,u,m,c,s[d1];
    char z[d2];
    c=0;
    k=1;
```

(See Page 28)



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FORM1040Ap1 US Individual Income Tax Return (Short Form, page 1)
FORM1040Ap2 (Short Form, page 2)
(Incl Schedules (These Schedules are an integral part of Form1040Ap2)
X,Y,&Z
SCHEDULEE1 Interest and Dividend Income
SCHEDULEE2 Child and Dependent Care Expenses
SCHEDULEE3 Credit for the Elderly or the Disabled
FLOWCHART (Hints for effective order/Short Form processing)
INPUT1 (File for common data, avoids repeat entries)
INPUT2 (File for entering info on dependents)
INPUT3 (File for entering info on elderly or disabled)
PRINT17 (Printer set-up routine)
REBATES (Form to register for rebates)
USER MANUAL (Easy reading, covers Short forms)
WARRANTY

LONGFORMS -- \$10

FORM1040p1 US Individual Income Tax Return (Page 1)
FORM1040p2 (Page 2)
(Incl Schedules (These Schedules are an integral part of Form1040p2)
X,Y,&Z
FLOWCHART (Hints for effective order/Long Form processing)
INPUT1 (File for common data, avoids repeat entries)
INPUT2 (File for entering info on dependents)
PRINT17 (Printer set-up routine)
REBATES (Form to register for rebates)
USER MANUAL (Easy reading, covers ALL TI-Tax forms)
WARRANTY

USUALFORMS -- \$10

FORM2106p1 Employee Business Expenses (Page 1)
FORM2106p2 (Page 2)
FORM2119 Sale of Your Home
FORM2441 Child and Dependent Care Expenses
FORM3903 Moving Expenses
FORM8606 IRA Contributions, IRA Basis, and Distributions
FORM44 worksheet Employees Withholding Allowance Certificate
SCHEDULEE1C Earned Income Credit

SCHEDULES1 -- \$10

SCHEDULEA Itemized Deductions
SCHEDULEB Interest and Dividend Income
SCHEDULEC Profit or Loss from Business
SCHEDULEDp1 Capital Gains and Losses (Page 1)
SCHEDULEDp2 (Page 2)
SCHEDULEDip1 Continuation Sheet for Schedule D (Page 1)
SCHEDULEDip2 (Page 2)

SCHEDULES2 -- \$10

SCHEDULEEp1 Supplemental Income and Loss (Page 1)
SCHEDULEEp2 (Page 2)
SCHEDULEFp1 Profit or Loss From Farming (Page 1)
SCHEDULEFp2 (Page 2)
SCHEDULER Credit for the Elderly or the Disabled
INPUT3 (File for entering info on elderly or disabled)
SCHEDULESE Social Security Self-Employment Tax

MOREFORMS1 -- \$10

FORM1040X Amended U.S. Individual Income Tax Return
FORM2210p1 Underpayment of Estimated Tax (Page 1)
FORM2210p2 (Page 2)
FORM3468p1 Investment Credit (Page 1)
FORM3468p2 (Page 2)
FORM3800 General Business Credit

MOREFORMS2 -- \$10

FORM4562p1 Depreciation and Amortization (Page 1)
FORM4562p2 (Page 2)
FORM4532 Investment Interest Expense Deduction
FORM4972p1 Tax on Lump-Sum Distributions (Page 1)
FORM4972p2 (Page 2)
FORM6198 At Risk Limitations
FORM6251 Alternative Minimum Tax -- Individuals

MOREFORMS3 -- \$10

FORM8271 Investor Report of Tax Shelter Registration Number
FORM8582 Passive Activity Loss Limitations
FORM8582p2 (Worksheets for Form8582)
FORM8582CR Passive Activity Credit Limitations
FORM8604 Low-Income Housing Credit Allocation Certification
FORM8615 Tax for Children Under Age 14 with Income Over \$1000
FORM8614 Parent Election to Report Child's Interest/Dividends
FORM8915 Excludable US Savings Bond Interest

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TRIALS OF A c99 BEGINNER—

(Continued from Page 27)

```
i=0;
s[1]=1;
s[2]=n;
while(k!=0)
{
    k=k-1;
    i=k+k;
    a=s[i+1];
    b=s[i+2];
    strcpy(z,&x[a][0]);
    u=a;
    m=b+1;
    while(c==0)
    {
        m=m-1;
        if(m==u)
            break;
        while(strcmp(z,&x[m][0])<=0)
        {
            m=m-1;
            if(m==u)
                break;
        }
        if(m==u)
            break;
        strcpy(&x[u][0],&x[m][0]);
        ++u;
        if(m==u)
            break;
        while(strcmp(z,&x[u][0])>=0)
        {
            ++u;
            if(m==u)
```

```
                break;
        }
        if(m==u)
            break;
        strcpy(&x[m][0],&x[u][0]);
    }
    strcpy(&x[u][0],z);
    if(b-u>=2)
    {
        i=k+k;
        s[i+1]=u+1;
        s[i+2]=b;
        ++k;
    }
    if(m-a>=2)
    {
        i=k+k;
        s[i+1]=a;
        s[i+2]=m-1;
        ++k;
    }
}
return;
}
```

The function files CSUP and CFIO must be linked with your program.

When space permits MICROpendium has also been including the program form of the c99 programs along with the source form on the monthly disk. A knowledge of c99 is not necessary to run the program form, just plug in your Editor/Assembler and select option 5.

Media Ware Software offers programs for graphics users

Media Ware Software is a recently-founded company supporting the TI99/4A, according to Mark Wacholtz of the company.

Programs the company offers include the following:

- European Creatures, described as quality mythological animals and hybrids ready to use as 68 Page Pro pictures in \$13 sets. Minimum order is five sets, at \$1 per set.
- Graphic Grabber Print Module, described as an all new print routine for Bud Wright's Graphic Grabber (included free), for printing labels designed through TI-Artist. It prints on standard mailing labels one or two across, single or double density (double density prints half size one across), or prints graphic disk jackets. The program sells for \$6.
- Artist Conversions, consisting of two programs, the

first of which converts CSGDs to Instance format. The graphic is displayed on screen, then the user has the option to save it to Artist format. The second program creates TI-Artist Fonts from Extended BASIC as easily as merging in a program, according to Wacholz. The disk also contains new CSGDs and new fonts, and sells for \$6.

- Page Pro Border Fonts, a disk of border fonts which can be saved as pictures and used to create a page. A second disk of sample page files is included. The package sells for \$7.

For more information or to place an order, write Media Ware Software, 2141 NW 64th Ave., Ste. 15, Sunrise, FL 33313-3950.

Make checks payable to Mark Wacholtz and add \$2.50 per order. Allow one to two weeks for delivery.

The Tigercub Reformatter

New power to modify document formats

By JIM PETERSON

The TI-Writer Formatter (Version 1.1.5) can be used to reformat D/V80 text files to a greater or lesser line length, but it can garble the text while doing so, and I have seen many examples of such in newsletters.

To use the Formatter for this purpose, the text must have carriage returns. If the ampersand, the "at" sign, the caret, the asterisk followed by two numeric digits, or the period at the beginning of a line, are present in the text, printing through the Formatter will delete them and in some cases delete or garble the text.

When text is printed back to disk with the Formatter, it will contain large blocks of lines with nothing but a line feed, which must be manually deleted.

It will also place a line feed after every

line, and convert carriage returns to line feeds. These can be stripped out by printing back to disk with the C option but, contrary to the manual, they are not really stripped out - they are converted to ASCII 32 blanks, which can cause problems in some applications. Also, the carriage returns will have been stripped.

Because of all these complications, I have never been satisfied with the Formatter. Therefore I wrote this program.

My program will reformat text which does not have carriage returns - such as the many files which are now being ported over from IBM - and will add the carriage returns, providing that headers are either indented or followed by blank lines and paragraphs are indented. It will strip the trailing blanks left by printing with the C option from the TI-writer Editor, and will

strip line feeds caused by printing to disk from the Formatter. It also strips the tab line.

It will of course also reformat text which does have carriage returns, to any greater or lesser length.

It will automatically edit and correct hyphenation that is no longer at the end of a line due to reformatting.

It will offer you the option (which TI-writer does not!) of hyphenating words. If you select this option, it will give you the opportunity to hyphenate whenever a word could be broken after two or more characters. If you select the option to justify, extra blanks will be inserted between words to align the right margin, just as TI-Writer does.

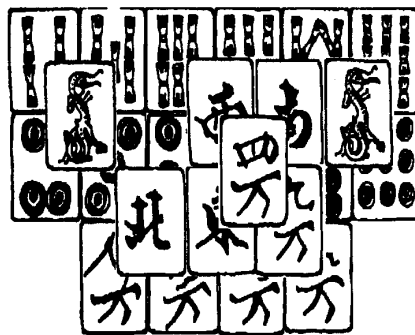
The program will optionally strip
(See Page 30)

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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REFORMATTER—

(Continued from Page 29)

blanks inserted by previous justification, and will automatically strip them before justifying.

Text with a preset left margin cannot be properly reformatted, but the program will strip such margins. It will also optionally add a left margin to reformatted text.

You can also hyphenate and/or justify and/or add carriage returns, and/or strip blanks and line feeds, and/or add or strip margins, without otherwise reformatting, by selecting a new line length the same as the old.

The program is intended primarily for reformatting back to disk, for use with multiple-column printing programs, but it will offer the option of output to the printer, and will then let you enter printer control codes.

You can even reformat to line lengths greater than 80. In this case, the printer or output file will be opened in the necessary record length.

When you boot the program, you are asked for the name of the file you want to reformat. Next you are given the option of outputting to disk or to printer and, depending on your choice, you will be asked for an output filename or the name of your printer.

Next you are asked if you want to set a left margin and, if so, of how many spaces. You are then asked what line length you want to reformat to.

Now the program can open the output file or the printer. If your left margin setting plus line length totals more than 80, they are opened for the necessary record length. You could dump to the printer in lines of elite condensed print 160 characters long, or save to disk in lines 254 bytes long - but you would have to write your own program to retrieve the data.

At this point, if you elected to output to printer, you will be asked how many printer codes you want to enter. If none, just press Enter. Otherwise you will be asked for them one at a time and you will have to know the numeric of their ASCII - for example, 15 27 71 for condensed double-struck.

Then you are asked if you want to hyphenate, and if you want to right justify. If you want the latter, any existing justifica-

tion will be stripped automatically; otherwise, you will be asked if you want to strip it.

The program now reads in 20 records and measures them to find what length it is reformatting from - it needs to know whether it is going to a greater or lesser length. It also scans these records to find the length of any existing left margin, which must be stripped. Presumably one of the first 20 lines will be full length.

The file is then restored and records are read in 60 at a time, reformatted and saved or printed. During reformatting, the program looks for words which were hyphenated at the end of a line but are now in the middle of a line; it deletes the hyphen and closes up the word.

If you elected to hyphenate, whenever a word will not fit at the end of a line but could fit two or more characters, you will be shown the entire line being worked, the maximum part that could be fitted, and the maximum point at which a hyphen could be inserted. If you choose to hyphenate, you will be offered that maximum, followed by a hyphen, as a default.

This section features two innovations - my CALLKEY with blinking cursor (just press Y or y or N or n, no need to press Enter) and my DEFAULT subprogram. You can press Enter to accept the default, or type your own shorter string and the default string will be erased so you do not need to delete the extra characters. However, this routine can miss the first character if you type too fast, so type the first character and be sure it appears on screen before continuing. Bruce Harrison has written a lightning fast assembly version for me, but it would not be practical to list it here.

An input here which is not followed by a hyphen will be rejected as a presumed error, but sometimes you will want the input to be without a hyphen, if the break is at a predetermined hyphen. In this case, just enter your input again and it will be accepted the second time.

This program was written to reformat normal text files. It cannot handle files which have neither carriage returns nor indented paragraphs, and it cannot reliably reformat columnized files or other specially formatted files. If the file contains

CTRL U codes or Formatter printer controls, they will be counted as characters in measuring line length.

Program listings, in any language, should never be reformatted. They will be garbled and impossible to key in correctly.

This program is released to the public domain with no restrictions except that no one except myself (Tigercub Software) and MICROpendium and non-profit user groups may charge a copying fee for it.

However, if you do find this program useful, I would be grateful if you would spend a few pennies for a postcard to tell me so. I am getting very tired of contributing programs to the TI world and never hearing a word about them again.

Jim Peterson (Tigercub Software) 156 Collingwood Ave., Columbus OH 43213

REFORMATTER

```
100 DIM I$(61),O$(250),T$(20)
:1078
110 GOTO 140 :219
120 LL,R,H$,J$,J,M,CFLAG,M$,
P$,L,Z,C$,P,X,A$,Q$,CF,IF$,O
F$,CR$,SET,K,S,U$,LM,LM$,SL$
,LMS,SLMS,WO,T$( ),Y,PC,CC,RC
,@$ :1097
130 CALL CLEAR :: CALL SCREE
N :: CALL COLOR :: CALL HCHA
R :: CALL DEFAULT :1046
140 !@P- :1064
150 CALL CLEAR :: CALL SCREE
N(5):: FOR SET=0 TO 12 :: CA
LL COLOR(SET,2,16):: NEXT SE
T :: CR$=CHR$(13):: ON WARNI
NG NEXT :1149
160 GOSUB 800 :1115
170 DISPLAY AT(8,1):"Input f
ilename?": "DSK" :: ACCEPT AT
(9,4)BEEP:IF$ :: ON ERROR 18
0 :: OPEN #1:"DSK"&IF$,INPUT
:: GOTO 190 :1203
180 RETURN 170 :1251
190 DISPLAY AT(17,1):"Output
to 1": "(1) Disk": "(2) Print
er" :: ACCEPT AT(17,11)SIZE(
-1)VALIDATE("12")BEEP:WO :14
5
200 IF WO=2 THEN DISPLAY AT(
17,1):"Printer? PIO": "" ::
: ACCEPT AT(17,10)SIZE(-18):
OF$ :: GOTO 220 :1023
```

(See Page 31)

REFORMATTER—

(Continued from Page 30)

```

210 DISPLAY AT(17,1):"Output
filename?":"DSK":"" :: ACCE
PT AT(18,4)BEEP:OF$ :: OF$="
DSK"&OF$ !080
220 DISPLAY AT(20,1):"Do you
want to set left margin
? Y/N" :: ACCEPT AT(21,13)SI
ZE(1)VALIDATE("YN"):SL$ :: I
F SL$="N" THEN 240 !078
230 DISPLAY AT(23,1):"Left m
argin how many spaces?" :: A
CCEPT AT(24,1)SIZE(2)VALIDAT
E(DIGIT):LMS :: SLM$=RPT$("
",LMS)!138
240 CALL CLEAR :: GOSUB 800
!198
250 DISPLAY AT(10,1):"Reform
at to length?" :: ACCEPT AT(
10,21)SIZE(3)VALIDATE(DIGIT)
BEEP:R :: Y=MAX(80,R+LMS)!12
6
260 ON ERROR 270 :: OPEN #2:
OF$,VARIABLE Y,OUTPUT :: ON
ERROR STOP :: IF WO=1 THEN 3
00 ELSE 280 !015
270 RETURN 210 !035
280 DISPLAY AT(10,1):"How ma
ny printer codes? 0" :: ACCE
PT AT(10,25)VALIDATE(DIGIT)S
IZE(-2)BEEP:PC :: DISPLAY AT
(10,1):"" :: RC=1 !037
290 FOR J=1 TO PC :: ACCEPT
AT(10,RC)VALIDATE(DIGIT)BEEP
:CC :: PRINT #2:CHR$(CC);::
RC=RC+LEN(STR$(CC))+1 :: NEX
T J !229
300 DISPLAY AT(12,1):"Hyphen
ate? Y/N" :: ACCEPT AT(12,16
)SIZE(1)VALIDATE("YN")BEEP:H
$ !014
310 DISPLAY AT(14,1):"Right
justify? Y/N" :: ACCEPT AT(1
4,20)SIZE(1)VALIDATE("YN")BE
EP:J$ :: IF J$="Y" THEN U$="
Y" :: GOTO 330 !016
320 DISPLAY AT(16,1):"Strip
extra blanks? Y/N" :: ACCEPT
AT(16,25)SIZE(1)VALIDATE("Y
N")BEEP:U$ !119
330 DISPLAY AT(18,5)ERASE AL
L:"READING RECORD" :: DISPLA
Y AT(20,2):"REFORMATTING REC
ORD" :: DISPLAY AT(22,6):"SA

```

```

VING RECORD" !013
340 FOR J=1 TO 20 :: LINPUT
#1:T$(J):: LL=MAX(LL,LEN(T$(
J))):: IF EOF(1)=1 THEN 360
!035
350 NEXT J !224
360 RESTORE #1 :: FOR J=1 TO
LL :: FOR K=1 TO 20 :: IF S
EG$(T$(K),J,1)<>" " THEN LM=
J-1 :: J=LL :: K=20 !068
370 NEXT K :: NEXT J !067
380 LINPUT #1:I$(1):: IF LM>
0 THEN I$(1)=SEG$(I$(1),LM+1
,255)!254
390 FOR J=2 TO 61 :: IF EOF(
1)THEN 440 :: LINPUT #1:I$(J
):: DISPLAY AT(18,20):J :: I
F ASC(I$(J))=128 THEN 440 EL
SE IF LM>0 THEN I$(J)=SEG$(I
$(J),LM+1,255)!164
400 IF POS(I$(J-1),CR$,1)<>0
THEN 410 :: IF ASC(I$(J))=1
3 OR ASC(I$(J))=32 THEN I$(J
-1)=I$(J-1)&CR$ !097
410 NEXT J :: M=J-2 !116
420 IF (ASC(I$(61))=13 OR AS
C(I$(61))=32)AND POS(I$(60),
CR$,1)=0 THEN I$(60)=I$(60)&
CR$ !250
430 IF R>LL THEN 620 ELSE 45
0 !034
440 CLOSE #1 :: M=J-1 :: CFL
AG=1 :: IF POS(I$(M),CR$,1)=
0 THEN I$(M)=I$(M)&CR$ :: GO
TO 430 ELSE GOTO 430 !048
450 FOR J=1 TO M :: DISPLAY
AT(20,22):J :: GOSUB 810 ::
IF U$="Y" THEN CALL UNFILL(I
$(J))!236
460 M$=P$&I$(J):: P$="" !250
470 CALL HSTRIP(M$)!035
480 L=LEN(M$)+(POS(M$,CR$,1)
<>0):: IF L<=R AND POS(M$,CR
$,1)<>0 THEN Z=Z+1 :: O$(Z)=
M$ :: GOTO 590 ELSE IF L<R T
HEN P$=M$&" " :: GOTO 590 !1
82
490 IF L=R THEN Z=Z+1 :: O$(
Z)=M$ :: GOTO 590 !201
500 C$=SEG$(M$,1,R):: CALL L
ASTPOS(C$," ",P)!019
510 IF P<>0 THEN 520 ELSE Z=
Z+1 :: O$(Z)=C$ :: M$=SEG$(M
$,R+1,255):: GOTO 480 !081
520 IF R-P<3 THEN C$=SEG$(M$
,1,P-1):: CALL JUSTIFY(R,C$,
J$):: M$=SEG$(M$,P+1,255)::
Z=Z+1 :: O$(Z)=C$ :: GOTO 48
0 !049
530 X=POS(M$," ",P+1):: IF X
=0 THEN X=LEN(M$)ELSE IF X=R
+1 THEN Z=Z+1 :: O$(Z)=C$ ::
M$=SEG$(M$,R+2,255):: GOTO
480 !142
540 IF H$="N" THEN 580 !131
550 GOSUB 760 !074
560 DISPLAY AT(12,1):"Hyphen
ate?" :: CALL CALLKEY(15,12,
"YNyn",Q$):: IF Q$="N" OR Q$
="n" THEN CALL HCHAR(2,1,32,
352):: GOTO 580 !000
570 GOSUB 770 :: GOTO 480 !0
07
580 GOSUB 790 :: GOTO 480 !0
27
590 NEXT J !224
600 FOR J=1 TO Z :: DISPLAY
AT(22,20):J :: PRINT #2:SLM$
&O$(J):: NEXT J :: Z=0 !216
610 IF CFLAG=0 THEN I$(1)=I$
(61):: GOTO 390 ELSE CLOSE #
2 :: STOP !112
620 FOR J=1 TO M :: DISPLAY
AT(20,22):J :: GOSUB 810 ::
IF U$="Y" THEN CALL UNFILL(I
$(J))!236
630 M$=P$&I$(J):: P$="" !250
640 CALL HSTRIP(M$)!035
650 IF POS(M$,CR$,1)<>0 AND

```

(See Page 32)

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REFORMATTER—

(Continued from Page 31)

```

LEN(M$)<=R+1 THEN Z=Z+1 :: O
$(Z)=M$ :: GOTO 750 !077
660 IF LEN(M$)<R THEN P$=M$&
" " :: GOTO 750 !252
670 C$=SEG$(M$,1,R):: CALL L
ASTPOS(C$, " ",P):: IF P=0 TH
EN Z=Z+1 :: O$(Z)=C$ :: M$=S
EG$(M$,R+1,255):: GOTO 650 !
124
680 IF P=R THEN C$=SEG$(M$,1
,P-1):: CALL JUSTIFY(R,C$,J$
):: Z=Z+1 :: O$(Z)=C$ :: M$=
SEG$(M$,R+1,255):: GOTO 650
!031
690 IF R-P<3 THEN C$=SEG$(M$
,1,P-1):: CALL JUSTIFY(R,C$,
J$):: Z=Z+1 :: O$(Z)=C$ :: M
$=SEG$(M$,P+1,255):: GOTO 65
0 !220
700 X=POS(M$, " ",P+1):: IF X

```

```

=0 THEN X=LEN(M$)ELSE IF X=R
+1 THEN Z=Z+1 :: O$(Z)=C$ ::
M$=SEG$(M$,R+2,255):: GOTO
650 !057
710 IF H$="N" THEN 740 :: GO
SUB 760 !239
720 DISPLAY AT(12,1):"Hyphen
ate?" :: CALL CALLKEY(12,12,
"YNyn",Q$):: IF Q$="N" OR Q$
="n" THEN CALL HCHAR(2,1,32,
352):: GOTO 740 !157
730 GOSUB 770 :: GOTO 650 !1
78
740 GOSUB 790 :: GOTO 650 !1
98
750 NEXT J :: GOTO 600 !011
760 DISPLAY AT(2,1):M$ :: DI
SPLAY AT(6,1):SEG$(M$,1,R)::
A$=SEG$(M$,P+1,R-P-1)&"-" :
: DISPLAY AT(10,1):A$&SEG$(M
$,R,X-R+1):: RETURN !122

```

```

770 CALL DEFAULT(14,1,A$,Q$)
:: CF=CF+1 :: IF POS(Q$,"-",
1)=0 AND CF=1 THEN 770 ELSE
A$=Q$ !052
780 CF=0 :: C$=SEG$(C$,1,P)&
A$ :: M$=SEG$(M$,P+1+LEN(A$)
-1,255):: CALL JUSTIFY(R,C$,
J$):: Z=Z+1 :: O$(Z)=C$ :: C
ALL HCHAR(2,1,32,416):: RETU
RN !213
790 C$=SEG$(C$,1,P-1):: CALL
JUSTIFY(R,C$,J$):: Z=Z+1 ::
O$(Z)=C$ :: M$=SEG$(M$,P+1,
255):: RETURN !044
800 DISPLAY AT(2,2):"TIGERCU
B REFORMATTER+ V1.2":" ":" Re
formatter * Hyphenater Ri
ght Justifier * CR Adder Un
filler * Marginater" :: RETU
RN !244

```

(See Page 33)

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| <input type="checkbox"/> MICROpendium Index (2 SSSD disks, XB req.) ..\$6.00 | |
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GENEVE DISKS

- | | |
|--|--------|
| <input type="checkbox"/> MDOS .97h (req. SSSD or larger, used with MBASIC) | \$4.00 |
| <input type="checkbox"/> MDOS 1.14F (req. for MBASIC) | \$4.00 |
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| <input type="checkbox"/> MY-Word V1.21 | \$4.00 |
| <input type="checkbox"/> Menu 80(specify floppy or hard disk version(s), SETCOLOR, SHOWCOLOR, FIND, XUTILS, REMIND | \$4.00 |

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

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

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<input type="checkbox"/> Series 2.....	\$9.00	\$7.00	\$5.00
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<input type="checkbox"/> Series 4.....	\$9.00	\$7.00	\$5.00
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REFORMATTER—

(Continued from Page 32)

```

810 IF SEG$(I$(J),LEN(I$(J)),1)=" " OR SEG$(I$(J),LEN(I$(J)),1)=CHR$(10) THEN I$(J)=SEG$(I$(J),1,LEN(I$(J))-1)!23
5
820 IF I$(J)="" OR I$(J)=" " THEN I$(J)=CR$ :: RETURN ELSE RETURN !015
830 !@P+ !062
840 SUB HSTRIP(M$):: X=1 !18
5
850 P=POS(M$,"- ",X):: IF P=0 THEN SUBEXIT ELSE IF P=1 THEN 870 !236
860 IF SEG$(M$,P-1,3)<>" - " THEN M$=SEG$(M$,1,P-1)&SEG$(M$,P+2,255)!166
870 X=P+2 :: GOTO 850 !072
880 SUBEND !168
890 SUB LASTPOS(A$,B$,Y):: X,Y=0 !042
900 X=POS(A$,B$,X+1):: IF X=0 THEN Y=X :: GOTO 900 !046
910 SUBEND !168
920 SUB JUSTIFY(R,C$,J$)!152
930 IF J$="N" OR LEN(C$)=R OR C$="" THEN SUBEXIT !054
940 P=1 !008
950 X=POS(C$," ",P):: IF X=P THEN P=P+1 :: GOTO 950 ELSE Y,P=X :: IF POS(C$," ",P)=0 THEN SUBEXIT !114
960 C$=SEG$(C$,1,X)&" "&SEG$(C$,X+1,255):: IF LEN(C$)=R THEN SUBEXIT ELSE P=X+2 !038
970 X=POS(C$," ",P):: IF X=0 THEN P=Y :: GOTO 970 ELSE GOTO 960 !190
980 SUBEND !168
990 SUB CALLKEY(R,C,V$,K$)!121
1000 CALL HCHAR(R,C+2,30):: FOR T=1 TO 3 :: CALL KEY(0,K,S):: IF S<>0 THEN 1030 !121
1010 NEXT T :: CALL HCHAR(R,C+2,32):: FOR T=1 TO 3 :: CALL KEY(0,K,S):: IF S<>0 THEN 1030 !231
1020 NEXT T :: GOTO 1000 !166
1030 IF POS(V$,CHR$(K),1)=0 THEN 1000 ELSE K$=CHR$(K)!137
1040 CALL HCHAR(R,C+2,32):: SUBEND !077
1050 SUB UNFILL(M$):: P=1 !161
1060 X=POS(M$," ",P):: IF X=P THEN P=P+1 :: GOTO 1060 !153
1070 X=POS(M$," ",P):: IF X=0 THEN SUBEXIT !248
1080 M$=SEG$(M$,1,X)&SEG$(M$,X+2,255):: GOTO 1070 !239
1090 SUBEND !168
1100 SUB DEFAULT(R,C,M$,R$):: R$="" :: X=ASC(M$)!070
1110 DISPLAY AT(R,C):M$ !109
1120 CALL HCHAR(R,C+2,ASC(SEG$(M$,1,1))):: CALL HCHAR(R,C+2,30)!240
1130 CALL KEY(0,K,S):: IF S=0 THEN 1120 ELSE IF K=13 THEN R$=M$ :: SUBEXIT ELSE DISPLAY AT(R,C):CHR$(K):: ACCEPT AT(R,C+1):R$ :: R$=CHR$(K)&R$ !144
1140 SUBEND !168

```

Newsbytes

Disk of 110 XB subs available to readers

A collection of 110 subprograms by Jerry Stern, author of MICROpendium's Extended BASIC column from November 1988 to February 1992, has been made available by the author and will be sold through MICROpendium for \$6.

Stern has resigned from writing the column because of time pressures.

In regard to the disk, he explains, "Nearly all of the subprograms on this disk have been explained in the columns at least once, but all the subprograms have at least one comment line to explain their basic function. Subprograms that end in a number, such as QUICK2, QUICK3 and so on, have the same general purpose, but are specialized versions of the subprogram."

Stern says the subprograms have no overlapping line numbers, so the user may

combine them safely in any project without the need for resequencing. Subprograms which need their printer names changed generally have comment lines to that effect.

The disk also contains the latest version of SUBINDEX2, published this issue.

All the routines may be used in any non-commercial software, shareware or free-ware. Use in commercial software is prohibited without specific written permission. Application for written permission may be made to Stern at 1323 Mantle St., Baltimore, MD 21234.

Goddard provides TI equipment in UK

Mike Goddard Computer Support buys new and used computer equipment in the United Kingdom. The company provides hardware, software, books and repairs for the TI99/4A.

For a price list, contact M.G.C.S., "Sarnia," Cemetery Road, Rhos, Wrexham Clwyd, LL14 2BY. Tel. (0978)843547.

Australia fair set

Australia's first TI fair of the 1990s is scheduled for Nov. 14 in Sydney, according to the TIsHUG news digest. For further information, contact Richard Warburton, (ISD) 61-2-9188132 or (STD) 02-9188132.

Sign-up info available for Northeast TI fair

Ron Williams of the Boston Computer Society says all user groups and vendors on the group's mailing list were mailed

(See Page 36)

MICRO-REVIEWS

Son of Airtaxi, Global War, Certificate '99 Companion Plus

By STAN KRAJEWSKI

I believe my articles have been serving their purpose. You may send comments to me, good or bad, at any time. I have not received any programs from our overseas friends. I know that they are some of our most powerful programmers and we would all benefit greatly from their contributions to this column. Thanks to the rest of you who have made contributions and are making this column work for all of us.

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

★ Leave it alone, back to the drawing board.

★★ Needs improvements, but workable.

★★★ A good program, worth trying.

★★★★ Send your money and buy it.

★★★★ SON OF AIRTAXI

With the "Sons of" other programs, why not Airtaxi! System requirements are; TI console, Extended BASIC, cassette or disk system. It is also compatible with the Geneve. Airtaxi was reviewed in the May 1990 MICROpendium. However, many changes have been made from the North American location. Although the scenario is the same, now almost the entire world is available for you to fly and learn your countries-city locations.

You are working for a Airtaxi Service. Each player can start with \$0 or \$100 dollars. You transport your customers to different cities around the world. A player wins by having a bigger bankroll than the other players after a predetermined amount of rounds decided upon by all players. The longer it takes you to find a city, the more money is deducted from your fare. Up to eight players are permitted to play. Each player has his own color airplane, represented as a dot, and players' colors are denoted on the top left hand corner of the screen, along with players' names on top center.

There are LETTER and NUMBER skill levels. The LETTER skill level, lets each player handicap for his own particular level. This is done by starting with "A" which places six cities on the map. As each LETTER increases, cities increase by three. The NUMBER skill level adjusts the size of the target. Lower numbers make the target easier to find; higher ones make it harder. If you run out of gas before finding your designated city, it will even tell you what the closest city to you is, and how many miles you were from your target.

Unlike its predecessor, Son of Airtaxi contains eight geographical locations: 1. World 2. Europe 3. Britain 4. Australia 5. Africa 6. South America 7. West Indies 8. Far East. None of the locations are marked, except in the DEMO mode. In the DEMO mode, a dot will flash with its location displayed at the bottom of the screen. You may leave the DEMO mode at any time by pressing the space bar. Once you choose a location from the menu above, each world location is treated as a separate program. The maps are finely detailed, and the game is a fantastic learning tool.

The author states that "the maps are exquisitely accurate, and although there is some game value, it is first and foremost, educational." As an example of how accurate it is, the upper left pixel is the exact location in a four-pixel blinker.

This program is a four-star rating because of its educational value, enjoyment for all ages, and versatility to run on any system with just Extended BASIC. Customizing instructions are given for users who prefer joysticks. An order form installed on this disk can be printed for customers who want to send for modifications to their copy for their particular cities, to default players' names to the program, or their name or school on the screen display. Although the author would rather distribute this program on disk because of the expense of handling

and postage involved with cassettes, he will send cassette if requested for an additional \$5.

The price of this outstanding program: \$10 including S&H! Don Shorock would rather see kids benefit from this program, rather than sell for a higher price and take a chance of it not being available to them. But it's not just for kids.

Son of Airtaxi is available from Don Shorock, P.O. Box 501, Great Bend, KS 67530-0501.

★★★★ Global War

I had planned to have this in the January issue because this program was only available to owners of the Myarc Mouse, and I reviewed it as far as I could without one.

However, I wrote the author explaining that I was a Geneve owner without a mouse, and asked him if he could program a joystick routine to this program, because I saw it was a good program, and would like to see others without a mouse enjoy it. Well, he did better and created a routine so we can use mouse, joystick or keyboard, so I am able to review this game from the standpoint of being able to run it in its entirety.

I had played a board game called "Risk" for many years, and still continued to play it until I got hold of this game. It is a world conquest game for us armchair strategists, really similar to "Risk" except that you do not have to sort, drop or accidentally move playing pieces from their spots. This game counts the armies for you and keeps track of your countries so you can concentrate on whose country you'll do in next.

System: requirements are Geneve, MDOS 1.14F or higher, MY-BASIC 2.99A, Myarc Mouse, Joystick, or Keyboard. Although you can set up your own batch files for the program to run to your configuration, the easiest way for you to

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MICRO-REVIEWS—

(Continued from Page 34)

load the program is by pressing CTRL, ALT, Delete. This will boot the existing Auto-Exec file. The program then initializes the RAMdisk, then loads the necessary files into RAMdisk. After you install MY-BASIC, it then executes the game.

You have the option of defaulting to any drive number. I left mine at DSK5 (RAMdisk) for optimum speed. The title screen is an impressive view of Earth from the Moon. After the title screen you have the option of reloading a saved game or starting a new one. You then can choose how many players you would like to play, 2-5. Your mission is to conquer the world.

The game starts by asking you if you would like to buy a lottery ticket. You must purchase a lottery ticket because this is where you get the money to purchase the armies you need to enter the attack phase. You then have the option of entering the attack phase, or you can stick around and try to win more money. In the "Attack Phase" there is a detailed map of the world divided into five continents. You move the arrow cursor into any one of the continents, to choose which continent you want to start occupying. After you choose a continent, you can choose from three to six countries, depending which continent you're in, and attack that country. The country is originally owned by the "Empire of" that particular country, until you conquer it. Then you are prey for any other player who thinks he can conquer you. You have status reports that tell you what countries you own and how many armies, airplanes, bombs, etc. you have before each turn. When you enter the attack mode, in the upper right hand corner, information is visible on what country you are attacking, who owns the country you are attacking, and how much of a defense force it has.

The "general" appears randomly at the start of your turn with decisions on whether he will give you money and armies, or take them from you. As the play progresses, so does the lottery jackpot. Winning that could help you conquer the world. After all, then you could afford to "nuke" your opponents. Each time you conquer a country, you then have to install

your defense force. The bigger the defense force the more chance you have to keep your country. Sometimes you cannot attack because negotiations are going on. You then can move on to another country or retire your turn.

The "Army Surplus Store" is where you buy armies, bombs and planes. You always get a discount, but will you be better off waiting until next turn? Or will your opponent get a better discount? You'll have to play to see.

This has to be one of the more exciting games I have played because of the plot and challenge. Also, this is not a short game, so the Save Game feature really comes in handy. The graphics and layout are professionally done, and you would have thought a major software manufacturer had produced this, because of its quality.

The only problem I found was in the new routine the author sent to me for joystick and keyboard users. It does not ask you which drive to save the game to, like the original routine did. So, if you used the default, DSK5 to play your game, you would lose your game statistics when shutting or re-booting the Geneve. I ran the game using DSK1, but the drawing of the boards is considerably slower.

I brought this to the attention of the author and I'm sure it'll be worked out by the time you read this.

Global War is available from 9640 News, P.O. Box 752465, Memphis, TN. 38175. The price is \$15 including S&H.

★ ★ ★

CERTIFICATE '99 COMPANION PLUS

I am happy to see continued support of established programs we are familiar with. Certificate '99 COMPANION PLUS by Notung Software is such a program. This single disk is packed full of all new fonts, borders, graphics and signatures to run with your existing Certificate '99 program by Great Lakes Software. System requirements are TI 99/4A with at least 32K or Geneve, disk drive, Epson compatible printer and the Certificate '99 program.

After the Certificate '99 program is

loaded, it prompts you to insert the companion disk. At this time you insert the COMPANION PLUS disk. It will then ask you if you would like to load a certificate. If you choose to load one, you can now take advantage of loading any one of the seven premade certificates by typing "Y" then DSK1. and the filename. You can keep the default border, graphics and signature, or use the other ones on the disk. I compliment Ken Gilliland on taking the time to create these amusing premade certificates. They really add to the fun of this program.

If you would like to make your own certificate you just press "N" and start from scratch with 11 new fonts, 30 new borders, 60 new graphics and 7 new signatures. You will see some familiar graphics and signatures if you have, or have seen, the Disk of Pyrates and The Bride of the Disk of Dinosaurs.

There is just one idiosyncrasy, but it does not affect the use of the program. Certificate '99 has its original signature selections hard-coded into the Certificate '99 program, making the signature selection menu unable to show the new signatures. However, the bright four-page documentation lets you easily look up what number to press for the correct signature.

Companion Plus is available from: Notung Software, 7647 McGroarty St., Tujunga, CA 91042, priced at \$7 plus \$1 S&H.

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

Graphics/music disk offered

Software and More has released a disk of three graphics and four songs, Grafiks and Music V2.2 written in assembly language to run out of Extended BASIC. The program sells for \$10 plus 53 cents postage.

Send orders to Software and More, 5820 SE Westfork St., Portland, OR 97206-0742. Checks should be made out to Sam Carey.

Newsbytes

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table sign-up information on the Northeast TI fair April 4.

The fair is scheduled from 10 a.m. to 4 p.m. in the cafeteria of the Waltham Central Middle School, 55 School St., Waltham, Massachusetts.

User groups or vendors who want tables at the fair or persons wanting information may write Williams at 14 East St., Avon, MA 02322-1913.

UGOC Hall of Fame selects Lou Phillips

Lou Phillips of Myarc has been named to the UGOC Hall of Fame by the Users Group of Orange County in California.

Myarc has provided the Personality Card, the first hard disk controller for the TI; Myarc Floppy Controller Card, capable of single-sided/single-density (90K) to double-sided/quad density (720K); the

Myarc Hard and Floppy Disk Controller Card (along with Disk Managers III and IV); 512K Memory Expansion Card (RAMdisk, Print Spooler, plus more); Extended BASIC II; Myarc RS232 interface card; Myarc Expansion System; and Geneve 9640.

The UGOC Hall of Fame was created in March 1989.

V3.0 of IWD Plus! released for Geneve

Version 3.0 of IWD Plus!, the ImageWise Display program is now available for users of the Geneve and ImageWise Video Digitizer, according to Joseph M. Syzdek.

New features listed are:

- Ability to save image to TI-Artist format once it has been reduced to black and white.
- Dither function for converting greyscale image to black/white for save to

TI-Artist format.

- Edge filter for converting image to outline.
- 16 or 64 colors in low-resolution (256x212) mode.
- Ability to modify 16-color Palette in high-resolution (512x212) mode.
- Save and Load your own Look-Up Tables and 16-color Palette.
- Auxiliary Picture Buffer for fast save/recall of image.
- MDOS Command Line Interpreter (CLI) for checking disk directory or formatting disks.
- Display of image as it is received from the digitizer.
- Direct VDP access for fast screen updates.

Version 3.0 is available for \$19.95 plus \$1.50 shipping and handling from Joseph M. Syzdek, 99 Highland Ave., West Springfield, MA 01089-1017.

Send announcements to Newsbytes, P.O. Box 1343, Round Rock, TX 78680.

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One of founders of Chicago UG dies at 70

Grant B. Schmalgemeier, one of the founders of the Chicago TI User Group, died Feb. 11 in Chicago. He was 70 years old.

He is survived by his wife, Ethel; three daughters, Susan May-er, Judith Caselman and Patricia Schmalgemeier; two sons, Terry and Walter; seven grandchildren; one brother, William; and two sisters, Janet Palmer and Helen Johnson.

According to Hal Shanafield, president of the Chicago user group, "he's going to be missed. He did a lot of behind the scenes stuff."

Schmalgemeier played an important role in the success of the Chicago group. His importance was indicated by the fact that his address was used by the Chicago group as its mailbox. However, his interests weren't limited to computers.

"He had a wealth of information about Chicago history," Shanafield said. A national authority on the 1993 Chicago World's Fair, known as the Century of Progress, his extensive collection of memorabilia will be parceled out to several museums.

At the time of his death, Schmalgemeier was in the process of writing a book on Chicago history based on a collection of some 400,000 postcards. He was also an authority on interurban mass transportation.

"There's a lot of people throughout the country who knew Grant," Shanafield said.

User Notes

Small bug in calculator program

This comes from Jim Peterson, author of last month's Calculator program. He writes:

Jerry Keisler has alerted me to a bug in the programmable calculator option of my Calculator, which will result in an error message if the formula ends in a number rather than a variable. The fix is simple. In line 1710, immediately after `N$=N$&Z$, add :: Z$=""`.

More tips on fixing joysticks

This comes from Fred Layton, of the San Francisco 99ers. This item originally appeared in his user group newsletter. He writes:

What prompted me to write was Ray Kazmer's solution to sagging connectors to the joystick ports (November 1991).

So you have a set of original TI joysticks that have been working intermittently for some time and you chucked them into the "grab box" with the best of intentions to return them to their former operating condition. But then you saw advertised a new single joystick intended for Atari or Commodore or whatever use and you made the big plunge. But it didn't work with your lil' TI jewel!

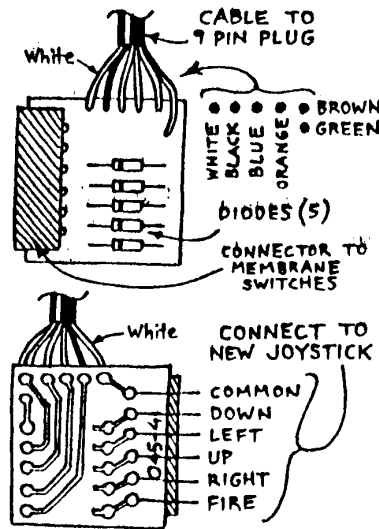
Well, you're in luck. With a little patience and a small soldering iron you can put that retired TI joystick to better use. I have found that most single-type joysticks have about the same configuration. That is: up, down, left, right, fire, common.

TI Joystick No. 1 and No. 2 are configured alike, except for one wire. That is what I call the "common" lead, which lets TEX know whether you are using JS1 or JS2. One way to be sure which is JS1 (that's the one you'll want) is to run the following program (BASIC is okay):

```
1 CALL CLEAR
2 PRINT "Hit the Firebutton"
3 CALL KEY(1,K,S)
4 IFS<1 THEN 3
5 PRINT "YOU ARE OK!"
6 GOTO 3
```

If you hit the fire button and your screen

responds with successive displays of YOU ARE OKAY!, then you are using JS1. If neither JS responds, then unscrew two screws from the JS back. You will be doing that anyway later. Locate the board (about 7/8 inch square) and gently pull the flat membrane from the black 6-contact connector. Shore out the two end contacts. Your screen should respond.



You may now cut the JS2 lead close to the 9-pin connector as you'll be using a single JS. Leave enough lead (2 inches) and put a drop of nail polish over the end after being sure you have no short between the 6 wires, and tape the 2 leads for mechanical support.

Now, leave the 6 leads connected to the board with the 5 diodes (orange) and turn the board over. With the wires oriented toward the top and board coding to the right (045-1B), the white lead should go to the first contact, which is common. Your connecting sequence will be:

1. Common
2. Down
3. Left
4. Up
5. Right
6. Fire

When you look inside your new JS you should see either a board with some type of normally open pressure contacts, or reeds which make contact as pressure is applied from the JS. There should be one

lead which is common to 5 places (2 through 6 above) and one lead to the fire button. The other four control your geographical response. That would be 180 degrees from JS direction.

If you have enough lead length, cut your round cable with 9-pin end, leaving wires soldered or connected. Then, very carefully solder these ends using the orientation listed above. Don't try to match colors of wires. A couple of wraps of black tape might be needed to secure the TI lead that is replacing the one which came with your new JS.

Wrap this board assembly in foam or cotton to protect it and store it out of the way inside your new JS box.

See the sketches accompanying this article to view the physical layout of the board and wiring.

Missing Link solution

This comes from Mark Wacholtz, of Sunrise, Florida. He writes:

Recently, while programming with Missing Link, I ran across what I thought was a bug. I used the CALL LINK("INPUT",x,y,A\$) command and found that all my text was being input in uppercase while the Alpha lock key was in the "released" position. It took me a while to find the case ... then find a cure.

I had done a CALL KEY(3,K,S) prior to the INPUT link. What this CALL KEY does is tell the computer that all alpha key presses will be sent back as uppercase coding. So, if you typed an "a," it would return the "A." This would have its functions, but not in this particular spot of my program.

I tried a CALL KEY(@,K,S) right before the INPUT link, but it still returned uppercase letters. I then tried CALL KEY(4,K,S), and it worked! I now had upper and lowercase performing as they should. However, the left and right arrow keys (FCTN S and D) didn't respond. CALL KEY(4,K,S) was also deemed useless. So, I tried CALL KEY(5,K,S). Success! All worked normally.

Even though you can't VALIDATE(UALPHA) on inputs with The Missing Link, you can use the following (See Page 38)

User Notes

(Continued from Page 37)

ing line to get an uppercase input and then return to normal keyboard.

```
100 CALL KEY(3,K,S) :: CALL
LINK("INPUT",X,Y,TEXT$,L) ::
CALL KEY(5,K,S)
```

Easy circle drawing

This comes from King Turambar, of Mussidan, France. He writes:

Here are a few lines explaining how to easily draw circles, without using the SIN and COS functions, nor decimal numbers.

This item is written for assembly programmers who would like to draw circles in bitmap mode but are discouraged by the GPL SIN and COS routines because they are so slow and occupy some bytes in video memory.

Before I begin, this method doesn't originate with me but by A. Amortilla of France who used it in one of his programs years ago. Mr. Amortilla has stopped any TI activity for many years now, and I thought that his method would interest other assembly programmers.

I won't spend much time explaining how to draw a circle, since the X BASIC program accompanying this article is easy to understand.

Just a few words: Only a quarter of the circle is computed by the program. The remainder of the circle is obtained by symmetries. This arcus is the one located on the right, at the bottom of the screen. We start from the middle of the screen, at the bottom, and go upward to the right.

This is how the program works:

We start from the bottom extremity. The asterisk is put on the screen.

Then we move one position to the right. Are we still at a good distance from the center, i.e. not too far away? If the answer is yes, it's all right. Go to the right, to the next asterisk. If the answer is no, we have to return nearer from the center. So, we try one position up. If it's good, then we go to the next asterisk on the right, same row.

If it's still not good, it's because we are on a "vertical" arcus, i.e. near the right extremity of the circle. So, we stay up but return one position to the left. And now,

it's good and we go to the next asterisk.

Once the quarter of the circle has been computed, it's finished.

This simple method gives rather good circles. It's the one I used in my program The Drawing Master.

```
1 !!131
2 ! EASY CIRCLE DRAWING !211
3 ! PROGRAMMED BY !076
4 ! KING TURAMBAR, OF THE !0
44
5 ! FANTI '99 USERS' GROUP !
084
6 !!131
7 ! FOR MICROPENDIUM !054
8 !!131
9 !!131
100 CALL CLEAR !209
110 !!131
120 ! CENTER !100
130 !!131
140 XO=16 :: YO=12 !171
150 !!131
160 ! RAY !143
170 !!131
180 R=10 !059
190 !!131
200 ! START !049
210 DX=0 :: DY=INT(R) !190
220 !!131
230 ! DISPLAY THE 4 DOTS !10
4
240 !!131
250 CALL DRAW(DX,DY,XO,YO) !1
65
260 ! FINISHED ? !076
270 IF DY=0 THEN 370 !196
280 !!131
290 ! NEXT DOT !233
300 !!131
310 DX=DX+1 !177
320 IF (DX^2+DY^2)<=R^2 THEN
360 !220
330 DY=DY-1 !180
340 IF (DX^2+DY^2)<=R^2 THEN
360 !220
350 DX=DX-1 !178
360 GOTO 250 !073
370 CALL KEY(0,K,S):: IF S=0
THEN 370 !183
380 STOP !152
390 !!131
400 ! THIS SUBPROGRAM DRAWS
!158
```

```
410 ! THE FOUR OPPOSITE !115
420 ! DOTS OF THE CIRCLE !10
1
430 !!131
440 SUB DRAW(DX,DY,XO,YO) !16
9
450 CALL HCHAR(YO+DY,XO+DX,4
2) !221
460 CALL HCHAR(YO-DY,XO+DX,4
2) !222
470 CALL HCHAR(YO+DY,XO-DX,4
2) !222
480 CALL HCHAR(YO-DY,XO-DX,4
2) !223
490 SUBEND !168
500 END !139
```

Changing uppercase to lowercase, and vice versa

The following, by John Briscoe, appeared in the The Computer Bridge newsletter.

By now most of us know about the Funneweb TI-Writer trick about uppercase and lowercase letters. You know — to change all the letters to uppercase just use CTRL ; and holding down those keys will run the cursor thorough the text until you want to stop, and changing all the lowercase to uppercase without affecting anything else.

However, have you noticed that Funnelweb will not allow you to use lowercase letters in a filename you are saving or loading? You can pick up a lowercase filename with SD but you cannot enter one from the command line. Now, the only characters that are not allowed as filenames are space and the period. So, why can't we enter them for filenames of our TI-Writer files? Of course we can! Just write the filename and then change the uppercase letters that you wish to lowercase using CTRL period.

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