FOR THE RECORD

by Frank N. Zic
(Acting Secretary)

The Aug. meeting of the West Penn 99'ers got off to a very late start due to set-up time, the heat and the hope that perhaps the slow trickling-in of members would soon allow an orderly start. In old business: a statusque membership report was given by Joe; and as listed in the newsletter, treasurers report was given, by Jan. A review of the names of those going to the Harrisburg Faire was mentioned and others were encouraged to participate.

New business brought a review by Scott of Rave's offer of discounts to club members on the purchase of various products, there were no takers. Tim Buckley of the San Diego users group offered to exchange libraries with other clubs. Rick will ponder the proposal and comment at the next meeting. Also looking to exchange libraries is the Chicago users group, as well as perhaps the Cleveland group. Sounds like an epidemic but I know there is no shortage of programs. The Central, Pa. users group stated that their Faire will be held in Carlisle on the 16th of Oct. John provided some written info on a Turbo Boost Module for Cassette based programs, a Module Expander for 8 modules, a list of books for the TI-99/4A and a list of instructions for the Comic-Show Editor, which I demoed later in the meeting. There will be a computer faire on Sept.10 in Uniontown, sponsored by W3PIE. Contact John Cermak (WB3DOD) at (412) 246-2870. The TI-Tips class started early, simultaneously with the demos. This provided an early quit time for the instructor. Note a console is for sale-$20. No Forte Music card demo was held.

Scheduled demos presented were, Gary Taylor on FNLWB 4.11 and Frank Zic on Comic-Show Editor, Best Games of the UK., and Ray Kasmer's really great."Woodstock". I also took the liberty to discuss the much harolded Lima Faire, just wanted to maintain your time standard, John. Another demo followed with Chris Pratt on an adventure game called Carfax Abbey Castle. Special note- the clubs Micropendium did not find Scott's new address yet. With the promise of cooler weather, we will all feel a little more active on our computers. Looking forward to meeting you once again, Ed. May the good 4's be with you.

The next meeting of the West Penn 99"ers will be held at the Presbyterian Church of the Covenant in Irwin, PA, this coming Tuesday evening at 7:00 PM. Please plan to attend, since initial nominations will be made for officers for next year, and if that doesn't get you, then just come to have a good time. Demos, and other interesting things, Jan's baking maybe? See you there!

DISK DRIVES (PART 1)
by John F. Willforth

The primary parts of a computer system are Arithmetic Logic Unit, Memory, and I/O. The ALU does the ADDING, the MEMORY holds the program and data, and the Input/Output section enables the computer to accept the program, data, and do something useful with the results.

Early computers were BIG, COSTLY, and SLOW (compared to todays machines). One of the major limitations for any computer over the last forty years has been the cost of the storage of programs and data within the computer (internal memory). Many companies have, in order to lessen this cost, experimented with new memory technology , wire loops, ferrite cores, short and long rods, bubble and many others. While this was going on, the computer could not wait, and as a result, external storage (memory) was developed. Some external memories are the Write-Once-Read-Many (WORM) storage devices, paper tape, punch cards, and even todays Laser Disks (optical). This was fine because when you moved this data or program to a place outside the computer, where you needed it less frequently you could have more of that valuable space in the computers internal memory for the things you do all the time in a computer, like keep track of the clock so that you will know when to go home.

This brings me to another type of external storage (memory), the Write-Many-Read-Many (WMRM) devices, among these are the various types of magnetic tape drives, and the most used by you computer enthusiasts, the DISK drive. I would like to take several months to get into how a disk drive does what it does, how it interfaces with the computer, and how the STANDARD (Hic!) disk operates in its job as an external extension of internal memory. I would like to show you how to build a simple stand alone disk exerciser/tester to give you as individules, or as a group the knowledge and a tool to fix your drives no matter what computer you use.

Let's start with the basics. A disk is an electro-mechanical device which can store data/program information in an orderly retrievable fashion. What good is it if you can't find it? The amazing part is that disks are able to transfer data to/from disk at rates above 5 million bits per second. Of course the floppy disk we will be talking about will be in the neighborhood of about 125 to 250 thousand bits per second (15k to 30K bytes per sec) max. Well don't expect that long program to load into memory in just 2 or 3 seconds, not unless your disk is on a Direct Memory Access channel, where data goes directly from your disk to the proper memory locations without the CPU having much to say about it. The reason some systems run much faster than others is because engineers use more expensive hardware innovations (features).

For the most part the average floppy disk is running on an interrupt basis with the Processor doing it's part in making sure each Byte of data going out to the disk is fetched from proper memory locations, and each byte coming in from the disk goes into the proper memory location. The CPU has a lot of other things to do as the transfer is taking place, and therefore usually data is handled in small blocks (256, 512, or 1024 bytes per block).

But we'd better start to share a little of the credit for the burdensome task of keeping track of where we are and where we're going to on the disk with the Controller. Sounds like a pretty important person. The CPU doesn't know what a disk is, let alone how to talk to it, thus the controller's job is to interface the CPU to the various disks that can be attached to the computer. It has many tasks to do depending on the type of system we are dealing with. Some have no resident software or the intelligence to use it if it did have it (kinda like me), and others have processors, ROM, and RAM as well as DMA channel interfacing.

I'd like to cover more, but keeping each article to one page almost assures me of getting this series into this newsletter each month. I know that I've been pretty broad in my approach here, but maybe all of this generallity has given you one clear thought to start our discussion on DISK drives. Next month I'm going to skip ahead of myself and present you with a Stand-Alone Disk Exerciser and Tester unit. This will be the primary tool for our learning to fix a disk drive.

Let's discuss Compiler options. These are directions to the Compiler that control the Compiler's output. I do not know what all of these options do so therefore I will only discuss those that I use.

The options are put into the source code as 'psuedo-comments'. A psuedo-comment is written {$_}.

{$L+} is a listing comment. This option would be the first line of a program. This option would cause the results of a program compilation to be placed on the #4 drive under the title "System.1st.Text". If there are compile time errors they will be listed. The results can be printed out using the "Transfer" option of the Filer. (Note; when the listing is printed out from this file a sheet of paper is form fed through the printer at the start. I tell you this so you will not be startled like I was.)

{$Q+} supresses the Compilers output to the consol, except for error messages. Further it does not give you the prompt "..press space bar to continue, E for Edit or Control(.) to exit". This allows the compiler to go a little faster because it does not have to write to the screen.

{$I filename}. This is one option that I heavily use. This is an Include File option. Let me give an example;

```
Program Sample;
   Const:_____;
   Type:_____;
   Var:_____;
{Procedure/Function Section}
{$I #5:Hello}
{$I #5:Howareyou}
{$I #5:Iamfine}
{$I #5:Goodby}
{End of Procedure/Function section}

Begin {Main program}
   Statements;
End.
```

Assume that the above Include File options are procedures and/or functions in the correct place in the program and we have the following files on the #5 drive; Hello.Text, Howareyou.Text, Iamfine.Text, Goodbye.Text and the main program as Sample.Text. Now call the Compiler and when the Compiler calls for the source file enter "#5:Sample". The Compiler will start and when it gets to the first Include File directive it will go to the #5 drive get that file compile it and then get the second file compile it etc. until it finishes. Then the entire program will be made into object code.

The advantage of this option is that it allows you to break the program into small logical parts the sum of which could be larger than the Editor's memory. (The Editor's memory is 13K.) Further the Include File directives can be nested up to three levels deep!

Notice in the program that the Include File directives are not suffixed with .Text. That is because the compiler first looks for the files with a .Code suffixed to their names and if it does not find that file it will look for a file with .Text as a suffix. If you want you can add Sample program.

If you want to have some procedures or functions completely written out as part of the program and not have them as Include File directives then these procedures/functions have to be "Forward" declared before you start the Include File directives. (See a text about Foward).

BELOW YOU WILL FIND A PROGRAM THAT WON'T TAKE TOO LONG TO KEY IN WITH 32K AND EXTENDED BASIC. I CAN'T GET IT TO WORK ON MY CONSOLE, BUT I BELIEVE THAT IT IS NOT THE PROGRAM, BUT THE VERSION OF OPERATING SYSTEM IN MY CONSOLE. IT IS A MACHINE CODE PROGRAM LOADED WITH XBASIC, AND RUNS IN LOW MEMORY. MR. MIKE STANFILL OF THE DALLAS TI U.G. WROTE IT, AND I VERY CAREFULLY KEYED IT IN. AFTER YOU TYPE 'RUN', THEN DO A 'CALL LINK("S")'. ON MY CONSOLE, THE CURSOR MOVES DOWN FOUR LINES, NAD THEN THE CONSOLE LOCKS UP. LET ME KNOW IF YOU GET OTHER RESULTS. I'LL NOT TELL YOU WHAT IT DOES, BECAUSE I'LL KNOW IT WORKS FOR YOU IF YOU TELL ME WHAT IT DOES! NOTE: IF YOU DO GET IT TO WORK, YOU CAN CHANGE THE "CALL LINK("S") TO ANY SIX ASCII CHARS. FROM P. 196 IN YOUR EXTENDED BASIC MANUAL. GO TO LINE 3, THE SIX GROUPS OF NUMBERS, 83, 32,32,32,32,32 ARE S, , , , , . CHANGE THEM TO WHATEVER YOU DESIRE.

```
1 CALL INIT
2 !*************************    * BALL PARK-A TINYGRAM *    *   BY MIKE STANFILL
  *    *    DALLAS TI UG     *    *************************
3 CALL LOAD(16376,83,32,32,32,32,32,36,246,"",8194,37,114,63,248)
4 CALL LOAD(9460,4,91,2,0,16,0,2,1,27,44,2,2,0,70,4,32,332,36,200,0,131,204)
5 CALL LOAD(9482,216,32,37,42,131,206,248,32,37,42,131,253,4,199,3,0,0,2,3,0,0,
  )
6 CALL LOAD(9504,152,7,131,206,22,1,16,231,4,91,1,0,3,140,26,144,36,3,134,13,144
  ,18)
7 CALL LOAD(9526,3,142,15,144,18,3,141,17,144,18,3,131,21,144,18,3,141,17,144,54
  ,3,141)
8 CALL LOAD(9548,23,144,54,3,140,26,144,36,3,134,13,144,18,3,142,15,144,18,3,141
  ,17,144)
9 CALL LOAD(9570,18,3,131,21,144,18,3,141,17,141,54,3,159,191,223,0,68,73)
```

BRIEF TREASURERS REPORT...JAN TRAYERS TEASURER

$1168.08   IN CHECKING ACCOUNT. $40.00   CASH ON HAND

```
10 ! **************
20 ! *          *          ♪ ♪ ♪ ♪     MUCH THANKS     ♪ ♪ ♪
30 ! * PRINT A TAG *       ♪ To:  ED MACHONIS  ♪
40 ! *          *          ♪   WITH ♥ LOVE ♥ FROM        ♪
50 ! *     by     *        ♪   T.I. USERS EVERYWHERE!    ♪
60 ! *          *          ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪
70 ! * ED Machonis *
80 ! *          *
90 ! **************
100 CALL CHAR(91,"2A542A542A542A54")! CHECKERED BLOCK
110 CALL CHAR(125,"10387C7CFE1038")! CHRISTMAS TREE
120 CALL CHAR(93,"00247E7E7E3C18")! HEART
130 CALL CHAR(96,"1018141434706C")! MUSICAL NOTE
140 CALL CHAR(124,"10781410182C64")! WALKER
150 CALL CHAR(123,"3C42A581A599423C")
160 OPEN #1:"PIO.CR" :: PRINT #1:CHR$(27);"E";CHR$(27);"G"
170 K$=CHR$(27)&"L"&CHR$(12)&CHR$(0)
180 H$=K$&RPT$(CHR$(56),2)&RPT$(CHR$(124),2)&RPT$(CHR$(62),4)&RPT$(CHR$(124),2)&
RPT$(CHR$(56),2)&" " :: B=1
190 DISPLAY AT(1,3)ERASE ALL:"***    PRINT A TAG    ***"
200 DISPLAY AT(3,2):"GREETING? (17 CHAR'S MAX)" :: DISPLAY AT(4,2):D$ :: ACCEPT
AT(4,2)BEEP SIZE(-17):D$
210 DD$=RPT$(" ",(17-LEN(D$))/2)&D$&RPT$(" ",(18-LEN(D$))/2)
220 DISPLAY AT(6,2):"CHOOSE BORDER:":" 1= [ [ [ ["," 5= ¦ ¦ ¦ ¦"," 2= } } } }",
" 6= $ $ $ $"," 3= ] ] ] ]"," 7= * * * *"," 4= ` ` ` `"," 8= { { { {"
230 DISPLAY AT(11,2):STR$(B):: ACCEPT AT(11,2)BEEP SIZE(-1)VALIDATE("12345678"):
B
240 ON B GOTO 250,260,270,280,290,300,310,320
250 B$=K$&RPT$(CHR$(85),2)&RPT$(CHR$(170),2)&RPT$(CHR$(85),2)&RPT$(CHR$(170),2)&
RPT$(CHR$(85),2)&RPT$(CHR$(170),2)&" " :: GOTO 330 ! CHECKED BLOCK
260 B$=K$&CHR$(4)&CHR$(12)&CHR$(28)&CHR$(60)&CHR$(125)&CHR$(255)&CHR$(125)&CHR$(
60)&CHR$(28)&CHR$(12)&CHR$(4)&CHR$(0)&" " :: GOTO 330 ! CHRISTMAS TREE
270 B$=H$ :: GOTO 330 ! HEART
280 B$=K$&RPT$(CHR$(6),2)&RPT$(CHR$(14),2)&RPT$(CHR$(252),2)&RPT$(CHR$(64),2)&RP
T$(CHR$(56),2)&RPT$(CHR$(0),2)&" " :: GOTO 330 ! MUSIC NOTE
290 B$=K$&RPT$(CHR$(66),2)&RPT$(CHR$(70),2)&RPT$(CHR$(248),2)&RPT$(CHR$(76),2)&R
PT$(CHR$(38),2)&RPT$(CHR$(0),2)&" " :: GOTO 330 ! WALKER
300 B$=CHR$(36)&" " :: GOTO 330 ! DOLLAR SIGN
310 B$=CHR$(42)&" " :: GOTO 330 ! ASTERISK
320 B$=K$&CHR$(60)&CHR$(66)&CHR$(137)&CHR$(165)&CHR$(133)&CHR$(133)&CHR$(133)&CH
R$(133)&CHR$(165)&CHR$(137)&CHR$(66)&CHR$(60)&" " :: GOTO 330 ! HAPPY FACE
330 DISPLAY AT(13,2):"RECIPIENT? (12 CHAR'S MAX)" :: DISPLAY AT(14,2):R$ :: ACCE
PT AT(14,2)BEEP SIZE(-12):R$
340 RR$=RPT$(" ",(12-LEN(R$))/2)&R$&RPT$(" ",(13-LEN(R$))/2)
350 N$=CHR$(27)&"W1"&RR$&CHR$(27)&"W0"
360 DISPLAY AT(16,2):"FROM? (25 CHARACTERS MAX)" :: DISPLAY AT(17,2):G$ :: ACCEP
T AT(17,2)BEEP SIZE(-25):G$
370 GG$=RPT$(" ",(29-LEN(G$))/2)&G$&RPT$(" ",(30-LEN(G$))/2)
380 DISPLAY AT(19,2):"NUMBER OF LABELS TO PRINT?" :: DISPLAY AT(20,2):"1" :: ACC
EPT AT(20,2)BEEP SIZE(-2):Q
390 DISPLAY AT(22,2)BEEP:"ALIGN LABEL":" PRESS ENTER TO PRINT":" PRESS ""R"" TO
REDO"
400 FOR D=1 TO 50 :: NEXT D
410 CALL KEY(0,K,S):: IF K=13 OR K=82 THEN 420 ELSE 410
420 IF K=82 THEN 190
430 FOR I=1 TO Q
440 PRINT #1:RPT$(B$,4);DD$;RPT$(B$,4);CHR$(13);CHR$(10)
450 PRINT #1:B$;"To:";N$;" ";B$;CHR$(13);CHR$(10)
460 PRINT #1:B$;"   WITH  ";H$;"LOVE ";H$;" FROM      ";B$;CHR$(13);CHR$(10)
470 PRINT #1:B$;GG$;B$;CHR$(13);CHR$(10)
480 PRINT #1:RPT$(B$,10);RPT$(B$,7);CHR$(13);CHR$(10)
490 PRINT #1:CHR$(13);CHR$(10):: NEXT I :: GOTO 190
```

*** PRINT AN ID ***

THE CHANGES I'VE MADE TO ED MACHONIS "PRINT A TAG" PROGRAM ON PAGE 5 OF THIS NEWSLETTER ARE SHOWN BELOW. THIS WILL NOW MAKE AN IDENTIFICATION LABEL FOR MEETINGS AND GET TOGETHERS WHERE PEOPLE MAY NOT KNOW EACH OTHER (T.I. MEETING OR FAIR). PRINTING THE LABEL WILL BE EASY AND ALL THE INFORMATION ENTERED REMAINS IN FOR THE NEXT TAGS DEFAULT DATA. IN OTHER WORDS EACH PASS MAY REQUIRE CHANGING THE NAME OF THE PARTICIPANT. SEE SAMPLE BELOW. THE STANDARD GUM LABEL WILL STICK TO CLOTHING BUT NOT DAMAGE IT.   JOHN F. WILLFORTH WP99

BELOW I'M GIVING YOU ONLY LINE INFORMATION CHANGES AND ADDITIONAL LINES REQUIRED TO CONVERT ED'S TAG ♪ ♪ ♪ ♪ WEST PENN 99'ERS ♪ ♪ ♪ ♪ PROGRAM INTO AN ID PROGRAM. ENJOY IT, I KNOW I DO!♪   JOHN   ♪
CHANGE LINES :   ♪   WILLFORTH   ♪
                                                        ♪   NEWSLETTER EDITOR   ♪
                                                        ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪

```
   30 ! * PRINT AN ID *
   190 DISPLAY AT(1,3)ERASE ALL:"****    PRINT AN ID    ***"
   200 DISPLAY AT(3,2):"HEADER?  (17 CHAR'S MAX)" :: DISPLAY AT(3,25):D$ :: ACCEPT
   AT(4,2)BEEP SIZE(-17):D$
   330 DISPLAY AT(13,2):"LINE 1? (12 CHAR'S MAX)" :: DISPLAY AT(14,2):R$ :: ACCEPT
   AT(14,2)BEEP SIZE(-12):R$
   360 DISPLAY AT(15,2):"LINE 2? (25 CHAR'S MAX)" :: DISPLAY AT(16,2):M$ :: ACCEPT
   AT(16,2)BEEP SIZE(-25):M$
ADD LINES :
   363 MM$=RPT$(" ",(29-LEN(M$))/2)&M$&RPT$(" ",(30-LEN(M$))/2)
   366 DISPLAY AT(17,2):"LINE 3? (25 CHARACTERS MAX)" :: DISPLAY AT(18,2):G$ :: ACC
   EPT AT(18,2)BEEP SIZE(-25):G$
CHANGE LINES :
   450 PRINT #1:B$;"   ";N$;" ";B$;CHR$(13);CHR$(10)
   460 PRINT #1:B$;MM$;B$;CHR$(13);CHR$(10)
```
THE ABOVE CHANGES TO ED'S PROGRAM CAN NOW BE RESEQUENCED.

MYARC HAS MOVED FROM BASKING RIDGE TO MARTINSVILLE, NJ. THE NEW PHONE # IS (201) 805-0006

SPEAKING OF MYARC, JERRY PETRULAK RECEIVED A LETTER FROM SUSAN COFFEY ON APRIL 15, 1988 IN REGARD TO A PROBLEM HE WAS HAVING WITH HIS MYARC MEMORY EXPANSION CARD. SHE STATED "MYARC'S 128, 256, AND 512K MEMORY EXPANSION CARDS WERE NEVER ADVERTISED OR SOLD TO BE USED WITH EXTERNAL POWER SUPPLY. HOWEVER, APPROXIMATELY ONE OUT OF FOUR WILL FUNCTION WITH AN EXTERNAL SUPPLY. IF YOURS IS ONE OF THESE, THE CORRECT POWER SUPPLY SPECS ARE 9 VOLT DC TIP POSITIVE AND 500 MILLI AMPS. " I FIND THIS INTERESTING, AND PARTICULARLY DISTRESSING FOR THOSE 3 WHOSE DON'T HOLD MEMORY! IF YOUR MYARC (RAM DISK) LOSES IT'S MEMORY WHEN THE PEB IS SHUT DOWN, REMOVE THE CARD FROM THE PEB FOLLOWING INSTRUCTIONS, AND REMOVE THE SHELL. LAY THE BOARD ON A NON-STATIC SURFACE (NON-CONDUCTIVE ALSO), AND PLUG THE DC SUPPLY THAT YOU MYSTERIOUSLY CAME BY (SINCE MYARC DIDN'T SEND IT TO YOU) INTO THE CARD. MEASURE THE DC VOLTAGE ON THE BOTTOM LEG OF THE TOP REGULATOR. IT MUST BE +5 DC IN ORDER TO SUPPORT THE LOGIC AND MEMORY ON THE BOARD. IF IT IS IN THE 3 TO 3.5 VDC RANGE, FORGET IT, YOU'LL LOSE IT EVERYTIME. LARGER MEMORIES, CHIPS DRAWING MORE CURRENT, DC ADAPTERS THAT ARE TOO SMALL, ALL CAUSE THIS PROBLEM. YOU MAY TRY A DC POWER SUPPLY RATED AT ABOUT 5 VOLTS, AND AS THE LETTER FROM MYARC SAYS, 500 MA. (½ A.). I'D SUGGEST 800 MA. TO BE SAFE, UNLESS YOU KNOW THAT YOUR CARD USES ALL LOW POWER DYNAMIC RAM MEMORY CHIPS. CAUTION: BE PARTICULARLY EXACT IN POLARITY ON THE DC ADAPTER YOU USE. THE TIP MUST BE POSITIVE (+).
   YOU TAKE RESPONSIBILITY FOR ANY DAMAGE THAT MIGHT OCCUR AS A RESULT OF ANY ATTEMPTED USE OF THE ABOVE INFORMATION. WE INTEND THIS ONLY TO HELP YOU GET THE MOST OUT OF YOUR TI SYSTEM.

FOLLOWING THE BUS
by John Guion

The Grand RAM is a RAM-Disk that can be configured to have anywhere from 64K to 512K. Unlike some other RAM-Disks (Myarc, CorComp, Foundation), the Grand RAM is also battery-backed so information stored on the card is retained after the power to the system is shut off. While there are other RAM-Disks that are battery backed (Horizon, Rave MXI01), the Grand RAM also has a few extra features. These include a print spooler, clock, extra expansion ports, a power-up menu, and "hot keys".

The operating system that allows the RAM memory to be used like a disk is stored in RAM on the Grand RAM card. It occupies 12K of memory that cannot be used for the other features on the card. The operating system is loaded by what is called the Configurator program. This program is loaded with the Editor/Assembler or Extended BASIC module. Once the Configurator is loaded, the Grand RAM's operating system can be loaded from disk into the card. All of the other features, such as setting up the print spooler and RAM-Disk, are accomplished with the Configurator. This is similar to using the CONFIG program on the Horizon RAM-Disk, but all functions are accessed from a single screen by pressing one key. The Configurator is also used to save the operating system back to disk once it has been customized by the user.

The most prominent feature, of course, is the RAM-Disk. This allows the user to use RAM memory to emulate a floppy disk drive. This not only offers more storage for your system, but the RAM-Disk operates about ten to twenty times faster than a floppy disk. In the 512K configuration, 500K of memory can be used for RAM-Disk. Since the TI disk system is limited to a maximum of 400K per drive, any memory used for RAM-Disk past 400K must be divided into multiple RAM-Disk drives. I tested the card with 128K of memory and then added another 64K of memory to the card (using my own chips). This allowed me to set up RAM-Disks of 464 and 720 sectors, respectively. If desired, this could be broken into smaller drives or increased with more memory chips. Other than the setup and speed, the RAM-Disk functions just like a floppy disk drive.

Another important feature is the print spooler. Memory on the Grand RAM can be traded between RAM-Disk and print spooler in 2K increments. Thus, some memory can be set aside for the spooler while leaving the rest available for the RAM-Disk. The spooler "intercepts" information that is being sent to the RS232 card and stores it in the Grand RAM's memory. The information is accepted by the Grand RAM at very high speed, instead of going to the RS232 card. Use of the computer is returned to the user while the Grand RAM then takes care of sending data to the RS232 card (and printer) at whatever speed it can. This greatly reduces the amount of time spent waiting for the printer to print when other work could be done. The print spooler does essentially the same job as an external print buffer. Unlike a print

buffer, however, the print spooler must use the computer to operate and therefore slows down other operations of the computer.

The Grand RAM also has an optional real-time clock. Like the memory, the clock is battery-backed and does not need to be reset if the power is shut off. The clock provides time, date, and day of the week information. There are two methods for using the clock. First, it may be accessed through programs (BASIC, assembly, or others) by opening a file called "TIME". The time and other information may then be read by the program. This is a very simple operation and is similar to the methods used by the other clock devices for the TI-99/4A. Second, the clock may be activated by a series of keystrokes so that the time is always in the upper right corner of the screen. Whether in BASIC, TI-Writer, or almost any other program, the time is available in this manner. The time will be displayed regardless of whether or not a program is currently running or even if the screen has been cleared. A different set of keystrokes are used to turn this feature off.

An optional menu may also be used that will appear whenever the computer is turned on or reset. Instead of the TI title screen appearing, the menu (called ROOT) will appear. The ROOT menu offers several features. The user can use it to catalog a disk, display or print a file, run either an assembly language or Extended BASIC program, and create a list of fifteen programs of the user's choice that may be run with the stroke of a single key. The user programs can also be assembly or Extended BASIC, however, any Extended BASIC program run from this menu requires that the Extended BASIC module be inserted in the computer. No module is required to run the assembly programs. The ROOT program was written by John Johnson for use with the Grand RAM and is identical in appearance and operation to both his MENU and BOOT programs.

The primary operating difference between the Grand RAM and other RAM-Disk cards is that all functions can be controlled by what are called "hot keys". The hot keys are a series of keystrokes that are set up by the user to control certain functions of the Grand RAM. Functions such as turning the ROOT power-up on or off, turning the clock on or off, cancelling spooler output, and other features are handled through the hot keys. When the Configurator program is run, it will ask the user to press the keys desired to activate a series of functions. Once the hot keys are set up for one function, the Configurator proceeds to the next function. When all of the hot keys have been assigned, all that is required to control these functions is pressing the key combinations that have been selected. For example, I set up the keys so that pressing CTRL, FCN, and T all at the same time will turn on the clock display. Pressing CTRL, SHIFT, and T will turn it off. Once they are set up, the hot keys are always active. This means that any function controlled by the hot keys may be accessed from either BASIC, the ROOT menu, the TI title screen or from a running program.

One problem that has always plagued RAM-Disks is that they cannot be 100% compatible with a real floppy disk drive. Early attempts at RAM-Disk cards were incompatible more often then not. Like the Horizon RAM-Disk, however, the Grand RAM is just about as compatible as a RAM-Disk can get. With the exception of programs such as high speed disk copiers that access disk controller cards directly, the Grand RAM is compatible with all floppy disk functions. I tested the Grand RAM with BASIC, Extended BASIC, Editor/Assembler, Funnelweb, Disk Utils, Fast-Term, Archiver, and other programs with no problems.

In fact, the only difference noticed was the speed increase due to the RAM-Disk. Since the size of the RAM-Disk is variable, it can also be set up to be the same size as a floppy disk, should any program require it. This is also nice in that it allows the RAM-Disk size to match your floppy disk size which makes backing up the RAM-Disk more convenient.

The Grand RAM also has a selectable CRU base which determines the memory space accessed by the card. This allows it to be added to a system without the problem of interfering with another card in the system. I tested the card with both a Foundation and a Horizon RAM-Disk in the box and all three cards worked together. One notable aspect of the Grand RAM design is that it does not replace the 32K card. Unlike RAM-Disks that do replace the 32K, multiple Grand RAM cards can be used in the same system in addition to other RAM-Disks (as mentioned above). This also allows it to be used with consoles modified to use the 16-bit bus for the 32K memory.

The Grand RAM has several good points. It provides an impressive increase in speed over floppy disks and is comparable to the other available RAM-Disks. The design of the card allows the user to choose a wide variety of memory sizes, so the user does not have to purchase more memory than they want or can use. The card is designed so that the only thing required to increase the memory is plugging in more 32K RAM chips (43256 or 62256 type). No soldering or other alterations are required. The battery-backing is also convenient in that it saves the time required to reload the RAM-Disk if the system has been shut down. The clock is a nice feature that not only allows a constant time display, but also is easy for programmers to access through software. The ROOT menu software is of a proven design and is probably the most useful feature of the RAM-Disk. It allows the user to set up a system with his/her favorite programs so that they are instantly and easily accessible. The spooler not only speeds up printing procedures, but eliminates the need for yet another device connected to the system. Finally, the Configurator software is the first program of its type to allow the novice user an easy and direct way to set up a RAM-Disk.

Unfortunately, the Grand RAM has also has quite a few problems. While I don't know everything about the 99/4A, I do consider myself an experienced user. I have owned RAM-Disks for four years and my family now has seven of them. Understanding the operation of the Grand RAM has been a thoroughly confusing project. The manual was supplied on disk (no printed copy) and is very poorly written. One of the documentation files even required fixing with a sector editor before it would print. Not only are the operating instructions incomplete, the procedures that are described are neither fully explained nor consistent throughout the manual. The Grand RAM was also supposed to be supplied with commented source code for its operating system. This might have shed some light on the problems I encountered, but it was not included as was advertised. The package also was advertised as including 4A Talk and Disk Master. Aside from the fact that I find neither of these programs useful or suitable for the Grand RAM, that the board was shipped with broken solder connections as well as two connections that had NEVER been soldered. These had to be soldered before the card was used. Wires had been added to fix improper board layout and one transistor had been added to the board with only one of its three pins soldered to anything. The physical design of the board also disturbs me in that it uses PAL chips and other components that are not readily available. This, coupled with the fact that no schematics were provided, makes the user entirely dependent on DataBiotics should any problem with the card arise. The two expansion ports on the top of the card may have a useful purpose, but DataBiotics has made no announcement concerning the release of the proposed devices for these ports. At the moment, they only add to the complexity and cost of the card. Another disturbing design flaw is that the card is too tall to allow the lid to be placed on the P-Box. The metal plate on the lid contacts the card and does not allow the clips to even touch the lid. The battery is also an uncommon device that is very thick and presses tightly against any card that is next to it.

Aside from the potential problems and inconveniences, the operation of the card also has bugs. When setting up the hot keys, the Configurator does not always accept the keys that were pressed, even through the display shows that it has. This is even more annoying since the manual's only mention of entering the hot keys says to follow the prompts in the Configurator, which make little sense. The clock display is a handy feature, but it causes problems when used with programs such as TI-Writer since it overwrites part of the screen. Pressing the keys to turn the clock off will work, but they are sometimes interpreted by the program being used as some other function as well. Having to turn the clock on and off during normal use also detracts from its usefulness as a convenient clock. This biggest bug I found was when the operating system was corrupted (which happened quite often). When a Horizon RAM-Disk has a corrupted operating system, it will usually fail to load the menu and require reloading of the operating system. When the Grand Ram corrupts its operating system, there is no indication until an attempt to write something the the RAM-Disk is made. At that point, it wipes out the contents of the RAM-Disk, losing whatever data may have been on it and locking up the computer.

The only conclusion I can reach is that the Grand RAM, in its current state, is not a good purchase. DataBiotics has a product which not only suffers from delivery problems, but is subject to the current RAM pricing problem. The user is dependent on their product support, with which they have failed even before the card is available. These factors, along with the various software and hardware problems, are not encouraging. Perhaps if the card could have been delivered when advertised or if more work in development had taken place, the Grand RAM could have been an excellent product. With the current situation, however, it seems that the money would be better invested in other products.

SOME OF YOU MAY KNOW THAT THE DALLAS GROUP HAS BEEN WAITING FOR ABOUT A YEAR FOR 12 OF THE 512K GRAND RAMS AND JUST RECEIVED ONE 128K VERSION. BESIDES NOT GETTING THE SIZE ORDERED, THEY GOT ONLY ONE. I'D HATE TO HAVE BEEN THE ON TO DECIDE WHO GOT IT. I DON'T THINK THAT IT HAS HAD ANY INFLUENCE IN THE ARTICLE PRESENTED HERE BY JOHN GUION.

RS232
UPGRADE KIT

With an RS232 upgrade kit, users can expand the software compatibility of their systems as well as add convenient features. Once installed the upgrade kit provides two new devices:

"TP" - In addition to the PIO and RS232 devices, TP is added to provide full emulation of TI's Solid State (thermal) Printer by an Epson compatible printer. This allows the user to run software which is set up to access only the Solid State Printer. Module software that was previously unable to print with a parallel or serial printer will use these devices as though the Solid State Printer was attached. Additionally, program listings can be made in 60, 32, or 28 columns so the printout is just as it appears on the screen. Any option available to the original Solid State Printer may be used with the TP feature. The TP option even allows the user to write one-line screen dumps for Extended BASIC programs, complete with graphics!

"SIO" - Either serial port may be set up to respond as SIO. The port, baud rate, number of data bits, and parity may be specified when the upgrade kit is ordered. Instead of having to enter a long device name such as "RS232/2.BA=4800.DA=8.PA=0" each time a port is accessed, "SIO" may be used. Not only is this more convenient than typing a long device name each time the device is accessed, it allows the user to easily modify programs that previously used only PIO for printer output. All the user needs to do is change occurrences of PIO in the program to SIO. Software switches such as ".LF" and ".CR" may be added to SIO if required by a particular program.

The TP, SIO, and PIO device names may also be entered in lower case so that errors caused by having the Alpha Lock in the wrong position are eliminated. None of these features interfere with the normal operation of the RS232 card.

The parameters for both "TP" and "SIO" ports must be specified when ordering to correspond with the configuration of the user's system. Installation of the upgrade kit requires the ability to desolder and replace one ROM chip on the TI RS232 card.

To order, send $14.95 (cash or check, please) to:

John Guion
11923 Quincy Lane
Dallas, TX 75230

Please use the enclosed form to specify your system configuration.

DISK CONTROLLER
UPGRADE KIT

Users of the TI disk controller card can now enjoy some of the features of the newer disk controllers at a fraction of the cost! By installing a few components, the TI card can be upgraded without the worry of software compatibility or the purchase of a new disk controller.

The TI disk controller upgrade kit adds the ability to connect a fourth single or double sided floppy disk drive to the system, just like the newer cards. The ability to use lower case drive names like "dsk1" is not only more convenient, but it allows the user to access a floppy disk drive if a RAM-Disk has been set up to use the same drive number. As an option, the head step time of the drives may also be decreased from 20 milliseconds to 12 milliseconds to reduce the time required for some disk operations. This upgrade does not provide double density.

This upgrade is for programmers, data base users, bulletin board operators, or anyone who needs access to more online disk space and extra features but does not want the extra cost of a non-TI card. With the low cost of disk drives (especially drives removed from a system upgraded to half-height units), upgrading the TI disk controller can be the most cost effective way to enhance your system. The cost of the upgrade kit is substantially less than the $150-$175 you can pay for a new disk controller (not to mention the cost of your TI card which then gets to sit on the shelf).

Installation of the upgrade kit is accomplished by replacing the two ROM chips on the TI disk controller and stacking a few additional chips. The ability to solder and desolder components is required. No modifications to the disk drives are needed. An illustrated installation manual is included with the kit.

If the faster head stepping is desired, the drives used with the system MUST be capable of handling the faster speed. Faster head step times should not be requested unless the user knows that the head step time can be accommodated by ALL the drives in the system. There is no extra charge for faster head stepping.

To order, send $19.95 (cash or check, please) to:

John Guion
11923 Quincy Lane
Dallas, TX 75230

Please state whether normal or fast head stepping is desired.

Paul Brock sent this in to remind me of what a load a newsletter editor was carrying. I would like to thank him for his help in carrying the load!

I have run across some absolutely irrefutable statistics that show EXACTLY WHY you are tired And it's no wonder you'r tired either. There aren't as many people actually working as you may have thought,at least not accoding to the survey recently completed.

The population of this country is 245 million, 98 million over 60 years of age, which leaves 147 million to do the work. People under 20 years of age total 85 milliom, Which leaves 62 millior to do the work.

There are 37 million who are employec by the government, which leaves 25 million to do the work. Four million are are in the armed forces, which leaves 21 million to do the work. Deduct 20,800,000, the number in the state and city offices, leaving 200,000 to do the work. There are 188,00 in hospitals, insane saylums, ect., so that leaves 12,000 to do the work.

Now it may interest you to know that there are 11,998 people in jail, so that leaves just two people to carry the load. That's you and me--- and I'm getting tired of doing every thing myself.

A little humor from Paul Brock
West Penn 99'ers.

MY TI
IS STILL
WORKING
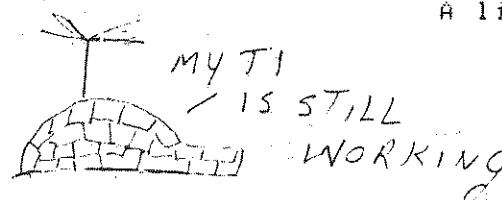
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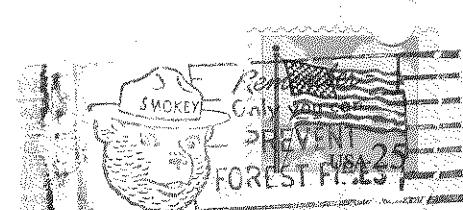
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