Atlanta 99/4A Computer Users Group

# CALL NEWSLETTER

VOLUME II NUMBER 5 May 1984 Atlanta, Georgia

EAST SIDE SUB-GROUP

TI99 COMPUTER FAIR PLANNED

We have planned a COMPUTER FAIR for Saturday, July 28, at the CLARKSTON WOMANS CLUB. features include:

- Lectures of interest to all ages and levels of expertise.
- Vendors with TI99/4A compatible hardware & software.
- Computer games and prizes for high scores.
- Program contest awards
- FUN FUN FUN for all ages

Plan now to come and support us in this important effort to show our vendors and suppliers that TI99/4A users are many and strong.

East Side June Meeting

The June meeting is scheduled at the Clarkston Woman's Club, on Church Street, across the RR tracks from East Ponce DeLeon, Just East of I-285, on Monday, June 4, at 7P.M.

AGENDA for the June Meeting:

Registration
Introductions
Needs for the Computer Fair
Volunteers Recruited
Software Review-Gaming
System Review-Monitors-Don Sherill
Education
Basic Program Techniques-Robert Murphy
Questions
Adjourn

NO EAST SIDE MEETING ON OUR USUAL FIRST MONDAY FOR JULY AND AUGUST, SO WE CAN PUT ALL OF OUR EFFORTS INTO THE COMPUTER FAIR.

Ralph Danson

....AND FROM THE SOUTHSIDE:

The Southside Chapter of the Atlanta TI Users Group is off and running! We had a good turnout at our April meeting.

Briand Sanderson of Network-99 has agreed to work as our Librarian and help Robert Orr.

We now have a permanent meeting place, and our meeting day has also been permanently set! Our meetings will be held the 1st SUNDAY every month at the CLAYTON COUNTY RECREATION CENTER in Jonesboro at 101 Lake Jodeco Road. Meetings will start at 3:00 sharp. We ask for the standard admission of $.50 for members, and $1.00 for non-members. Remember: You do not have to live on the Southside of town to come, we welcome anybody who is interested in communing with others who compute!

We have a very congenial and supportive group getting started, and we plan to be the best sub-group in the Atlanta area, so if you have any questions, don't hesitate to get in touch with any of the officers. Telephone numbers were published in last month's newsletter.

## HELP NEEDED!

Tom Bouisseau, who has been our newsletter chairman since the start of the club, and under whose guidance our newsletter has become one of the best in the country, has resigned his post because of family and job commitments.

Tom has served the club and each one of you who has read, enjoyed and learned from the newsletter. I would like to thank Tom for all his efforts on all of our behalfs. Now we need a new chairman, and several helpers.

Most of the officers have and will continue to help with the newsletter so the problem is not a huge one, but it is one that must be done. If we are to continue even having a newsletter we must have someone who will give direction to the newsletter. We also need others to help type and work on the newsletter.

We need to fill several open positions on the club's staff. Without these positions being filled, none of the officers can do the job he or she volunteered to do because we must do several other jobs to keep things going. I'm much afraid that what is happening is that we are rapidly slipping backward and the club is hurting.

The club needs a Secretary, a Publicity Chairman, an Education Chairman and a Newsletter Editor. I don't know how to impress upon you the seriousness of the position the club is in. We simply must fill these positions before the work load gets too much for the few officers left and we wind up with no officers and no activities, or even no club. I know that it's hard to look at a little extra work now that summer is finally here, but we need to keep the club rolling.

Please volunteer to help with one of the open positions, even if you do not wish to be chairman, you can help by working on one of the committees. PLEASE, PLEASE, PLEASE VOLUNTEER!!!!!

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**********  CLUB OFFICERS  **********

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| | |
|---|---|
| Marshall Gordon | President |
| Gary Matthews | Vice President |
| Elise Gordon | Secretary/Treasurer |
| We need one | Newsletter Chairman |
| Bill Kleinsorge | Program Chairman |
| Bob Willis | Library Chairman |
| We need one | Education Chairman |
| We need one | Recruitment Chairman |

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EAST SIDE CHAPTER (ESCUG)

| | |
|---|---|
| Ralph Danson | President |
| Bill Dickinson | Vice President |
| Pat Hester | Secretary/Treasurer |
| Robert Murphy | Librarian |

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SOUTH SIDE CHAPTER

| | |
|---|---|
| Billy Glass | President |
| Dennis Hawkins | Vice President |
| Bob Orr | Secretary/Treasurer |
| Pete Couch | Publicity |
| Mary Anne Maslanka | Communications |
| Steve Bell | Programs |

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## PRESIDENTS CORNER

Because TI has now completely removed itself from the Home Computer market and is ceasing all manufacturing and selling, its important to know that there are others out there that are going to take up the slack. There are many third party products, we have included in this newsletter a listing from TI about third party availability (see center pull out section), and the number of third party products continues to increase daily. TI states that they assume no responsibility for the quality or compatibility of the products, well we can't either, we're just passing the list along. So any one out there that has purchased from any of these people PLEASE, PLEASE, PLEASE write up a short article on it and let others know how they work.

This month I'm going to address Third Party availability. TI, since they made the 99/4A is the first party, you and I since we purchased the 99/4A are the second party, and finally anyone who writes software, or books, builds hardware or anything else is third party.

I recently purchased a WIDGIT from **Navarone Ind.**, and let me tell you, its been a pleasure. It has just about done away with Module Port lockup. I haven't had it long enough to tell if its going to eliminate having to clean the module port, but I have not taken it out of the port since I received it. With three of my favorite Modules in place at all times its just not necessary to remove the WIDGIT. It also seems to have helped the heat buildup on that side of the console. About the only thing that is annoying is its length: I hit into it sometimes when I go hit the 'ENTER' or 'Shift' keys. The length however is partially due to the reset button. Because of which I never have to power down the console on lockup, I just press the reset and I'm up and running again.

Although **CORCOMP INC.** appears to be the first to release a P-BOX for the 99/4A, at least two other companies are in the process of manufacturing a compatible P-BOX. **CORCOMP's** already released RS232 card and 32K memory expansion do the same job as TI's originals. **FOUNDATION** released a 32K card last year, and followed up with a 128K card and although there is little 99/4A software for it right now its use can still greatly expand your data handling capacity by using it as a disk emulator.

I'd like to devote a few lines to the rumors going around about the CORCOMP P-BOX. First it is going to be out in three styles, from as large as half the size of TI's P-box to one about twice the size of the Speech Synthesizer. The larger one will be either empty with slots for cards, or complete with RS232, 32K memory, and a vastly expanded Disk-controller capable of handling up to four Double sided-double density drives in any combination. This system will also allow you to add extra cards later and its power supply is capable of handling two slim line drives in the box, I also hear it will be significantly quieter than the TI version. The smaller system is supposed to come with an RS232 on board and the capacity to add the 32K memory and the same Disk controller. The smaller system will plug in into the Speech Synthesizer and sit next to your console. Whereas the larger will be connected by a round wire which connects to the console at 90 degrees so no more 'Fire Hose' sitting on your table. If just some of the rumors are correct its going to be one great piece of equipment. Time will tell.

Inside the September issue of 1983 99'er Magazine there is a product directory. For those of you who have a copy take a look. For those who would like to see it the club has a good collection of 99'er magazines for sale. You can purchase them up at meetings and for those who live too far away you can order by mail or phone.

I get a chance to see a good number of the newsletters of other groups. Most are growing stronger each month. Its going to be interesting to see if owners of the 99/4A are not going to obey TI's command to roll over and die, and continue to compel the 99/4A to continue to live on.

MARSHALL

## LIBRARY PROGRAMS

As mention in the last Newsletter and at the April meeting, the club is planning a Library Programs Swap Meet. This means that the clubs library listing will be available for members to choose what they want and then actually get the programs at the meeting. Several members have agreed to bring their systems (console,monitor,P box with at least one disk drive,and tape recorder) to the Swap Meet. It is planned for the June meeting (June 17) and it is expected to be worthwhile enough to take up the entire meeting time. All details of this program have not been completely worked out yet. We do need several more people to bring their systems because it will take at least eight to make this endeavor work.

The people who bring their systems will obviously be in the best position to get what programs they want, early. Only members will be entitled to get the programs. Bring your own blank tapes and diskettes, but we do plan to have them available for you to buy if you forget to bring your own. Most of the recording of programs will be to tape since only one or two dual disk systems will be available.

Although the procedure that we will follow has not been finalized, here is a representative idea of how it will work.

People will make a list of programs that they want and then go to a system set-up. The number of people waiting at each location would determine the time a person would be allowed to spend before they had to allow the next person their turn. If each set-up location dealt with only one category of program (example- Music or Education) then it ought to be managed fairly easily. I repeat, the more systems that participate, the easier it will be for more people to get more programs.

In case it wasn't made clear earlier, This is NOT a money making effort. It doesn't cost a thing to get these programs if you are a member and bring your own tapes.

Smaller clubs have been doing this around the country for months. I very much want our 'larger' group to accomplish this as it will give our members one more example of the tangible benefits of belonging to a User's Group; especially one like ours with such a large library of Public Domain software.

Those wishing to assist in this venture please contact Gary Matthews (233-3096) or Bill Kleinsorge (971-2599). With a little more help, I think this will actually work!

Gary Matthews

## MASTER LIBRARY REVIEW

I have wanted a program that would allow me to review all of my disk catalogs without having to change every disk in order to locate a particular program. I also wanted a program that would allow me to list one catalog in a two up format, in order to save paper and compact the list. I considered buying some of the advertised catalogs, but I finally threw this program together.

To use the program, you will first need to create your file of catalogs by using your disk manager to list the catalog to 'DSK1.DISKNAME'. This file can then be read by the following program. You can use the 'AID' key to interrupt the listing if you wish to stop prematurely. This program will also allow you to enter '0' and it will list all of the files on the chosen disk.

Ralph Danson

```
1 REM SAVE DSK2.LIBREV
10 REM *** PREPARE THE FILE TO USE WITH THIS PROGRAM BY USING THE
DISK MANAGER
20 REM *** PRINT THE CATAOG TO DSK#.DISKNAME -- BE SURE TO USE A
SPECIAL DISK FO R STORINC ALL OF YOUR CATALOC FILES 30 REM ***
THE CATALOG WILL BE SAVED IN DISPLAY/FIXED 32 FORMAT
40 REM *** CHANGE THIS PROGRAM TO YOUR INDIVIDUAL NEEDS SUCH AS
LINE 250 IF YOU HAVE NO SUCH DISKS AS 'LIBRARY_##'
100 REM BY Ralph Danson, Atlanta 99CUG,East Side
120 ON WARNING NEXT :: ON ERROR 130 :: GOTO 180
130 ON ERROR 130
```

```
140 CALL ERR(CODE,TYPE,SEVER,LINE)
150 PRINT "INPUT ERROR"
160 IF LINE=400 THEN RETURN 580
170 IF LINE=360 THEN 610
190 CALL CLEAR
200  PRINT  TAB(7);"LIBRARY  REVIEW":  :  :  :  :TAB(7);"MENU  TO
REVIEW": : : : :TAB(5) ;"ENTER DISK NAME OR"
210 INPUT "#=LIBRARY_# OR 0=CATALOG : ":MENU$
220 IF LEN(MENU$))2 THEN 320
230 IF MENU$="0" THEN CALL AID(MENU$):: GOTO 220
240 IF LEN(MENU$)(2 THEN MENU$="0"&MENU$
250 MENU$="LIBRARY_"&MENU$
260 PRINT MENU$:" IS THAT CORRECT (Y/N):";:: INPUT YN$
270 IF YN$()"Y" THEN 200
280 PRINT "WHERE DO YOU WANT IT PRINTED":" 1 FOR SCREEN":" 2  FOR
OTHER" :: INP UT PRNT
290 IF PRNT)2 OR PRNT(1 THEN 280
300 IF PRNT=1 THEN 320 ELSE INPUT "DEVICE ":DEVICE$
310 OPEN #2:DEVICE$,OUTPUT
320 DSK$="DSK2."&MENU$
330 OPEN #1:DSK$,DISPLAY ,VARIABLE 32,INPUT
340 FOR N=1 TO 100
350 LINPUT #1:PRO$
360 PROG$=SEG$(PRO$,3,28)
370 IF EOF(1)THEN 510
380 PRINT PROG$
390 IF PRNT(>2 THEN 460 :: SIDE-SIDE+1 :: IF SIDE)2 THEN SIDE=1
400 LINE=LINE+1
410   IF  LINE)7  THEN  430  ::  IF  LINE)5  THEN  420  ::  PRINT
#2:TAB(24);PROG$ :: GOTO 60
420 PRINT #2:PROG$;" ";PROG$ :: GOTO 460
430 IF SIDE=1 THEN 450 :: PRINT #2:PROG$;" ";
440 GOTO 460
450 PRINT #2:PROG$
460 CALL KEY(0,K,S)
470 IF K=1 THEN Z=1 :: GOTO 500
480 IF S()0 THEN 460
490 NEXT N
500 IF Z=1 THEN PRINT "PREMATURE INTERRUPT ";MENU$
510 CLOSE #1
520 IF PRNT=2 THEN CLOSE #2
530 IF Z()1 THEN PRINT "THIS CONCLUDES ";MENU$:
540 Z=0
550 INPUT "ANOTHER MENU(Y/N)? ":YN$
560 IF YN$="Y" THEN 190
570 STOP
580 REM ERROR IN OPEN #1-DISK
590 PRINT "ERROR ";CODE;"IN DISK FILE"
600 GOTO 200
610 REM ERROR IN OPEN #2-PRINTER
620 PRINT "ERROR ";CODE;"IN PRINT FILE"
630 GOTO 280
640 SUB AID(MENU$)
650 DIM TYPE$(5),TYP$(5)
660 TYPE$(1)="DIS/FIX"
670 TYP$(1)="DIS PLAY FIXED"
680 TYPE$(2)="DIS/VAR"
690 TYP$(2)="DIS PLAY VARI ABLE"
700 TYPE$(3)="INT/FIX"
710 TYP$(3)="INT ERNAL FIXED"
720 TYPE$(4)="INT/VAR"
730 TYP$(4)="INT ERNAL VARI ABLE"
740 TYPE$(5)="PROGRAM"
750 TYP$(5)="PRO GRAM"
760 INPUT "DISK DRIVE(1-3): ":A
770 A=INT(A)
780 IF A(1 THEN 760
790 IF A)3 THEN 760
800 OPEN #1:"DSK"&STR$(A)".",INPUT ,RELATIVE,INTERNAL
810 INPUT #1:A$,J,J,K
820 PRINT " AID=STOP    ANY KEY=DELAY"
830    DISPLAY     "DSK";STR$(A);"-DISKNAME=";A$:"AVAILABLE=";K;"
USED=";J-K
840 DISPLAY :"FILENAME   SIZE TYPE P":"---------- ---- ------ -";
850 FOR LOOP=1 TO 127
860 INPUT #1:A$,A,J,K
870 IF LEN(A$)=0 THEN 980
880 DISPLAY :A$;TAB(12);J;TAB(17);TYPE$(ABS(A));
890 IF ABS(A)=5 THEN 920
900 B$=" "&SIB$(K)
910 DISPLAY SEG$(B$,LEN(B$)-2,3);
920 IF A)0 THEN 940
930 DISPLAY TAB(20);"Y";
940 CALL KEY(0,K,S)
950 IF K=1 THEN 980
960 IF S()0 THEN 940
970 NEXT LOOP
980 CLOSE #1
990 INPUT "FILENAME ":MENU$
1000 IF MENU$="00" THEN 760
1010 SUBEND
```

## I LOVE MY PRINTER

Four months ago I purchased a printer. It took a year of careful holding back, looking at many different companies, and research coupled with saving before I ran out and bought on impulse because the deal was too good to pass up.

My printer is a MANNESMANN TALLY SPIRIT 80 and I must tell you that I lucked out. This article is a payback to Kierulff Electronic Inc. who offered one to the club at a reduced price if we would show it around and say where we got it. So... for the last four months I have been taking it to our downtown meetings and gushing over it to all who listen.

The SPIRIT 80 is dot matrix, 80 characters per second, and uses the newer square dot print head. The printed letters are made with square dot print wires that make a more fully formed letter than you see with standard 'round' dot matrix printers. In other words, the print quality is exceptional. The SPIRIT 80 has a number of different print styles and controllable settings. Some are: pica (10 letters per inch), double width, condensed printing, italics, multiple line per inch settings, underlining, double strike, and enhanced printing. It will also do dot graphics. In other words it does all those nice standard things that you expect from a dot matrix printer. It handles both tractor feed and single sheets. I have not ever seen anybody else's dot matrix print quality look as good as this. It was good enough to print my resume on. It is a little quieter than standard. I like it for the above reasons plus it was within my price range and MANNSMANN TALLY is a U.S. company. Even though it is manufactured in Japan, it is a large U.S. company that is responsible when you buy it.

As mentioned earlier, Kierulff Electronic Inc. which is located in Norcross,Georgia, gave the club a special deal to purchase this printer. They list it at $399. If you pay cash or talk to them extra nice, I do not know if you can get the price down any. The printer comes without a Centronics Parallel cable so you must buy or make one. About the only thing that would warn you to be careful with is scrolling the paper backwards. It can jam against and bend the thin metal strip backwards at the bottom of the platen roller. This is just something I have learned to be aware of, but it has not given me any operational problems.

The printer is advertised mail order in magazines at about $325. I can offer no advice on that since you alone have to decide about possible savings versus shipping charges, eventual arrival date, honorability of the mail order company, and the lack of face to face support after you have your product.

I am told that a Japanese company (DNEI Corporation) makes the printer for MANNESMANN TALLY. You can get the DNEI Corp. version for about $299 with a cable from ANCRONA Electrics located off Piedmont Road.

Gary Matthews

## UNDERSTANDING YOUR CENTRONICS PARALLEL CABLES

Several people, including myself, have gone through the excitement and frustration of having bought a brand new printer and then had to wait for a cable to be made; or worse find out that the cable they bought doesn't work. Take heart. What follows is the information that you wished were included in the manual when you got your RS232 card and your printer.

Before we start working on what wires go where let's get some ground rules out of the way. What I will be describing applies to most any printer with a parallel hookup. The only exception that I am aware of is the smallest Okidata: all others (Gemini, Epson, TI-Impact, Mannesmann Tally, etc.) will work fine with this description.

First: Point of reference- This will be described as if you have a cable ready-made in your hand. The end of the cable that attaches to the printer is a 36 pin MALE connector; the end that attaches to the RS232 card's PIO port is a 16 pin FEMALE connector. Look at the figures for a better idea. In each case it is pictured as if you are staring down into the end.

On the Printer end of the cable there are usually the numbers 1,18,19, and 36 printed inside just barely large enough to see. 1 (Referred to later as P1-for printer) is at the top left of the plug. Remember the plug should be facing you so the top of the plug is longer than the bottom. As you go from left to right it is numbered from 1 to 18 with P18 being the top right most pin connection. The far left bottom of the plug is P19 and counting over brings you to P36 at the bottom right connection. Okay, of the two ends of our cable we now know which pins are which on at least one end. So, if you look at your printer manual and it describes what kind of signal each pin is carrying, you can look at your cable and point to the right one. Read those signal descriptions with a grain of salt because out of those 36 pins only 11 (That's right Eleven) are used. Only the top row of pin connections (P1-P18) are in the ball park, the bottom row of connections (P19-P36) can be completely ignored when looking at or making a printer cable.

Because of it's shape, the Printer end of the cable cannot be plugged into the printer any way except the right way. If the plug you have made (or bought) to plug into the RS232 card has a notch on it then it too can only be plugged in the right way. Some do not have notches so you could very easily plug it in backwards. That will not hurt your printer, but it sure won't make it work either. Now, let's stare at the end of the cable that plugs into the RS232 card's PIO port. I will refer to the pin connections as R1 through R16. When I describe how pin number 1 is referenced for the RS PIO plug, pay close attention. Again I ask that you look at the picture of this 16 pin rectangular plug as I point out how it is numbered. The top left most hole is pin 1 (RS1). Pin 1, if you are actualy looking at your RS232 card, is the pin that is away from the P box and towards the disk drive end of the box. Now that we know where pin 1 (RS1) is on the cable and on the card, we will continue on. Let me quickly repeat, RS1 is the top left most pin when looking at the PIO card connector part of the cable. The pin to the immediate right of that is pin 3, to the right of that pin 5 (RS5), and so on till you get to the top right hole which is RS15. If you are following, you will catch on that the bottom left most connector hole is RS2, then moving to the right RS4, and so on till you get to the bottom right hole RS16. The reason I belabor this numbering of pins so much is that it causes great confusion if you don't understand that the two ends of the cable are numbered in different ways.

Now for the easy part; Here are the pin connections on the cable as they are referenced from the PIO Card end to the Printer end:

| | |
|---|---|
| RS1 to P1 | RS2 to P2 |
| RS3 to P3 | RS4 to P4 |
| RS5 to P5 | RS6 to P6 |
| RS7 to P7 | RS8 to P8 |
| RS9 to P9 | RS10 to P11 |
| RS16 to P16 | |

The thin blue manual that comes with your RS232 card will tell you just what signals are carried on those pins. RS1 is handshake out, RS2 through RS9 carry the eight data bits, RS10 is handshake in, and RS16 is the logic ground. It is interesting to note that signals listed for pins RS11 through RS15 are not needed for the printer to work properly.

If you make your own cable, the parts will cost less than $20.00. If you can buy a cable for any where near $20.00 then do it. You can use a multimeter to verify that the pin connections are correct. If you don't want to run out and buy the parts to make your own cable, at least now you know the proper reference for the pin numbers and just what signals they carry. number 1 is, and just what signal it carries.

Gary Matthews

## CALL LOADS

Here are a few more Call Load locations and what they do. If you have found any please write them down and pass them on to the group.

Remember to type in CALL INIT and CALL LOAD before the locations listed below.

(-32730,32) Returns you to the title screen.

(-31962,255) Will restart Extended Basic, and run a program called load if its on the disk.

(-32116,4) Puts you into Basic from Extended Basic WITHOUT losing the program in memory.

(-28672,SP) Tells you if the Speech Synthesizer is attached.

```
100 CALL PEEK(-28672,SP)
110 PRINT "HELLO HOW ARE YOU"
120 IS SP=96 THEN CALL SAY("HELLO HOW ARE YOU")
130 (REST OF PROGRAM)
```

SP in the above program will return 96 if the speech synthesizer is attached, and 0 if it isn't. Its a fast way to tell without having to ask.

From David Douglas of the ALOHA 99/4A CUG of Honolulu comes this excellent tip: When writing programs that utilize the speech synthesizer, use a variable in your OPEN statement. If the variable is set to 0 (zero) the program will run by printing all speech inputs to the screen. Note: File 0 (zero) is reserved for the display screen only.

(-32187,9) Will give you a program line number of 0, which the computer will give an error message if you try to use it.

(-32188,127) Changes the screen color and gives a breakpoint.

(-32188,1) Changes the screen color and gives a syntax error.

Try any number between 1 and 127 and see what you get.

(-32116,1) Puts random characters on the screen. (-32116.8) Searches the disk and loads a program called load.

-32116 also seems to be a fertile location.

(-32114,2) Loads random garbage onto the screen.

(-32114,13) Screen goes wild.

(-32114,119) Puts wild lines and boxes on the screen.

MG

## FORTH

As I explained last month TI gave us FORTH in an as-is condition, so there are some changes to be made. As an aside everyone is is jumping on the 'Correct FORTH' bandwagon which probably would not have happened if TI was still around. So I for one am glad its working out the way it's going.

As to corrections: **NUMBER ONE---BACK UP THE DISK.** To those of you who did not do it or are having problems doing it. The club makes this offer.

1) Bring your disk to the next meeting and **BEFORE** the meeting one of the officers will back up your disk.

2) If you need or want your disk reprogrammed we'll do it at the same time.

3) Cost? You bring the disk or you buy one from the club, the cost is zero! If we have to mail it to you the cost is one dollar. By the way single disks cost $2.25.

4) BRING YOUR ORIGINAL DISK OR NO DUPLICATION.

Put in your Editor/Assembler, turn on the P-BOX, screen, printer, and finally the console and using your COPY of FORTH boot it up. Follow the instructions in chapter one of the manual. Type in -EDITOR and press ENTER after the screens are loaded, type 72 EDIT and press ENTER. Screen 72 has the data that controls the RS232 I/O SUPPORT. First to correct the error on this screen go to line 5 (use the Fctn/X to drop down) change PAB_ADDR to PAB-ADDR. This will correct the error on this screen. However before we leave this screen, lets try to change the RS232 data supplied by TI with what you need for your printer.

First look at line 4. Is your printer serial if it is, then is it 9600 baud? If not change the 9600 on line 4 to match your printer, and skip down to the next paragraph, don't do the following changes. If your printer is parallel go to line 2 -- replace RS232 with PIO and delete the two extra characters. On line 3 do the same thing. On line 4 change "RS232.BA=9600" to "PIO" space over the extra characters, do not delete them. Leave OPN 3 where it is.

Now before we leave and finalize this correction goto line 0. Change RS232 to PIO if necessary, and if you want change 12JUL82 LCT) to todays date and your initals, since you made the final changes.

Next press Fctn/9 (BACK) to get out of the edit mode. Type in FLUSH and press enter to write the changes to your disk. Type in MENU and enter, and at the menu cursor type in -PRINT and enter. After the printer commands are loaded type in SWCH 72 LIST UNSWCH, and press ENTER. SWCH redirects the output from screen to printer, 72 LIST lists screen 72, and UNSWCH redirects the output to the screen. By now you have a correct copy of screen 72, I'd suggest that you put the printed copy in your manual to show you what you corrected.

Now lets goto screen 3, type in 3 EDIT and ENTER. On lines 11, 12, or 13 enter what is correct for your set-up. If you have one single sided disk then FORTH is correct for you. Otherwise add the following;

1) DECIMAL 180 DISK_HI ! (SETS YOU UP FOR TWO SINGLE SIDED DISKS.)

2) DECIMAL 180 DISK_SIZE ! (SETS YOU UP TO USE DOUBLE SIDED DRIVE(S))

3) DECIMAL 360 DISK_HI ! (SETS YOU UP FOR TWO DOUBLE SIDED DRIVES), you must also have change 2 on the screen.

Before I go on I need to mention that for anyone who wants to work with FORTH Craig Milers monthly newsletter **The Smart Programmer** has a section on FORTH. In last months he shows how to auto-boot both FORTH and most of the routines at the same time. Is that a time saver. I'll bring my copy of the SMART PROGRAMMER to the next meeting so that you can look at it. However if you'r serious about programming you need your own copy. It costs $12.50 a year and can be ordered by sending a check to:

MILLERS GRAPHICS
1475 W. CYPRESS AVE.
SAN DIMAS, CA. 91773

MARSHALL

## FORTH PARAMETER PASSING TO DOES)

by David McKibbin, reprinted from the Forth Dimensions

Often in programming one runs into the case where several different processes share similar structures. Not wanting to waste time or space for redundant code, the programmer usually creates a subroutine. Then the individual processes merely pass arguments to the procedure to accomplish their task. Several schemes can be used to pass these parameters. In simple cases, the stack can be used directly. This is the typical act of programming in FORTH.

```
: DELAY 0 DO LOOP ; (SPIN FOR A WHILE)
100 DELAY          (COUNT PASSED ON THE STACK)
```

However, as the procedures get more complex it gets more and more difficult to keep track of the passed parameters especially when the procedure itself is using the stack heavily. Also many times it is necessary to pass not only numbers but operators or words as parameters. One means of accomplishing this is via (BUILDS DOES). Parameters will be stored in the paramter field of the newly defined word and assesed from DOES) via a new word{$. One $ will push the first parameter on the stack, two $ will push the second, etc. All parameters are 16 bits. Varabile R# is used to store the parameter base address.

```
: $ 1-DUP+R#+ ;   (PUSH THE N'TH PARAMETER ONTO THE STACK)
: EXAMPLE (BUILDS DOES)R# ! 1$ 2$ EXECUTE ;
EXAMPLE ZZZ 90, 'EMIT CFA, ( TYPE A "Z" )
EXAMPLE SPC 10,' SPACES CFA,  (TYPE 10 SPACES )
```

Now that the mechanics are explained the following example will fully demonstrate its usage. Both DUMP (16 bit dump) and CDUMP (8 bit dump) share a common structure with only a few inner words differing. DUMPS is a new defining word used as a procedure for both DUMP and CDUMP.

```
: U.R 0 SWAP D.R ;
: DUMPS (BUILDS DOES) R# ! ( STORE PARAMETER BASE ADDRESS )
    BASE  R)HEX ( SAVE BASE AND SET HEX )
    OVER + SWAP ( CONVERT TO BEGINNING AND END HEX )
    BEGIN
      CR DUP 4 U.R 2 SPACES ( TYPE ADDRESS )
      1 $ 0 DO
        DUP 2 $ EXECUTE 3 $ U.R 4 $ +
        2DUP + OVER 16 MOD 0= CR IF LEAVE THEN
      LOOP
      2DUP + ?TERMINAL CR
    UNTIL
    DROP DROP CR
    R)BASE ! ;              ( RESTORE BASE )
DUMPS CDUMP 16 , ' C CFA, 4, 1, ( 2-ADDRESS, 1-COUNT )
DUMPS DUMP 8 ,  '  CFA, 6, 2, A 2-ADDRESS, 1-COUNT )
```

What has been accomplished is akin to passing procedures/functions as parameters in Pascal. I expect that there are other ways to do this in FORTH beyond what has been proposed.

FORTH FROM OTHER GROUPS

From RAMON's notes of THE ROM NEWSLETTER of the Users Group of Orange County comes this;
FORTH TIPS:

For those of you with forth and a green screen, you may wish to make the following change. First, on screen 51, line 9, change the 0F4 to 0F1. This change changes the values sent to the VDP write to register 7 to white on black instead of white on blue. Now any time you enter the text mode, the colors will be set to green screen colors. You must make sure that you "FLUSH" your results. Also, make sure that before you start messing around with the system disk that you have an unaltered master set aside.

Another change you may wish to make is to change some of the system responces to user inputs. For example, you may wish to have the computer not say "OK" after executing your commands. I changed my disk so that the computer responds "AYE". This was done by changing the "OK" in screen 16.

Also, if you want the computer to give you more humorous error messages, you can change them by changing the responces in screens 4 5. It is important that you do not change the order of the messages or you will get the incorrect error messages.

From the 99'ERS USERS GROUP ASSOCIATION, a national association of 99/4A User Groups, to which our group belongs

DOUBLE-SIDED FORTH

By Jim Vincent
President
Milwaukee Area Users Group

So you have double-sided drives on your TI 99/4A. When you obtained your copy of TI FORTH from the users group, you immediately tried copying it to a double-sided disk using Disk Manager II, didn't you? Didn't work so hot did it? Well, this article will show you how to make TI FORTH work with you double-sided drives.

TI FORTH uses direct sector addressing to read/write screens to disk. Each screen is 1024 bytes or four (4) single density sectors long. To be compatable with the Disk Manager module and normal file I/O for initial loading of the FORTH program, the Forth disk uses the standard disk header and directory sectors. (See the next article for a slightly different version of this. Ed.)

Since there are only three files on the disk, this means sectors zero (0) through four (4) are allocated to this overhead operation. The first file, FORTH (actually just a short Assembly Language loader program) begins in sector 22 (hex) as usual. It is followed by the actual FORTH program file which is also handled via normal I/O routines and occupies up to sector 4C. SYS-SCRNS occupies all remaining sectors on the disk, for single-sided that a2 138 (hex). Thus the SYS-SCRNS takes up not only the sectors from 4D to te end of the disk, but also hasan extent that takes up sectors 5-21 (hex).

Now, since TI FORTH uses direct sector addressing, it expects screen 3 (the boot screen) to be in sectors C thru F. If you use the Disk Manager to copy these three files from a single-sided disk to a double sided disk, the Disk Manager is able to place the whole SYS-SCRNS file on disk contiguously. No extents are required, thus what was at sector 5 to 21 is now at sector 168 to 184. Is it any wonder FORTH acts strange? The boot screen only contains garbage!

To remedy this situation we must copy a single-sided disk, sector for sector, to a double-sided disk and then doctor sectors zero (0) to four (4) to comply with the Disk Manager's standards. Then, to use the extra capacity, we will update a couple of screens.

Your first step however, must be to initialize a double-sided disk using the Disk Manager II. Next load FORTH and set DISK_LO to zero (0). (0 DISK_LO ! is the proper command. Ed) Load the -COPY screens and use the command FORTH-COPY to duplicate your single sided FORTH to the double-sided disk. If you do not have two drives, use the Disk Manager to copy all three files but then use FORTH to copy screens 1 thru 9.

the advised technique is shown below:

n BLOCK UPDATE (where n is the screen number to be read from the old disk.

FLUSH (writes screen to new disk, moves up to 5 screens at a time.

**Now edit screen 3 toadd the following commands:**

180 DISK_Size !(supports double-sided capacity per disk)

360 DISK_HI ! (supports two double-sided drives)

Next time you boot FORTH it will recognize screen 175 as part of disk 1 and screen 185 as part of disk 2. Now let's fix the commands in the -copy acreens. Edit screen 39. The value 90 appears once in DTEST and twice in FORTH-COPY. change all three occurances to 180. Next edit screen 40 with the following:

| Line | Current | Change To |
|---|---|---|
| 3 | 168 | 2D0 |
| 6 | 2000 | 202B |
| 8 | 12 + 26 | 12 + 0201 SWAP ! DUP 14 + 24 |
| 10 | 165 | 2CD |
| 13 | 4016 | 802C |

Now let's make our FORTH disk compatible with Disk Manager II. Here's the word you need to do ti:

```
HEX
:DOUBLE-FORTH 0 BLOCK UPDATE DUP A
+ 2D0 SWAP ! DUP 10 +2028 SWAP !
12 + 0201 SWAP ! 1 BLOCK UPDATE DUP
E + 2A0 SWAP ! DUP 1C + AD20 SWAP !
DUP 1E + 2805 SWAP ! 20 + F029 SWAP
! FLUSH ;
DECIMAL DOUBLE-FORTH
```

Now that you have full use of your double-sided drives, I'd like to issue a couple of challenges. (1) Figure out how to alter the FORTH command FORMAT-DISK to format a double-sided disk. (2) Alter FORTH to support CorComp's double-density disk controller card.

ANSWERS TO JIM'S CHALLENGE WILL BE PRINTED IN THIS NEWSLETTER. MAIL YOUR CHALLENGE ANSWERS OR QUESTIONS ABOUT TI FORTH TO JIM AT:

FORTH CHALLENGE
Attn: Jim Vincent
2007 No. 71st St.
Wauwatosa, WI. 53213

(Also a challenge from your local editor, I do not understand the changes on line 5, nor what to do with the 'word' described above. All those of you who bought a copy of FORTH, I expect you at the next meeting to discuss these items. Ed.)

From Kaptain Kluge in THE PAPER PERIPHERAL of the Central Texas 99/4A Users Group.

### Back In Forth

In order to resolve this I had to play detective and hunt down one of the implementors. When I told him about the warning, he said that was the silliest thing he had ever heard. It turns out that you can edit any screen that is listed in Appendix I.

The real story is that FORTH uses a primitive way of managing the screens on the disk instead of the directory structure that the 99/4A uese to store files. Esentially there is no management, you get to do it yourself. (Oh What Fun!) You see, the disk is divided by FORTH into 90 blocks called screens, and it goes directly to the disk to read and write these screens. This means that FORTH has access to every byte of space on the disk. But you may say, "Look at a catalog of the disk, there are two other files there: Forth and FORTHSAVE. "Lies, lies, all lies!! Those files actually co-exist with screens 6 thru 19. The implementors played some games with the system disk's directory (which by, the way, co-exists with screens 0 and 1). This makes it look to the editor/assembler which has to load the files as if they are there. The big file at the end, SYS-SCRNS, is actually nothing but a filler, designed to take up the rest of the space on the disk so the user won't accidently put another file in the disk and use some space that FORTH is already using.

If you would like to see this for yourself, try experimenting with the following commands:

FORMAT-DISK -- This will format a diskette so that FORTH can use it, but no "faked" directory is written to the diskette, so the disk appears to be uninitialized to the disk manager. You can edit every screen on this disk from FORTH.

DISK-HEAD -- This takes a disk that was formatted by FORMAT-DISK and writes a fake directory into screens 0 and 1. Now the disk manager can perform a catalog on the disk. If you do this, you will see that the disk manager thinks that the disk is full with one file called SCREENS. (Make sure that you have a data disk in DSK1, not your FORTH system disk, or it'll get zapped instead when you try this command. Also make sure that you perform a 0 DISK_LD ! command before you try the DISK-HEAD command, or it won't work.) You can edit every screen on this disk except 0 and 1.

SMOVE -- This command will let you copy the first 21 screens from the system disk (0 thru 20) on to another disk. If you do this, a catalog by the disk manager reveals that there are now 3 files on the disk: FORTH, FORTHSAVE, and SYS-SCRNS, just like on the system disk. (Assuming you have a 2 drive system the sequence of commands are 1B0 DISK_HI ! 0 90 21 SMOVE. Put your system disk in drive 1 and the large disk in drive 2.) You can edit every screen on this disk except 0 thru 19. (Please keep your write protect notch covered, I switched the position of the disk drives because they tried to write to the wrong disk the way the author had the sequence listed. Ed)

By the way, the implementor that I talked to says that, unfortunately, there is no way to boot from anything other than the editor/assembler. Sorry about that folks.

(Maybe thats what the implementor says, or maybe thats what TI wants you to think, and maybe its so, but I'm betting that if there is a way to boot FORTH any other way someone out there in 99/4A land will find it, and pass it on. There will be more of this column next month. Ed.)

My fellow 99ers;

I would like to begin by expressing my gratitude for, and appreciation of your Exchange Library Service. I recently received 6 programs from you in exchange for 2 of my own, and I must tell you that I am absolutely delighted with them.

I found two minor problems with the "STAR TREK" game. I have solved both problems and thought that perhaps I should share these solutions with you. The first problem became evident when, during the course of losing my second game I attempted to make a "Movement Change". I found that if I had less than 10% of "Warp Drive" remaining the game went into a systemic lockup and made further play impossible. The second problem occurred after successful completion of a game. The program offers the option to "Play Again". Upon starting the next game, I found that the "Status Report" conditions were not reset from the previous game.

To correct the latter problem, simply edit line 3150 to read thusly:

```
3150 IF B$="Y" THEN 500
```

To correct the first (and most frustrating) problem, first add these lines:

```
3111  PRINT "INSUFFICIENT POWER
      FOR THAT (4 SPACES) MANEUVER,
      CAPTAIN."
3112  Q1=0
3113  GOTO 820
```

Then edit line 1800 to read:

```
1800  IF Q1)INT(W1/10) THEN 3111
```

These changes will eliminate the problems I have mentioned, and make the game more enjoyable for anyone.

Again, thank you for the service that you preform. I sincerely hope to communicate with you again soon.

Sincerely,
Gene Wotring
Adrian, MI.

**********

### CLUB SALES

* * * * * * * * * * * * * * * * * * * * *

| | |
|---|---|
| **Solid State Cartridges** | |
| Yahtzee | $ 13.50 |
| Sneggit | $ 24.30 |
| ZeroZac | $ 15.00 |
| Beginning Grammar | $ 15.00 |
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| **Disk Based Programs** | |
| Tombstone City | $ 15.25 |
| Munch Man | $ 15.25 |
| **Cassette Software** | |
| Structural Engineering Lib. | $ 8.00 |
| Oldies But Goodies-Games 1 | $ 8.00 |
| **FORTH Language Package** | |
| members | $ 20.00 |
| non-members | $ 30.00 |
| **Books and Magazines** | |
| Using and Programming the TI | $ 8.00 |
| The Best Of 99'er | $ 18.00 |
| 99'er magazine Vol.1 No.6 Nov 82-Jan 83 | $ 3.50 |
| 99'er Home Computer Mag. Feb 83-Nov 83 | $ 3.50 |
| Home Computer Mag. Vol.4 No.1 | $ 3.00 |
| Home Computer Mag. Vol.4 No.2 | $ 3.00 |
| **Hardware** | |
| Peripheral Expansion Box | $100.00 |
| Peripheral Expansion System Box,Memory Expansion Card,Disk Controller Card and Disk Drive | $500.00 |

**********

## ASSEMBLY LANGUAGE BOOKS

You have been experimenting with TI Basic and Extended Basic, but now you want to try your hand at something more advanced. You make the decision to purchase the TI Editor/Assembler and you open up the manual and start to read. In the first section you find all the great things possible with this new language. Then you read "This manual assumes that you already know a programming language, preferably an assembly language." Well, welcome to the group! This is how many of us found ourselves and we started to look around to find any books on the subject but, no such books could be found. Now the picture has changed and some good books are starting to appear at the book stores, computer and mailorder dealers. This article does not attempt to list all such books on the subject as some of the books were not advertised or announced but, were were first discovered after looking in the book stores.

INTRODUCTION TO ASSEMBLY LANGUAGE FOR THE TI HOME COMPUTER
By Ralph Molesworth
Steve Davis Publishing
ISBN 0-911061-01-0
$16.95

FUNDAMENTALS OF TI-99/4A ASSEMBLY LANGUAGE
By M. S. Morley
TAB Books, Inc.
ISBN 0-8306-1722-1
$11.50

LEARNING TI 99/4A HOME COMPUTER ASSEMBLY LANGUAGE PROGRAMMING
By Ira McComic
Wordware Publishing, Inc.
ISBN 0-13-527862-7
$16.95

ASSEMBLY LANGUAGE TUTORIAL
The Softies
7300 Gallagher, Suite 229 Edina, Minnesota 55435
$14.50

ASSEMBLY LANGUAGE PRIMER
John T. Dow
6560 Rosemoor St. Pittsburgh, PA 15217
$20.00

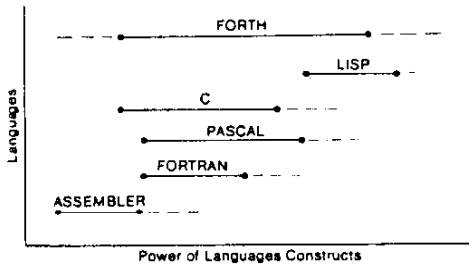
Winston Yancey


### Looking for a computer language that is:

**Extensible** – The FORTH computer language builds upon itself. A FORTH program is a set of increasingly powerful commands. Each command is built on those that have been previously added to the language. The low run-time overhead for each command encourages modularity. Extensibility is part of FORTH's innate structure.

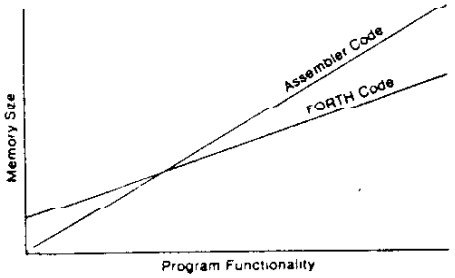
**Easily Debugged** – FORTH is an interactive language where changes can be entered and immediately tested, minimizing programming development time.

**Powerful** – FORTH spans the power of most other computer languages.




**Transportable** – Applications written in FORTH can be run easily on many different computers. In addition, the ready availability of cross-compilers means that anyone can maintain their own FORTH implementations.

**Compact** – FORTH code becomes more compact than even assembly code.




### FORTH is the Answer!

FORTH is extensible, easily debugged, powerful, transportable and compact. It can include an interpreter, compiler, assembler, operating system and editor.

### Who needs FORTH?

Everyone! FORTH is used in video games, operating systems, real-time control, word processing, spread sheet programs, business packages, database management systems, robotics and engineering and scientific calculations.

### Where can I get more information on FORTH?

Everywhere! The FORTH community is broad, varied and worldwide!

- **The FORTH Interest Group (FIG)** is a non-profit worldwide organization of over 3,800 members and more than 30 chapters devoted to the dissemination of FORTH related information. Most FIG chapters meet monthly. Contact the FORTH Interest Group for the chapter nearest you.
- **FORTH Dimensions** – is published six times a year by the FORTH Interest Group. A one year subscription is included with FIG membership. FORTH Dimensions keeps members informed of the latest FORTH news, applications and recent developments of the language.
- **FORTH Vendors** – Over 100 vendors support implementations of FORTH on almost every computer, large and small. Professionally written books range from tutorial to more advanced topics.
- **FORTH Development** – The FORTH Modification Laboratory, FORTH National Convention, and the FORTH Standards Team meet periodically to monitor and guide the evolution of FORTH.

### Join the FORTH Interest Group!

To join the growing family of FIG members and receive your 1 year subscription to FORTH Dimensions merely complete the attached application and return it to the FORTH Interest Group, P.O. Box 1105, San Carlos, CA 94070 with your payment of the annual dues of $15.00 US, $27.00 Foreign. Or, call (415) 962-8653. You will also receive information on other publications available from the FORTH Interest Group.

FORTH Interest Group

Name _____
Organization (if applicable) _____
Address _____
City _____ State _____ Zip _____ Country _____
Where, or from whom did you get this application? _____
VISA# _____ Mastercard # _____
VISA/Mastercard Expiration Date _____

Please make check or money order ($15.00 U.S., $27.00 Foreign) in US Funds on US bank payable to: FORTH Interest Group and mail to P.O. Box 1105, San Carlos, CA 94070; (415) 962-8653 for credit card orders.

• FIG Membership Application •

TEXAS INSTRUMENTS

March 28, 1984

Dear 99/4A Owners:

I would like to take this opportunity to thank each of you for your loyal support of our products, and also to pass on information concerning a change in the services we have been offering to our customers.

Effective April 2, 1984, Texas Instruments will no longer sell products for the TI-99/4A Home Computer. As you may recall, when we announced our withdrawal from the home computer market we said we were committed to providing product sales support until such time as another means of support could be identified.

Arrangements have now been concluded to provide availability for all existing software through an organization separate from Texas Instruments. The Triton company is a well-established direct-response/mail order firm, and we are confident that they are capable of providing this continued support. They may be contacted at:

Triton
P.O. Box 8123
San Francisco, CA 94128

You may also call them toll-free at 800/227-6900 in the continental United States or at 800/632-4777 in California.

Although availability may be limited in certain areas, you should also check with local Texas Instruments retailers if you wish to purchase additional software titles. Many titles may still be obtained through these retailers.

At this time Texas Instruments peripherals and accessories are no longer in production and quantities are very limited. To further assist you we can now provide a listing of many third-party peripheral suppliers.

Please keep in mind that while the enclosed list is not comprehensive and while we cannot assume responsibility for the quality or compatibility of any of these products, we do feel that it is a means for additional enhancement for your basic system.

We do appreciate the understanding and patience you have shown in the past months. It has been a most difficult time for all of us, and we want you to know that we are still very much committed to providing continued support of the 99/4A product line, including in- and out-of-warranty repair capability, applications information and technical programming assistance.

Although we no longer formally coordinate TI Users Groups, we do assist new groups and maintain and make available an up-to-date group listing. In addition, we are interested in receiving newsletters and information on your current activities, as your participation makes our work that much easier.

I would like to again emphasize our appreciation of your support and interest in Texas Instruments. We are justifiably proud of our commitment to excellence in both our products and customer service. I hope that we continue to warrant your support, as we will make every effort to work with your group in the coming years.

If you have further questions or comments or should you require assistance, please contact us at the letterhead address.

Sincerely,

Carl Gundlach
Manager, Consumer Services

**MANUFACTURERS OF THE FOLLOWING ITEMS HAVE REPRESENTED THAT THEIR PRODUCTS ARE COMPATIBLE WITH THE TI-99/4A. HOWEVER, TEXAS INSTRUMENTS ASSUMES NO RESPONSIBILITY FOR THE QUALITY OR COMPATIBILITY OF ANY OF THESE PRODUCTS.**

FLOPPY DISK DRIVES (Stand-alone:)

Percom Data Cor., 11220 Pagemill Road, Dallas, TX 75243 Phone Number: 214/340-5800

(Utilizing TI Disk Controller:)

Software Support, Inc., One Edgell Road, Farmingham, MA 01701 Phone Number: 617/872-9090

International 99/4 Users-Group, Inc., P.O. Box 67, Bethany, OK 73008 Phone Number: 405/948-1023

Western Micro Systems, 2750 S. Havana, Suite S, Aurora, CO 80014 Phone Number: 303/337-5909

WINCHESTER DISK SYSTEMS

Myarc, Inc., P.O. Box 140, Basking Ridge, NJ 07920

STAND-ALONE RAM EXPANSIONS

Ultracomp Systems, 1001 Ogden Avenue #5, Downers Grove, IL 60515
Doryt Systems, Inc., 14 Glen Street, Glen Cove, NY 11542
Tachyon Systems, 5125 S. Westwind Way, Kearns, UT 84118
Intellitec Computer Systems, 2337 Bonanza Court, Riverton, UT 84065

RAM EXPANSION CARDS FOR PERIPHERAL BOX

Intellitec Computer Systems, 2337 Bonanza Court, Riverton, UT 84065
Foundation, 74 Claire Way, Tiburon, CA 94920

JOYSTICKS

Newport Controls, Bishop, CA 93514
Nebulous Enterprises, P.O. Box 99, Swartz Creek, MI 48473
Jackson Design, 12520 Ridgeton Dr., Lakeside, CA 92040
Wico Corp., Consumer Div., 6400 W. Gross Point Road Niles, IL 60648

Several of the vendors in the "CABLES, SUPPLIES, & MISCELLANEOUS" section below after adaptors which can allow any Atari-compatible joystick to be used with the TI-99/4A.

STAND-ALONE RS-232 INTERFACES

Ultracomp Systems, 1001 Ogden Avenue #5, Downers Grove, IL 60515
Intellitec Computer Systems, 2337 Bonanza Court, Riverton, UT 84065
Model Masters, Inc., 22411 Mountain Laurel Way, Diamond Bar, CA 91765

RS-232 INTERFACE CARD FOR PERIPHERAL BOX

Information Associates, P.O. Box 2207, Acworth, GA 30101

STAND-ALONE PARALLEL (CENTRONICS-COMPATIBLE PRINTER) INTERFACES

Intellitec Computer Systems, 2337 Bonanza Court, Riverton, UT 84065

PRINTERS

There are numerous companies advertising printers which can be used specifically with the TI-99/4A, but in reality, almost any printer which can be interfaced via the RS-232 serial or Centronics parallel methods can be used by means of the appropriate cable obtainable from one or more of the vendors in the "CABLES, SUPPLIES, & MISCELLANEOUS" section below.

MONITORS

Vid-Com, 1018 E. Philadelphia St., York, PA 17403

Any video display which can accept NTSC composite video or VHF channel 3 or 4 RF can be used.

COOLING FAN

Reality Software, 4615 Kensington Dr., San Diego, CA 92116

CABLES, SUPPLIES, & MISCELLANEOUS

Vid-Com, 1018 E. Philadelphia St., York, PA 17403
Tex-Comp, P.O. Box 33084, Granada Hills, CA 91344
Danien Enterprises, Inc., P.O. Box 522036, Miami, FL 33152
Software Support, Inc., One Edgell Road, Framingham, MA 01701
99'er-Ware, P.O. Box 5537, Eugene, OR 97405
Tovertronics Inc., P.O. Box 18870, Fort Worth, TX 76118
Tenex Computer Marketing Systems, Box 6578, South Bend, IN 46660
Denali Data Design, 1413 N. McKinley Ave., Oklahoma City, OK 73106
Compro Systems, P.O. Box 33173, Cleveland, OH 44133
Cintronics, 431 Ohio Pike #206C, Cincinnati, OH 45230
Western Micro Systems, 2760 S. Havana, Suite 5, Aurora, CO 80014
International 99/4 Users-Group, Inc., P.O. Box 67, Bethany, OK 73008

MODEMS

Anchor Automation, 6913 Valjean AVe., Van Nuys, CA 91406

Any modem which can be interfaced via the RS-232 serial or Centronics parallel methods can be used by means of the appropriate cable obtainable from one of more of the vendors in the "CABLES, SUPPLIES, & MISCELLANEOUS" section below.

BAR CODE READER

Databar Corp., Eden Prairie, MN 55344

LIGHT GUN

Non-Polyoptics, 13721 Lynn Street #15, Woodbridge, VA 22191

KEYPAD

Computech Distributing, 209 E. Walnut, Springfield, MO 65805