

# TI \* MIES



AUTUMN 1994. ISSUE 46



HALLOWEEN, Bonfire night, and, the return of a 99/4A workshop!!!

TI Computing telecommunicates  
with The MOBB

Mansfield On-line  
Bulletin Board.

See, and use a demo at the workshop.



CD-ROM Arrives

Hopefully, we'll have a demo of CD-ROM too!!!

Front cover drawn on YAPP running from Editor Assembler.

R.T.

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## Disclaimer.

All the views by contributors to this magazine are strictly their own, and do not represent those of the committee. Contrary opinions are very welcome and errors will be corrected upon request.

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FROM THE CHAIRMANS CHAIR

Hello again freinds, I write this time with news of the group's new BBS or Bullitin Board System for those who want to know what BBS ment. I have done quite a lot of work and now intend to put it on line on several test dates before we go on 24hrs 7 days a week. The system will start with the After Hours program. This will allow you to upload and download the programs that will be on the system, at speeds of up to 9600. However we are at this time obtaining a better and some would argue the best BBs around called S&T which will give full colour ansi graphics. (When viewed with your computer, on line.) That will give you all something to look forward to in the near future.

How do I access this board you ask? Well this is what you need as a minimum

RS232  
TE II  
TI 99/4a Computer  
Modem (Minimum 300 TO 2400bps)

This set up is not a very good set up as you can only access the BBs at 300bps which is very slow!!!!

The ideal sytem is  
TI 99/4a Computer  
TI Expansion System  
32K  
Rs232  
Disk Drive  
Modem (minimum 300 TO 2400bps)

This set up will be ideal. The only thing then will be to obtain a terminal program to access our BBs. The best for this is TELCO. This is in the Library. This program will able you to set up and receive all the data you wish. This program will access other boards other than ours. You will be able download GIFs and text from them. However from ours your will be able to download TI programs as well.

Modems cause quite some confusion and seem to cause all sorts of problems. If you are thinking of buying a modem then do not get a modem that operates at not less than 2400bps, and is Hayes Compatable. What did all that mean? Well Bps is bits per second, this is the transfer rate at which you can talk to the other computers. The bigger the figure the faster the flow of data down the phone line. The suggested rate for you to talk to us will be 2400bps. This is the safest speed we can talk at. At this time it appears that the TI RS232 can only play safely at this speed. I have with a little amplifer made by Gary, gone up to 19200bps and

transferred ASCII files without a hitch. However when it comes to binary files it will only do it at 4800bps, even with the amplification. Gary is going to have a talk with Colin HINSON at TI in Bedford to see what the problem is. In any event 2400bps is still fast. Fortunately our files are not very long. When compressed with the program Archiver these reduce in size by about one third. So for about a three minute call you will have a program to run after you have decompressed it. The BBs will have on line as a standard file, the Archiver program. I will tell you more about this program later. So back to modems, if you have one then I maybe telling everthing you already know, but for those who don't then here goes. Your modem should be Hayes compatible. This means that it conforms to the HAYES "AT" commands. This modem will be like another small computer to which you talk to. With the AT commands you can make it dial out and it will listen to the other computers HAYES modem at the other end. If say he is on 19200bps and you are at 2400bps the two modems will talk and connect on at 2400bps. The larger Modem buffering down to the correct speed. Other than speed you need to set how the modem talks. The most common set up is 8N1 if you set this up on Telco as the default you can't go wrong. There is also the language which it talks. This is set up by using XMODEM or ASCII capture. XMODEM is for binary files. This has various error checking which allows you to dump down the file without any problems. Just as matter of interst there are other languages such as Ymodem, Zmodem ADM3 etc. ASCII capture allows you to download written files, like on this page which are in DV80 format (Display Variable 80). So depending what you want to download / Upload you will have to decide the language. However when just talking to the other computer or modem then its type and go as 8N1. If you have any problems Richard TWYNING Gary SMITH or myself will be glad to help.

Next we go to the Telco. This program is a monster. It is very user freindly and has 40 and 80 col options. Everything is in menus and is very easy to get around. Also there is a help screen to each page (fctn aid) If you read this it will help you with short cuts. The program will allow you to spool your session online down to disk so that you can view what you just did off line. This is very usefull if you have a large file that you want to read but not at the cost of BT. So you can scan round and read later. The program allows any speed to be accessed. Ie if you and your mate wanted to talk at 5001bps you could do so. However this would only be possible on a computer to computer link not via a modem. There so many things in TELCO that I will be giving demos at the Workshop in Sandbach. So be there. When You get Telco it has very good Doc's with it so you will not be lost. As a terminal program it is the BEST there is. That includes other machines, believe me I have used them!!!

Achiver, this program allows you to take any type of file on your disk system and compress it down into a ARK file. Richard and I when we compress down put an extension in the name of the file which tells you it is compressed. IE, TIUSER\_ARK

This file if you look at it from DM 1000 is a Disk Fixed 128 file. So if you see one of these on a disk try it in archiver to see if it will explode. Archiver not only allows you to compress one file it will compress if you want several files together into one file. So if you exploded TIUSER\_ARK you could get this,

TIUG\_DOCS  
ROS\_8.1  
TUTOR1  
TUTOR2

So you can see that you can back up your system with this system. Archiver also allows you to catalog the disk in the standard way, and will also catalog all files in an ARK file. You can also obtain a print out if so required. I will also if required do Demos of this program so you can see what it does. I have it in Funnelweb. So if you want a copy let me know at the show. Better still send your money to Stephen Shaw so the library can prosper. I will in any event charge for the program and send Stephen the cash. The cost will be 50p a disk.

Ok enough of the BBs, if I tell you too much about it then you will not come on line. For those who hav'nt got a modem then come to the work shop and you can use the LINK to access it at no cost whatsoever. You will also be able to get programs off of it.

---

### THE WORKSHOP

We are having a workshop as you might have read in the last issue on page 53. The Workshop will be held between 10am - 5pm on SATURDAY 12th NOVEMBER 1994 at:-

Wheatsheaf Public House,  
1 Hightown,  
Sandbach,  
Cheshire.

If you have any problems finding us there is a contact number to the public house. It is 0270 762013.

There will be bar meals and drinks in the pub at reasonable prices. If you wish there can on the day, be hot full meals, these have to be ordered early on so they can be prepared.

\*\* Included in this issue is a map to show you how to get there. \*\*

Entry is free to all our members and family but 50p to non members. I hope to see you at the do as there will be a lot to see and do.

THE QUEST FOR THE BUG  
Garry J Christensen  
Brisbane User Group, Australia

Assembly language is one of the most powerful programming languages for the T199/4A however it has drawbacks in that it is also complicated and requires attention to detail. A functioning programme can be very good but getting it there is not easy. One of the greatest problems is debugging.

There are so many things that can happen in assembly programming. Some of the errors will show up when you assemble the source code. These are the easy ones to fix. They are called 'assembly time errors' and the assembler points the error out to you.

More frightening are the 'run time errors'. These may cause the computer to lock-up, display pretty flashing lights on the screen (whether you want them or not), and even screech at you. Others just do the wrong thing then keep going as if it was all OK.

How do you find these errors? In this article I will cover some of the simpler methods of debugging your assembly programmes. By far the easiest is with a 'Debugger'. This is a programme that is specifically written for the purpose of finding errors in assembly programmes. The other way is by the 'try and see' method. This one seems to be particularly slow. You will understand why when I discuss it.

The first thing to do is to localise the error. Where in the programme is it occurring? Regardless of the method used, you have to know where to look. Execute the programme and see what parts of the programme are definitely being performed. The last one of these acts as the starting point for the search.

Firstly I will cover the 'try and see' method. I find the easiest method is to place a piece of code into the programme that will be easily recognised. One may be to write a letter on the screen.

```
LI R0,>0108  
LI R1,>4100  
BLWP @VSBW
```

If the letter appears, your programme has executed up to that point. If not, the error is somewhere before the inserted code.

Perhaps you can already see a problem with this method. It requires the insertion of the code, assemble it, and execute it. If that was not the problem, return to the editor, delete the inserted code, type in a new piece further on, and repeat the process. Very time consuming, remembering also that most lock-ups require that the computer be turned off.

A small saving can be made by inserting several pieces of code, each with a different letter. If the programme only displays the letter 'A' then the error is between 'A' and 'B'. If 'ABC' is displayed, the mistake is between 'C' and 'D'.

This method will not work well if the lock-up involves the erasure of the screen contents as you will not have time to see the display. In these cases another method needs to be used. The easiest is to execute the power-up routine.

This has the effect of 'quitting'. In this case, only one can be used.

All this method does is to isolate the part in which the error occurs. It is absolutely no help in finding it. The error could be anything from the wrong register being used to a logical error in the manipulation of data. An error may even be somewhere else but it's effects are not felt until later in the programme. Finding the error is the hard bit but knowing where to start looking is a big start.

The debugging programme allows you to localise the area of code, inspect the registers and memory locations and it allows you to change values so that finding the error is made easier. For the purposes of this article, I will be using SBUG as the debugging programme. Most other debugging programmes function in the same manner so the conversion to your programme should be easy.

The first thing that you need to know is where your programme and data are in memory and one thing that is essential is a programme listing. I will assume that you know how to produce a listing. If not, check in the Editor/Assembler manual.

To save some mathematics and some hunting around, I set the absolute origin of the programme to >C000 (AORG >C000). Setting an absolute origin means that all the addresses in the listing correspond to the location of the instruction or data in memory. The reason for setting it at >C000 is because absolute code is not recorded in the free memory pointers. SBUG will still load at >A000 even if the programme is loaded there. >C000 loads your programme above SBUG.

With that done, load your programme (no auto-start) and SBUG and execute SBUG. From the debugger environment, you have much more control over what happens. The first thing to do is to set up the execution parameters. Press 'R' to set the workspace, programme counter (execution address) and status byte.

The execution address will be the entry address of your programme (get it from the listing). I use the GPL workspace (>83E0) because that is the area used when control is handed to your programme and your programme should set its own workspace as soon as it starts. The status byte I set to 0.

Next the breakpoints. A breakpoint is the place where your programme is to stop and the control returned to the debugger. Set this to an address of an instruction that you know is being executed correctly, as close to the suspect area as possible. Next hit the 'E' for execute. Your programme will start to run and when a breakpoint is found, you are returned to SBUG.

If you like to carry on in this fashion, setting breakpoints and executing, eventually the computer will encounter the error and will not return to the debugger. Obviously it is between the last breakpoint that worked and the last one set that the error occurred. Reload and start again.

Regardless of how you do it, you have isolated the area in which the fault may lie. If you doubt that any code is executing correctly, you may like to disregard the bit about setting breakpoints and continue on from here.

Before continuing I need to explain a couple of functions of the debugger. The first is the 'S' command. This will execute only the next instruction of your programme, single step operation. The disassembled code will be displayed on the screen along with the current programme counter.

The 'M' command will allow you to inspect or change any memory location and the 'W' command will allow the same functions on the workspace registers. There are many possible ways to use these so I won't go into them here. Refer to the instructions booklet for details.

Now its time for you to do the detective work. There are too many things that can go wrong for me to tell you what to do next. You must step through the programme, following it on the listing, and see if it does as it should. You should have a good idea what values the registers and memory contain. Keep a check on them as you follow it through. You will come to a stage when it does something that it is not supposed to do. Here is the error.

Go back and have a look at it in more detail. Reset the workspace pointer, programme counter and status byte as in the beginning. Set the breakpoint to a couple of instructions before the error and execute the programme.

Check the data and register values that relate to this part of the programme. Are they correct? If not, go back further and try again. Step forward, check again. Is everything OK? Eventually the cause of the problem will become apparent.

Perhaps this would be a good point to list all the errors that you are likely to make so that you could check for them. I don't have that many hours to spare. If I wrote down every error I made in assembly programming from the beginning, I would have a full book by now.

There is no easy way. You have to hunt them down like wild animals, track them, stalk them sometimes and eventually you will find them. Even then there are some that you may need assistance with. Technical or some of the 'hidden' features of the language are more subtle. For these there is no substitute for experience, however the only way to gain experience is to find your own mistakes. Get some guidance, but find them yourself.

This article acts merely as an introduction to debugging. SBUG has many other features that may benefit you in your quest for the elusive bug. Get to know the basics first, read the instruction book, apply what you already know to each new problem. Only then does knowledge grow. It's a hard road but stick with it, the rewards can be great.



## HOW FAMILY COMPUTING RATES TI SOFTWARE

FAMILY COMPUTING MAGAZINE, which is no longer being published, supported the 99/4A in 1984 and 1985 with software reviews and type in programs. Each issue had a short reviews of "New and Noteworthy" software. Below are their reviews of some software that runs on the 99/4A. O=overall.

Each category except ease of use was rated with 1 to 4 stars. EU had E(asy), A(verage), or D(ifficult) ratings.

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From the February 1984 issue:

TITLE: Household budget management. TI. \$15.95

BRIEF DESCRIPTION: Helps create a household budget and keep track of how well you adhere to it.

OVERALL: \*\* DOCUMENTATION:\*\* ERROR HANDLING:\*\*

EASE OF USE: EASY VALUE FOR MONEY:\*\*

---

From the March 1984 issue:

TITLE: Pirate's Adventure TI. \$24.95

BRIEF DESCRIPTION: Voyage among pirates and cutthroats, collect booty and transport it safely to your apartment in this text adventure game, the first in a lengthy series.

OVERALL: \*\* DOCUMENTATION:\*\* ERROR HANDLING:\*\*

EASE OF USE: DIFFICULT VALUE FOR MONEY:\*\*

---

From the April 1984 issue:

TITLE: M\*A\*S\*H TI. \$29.95

BRIEF DESCRIPTION: Fly helicopters to rescue wounded combatants, operate to remove small shell fragments. Flexible system allows for rescue only, surgery only, or combination of both. Best suited for ages 8+.

OVERALL: \*\* DOCUMENTATION:\*\*\* ERROR HANDLING:\*\*

EASE OF USE: EASY VALUE FOR MONEY:\*\*\*

---

TITLE: Alligator Mix. DLM \$34

BRIEF DESCRIPTION: Kids in first through third grade math levels drill and practice basic addition and subtraction in arcade-style game that tests three degrees of skill at nine speeds.

OVERALL: \*\*\* DOCUMENTATION:\*\*\* ERROR HANDLING:\*\*

EASE OF USE: EASY VALUE FOR MONEY:\*\*\*

---

TITLE: Submarine Commander Thorn EMI \$20-\$45 depending upon make of computer.

BRIEF DESCRIPTION: Track and follow enemy convoys, use special sonar, and torpedo enemy ships in exciting submarine simulation game popular among players 10+.

OVERALL: \*\*\* DOCUMENTATION:\*\*\* ERROR HANDLING:\*\*\*

EASE OF USE: AVERAGE VALUE FOR MONEY:\*\*\*

---

From the June 1984 issue:

TITLE: Star Trek TI \$29.95

BRIEF DESCRIPTION: Fly your starship around the galaxy, destroying enemies with Photon Torpedoes and Phasers. Engage warp drive for high speeds in fun-to-play arcade game, for ages 8+.

OVERALL: \*\*\* DOCUMENTATION:\*\*\* ERROR HANDLING:\*\*

EASE OF USE: EASY VALUE FOR MONEY:\*\*\*

7

TITLE: Suspended Infocom \$49.95  
BRIEF DESCRIPTION: Save civilization by controlling and operating a series of computers from a state of suspended animation in which only your brain functions. Clever, tough text-only; adventure game for ages 12+.  
OVERALL: \*\*\* DOCUMENTATION:\*\*\* ERROR HANDLING:\*\*\*  
EASE OF USE: DIFFICULT VALUE FOR MONEY:\*\*\*

From the August 1984 issue:

TITLE: B1 Nuclear Bomber Avalon Hill \$16  
BRIEF DESCRIPTION: Pilot your bomber into Russia to destroy designated targets in exciting strategy game. Lacks interesting graphics, but its short play length is a plus for younger gamers. For ages 12+. Not an arcade game.  
OVERALL: \*\*\* DOCUMENTATION:\*\*\*  
EASE OF USE: AVERAGE VALUE FOR MONEY:\*\*\*  
[anyone got this? tell stephen shaw please].

TITLE: Enchanter Infocom \$49.95  
BRIEF DESCRIPTION: Seek out evil warlock. Acquire spells, powers, and learn secrets in all text fantasy adventure game filled with wizards, magical creatures, and stimulating puzzles.  
OVERALL: \*\*\* DOCUMENTATION:\*\*\*  
EASE OF USE: DIFFICULT VALUE FOR MONEY:\*\*\*  
=====from lima ug=====

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[all of the above except the Avalon Hill title are available from the group disk library]

A MATH COPROCESSOR FOR THE 99/4A  
by Charles Good  
Lima Ohio User Group

A math coprocessor can do mathematics independent of a computer's main CPU. When using such a coprocessor the effect is similar to running two programs simultaneously. The coprocessor does its calculations while the main program continues to run uninterrupted. The results of the math coprocessor's calculations can then be fed into the main program.

For example, have you ever used MULTIPLAN and wanted to recalculate one small part of the spreadsheet instead of waiting and waiting for MULTIPLAN to recalc the whole thing? Or have you ever been in the middle of an accounting program, such as one designed to balance your checkbook, and wanted to do a little quick calculating. In a BASIC program you can usually press CLEAR.

Then from command mode type PRINT followed by your calculations. Pressing ENTER gives you your answer and then you can type CON to continue the program. This is rather cumbersome, and the program's screen display is disrupted. With an assembly language program you don't even have this option.

Well, let me introduce you to the TI-7000 math coprocessor. This inexpensive peripheral attaches to the 99/4A console just above the keyboard. It uses no extra power and is always available to do independent calculations which can then be fed into the main running program via the 99/4A's keyscan routine.

Permanent or temporary installation can be done by anyone following the simple instructions that come with the installation kit, since no soldering is required. I paid \$4.93 for my TI-7000, and an additional small sum for the installation kit. Every serious 99/4A user should have one of these.

The Texas Instruments TI-7000 is a credit card sized solar powered calculator. No battery is ever needed.

It can be permanently mounted to the flat area above the 99/4A's keyboard with super glue, or can be temporarily attached using double sticky tape.

Its nice rubberized keys give a tactile response when they are pressed, and the LED display is easy to read. It has + - \* / and % keys and includes one memory. I bought mine at WAL-MART. Output from the TI-7000 is entered into the 99/4A via the keyboard, which is of course detected with the 99/4A's keyscan assembly routine.

How about a battery backed clock/calendar for the 99/4A? CorComp's TRIPLE TECH card is conveniently hidden in the PE box and provides this function. But you can't get the thing to automatically time/date stamp your disk files. A used TRIPLE TECH usually sells for \$75.

I found an equally convenient device in the automobile section of WAL-MART for only \$2.95 complete with installation kit. I mounted this small battery clock/calendar next to my math coprocessor. You can also use the double sticky tape that comes with it to mount this clock on the dashboard of your car. As with the TRIPLE TECH card, I can now always get a display of the current time, month, and day of the month as I sit typing newsletter articles. Also like the TRIPLE TECH, I can't time/date stamp my disk files with this device.

====eof=====

Dice Roller Program  
By: Andy Frueh, Lima UG

There are a lot of public domain programs out there to aid in the play of role playing games, usually Dungeons and Dragons. However, there are a lot of other similar, but not identical, games. The D&D aids are hard to use with these other games. For this reason, I created the Dice Roller.

Dice Roller can simulate practically any type of dice roll, or any kind of random numbers. As written, it accepts any one to three digit number, from 0 to 999. If you need more digits, or need to exclude certain values, the places to do that are lines 20 and 30.

I won't go into details of the change, since that is within most users limits.

When the program is run, you first set a minimum value. There is a default of 1. Next comes the maximum, set at 6. If the max is smaller than the minimum you must enter both values again. When everything is done, a number between and including the max and min is generated.

[stephen: now rewrite it to detect a reversed max/min and AUTOMATICALLY reverse them back correctly! It ain't too hard].

You then get a menu of three options. With these, you can roll again with the same max and min, change those values, or end the program. Each time you use the same conditions to roll, a "Roll E" counter increases by one. When the max and min values are reset, EVEN IF TO THEIR PREVIOUS VALUES, then the Roll counter is reset. If you need

these numbers printed to a printer (PIO default, or you can enter a disk filename), then add the extra lines at the end.

```
10 RANDOMIZE :: DISPLAY AT(1,8)ERASE ALL:"Dice roller" ::  
DISPLAY AT(4,8):"Assumes that there is one maximum and  
minimum value and that all numbers fall between these two  
values."
```

```
20 RO=0 :: DISPLAY AT(13,1):"Minimum value? 1" :: ACCEPT  
AT(13,17)SIZE(-3)VALIDATE(DIGIT):MI :: DISPLAY  
AT(15,1):"Maximum value? 6" :: ACCEPT AT(15,17):SIZE(-3  
)VALIDATE(DIGIT):MX
```

```
30 IF MI>MX OR MX<MI THEN 20 :: IF MX=MI THEN 20 ::  
X=INT(RND*(MX-MI+1))+M :: IF X<MI OR X>MX THEN 30 :: DISPLAY  
AT(19,23):"Roll £" ! £ IS SHIFT 3
```

£=#

```
40 RO=RO+1 :: DISPLAY AT(17,13):X :: DISPLAY AT(20,1):"1)  
Repeat roll 2) New conditions 3) End";
```

```
50 DISPLAY AT(24,5):"1";: DISPLAY AT(21,24):RO;: ACCEPT  
AT(24,5)SIZE(-1)VALIDATE("123"):R$ :: IF R$="1" THEN 30 ::  
IF R$="2" THEN 20 ELSE CALL CLEAR :: END
```

Add these lines if you want printer and screen output.

```
5 DISPLAY AT(13,1)ERASE ALL:"Printer name? PIO": ACCEPT  
AT(13,16)SIZE(-15):D$: : OPEN £1:D$ ! £ is shift 3
```

```
25 PRINT £1;TAB(6);"Min: ";MI;" Max:  
";MX;CHR$(27);CHR$(41);CHR$(27);CHR$(60)
```

```
35 PRINT £1:"! Roll ";RO;" ! ";X;"  
!";CHR$(27);CHR$(41);CHR$(27);CHR$(60) (No £=#)  
=====eof=====
```

In "Getting Started with the Texas Instruments TI99/4A" readers found out about something called a HexBus Interface. Not many folk have heard much more but it is alive and well.... here is a little article on one peripheral dsigned for use with it....

T.I.'s HexBus "PRINTER 80" for use with the CC40  
described by Charles Good  
Lima Ohio User Group

Hex Bus peripherals connect to the CC40 in a manner similar to the way disk drives and printers connect to the Commodore 64. Most HexBus peripherals have two HexBus 8 pin ports. The CC40 has one HexBus port. You connect a HexBus port of the first peripheral to the CC40's HexBus port with a special cable.

You then connect the second peripheral to the other HexBus port of the first peripheral, etc. Peripherals chained together in this way can be accessed individually by the CC40, and it usually doesn't make any difference in what order the peripherals are chained together. You don't need any interface cards or other special hardware to use these small inexpensive peripherals with a CC40. Just cable `em together! HexBus peripherals once made by T.I. include the printer plotter (using adding machine roll paper prints 16 or 32 columns of text and plots in

4 colors), RS232/PIO interface, 300 baud modem, WAFERTAPE DIGITAL TAPE DRIVE, and 80 column printer.

Of these, the 80 column "PRINTER 80" is the only one still available new directly from T.I. The WAFERTAPE DRIVE is very rare and was never officially released. The others are not too difficult to find used. The PRINTER 80, T.I. model HX1010, costs \$70 + shipping and tax, and comes with 3 ribbon cartridges and an AC adaptor. It comes in gray plastic and measures 12.5 x 6.4 x 1.9 inches. It can be powered with four size D batteries or the accompanying AC adapter. You shouldn't use a generic selectable voltage AC adapter like those you can buy in many stores. These are only rated at 300 milli amps and the PRINTER 80 needs more power.

In addition to the AC jack and two HexBus ports on the back of the printer, there are four controls on top; on/off, power paper advance, power paper reverse, and paper release. The PRINTER 80 is a full 80 column printer that uses 8.5 inch wide paper and has a maximum printing width of 7.5 inches. It is a very quiet thermal printer. The cheapest way to use it is with rolls of FAX paper. A 96 foot long 8.5 inch wide roll of FAX paper costs \$3 at a nearby discount department store. You can also use the "one pass only" 20000 character thermal cartridges that come with the printer to print on regular 8.5x11 typing paper. Replacement cartridges cost \$3 from T.I.

Printing is slow compared to most computer printers, only 20 characters per second. But that is alot faster than a good touch typist. There is only one font, elete. There is no provision for emphasized, condensed, expanded, NLQ, etc. fonts. What you see here was printed on a PRINTER 80. ASCII 32-126, including lower case letters with true descenders can be printed.

You can send low numbered ASCII codes that set the PRINTER 80 for single or double space, perform single foreword and reverse line feeds as well as 1/2 foreword and reverse line feeds (for subscript and superscript) without carriage returns, and carriage returns without line feeds.

There are no dot addressable graphics. For such graphics you need the HexBus printer plotter. There is nothing fancy about the PRINTER 80, but it has some very attractive features. It is SMALL, CHEAP, and since it is battery powered it is TOTALLY PORTABLE. For text printing it has all the required features. The combination of a CC40 and a PRINTER 80 gives you a complete, inexpensive, totally portable word processing/printing package.

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NEVER RELEASED SOFTWARE MODULES FOR THE 99/4A

by Charles Good  
Lima Ohio User Group

Milton Bradley made two game modules for the 99/4A that I have never seen mentioned in the TI literature. One is their dealer's game demo module, and the other is a previously unknown game.

When you plug in the MILTON BRADLEY GAME VISION module and press any

key from the TI's title screen, you are presented with the following menu:

PRESS

- 1 for TI BASIC
- 2 for Milton Bradley Games
- 3 for Connect Four
- 4 for Hangman
- 5 for Yahtzee
- 6 for Zero-Zap

That's right folks, this single module contains all four games. If you press 2, you get a continuously running demo of all four games, one game at a time. The demo starts out with MILTON BRADLEY GAME VISION PRESENTS, and the major features of the first game (Connect Four) are presented in a text display. Then there is a short demo of the actual game.

This demo runs for a couple of minutes and then the major features of the next game (Hangman) are displayed as text, etc. etc. Once all four games are demonstrated, the whole thing starts over. By pressing any key (none of the keys on my console are labeled as the "any" key), you are given the opportunity to actually play the game currently being demonstrated.

I have no idea when this module was created. There are no dates or copyright statements in any of the game demos. It's easy to see why Milton Bradley never actually sold this module. Such sales would undercut the market for Milton Bradley games sold as individual modules.

The other "never released" module is Milton Bradley's CARD SHARP. There is no date or copyright statement on the title screen. You get your choice of two gambling card games with CARD SHARP, Stud Poker or Blackjack.

Selecting Stud Poker brings up these instructions:

Enter Bet——ENTER  
End Game——@  
Show Card——S  
Hide Card——H  
Fold———F  
Secret Show—X

You are then prompted to enter the amount of money you wish all players to have at the start of the game.

As you may know, Stud Poker starts with the first card of each player face down and the rest face up. Cards are dealt one at a time, and each player must bet in order to stay in the game and receive the next card. SHOW allows a player to peek at his hidden card. SECRET SHOW reveals ten cards NOT yet dealt out. The game always includes four hands. If there are fewer than four human players, the computer plays the remaining hands, to the end. If, for example, there is only one human player and he folds, the computer continues to automatically play the other three hands until there is a winner. Sometimes the computer will FOLD some of the hands under its control, just as real players sometimes FOLD.

Selecting BLACKJACK brings up this submenu:

Enter Bet——ENTER  
End Game——@  
Hit———H  
Stand———S  
Double Down—D

One to four can play at once. The computer plays the dealer.

Except for the sound of cards being shuffled, there are no sounds or music in CARD SHARK. There is no fast action, There never is in card games. The only graphics are the display of the cards. Quite honestly, there are several BASIC and XBASIC public domain programs that play Blackjack and Stud Poker every bit as well as CARD SHARK. This is probably why MILTON BRADLEY never tried to market CARD SHARK.

My thanks to Mike Wright for calling my attention to this software.

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#### SELLING THE 99/4 AND THE 99/7 (SJS)

Ever hear of the TI-99/7? Probably not. It is discussed in the following article by Bro Uttal, originally published in the June 16 1980 issue of FORTUNE magazine. The article's discussion of TI's marketing strategy for the 99/4 could very well have been written 3 1/2 years later as a discussion of TI's marketing blunders with the 99/4A.

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John V Roach, executive vice president of Radio Shack, the leading producer of personal computers, says he doesn't like to knock the competition. But at a recent brokerage house seminar on electronic technologies, the genial Texan just couldn't restrain himself. Having stepped to the podium, Roach pointed to a demonstration model of Texas Instruments' new home computer, the 99/4. "I'm sure glad somebody brought a TI computer here today," he deadpanned. "it's only the second one I've seen - and the first was when they launched it at the consumer electronics show last June." Roach's wisecrack brought down the house.

The butt of the gibe is TI's first entry into a market that could become the consumer electronics bonanza of the Eighties. Less than five years old, the personal computer business should rack up world wide sales of over \$650 million this year. By 1984 it could top \$3.5 billion, more than the combined value of all the digital watches, stereos, and video recorders sold in the U.S. in 1979. Scores of companies have launched personal computers to stake their claims on this new Golconda.

#### A BUNGLED OPPORTUNITY:

But the innovative giant of consumer electronics was slow to move, and when it finally did, it chose a wrong-headed marketing strategy and a product that relatively few people seem to want. "Basically, the 99/4 is a dog," says a disgruntled distributor, "and TI has no concept of how to sell it. When I asked a TI exec why anyone should buy it, he couldn't say." The company has dropped about \$20 million trying to crack the market, says a former executive, and it has bungled a major opportunity for growth.

TI refuses to talk about the 99/4, but the problems are obvious. It started shipping last October (of 1979) and by the end of this year had expected to sell at least 50000, worth roughly \$35 million at wholesale. But Dataquest, a market-research firm, now estimates that TI will ship less than half that number. New England Electronics Co., one of the top ten personal computer distributors in the country, has quit carrying the machine; it is trying to help its dealers by shifting 99/4's from the many stores where they are gathering dust to the few that have found a way to move them.

Although some of TI's troubles can be laid to start up problems, the debacle raises fundamental questions about the company's strategy. Unlike most of its rivals, TI is concentrating on selling to the ordinary consumer, who would ultimately produce a much bigger market than computer hobbyists, engineers, small businessmen, and professionals. To appeal to Mr. and Mrs. America, the company designed the 99/4 to be the least threatening of computers, with a full color TV screen, programs that simply snap into the keyboard console, and a speech-synthesis chip that enables it to "talk." This friendly machine is supposed to help its owner play games, educate children, and manage household finances.

#### HOW APPLE GOT BITTEN

Almost everybody else in the industry feels that the consumer market is coming - but will take four or five years to develop. The leading companies - Radio Shack, Apple Computer, and Commodore - have turned instead toward the businessman and professional. "TI is making the same mistake we made three years ago," says Steve Jobs, the 25 year old vice chairman of Apple. "The market now is for machines that can solve serious problems, and to do that, you need alot more than the 99/4 offers." John Antonchick, who follows the industry for Creative Strategies International, a market research firm, estimates that the home market is only one-eighth the size of the business professional hobbyist segment - and will grow less than half as fast for the next few years.

TI figured that consumers would be willing to pay a premium for the TI name, but the price of the 99/4 - now \$1400 - seems much too high. Those few competitors who are trying to penetrate the home market have kept prices well below \$1000. Their machines are less versatile than TI's but they feel the consumer simply will not pay for the extra functions TI is offering. Roach of Radio shack observes, "When the computer does become a mass market appliance item, it is very unlikely that it will sell for more than \$500."

In its single minded quest for the consumer, TI has managed to exclude itself from the business and professional market. It designed the system in a way that makes it difficult for small, independent companies to write programs or make peripheral gear that can be used with the 99/4.

These creative suppliers have helped others in the industry grow by providing software and peripheral equipment needed to serve specialized markets such as dentists' offices. Conrad Jutson, who left TI's personal-computer group to help Atari get into both home and professional markets, notes: "What the leading edge consumer needs is a lot of software; without it, the computer is just so much old iron." when Atari introduces its new software this year, he says, most of it will come from third party suppliers.

So, it seems, TI has produced a machine too costly for the mass market and too limited for the sophisticated user. It has ended up, as a distributor says, "offering less product for more money - the opposite of TI's usual strategy." This outcome can be traced to the way the machine was developed. From the start, the product lacked focus. It began as a video game, changed into a primitive home computer, and, after surviving the ministrations of three successive program managers, emerged as a hybrid.



## HEROES CAN BE EXPENSIVE

TI's top managers loved to dabble with the library of programs being developed for the new machine. "some of them saw in the 99/4 their private electronic fantasies," recalls an engineer who worked on the project. Another veteran links the hazy focus to TI's famed management system, which sets aside special funds for engineers to develop their own ideas. "An engineer comes along with a bright idea," he says, "and before anybody on the operating side knows what's happening, he's been fiddled, he's off and charging, and he's a hero. It works half the time. But half the time, you end up pouring an awful lot of money down the drain before somebody says, 'Whoa! There's no marketplace.'"

Ironically, TI killed two other computers that bid fair to do better than the 99/4. The first, a "professional" model aimed at scientists and engineers, would have gone head to head with the HP85, one of Hewlett-Packard's hottest new products. But since TI's operating executives are required to meet tight development budgets, the consumer products group bled funds from the professional model to speed up introduction of the 99/4 when it had fallen behind schedule.

The high end of the line was supposed to have been the 99/7. According to managers who worked on that system, its specifications, software, and price - about \$5000 - would have made it a strong contender in the business and professional market. Moore Business Forms Inc., the leader of its industry, apparently agreed: it created a Texas division to sell the 99/7. Distributors of personal computers were so impressed with the 99/7 that some of them took on the 99/4 against their better judgement just to get the more sophisticated machine.

## LEFT WITH THE LUMP OF COAL

Internal competition ultimately put the kibosh on the 99/7. TI's digital systems group, which is based in Austin and sells minicomputers to small businesses, argued that it should control development of the 99/7 because the machine was designed for small businesses. Besides, the 99/7 was so powerful and inexpensive that it would have cannibalized the low end of the minicomputer line. The squabble went all the way up to top management, which decided at the last minute to cancel the 99/7 introduction and transfer the project to Austin.

There, the "not invented here" syndrome took over. Austin engineers started questioning the new product's technical and economic feasibility, and within six months, most of the project staff had left for other jobs in TI. Looking back on all this, an allumnus concludes, "They threw away the two pieces of gold and kept the lump of coal."

Nobody doubts that someday, in some way, TI will be a major factor in the personal computer market. The questions are when and how. Given the disappointing results to date and the slow evolution of the mass market, TI might well decide to ease off on the business for several years. That would leave competitors laughing and dealers groaning - but it would give TI time to develop a coherent strategy.

FORTUNE, June 16, 1980, pages 139-140

[Anyone out there think TI could still have a strategy for manufacturing desk top computers?].

THE BIRTH OF A COMPUTER  
Bill Gaskill  
October 1992

In April 1984 Texas Monthly magazine published an article written by Joseph Nocera entitled "The Death of a Computer". It was among the most comprehensive accounts ever written on the events leading to the demise of the TI-99/4A computer. Perhaps because of this, the article became so popular that only 2,000 copies of the April 1984 issue of Texas Monthly were available for sale a scant month after it hit the news stands.

Mr. Nocera's work was the driving force behind this article because reading it made me realize that more effort has gone into writing about the demise of the TI-99 than has ever been invested in writing about its birth and life. The reasons for such universally poor coverage of the TI-99 are a matter of debate, but my research leads me to believe that TI's policy of a closed architecture on the TI-99 may have been carried over to one of closed mouths when it came to talking about the machine. No matter what the reasons, it appears that a negative and non complimentary relationship between TI and the media cast a cloud over the 99/4 even before it's release.

Nevertheless, there are some choice tidbits lurking around in the printed media of the late '70's and early '80's which help to piece together the days before, during and after the 99/4's birth. Because I have access to so many back issues of Byte, and because it is the oldest computer magazine still in existence, I chose it as the main source of information for this article. The material chosen from the many issues of Byte that I read through is presented in time line format so one can pick up the chronology of events easier. It is the sequence of events like the RF modulator hassle with the FCC and the production problems with the TMS 9900 chip that to some extent explain why Texas Instruments was so late with its entry into the personal computer market.

Lastly, you will notice that I have thrown in a few items not related to the TI-99. Most are what I consider significant developments in the personal computer industry that I thought would add some flavor to the article and perhaps a little perspective for the reader about the world that the TI-99/4 was born into. For other historians of the TI-99 I've also provided notations as to the source/location of the information used in the time line. Although not presented according to Turabian, I think someone might find the references useful. I hope you enjoy the reading.

**\*\* LIFE BEFORE THE TI-99 \*\***

1974: Jonathan Titus creates the Mark 8 microcomputer and advertises it for sale as a kit in Radio Electronics magazine. This becomes the first programmable microcomputer made available to the general public. (YOUR OWN COMPUTER, Waite/Pardee, p.15).

1975: The MITS Altair 8800 microcomputer is introduced and it becomes the first company or corporate venture into microcomputers for sale to the general public. (YOUR OWN COMPUTER, Waite/Pardee, p.17).

1976: Explosive growth hits the industry when companies like Apple, Cromemco, Imsai, Digital and others introduce microcomputers. (YOUR OWN COMPUTER, Waite/Pardee, p.19).

1977: The Radio Shack Division of Tandy Corporation and Commodore Business Machines both join the competition for personal computer dollars with the introduction of the TRS-80 and Pet 2001 respectively. The year 1977 also sees the birth of the computer publications industry when a host of new magazines such as Creative Computing, Kilobaud, Personal Computing, Intelligent Machines Journal (now Infoworld) all appear, trying to break in on some of the profits already being realized by Carl Helmers and Virginia Peschke who had created Byte Magazine back in mid-1975.

Aug 1977: The TRS-80 is released on August 3rd. It comes with 4K Ram and carries a retail price of \$599.95. (Byte, Apr 1978, p.49).

Oct 1977: Commodore enters the market with the Pet 2001. It retails for \$495 with 4K of Ram or \$795 with 8K of Ram. (Byte, Feb 1978, p.190).

Jan 1978: The PLATO computer aided instruction system is developed at the University of Illinois. (Byte, p.184).

Feb 1978: UCSD Pascal is introduced by the Regents of the University of California at San Diego. Price is \$200. (Byte, p.46).

Mar 1978: Texas Instruments begins recruiting personal computer specialists by running full-page ads entitled "Your experience with personal computers is going to open an unlimited career at TI." in trade magazines. (Byte, p.13).

Mar 1978: RAMBLING RUMORS ABOUT TI letter to the editor appears in Byte Magazine with a Q and A. Question: "What will TI do to enter the personal computer market?" Answer: TI is a very aggressive company with the desire to make lots of money by filling the needs of the marketplace. When the bonafide need for a new product arises, if it is in TI's area of expertise, TI will be there, front and center..." (Webb Simmons in Byte Magazine, Mar 1978, p.133).

Apr 1978: TI releases a recreational Solid State Software Leisure Library module for the TI58 and 59 programmable calculators. The module sells for \$35 and includes such applications as golf handicapping, craps, NIMS, Acey-Deucey and 16 other games or recreational programs. Is this perhaps a predecessor to the Solid State Software Command module that would be touted as a reason for buying the TI-99/4? (Byte, p.194).

May 1978: Texas Instruments introduces the TMS3064 charge coupled device memory chip. (No significance to the TI-99/4, but it shows that TI was still involved in other computer developments besides the 99/4 Home Computer. (Byte, p.180).

Oct 1978: The Exidy Sorcerer is released with 8K of Ram, a 64 column by 30 row screen and the ability to use plug in modules which are the size of 8-track tapes. Price is \$895. (The significance of this computer's release is that four years later Texas Instruments would use it as one of the home computers which offered cartridge software, that the 99/4A competed against for market share). (Byte, p.81).

Oct 1978: Technico Inc. of Columbia, MD releases the SS-16, which is based on TI's TMS9900 chip. Here again, no direct impact upon the 99/4, but evidence that TI was trying to push the 16 bit chip in places other than their own home computer. Four months later Byte would offer a look at the success of 16 bit chips industry wide and tell us that it was not well accepted by the industry. (Byte, p.200).

Dec 1978: Over 14 million microprocessors are manufactured during the year, with TI's 4 bit TMS-1000 chip leading the way. Most are used in calculators and games, but sales in the game market appear to be slowing down. (Byte, July 1979, p.99).

**\*\* THINGS ARE REALLY HEATING UP \*\***

Feb 1979: TI'S NEW PERSONAL COMPUTER-Rumors are flying about Texas Instruments' impending entry into the personal computing market. The unit will reportedly use the TMS 9900 processor with 40K of read only memory circuits, will generate 20 lines of 40 characters on a standard television, will have provisions for accomodating video disk players and video tape recorders, and will have sophisticated sound production. Sources predict a mid-1979 unveiling. (Byte, p.63).

Feb 1979: Atari enters the personal computer market by announcing (but not yet delivering) the 400 and 800 model home computers. The 400 is a non-expandable 8K Ram computer which sports a touch audio feedback keyboard, a single cartridge slot and a cassette I/O port. It also has 16 color capability and 8 luminance levels. The suggested retail price is \$500. The Atari 800 is an 8K Ram computer expandable to 48K Ram and it comes with a cassette recorder, it has additional color features, a full keyboard, \*K BASIC built in, high resolution graphics, and it supports two cartridge ports. The 800 carries a suggested retail price of \$1000. Both machines will use the 6502 chip. Limited quantities are scheduled to be available in August, with full availability in the Fall. (Byte, p.63).

Feb 1979: The future of the 16-bit microprocessor comes into question when its lack of acceptance by the industry is pointed out in Byte. The 8-bit 6502 chip used by Apple, Commodore and others is fast becoming the most popular microprocessor of the day. (Byte, p.63).

Although this is supposition on my part, it appears that TI was under a great deal of pressure to join in the personal computer fray. They would probably have done so anyway, but the level of "expectation" seems to have been extremely high and may have driven them to produce and release a product before they were actually ready to do so. The lack of availability of the TI-99/4 even after it's official debut in January 1980 seems to add some credence to this.

Mar 1979: Despite its seemingly unpopular position in the market, Byte Magazine runs an extensive article on mapping the instruction space of the TMS 9900 microprocessor. (Byte, p.14).

Mar 1979: FCC serves a cease-and-desist order on all personal computer manufacturers who fail to receive FCC approval on their products prior to making it available for sale. (Byte, p.108).

Mar 1979: Tandy Corporation begins marketing their TRS line of personal computers through their own direct sales stores. Several other makers of personal computers withdraw their products from the shelves of department stores after meeting with poor results. (Byte, p.108).

Mar 1979: Texas Instruments announces the new Speak and Spell learning aid for children. It is based on the TMS 1000 chip and two 128K dynamic read only memory chips, each with the capacity to store over 100 seconds of speech. (Byte, p.246).

Apr 1979: Publishing giant McGraw-Hill purchases Byte and onComputing magazines, adding further credence to the escalation of the personal computer market. (Byte, p.14).

Jun 1979: TI AND HP PC SYSTEMS RUMORS—Texas Instruments and Hewlett Packard continue to maintain tight lips on their rumored personal computer systems. As TI said, "TI will not discuss products that have not yet been announced." However, information has leaked out on these units which are expected to have a tremendous impact on the personal computer market. Several rumors have been reported in previous Byte columns. The latest is that TI will introduce their entry at either the NCC (National Computer Conference) show in June or the Consumer Electronics Show in July. In either event, it is expected to be ready for the 1979 Christmas market.

Both HP and TI are expected to have \$500 list prices for the basic unit. Key retailers have already been approached by both TI and HP to set up for selective distribution. It is rumored that they will favor selected personal computing stores that can do justice to software requirements. (Byte, p.129).

Jul 1979: Milton Bradley begins advertising for "Creative Electronic Engineers, Microcomputer Programmers and Technicians" to accommodate their expansion into the personal computer arena. (Byte, p.51).

Jul 1979: FCC asks Apple, Atari, Commodore, Heath, Southwest Technical Products and Radio Shack to submit their personal computer systems for TV interference testing. (Byte, p.99).

Sep 1979: New England Electronics runs a full page ad in Byte Magazine proudly announcing the "Revolutionary TI-99/4 Personal/Educational Computer" and the fact that they have been selected as one of the distributors. Buyers are cautioned that 99/4 product availability is September/October, but is always subject to TI's dealer allocation.

Oct 1979: Rodney Zaks, the author who would give us the book, YOUR FIRST TI-99/4A PROGRAM in 1983, releases 6502 GAMES through Sybex Publishing. Zaks would ultimately write almost a dozen computer books for Z80, 6502 and TMS 9900 machines. (Byte, p.73).

Oct 1979: Atari has received FCC approval for their model 400 and 800 personal computers. This will probably make the FCC less willing to grant the Texas Instruments request for changes in the rules, as the FCC finds that other companies are able to pass the current requirements. (Byte, p.107).

Oct 1979: PERSONAL COMPUTER TIMESHARE NETWORK INAUGURATED—Telecomputing Corporation of America, McLean, VA, has started a Personal Computer Network which may be accessed by home users with terminals or personal computer systems. They have about 2000 programs and data bases on-line for immediate access. Called "The Source", the service will be available in 200 US cities at \$2.75 per hour from 6 PM to 7 AM weekends and holidays. The rate during normal working hours will be higher. (Byte, p.107).

Oct 1979: Texas Instruments releases the TMS 9927 video controller chip. (Byte, p.253).

Nov 1979: TI MICROCOMPUTER PICTURE IN TRANSITION—Although Texas Instruments finally introduced its 99/4 personal computer system in June, it is expected to be an interim product. TI failed to get FCC approval for the original version (of the computer) and also ran into processor production difficulties which forced the introduction of a high-priced personal computer system (\$1150). TI is still pursuing a rule change request with the FCC and the development of its 9985 stripped down version of its 9940 16-bit processor. TI hopes to then introduce a personal computer system for under \$500 which connects to a standard color-television receiver.

TI has also expanded its small business computer (99/7) marketing efforts. The 99/7, which starts at \$5000, will be marketed by Moore Business Forms, through over 750 sales offices as well as through computer stores and TI's own retail outlets. (Byte, p.81).

Nov 1979: FCC COMPLETES RADIO FREQUENCY RADIATION TESTS—The FCC has completed its tests of six personal computer systems and will release the data soon. Reportedly, the FCC has found that all but one exceed interference levels permitted for devices that connect to television receivers (eg. games). The test included Atari, Apple, Commodore, Southwest Technical Products and Radio Shack systems. Only the Atari passed... (Byte, p.82).

Nov 1979: Computer Shopper releases "Issue No. 1" and offers annual subscriptions for \$10/year, or \$5/year to charter subscribers, whatever they are. (Byte, p.189).

Nov 1979: Milton Bradley announces its Microvision handheld mini video game machine with its own screen. Microvision comes with the game Blockbuster, and six other games are available separately. They are: Bowling, Star Trek, Phaser Strike, Connect Four, Vegas Slots and Mindbuster. Price for Microvision is \$51.25. (Byte, p.252).

Dec 1979: Image Computer Products of Northbrook, IL announces that it will produce the TI Six-Pack, which consists of six TI Basic games on cassette. Aside from Milton Bradley and Scott, Foresman, which TI lined up to produce software for the 99/4, Image Computer Products becomes the first third-party software house to support the new TI computer.

Dec 1979: SubLogic releases its first Flight Simulator dubbed FS1. It is available for the Apple II and TRS-80 computers for \$25. (Byte, p.133).

Jan 1980: TI RF MODULATOR FCC WAIVER GRANTED—The Federal Communications Commission (FCC) has granted Texas Instruments a waiver which permits TI to connect its personal computers to home color television receivers using a radio frequency (RF) modulator. TI Originally petitioned the FCC for approval of the RF modulator system in February 1979. The petition was rejected since the regulations require that the complete system be submitted for approval: TI submitted only the RF modulator for approval. Subsequently, Texas Instruments applied for a waiver, provided that the modulator unit met the standards.

The FCC asked other personal computer system manufacturers to comment on the TI request. Radio Shack, Apple Computer, Commodore, Mattel, and Atari responded negatively to the request. Apple, Atari and Mattel went to great expense to comply with the FCC regulations. The Radio Shack and Commodore systems, which contain integral displays and do not use RF modulators, do not come under the FCC regulations.

The FCC decision further waives testing by FCC and merely requires that the manufacturer provide the FCC with test results showing compliance. In a related action, the FCC relaxed the standards on RF interference generated by commercial and personal computer systems.

Several personal computer manufacturers that compete with TI have already stated that this waiver will give TI a competitive advantage. Furthermore, several firms publicly questioned the FCC's rule-making methods in making this decision. The likelihood now is that the other personal computer makers will offer systems with RF modulators. It will probably take these manufacturers at least a year to bring out such competing systems. (Byte, p.115).

**\*\* A COMPUTER IS BORN \*\***

Jan 1980: PERSONAL COMPUTER INTRODUCED BY TEXAS INSTRUMENTS--Texas Instruments has introduced a personal computer featuring easy-to-use computing power for personal finance, home management, family entertainment and education. Designated the Model TI-99/4, the system consists of a console with 16K bytes of programmable memory, a wide range of sound effects, sixteen colors for graphic display, a powerful extended BASIC programming language, and a 13-inch color video monitor.

At the heart of the TI-99/4 is a library of Texas Instruments Solid State Software command modules. These command modules allow users instant program accessibility. Solid State Software command module titles include: Demonstration, Diagnostic, Early Learning Fun, Beginning Grammar, Number Magic, Video Graphs, Home Financial Decisions, Household Budget Management, Video Chess, Football, Physical Fitness, Speech Construction, Investment Analysis, Personal Record Keeping, Statistics, Early Reading and Tax and Investment Record Keeping.

Among peripheral accessories offered is a Solid State Speech Synthesizer with a price of \$150. By building a basic vocabulary into the language system, home programmers can place audible messages in their programs. The speech synthesizer module has a 200-word vocabulary and plugs into the console. Speech can be written into programs using BASIC programming language. Future command modules will call up spoken words automatically.

TI BASIC is a full floating point, 13-digit expanded version of BASIC that is fully compatible with ASCII and the BASIC specifications of the American National Standards Institute. TI BASIC includes a full complement of 24 BASIC statements, 14 commands, color graphics, and sound and music over four full octaves. A Beginner's BASIC Guide for self-teaching comes with the TI-99/4. For users knowledgeable about programming, McGraw-Hill has published Programming Basic With the TI Home Computer, a book by Herbert Peckham.

Remote controls are offered as accessories to the TI-99/4. Two of these controls may be connected to the computer at the same time. Each includes a multiposition (360 degrees) rotary lever with a side-mounted pushbutton. Other accessories offered by Texas Instruments include: a printer, disk storage, and an RS-232 interface for connecting the computer to other electronic devices.

The price for the TI-99/4 system is \$1150. Solid State Software command modules carry prices ranging from \$19.95 to \$69.95 each. For further information contact Texas Instruments Inc. Consumer Relations, Attn TI-99/4, POB 53, Lubbock, TX 79408. (Byte, p.235).

Despite the fact that the TI-99/4 was "officially" available in January 1980, it was in short supply as evidenced by the following ad in the January 1980 Byte Magazine, page 88.

#### AN OPEN LETTER ON THE TEXAS INSTRUMENTS TI-99/4 HOME COMPUTER

"Its a fact that the new TI-99/4 is the most sought after home computer on the market today. However the demand far exceeds the factory's ability to produce them, so they will be in short supply, for all dealers, for the foreseeable future..."

In between the excitement of TI's much anticipated entry into the personal computer market in 1979 and its decision to abandon that very same market in October 1983, lies the story of a thousand and one mistakes in corporate strategy, the creation and release of hundreds of exciting new products for the TI Home Computer, the appearance of some of the most talented personalities the community would ever produce and ultimately the heart rending disappointment users felt when the bottom dropped out.

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### FOR SALE

Due to lack of time and space I am reluctantly forced to dispose of all my T.I. computer gear which I have accumulated over a good number of years. I haven't listed anything here as it goes on for two full A4 pages.

Please write enclosing an S.A.E. for a full list of hardware, software (cassettes, disks & cartridges), books etc, etc.  
(No phone calls please)

Mr David Duncan  
15 Inglewood Close  
Darlington  
Co Durham  
DL1 2TX



INSTRUCTIONS AND HINTS  
FOR TI-WRITER WORD PROCESSOR  
by Dick Altman [part one]

Dick Altman, 1053 Shrader St., San Francisco, CA 94117.

[Dick likes to use the FORMATTER option of TI Writer, and his notes are made with this in mind.]

[Although regarding TI Writer this article is mostly relevant to the many clones such as Fun!web, Rag-Writer, Euro-Writer, BA-Writer etc etc].

IT CAN BE MASTERED! It just takes perseverance and determination and a desire. I have been using it since January 1985 and I don't have it all yet, but I can use it to my immense satisfaction. This came from months of sitting with the large manual in my lap flipping pages back and forth until I had practically memorized the £\$%& thing! I was at the point where when I had a problem I could say "Oh that is on page 146" or whatever. For instance: this article was done on the TI-WRITER and I now do ALL of my correspondence with it also.

FIRST RULE: Read the TI-WRITER Quick Reference card and reread it. Of course this means after you read this article. Do all of the operations shown on the card-at least once-even though you might think you will never need that particular one. You will find you have to open up the big manual probably, to accomplish some of the operations. After you have almost 'memorized' the card (literally!) then you will find yourself using it almost exclusively and very seldom having to refer to the cumbersome manual.

You will find 3 'windows'-from left to right-to obtain the 80 columns (80 normal characters) width. Each window is 40 columns wide. The first one is from 0 to 40, second one is from 20 to 60, and the third is from 40 to 80. The first thing I do upon booting up TI-WRITER is to set my limits to 37 characters wide. If I take a whole window of 40 characters, it seems to crowd my screen, and I don't like to window back and forth to read my work. I do this by pressing "T" (for TABS), then press ENTER, then placing an "L" on the second dot, and an "R" on the 39th dot, then pressing ENTER again.

Now I find my cursor blinking at me from line £0001. Here is where I tell the formatter what margins I want it to PRINT my work within. It's also at this point that I select condensed type because I like it better than the normal size type, and I can get 132 characters per line if I wish. It just looks better in my opinion. I normally do this on line 0002 because I used 0001 to set up the formatting (margins, etc.) commands to the printer.

So, on line 0001 I put in the following 'dot' command (a dot command is merely starting with a period): .LM 20;RM 120;FI;AD (AND END ALL DOT COMMANDS WITH A 'carriage return'). The semicolons are necessary, and the spaces, just as I listed it here. I'll do it again: .LM 20;RM 120;FI;AD(c/r). You of course don't put in the line number 0001. That is already there.

[DOT COMMANDS ARE ACTED UPON BY THE FORMATTER PORTION OF TI WRITER]

That tells the formatter to set the Left Margin at 20, the Right Margin at 120, then Fill each line, and Adjust (justify) the right margin. The 'FILL' command tells the program to put in as many whole words on a line, within your predetermined margins, as possible. The 'ADJUST' tells it to add extra blanks between words to cause the even right margin.

You can enter your 'commands' just about anywhere within your work!

Just pressing ENTER will normally automatically put in the 'carriage return' symbol, but sometimes it doesn't. It depends on what you were doing last. In that case, use Control and 8 to put in a carriage return.

On line 0002 I put in a 'Control' command thusly: Control U Shift O Control U. Neither a 'dot' at the beginning, nor a 'carriage return' at the end is necessary. This command throws the printer into 'condensed'

Then if I want to center a title (or date) or some other heading at the top of my article, on line 0003 I put in another dot command like this: .CE (remember a carriage return is required at the end of all dot commands). If my title is say three lines of type, then make that dot command thusly: .CE3(c/r) otherwise it will 'center' only one line. The centering command at the top of this article was '.CES' because of the blank line in it. The lines you wish centered have to immediately follow the centering command.

The default page length of the formatter is 66 lines, normally the same as the default on your printer. This gives you about six blank lines at the top and bottom of your page, and only fifty some actual lines of type. You can, with a dot command change your page length with this: '.PL nn' as I did in line 0002 of this article. (Not enough room in 0001). You will probably have to change number of lines your PRINTER counts to a form feed. Adjust your paper to the top of the page before you turn the printer on, and then ONLY roll it up with Form Feeds, else it may lose track of where the page starts!

Then you start typing your article, letter, whatever. If you wish each paragraph to be indented, it takes another dot command of: .IN(number). If, as in my suggested margin settings of .LM 20;RM 120, you wished to indent each paragraph five spaces, the command would be: .IN 25 because the counting starts at zero or left edge of the paper. If you include the indent command with others in line 0001, the semicolon replaces all but the first dot, thus .LM 20;RM 120;IN 25. You may put more than one dot command on one line, but never anything else BUT dot commands and the C/r.

The fun part of a word processor is the capability of inserting or deleting a word or an entire phrase without having to retype the entire page or article. Another fun thing is the ability to move a sentence or an entire paragraph to another place in your work. This is all done very simply. Just place your cursor in the last space before where you wish to insert another word and press the FCTN key and the number 2.

This causes everything beyond your cursor to move down one line, then type in your new word or sentence and after the space at the end of it press the Control and the 2 (just once) and everything will jump back up to your cursor! If you are near the beginning of a long paragraph it takes a little longer (a couple or three seconds) to reformat the paragraph, than it does if you are near the bottom of that same paragraph—DON'T GET IMPATIENT AND HIT THE KEYS AGAIN, JUST WAIT A COUPLE OF SECONDS!

**\*replace all £s below with #**

To move let's say paragraph £10 into the £3 spot is just as easy. First look at paragraph £10 and make a note (mental??) of the line numbers on the first and last line. Function and zero shows the line numbers or moves them off the screen. Suppose they were 0076 and 0093. Then determine what line number you wish it to be after. Let's suppose it was 0023. Then with FCTN 9 go to the 'command' line, type M (for Move) and hit ENTER. Then type in 0076 0093 0023 and hit ENTER again. Look at those numbers and read the instructions on the Quick Reference Card for MOVE.

On most dot matrix printers, there are two different commands to make neat printing. They are called 'emphasized' and 'double strike'. You can't use (on my printer at least) the emphasized method while in condensed size of type. But I can use double strike. The difference is basically this. Both commands print each letter twice, but in two different ways. One of them (emphasized) moves the head slightly to the right so that each letter is a little thicker.

Double strike just prints the line twice. I think emphasized is slightly faster than double strike, but I've never timed either of them. Since I use condensed printing almost exclusively, and can't use emphasized, I don't worry about it. Incidentally, you may enter these commands throughout your article. Another good command to learn is the 'OOOPS' command. Merely Control and the number one. This eliminates only your last change just now typed in, and returns your work to its former self (hopefully!). [If you DEL LINE (FCTN 3) TWICE, using OOOPS will only recover the last line deleted- the previous one really is lost!]

Another good habit to get yourself into, is 'SAVING' your work every few minutes (or every few pages). Sometimes just an electric motor in your home (refrigerator, etc.) kicking in will cause a momentary change in the power supplied to your computer (you've seen your lights flicker). If you save your work every once in awhile, you someday will be glad you were in the habit. Especially if you have just put in to the word processor a 20,000 word story.

The power glitch could cause you to lose it all! If you have been saving it on a disk, when that glitch occurs you will have all but a small part of it saved. When you save something to a disk, then come back to that same disk and save something else with the same name, it replaces the first item with the second. It does not become two separate items on the disk. Of course, if you are really a worry-wart, you will do the saving on two disks, alternating back and forth, just in case that glitch comes while you are in the act of saving your work.

Part Two follows next issue, space permitting.

=====

!!!!!!

(Due to an Editorial error part 2 was printed in issue 42. Somehow the cart got put before the horse. Sorry!!!! Ed.) =====

^ \* ^ \* ^ \* ^



Dear TI'ers,

Welcome to what will hopefully turn out to be a much shorter article. I feel that I should try and shorten them to encourage other users to write something for the magazine. In view of recent events, in which I discovered that my articles are not appreciated by the entire readership, I am also not in the mood to write as much for this article! There have been complaints that TI\*MES has been getting rather thin.

Imagine how thin the summer issue might have been without my 40 pages!!!

One thing that was said at the AGM was that our turnout seemed to contain the same old faces. The same is true for the newsletter! It seems to be only myself, Trevor, Gary, Walter Allum, and a few others, who continually write articles. I said that Ross made the comment that we need to get more people involved in the group. A good way to start would be to encourage more people to contribute something to TI\*MES. We want to hear from you, no matter what it's about.

You don't necessarily have to have a printer. I will accept written submissions, which I will type up for you myself. We might even write a word processor for TI-BASIC which allows text to be dumped on cassette. Trevor currently has the capability of running a tape recorder, and soon, I will be running a separate 4A system with a new box that I purchased the day before the AGM. I'll have to sit down and study cassette filing. Now, there's an idea!!!! Amongst the console-only people out there, there must be somebody whose completely worked out cassette handling!!!

Maybe they could submit an article on that. How's that for a start?!?!?

We MUST ask people who DO have printers to USE THEM. Even if you write five pages an issue, then that's only twenty pages a year, which is a THIRD OF A PAGE A WEEK!!! This amount will not wear out anyones printer, and even my ten year old EPSON RX-80 is capable of much more than this. If everyone sent articles on disk to Gary, then it would wear out Gary's printer, and I'm sure we would have more complaints if the

committee voted to buy him a bubble jet printer!!!

I was unsure of how to begin my article this quarter. I'm (hopefully) intending to write less, but I've not started it the right way! I've invested in a Personal Organiser, which means I can type my article wherever I am! I am currently sat on an underground train, on the Central Line, and I'm travelling home from work at Liverpool Street, to Leytonstone! If I consult my diary function, it tells me I've only got 64 days of this torture to go, and then I can return to Mansfield (the Cultural Oasis) for good!!!

Today's date is the 23rd of June. Still no sign of the SCSI cards!!! I called Bud on Monday for a progress update, but this week's delay turns out to be because of a lightning strike in Chicago!

Apparently, Mike maksimik works for a department store in Chicago, and is in charge of their IBM AS/400's!! I think, according to Bud, the lightning took out one (or more) AS/400's, and it took Mike a week to sort it all out. It sounds slightly far fetched, until I tell you that our AS/400 at Mitsubishi caught fire, and had to be QUICKLY turned off before it set off the Halon Gas in the computer room!!!

On Monday, Bud "definitely" promised to send my CD-ROM drive, so I could have a play with it before the SCSI cards arrive. I just might possibly take it into Mitsubishi and get them to test it out for me on a SPARC 20!!!

I'm not sure how up-to-date I am on reporting Bud's progress (or Mike's progress!), and I definitely couldn't include the developments of Monday's phone call in my previous article.

The SCSI cards are sat in Bud's hallway, just waiting on the code from Mike, so it can be blown into EPROMs and stuck on the cards. Two people have asked for refund, and Bud has given them their money back. Bud is probably more worried about the cards than we are. He's put alot of money into the project, and he's not going to get any more orders while there's this delay.

I just want to urge those people who were thinking of ordering a SCSI card, and those who have already ordered, not to give up hope. The DSR IS VERY close to finally arriving, and I'm hoping that two of them will be delivered to 24 Peel Road, Mansfield, VERY SOON, and I can sort out my life, before returning to University!! It's painful to look at my collection of disks, and wonder where certain programs are in a minefield of disk boxes!!!

I just wish I was one of the lucky ones who already have the SCSI card. I called Jim Cavanaugh's Bulletin Board, and found that Jim was at home, and was sat watching the Board as I dialled in!! I paged him, and he broke in for a chat! He tells me that Brad Snyder already has the SCSI card, and he's working on a disk manager that will use pull-down menu's etc. This is a completely different package to UNI-MANAGER, which will be the "universal disk manager". Mike is (or was) writing

Uni-manager, but this work has had to stop whilst he re-writes th card's DSR.

Today's date is the 4th of July, so not much work will be done on the SCSI's today in the States, because it's Independence Day!! I couldn't resist trying to phone Bud at the weekend, but I only got his answering machine! Gary came over on Friday night, until about 2am, and we edited the newsletter. Thankfully, we managed to find the advert that was submitted by Peter Hutchinson, who's decided to sell out his gear in favour of a much less powerful computing solution! I'll be writing to him this week, and sending a disk for the 4A emulator he's got. I'll just have to hope it runs on my K.C.S. PC emulator on the Amiga, and I'll give my results later (no it doesn't! 286 or higher!)

Mark also phoned on Saturday, to say that he was getting his main computer back. He's bought a new system, but his friend has borrowed the main one, which has got the wire-wrapped "Colin Hinson special" RAM Disk (which is more or less an home-built Myarc 512K card). He wanted something decent for Word Processing, and rather than risk his data on a PC, he borrowed Mark's 4A, and used Funnelweb.

NEWS UPDATE - Today's date is 12th July 1994. It's 6:40am, and I'm sat on a tube headed to Liverpool street! We just left Leyton station, and we had a bit of turbulence. It must have been an air pocket!!! A week ago today, I called Bud. The LATEST was that NO, he had still not sent my CD-ROM drive, after promisng to send it two weeks previously, and there was nothing definite on the SCSI DSR's. What he did say was, there were alot of individual modules, that worked 100% when calling them seperately, and they all work fine on the GENEVE. The problem is though, that they do not share common low level access routines, so collectively, they are much bigger than an 8K EPROM. What Mike's got to do now, is alter them around, to make the routines common, and them combine them into a single compilable program that will fit into the 8K DSR EPROM.

Here's some more news. It's the 13th of July, and I'm sat on a tube again. Today's another rail strike day, but I managed to beat the parasites (executives!) to a seat! Yesterday I phoned home for some more information from my dad about the letter that Jim Cavanaugh from New York has sent me.

He wants to subscribe to our group (which he has already done), and has even asked about the costs of back ssues of the newsletter. When I wrote to him, I asked if he knew where I could get a copy of C-Shell, and it appears that he possibly might have sent me a copy !!! I'm over to Gary's this weekend to help him lick and stick the newsletters and post them out! We'll be checking out Jim's disk then, and also an IBM disk from Peter Hutchinson. It's the 99/4A emulator that you will have seen mentioned in Peter's letter in the last issue.

Well, today's date is 18th of July, and at the weekend I managed to have a look at Jim Cavanaugh's disk. Unfortunately, it didn't contain C-Shell, but I'm sure Jim will continue to work on finding me a copy. When I visited Gary, our time was spent working on the PC mostly. Gary played an excellent game

in Microsfft Windows, called "Hunt The Wumpus"!!! Yes!! It's included with the emulator. I'm slightly depressed today, however, because we need a convertor before we can use Gram Kracker files. I transferred a copy of my Editor/Assembler cartridge GRAM file, Archiver, and an archive containing The Missing Link onto my organizer so I could take it to work, and use them on the emulator, but I've discovered that we need a convertor for normal files, as well as Gram files.

I've sent Mark a copy, and he's so impressed with it, he's going to buy the new registered version. When you buy this you get the convertor that converts normal files uploaded with TELCO into files compatible with the emulator. Amongst other things, this adds a header that includes bits that tell the emulator what type a file is, such as DIS/VAR, DIS/FIX, INT/FIX, etc. As we all know, this is because EVERY imaginable computer that we know, doesn't have true hardware file types like our poor old home computer, NOT EVEN A SPARC-STATION TWENTY, THAT USES A TEXAS INSTRUMENTS TMS390Z50 SuperSPARC chip and costs \$30000!!!!

Mark phoned the other night to say that he'd made contact with some German TI Users, who had ordered his Game Writers Toolkit. Now he's got the 4A emulator for the PC, he can do some TI programming when people think he's PC programming!!!

General Secretary's log.

Year: 1994, Week: 33, Day: 6 (20th August 1994!!)

Yesterday, I had some new news about my CD-ROM drive!

It won't be long now before I see it, because it's arrived in Mansfield and my dad phoned me at work to tell me the news! The SCSI DSR is 100% complete, but won't fit into 8K without a little more work to condense some routines. It will run from the GENEVE though, because Mike Maksimik's coded the entire device routines on the GENEVE.

Remember when I described the features of the SCSI card in a previous article, and said you can mirror the 8K DSR into the 32K cache RAM?

Well, this is how you can currently use the SCSI card from MDOS. After loading MDOS, the SCSI software is loaded, which mirrors the EPROM address into the 32K RAM cache. The DSR code, which is still slightly bigger than 8K, is loaded into the 32K RAM. Then, the SCSI card wakes up, and your 2.6 million sector CD-ROM drive is instantly available!!!

Returning to my drive, after trying to find a 10Volt power supply, I've just been out to buy a 240V to 120V step-down transformer that has a U.S. power socket on it. I've powered up the ROM drive, but it wouldn't do much!

I was pushing my luck to think that it might automatically play an Audio CD once inserted, so it just sat there! It's operation is controlled entirely from the SCSI interface. The only things on the drive are a volume control for the audio output, and the button to eject the lid.

Here's the drive specifications:

NEC CDR-25BJ

User Data Capacity: 680Mbytes per disk  
Total Number of Blocks: 333Kblocks per disk  
User Data Blocks: 2048bytes per block  
Data Transfer Rate: 150K per second  
Burst Transfer Rate: 0.7Mbytes per second  
Access Time: 650msec  
Hard Error Rate: Below 10<sup>-12</sup>

Audio Section:  
44.1KHz 16-bit stereo

I've also already got my Optical drive, and the last box of disks that I will ever buy! \$150 for a box of five! Around 942080 sectors on a 3.5" disk isn't bad though. They're manufactured by Verbatim, who do manufacture standard 5.25" and 3.5" magnetic floppies, and they've got a lifetime guarantee. Opticals are quoted as having a shelf life of 30 years, but this box has a certified Archival life of up to 40 years. The disk library would be much more permanent on Optical disks. On three Optical disks, I could get the equivalent of 3925 standard 720K TI floppies!

I'll have to talk to Stephen very nicely,

The drive is no different on the outside and is the same size as a standard 3.5" floppy, but the slot is higher than normal, as the disks are twice as thick as a magnetic floppy.

Returning to the SCSI card. I've sent a copy of the technical details of the Optical Drive to Bud, for him to make sure that the necessary commands needed to operate it are included, and for the design team to give me advice on how to best set the defaults on the drive to make it operate more efficiently with the SCSI card.

They're now putting the latest DSR into MDOS 2.0, which will later be released as 2.0S. I called Bud a few nights ago, and he had Don O'Neil on the phone at the same time! That's the advantage of AT&T!!

Don gave the answer to another technical question. Running the DSR from memory on the GENEVE, as opposed to having it loaded in the EPROM, means that the operation of the FC-1 card is not affected in any way. The function of the SCSI card, with or without the FC-1 card is working 100% as desired, and this is working NOW with the GENEVE.

They're just modifying MDOS 2.0 to include the corrected DSR. They're of course, working on getting the DSR into the EPROM to allow it to be used fully with the 4A. Mike Maksimik thought he'd done this already, but found that some areas had been overwritten when finally getting it into the EPROM.

Unfortunately yet, this means that the system will not boot up from a SCSI drive, so you've have to boot from a floppy, or MYARC/ST506-412 hard disk, or Horizon RAM Disk. The DSR should find the 1st SCSI device itself, and allow the GENEVE to find MDOS, and Bud mentioned an EPROM with a header that would do this, but in one of my recent phone calls, he says we'll still have to boot from floppy.



This doesn't mean a floppy from the SCSI card though. The floppy control on the SCSI card is performed by a second card called the FC-1 card. Bud's team doesn't manufacture the FC-1 card, and they buy them off the shelf from a third party.

They are SCSI devices in their own right, and are programmable, and "intelligent", so Bud's team can do with them, just about anything they like. As I've mentioned in previous articles, they work with standard TI floppies, and allow the use of 1.44Megabyte and 2.88Megabyte PC formats. I've never ever seen a PC using a 2.88Meg drive though, and Bud's team have managed to squeeze over 3.6Megs out of these drives.

The cheapest price I've been quoted for a 2.88Meg drive is £56+VAT and postage, which is from the same place I bought the Optical Drive. I got the Optical for £460+VAT and postage, and that's the 230Meg version. Most places are still doing the old 128Meg version for £639!!!! One of these is PowerMark. Avoid them like the plague!

In this issue I was planning to include a little graphics program. No, it's NOT VAPOURWARE! The reason it isn't included is because I got carried away, and made a few over estimations. I only found this out when my initial routine was generating character codes, and I realized that I will need 512 definable characters!! In case you don't beleive me, I have included the program so far for you to have a look at!!

I've got to rethink it for the Winter issue, and scale it down to use 64 characters! I'll let you type in the routine so far, and run it. Don't worry when you get a BAD VALUE error! The program is trying to define 512 characters! When the program stops, and you do a PRINT COD it will give you 144. Character codes in XB stop at 143, so it's useless as it is.

I will just let you type it, and run it, just to see if you can guess what it might be for. I did an earlier version in 1985-1987ish, but that only used 16 characters, and I wanted to improve it. I took the improvements too far though!!!

Some comments have been made in certain letters which have been sent to committee members relating to "Vapourware". All of the programming efforts I have spoken about are DEFINITE plans. As with all things though, it's just finding time to do them. The game I spoke about, will be named "DARKSTAR", and I've already got a set of graphics defined for it, which is the way I start all games. There are also others in the pipeline, including the Lemmings 4A idea that I would still like to do. The routines for it are still in my head, and I no it wouldn't look anywhere near the quality of Lemmings on the PC or Amiga, but I believe that the 4A is capable of producing something with a similar idea, which will be quite playable.

Back to the long-running saga of my CAD program. I've got a 1" high stack of notes from my current development efforts on the program, and I've got a WORKING test program that's over a year old, and runs with XHI and Extended BASIC on the GENEVE and 80-Column card. I chose this to prototype the program because The Missing Link gives a strange sized screen, and MYARC Advanced BASIC at that time wasn't at all reliable. Now, Gary and I have got Advanced BASIC Version 1.5H, but the copy of MDOS 1.5H was corrupted. Now, we're waiting for the much more reliable and final MDOS 2.0 which Bud will send with the SCSI

modifications.

I have been considering my final year project for University for some time, and even submitted one idea and title to the university. This was: "Great Computing Ideas, Past, Present, and Future". This was going to be a study of how brilliant architectures could be developed, and then discarded for no apparent reason, something of which we are all aware with our own unique machine.

What I have now decided to do, is use my CAD program as my final year project! I will have no excuse for not finishing it! AND... By the time the next AGM comes around, you will be able to see, and use a working version (assuming they approve it as a suitable project).

If you're not convinced, here's a copy of the letter that I've written to the project supervisor:

Mansfield,  
Notts.

Tel: 061 70

7th September 1994.

Professor  
Department of Computing,  
The Nottingham Trent University,

Dear Professor

I have spoken to Dr. with regard to my final year project, and he suggested I write to you directly. In the hand-out containing subject areas for final year projects, I have noted that you are project supervisor for several graphics related subjects, which include sketch recognition, and Giroud shading. One of my main interests is in graphics, although, like many others, I found some of Richard Cant's lectures on hidden line removal difficult to follow.

In my spare time, I help to run a user group, dedicated to supporting the Texas Instruments TI-99/4A home computer, and I have been the General Secretary of the group for several years.

My use of this machine seems to be frowned upon by the university, despite it having an operating system, and architecture far more advanced and expandable than todays PC compatibles.

Proof of this is the fact that I have just purchased a state-of-the-art Fujitsu M2512A 3.5" 230MB Optical floppy drive for use on a new SCSI-2 card for the 99/4A, which also allows a standard 2.88Megabyte floppy drive to be formatted to 4MB.

This proves the continued value of the machine, which is truly remarkable, since it was taken out of production in 1983.

Returning to my final year project, last year I started work on a CAD program for the TI-99/4A, for the benefit of not only the members of my own user group, but, also the benefit of the hundreds of TI-99/4A user groups worldwide.

To make this idea more suitable as a final year project, I have decided to make it machine independent, and have a main shell that can be compiled with different low-level routines, depending on the platform for which it is being compiled. These will be C99 for the 99/4A, C99-MDOS for the MYARC GENEVE 9640, and C++ for IBM compatibles.

The MYARC GENEVE is a compatible upgrade to the 99/4A, using a TMS9995 rather than TMS9900 microprocessor, and 9938 Video Display Processor, rather than the TMS9918A/TMS9929 (NTSC/PAL).

To recap on my project again, my main points of research will be to fully familiarize myself with true 3D graphics (the camera and viewpoint method), and shading and rendering techniques.

Also, in the case of the IBM PC, I will need to study the file handling facilities offered by C++, and if necessary, write interface routines to hide the shell of my program from the noticeable shortcomings of the PC filing system, against the much more advanced system utilized by the TI-99/4A and MYARC GENEVE 9640.

#### CAD program features:

- \* Machine independent.
  - Running on the TI-99/4A, GENEVE 9640, and IBM PC.
- \* Resolution independent.
  - Usable with the TI-99/4A's standard resolution of 256 \* 192
  - Usable with a 99/4A possessing a 9938 VDP chip, and the GENEVE 9640 at resolutions of:
    - 512 \* 212, in 16 colours
    - 512 \* 424, in 16 colours
    - 256 \* 212, in 256 colours
    - 256 \* 424, in 256 colours
  - Usable with a PC in standard resolutions:
    - 320 \* 200, in 256 colours
    - 640 \* 200, in 16 colours
    - 640 \* 400, in 16 colours
    - 640 \* 480, in 16 colours
- \* Drawing features.
  - All standard CAD facilities:
    - Point, Line, Circle, Text, Arc etc.
    - Object move, Object Copy etc.
    - Zoom on drawing extents, zoom to window,
    - Keyboard input, and cursor input of coordinates, in both Polar and Rectangular formats.
    - 2D and 3D support.
- \* Additional features.
  - 3D plotting, with hidden line removal
  - Full rendering on GENEVE/9938VDP, and PC versions
  - Sketch recognition to turn "pixelized" images into vectors for more efficient storage, and faster processing.
- \* File handling features.
  - Total security from power failure, entire CAD database

- maintained as "Virtual Memory Array" (RELATIVE) file on disk.*
- Ability to swap files freely between 99/4A, GENEVE and PC versions.*
- Ability to merge individual CAD files.*

*I would be grateful if you could consider my project and inform me of its suitability.  
Thank you for your time.*

*Yours sincerely, \_\_\_\_\_*

*RICHARD TWYNING*

So, you can see, for those members who have felt it necessary to purchase a PC, they will hopefully be able to create files on them, whilst giving their 4A a rest, and then upload the files to the 4A, and give us all the benefit of their creations. This is also assuming that I can make the Messy DOS filing system do the same things as the TI filing system!!!!

As if these promises aren't enough, Mark and I have got another idea in the pipeline, which is, yes, you guessed it, related to MODEM's!!!! This will be in C99 which a bit of assembly that we'll be pinching from either After Hours or Small Talk. Now there's a clue, since they're both Bulletin Board programs!

This brings me neatly onto the BBS, and in the words of Barry Norman, "And why not!"

Progress so far:

I managed to get the MultiTech ZDX working with the following with the following wiring:

CRAY 1 or CRAY 2 RS232 port.	MultiTech ZDX Modemly 19.2K upshot device!
RxD - Pin 2. >>>>>>	Pin 3. - TxD
TxD - Pin 3. >>>>>>	Pin 2. - RxD
DSR - Pin 6. >>>>>>	Pin 6. - DSR
GND - Pin 7. >>>>>>	Pin 7. - GND
DTR - Pin 20. >>>>>>	to Pin 20. - DTR and Pin 4. - RTS

This works, and it's almost perfect at 9600bps. It only loses the odd character here and there. Much higher than this though, and it refuses to talk to the MODEM!! Trevor is using a slightly different cable arrangement, and is getting much more noise at 9600bps.

Trevor and Gary experimented with amplifying the RS232 card input. The card will transmit perfect text to the Amiga at 19200bps, but you can usually forget the opposite direction at this speed. However, Gary amplified the data going into the RS232, and they got perfect text from the Amiga at 19200bps!

However, the MODEM still didn't work at all. But... Don't panic!!! Both devices don't output correct RS232 voltages, which should be 12V!!! The Amiga outputs 7V, and the MODEM only outputs 3V!!! This is why the Amiga worked, and the

MODEM still didn't. Gary still has the facility to amplify the handshaking on the port, as well as the data, so this will be the next course of action. After speaking to Colin Hinson, Trevor has informed me that Colin's view was that the TI RS232 should be able to handle up to around 32000bps. This would require true RS232 to be sent into it. Colins suggestion was for us to put Gary's oscilloscope on the input signal to see if it's square. If it isn't, then this is where our noise and errors are creeping in!

As far as the BBS programs themselves are concerned, I ordered Tim Tesch's BBS software ages ago, but Jim Cavanaugh told me not to worry, because Tim is honest, but SLOW!!!

I still haven't been paid for the order by Mr. Treasurer either yet!! Hint, hint!!

Trevor and I experimented with getting After Hours running, but it's a bit of a strange program, and its security runs into not only defeating hackers who are dialling in while it is running, but also defeating people who want to make changes to it, other than the ones that are documented!!!

Small Talk seems to be the best bet again, just to give people SOMETHING to play with until we get the S&T Bulletin Board. Small Talk, as its name suggests, IS SMALL. It's menu systems are simple, and don't give even the scope of After Hours for limited customization of certain areas.

Small Talk did agree with the MultiTech MODEM when I tried it on the GENEVE. One thing it seems to completely dislike is the Mechatronic 80-Column card!?!?!?!?

It loads up, and instead of saying WAITING (for a call) and displaying a current list of callers, it gives an I/O error zero?!?!? WEIRD!!!

Small Talk is a very neat little program though, and it does allow a completely secure upload area. Once a file is uploaded, it is completely invisible on the up/download disk if another user, or the same user tries to download it again. The Sysop must check the files and make them visible by renaming them. Should any "untoward" files be found, he has also got the opportunity to delete them before another user can download, or read them.

I'll shut up about this now, as Trevor has devoted a large part of his article to the BBS.

Well, I said it would be shorter, and it appears that I was right!!!! I'm getting tired. It's 11pm, and I'm up at 5am in the morning to go running!

Apologies for not having "Somewhere In TI\*MES" in this issue. It will return in a bumper edition in the Winter. I promise I'll try and keep that one as short as possible!!!

I'll look forward to seeing you at the Sandbach workshop on the 12th of November, when I WILL BE DEMONSTRATING THE SCSI CARD!!!! If I don't remain optimistic about it I'll go crazy!!!

Many thanks to John Murphy for C-SAVING his Mechatronic Extended BASIC and sending me a copy. I'll have to do a comparison between that, and Triton Super XB.

Oops, I almost forgot.

News for those who don't have the opportunity to read Micropendium. In the August issue, Don Walden at Cecure Electronics has been given full authority by Texas Instruments, to repair 99/4A equipment.

He was awarded the contract after Texas Instruments representatives visited his workplace, to satisfy themselves of a good service. Cecure will acquire new storage facilities for "literally, a ton" of new parts and equipment to use for repairs. TI themselves are providing Cecure with supplies to take care of 99/4A customers for at least the next five years!

You can contact Don Walden at:

Cecure Electronics  
P.O. Box 222,  
Muskego,  
WI 53150

Telephone: 0101 414 679 4343 (voice)  
0101 414 679 3736 (BBS)

AND....

Don O'Neil of Western Horizon Technologies, who is on the SCSI card design team, is offering a hardware developers kit for both the 4A and GENEVE.

The kit includes all parts necessary to build a fully buffered interface, CRU and memory decode compatible with the GENEVE, and schematics of that and other applications.

With the kit you get a disk full of utility programs, which include Extended BASIC LINK's for turning CRU bits on and off. Each chip in the kit comes with its appropriate two or three level wire wrap circuit.

The parts included in the kit are, one 74LS125; one 74LS138; three 74LS244's; one 74LS245; one 74LS520; one custom WHT Decode GAL (Gate Array Logic); one eight-position DIP switch (for CRU location selection); one 178MC205 1.5amp 5V regulator and heat sink; one 60-pin TI Leading Edge connector; one 47-ohm resistor; one 3904 transistor; one Red LED; one 4.5inch \* 8.5inch perforated board; two 30-pin ZIP WW Strips (for Leading Edge Connector); one set of main circuit schematics with P-Box pinout; three sets of optional circuit schematics and parts requirements; three mounting bolts and nuts for the Leading Edge connector and regulator; and a spool of wire wrap wire!

The kit sells for \$39.95 with no warranty, and no technical support available.

For further information or to order, contact:

Western Horizon Technologies,  
10225 Jean Ellen Drive,  
Gilroy,  
California 95020

Well, that finally is it for now. Just remember that on the day of our workshop on the 12th of November, the TI International World's Faire, will be held at the Holiday Inn, in Gurnee, Illinois, and will be sponsored by Chicago and Milwaukee users

groups. For information, contact Don Walden (Cecure): 0101 414 679 2336.

Bluesman, over and out. 11:27pm!

I'll Be Back.

```
100 CALL CLEAR
110 CALL SPRITE(£1,140,7,1,1
):: CALL CHAR(33,RPT$( "F",16
)):: CALL MAGNIFY(2):: FOR A
=0 TO 1 :: FOR B=0 TO 1 :: F
OR C=0 TO 1 :: FOR D=0 TO 1
:: FOR E=0 TO 1
120 FOR F=0 TO 1 :: FOR G=0
TO 1 :: FOR H=0 TO 1 :: FOR
I=0 TO 1
130 CALL HCHAR(1,1,A+32):: C
ALL HCHAR(1,2,B+32):: CALL H
CHAR(1,3,C+32):: CALL HCHAR(
2,1,D+32)
140 CALL HCHAR(2,2,E+32):: C
ALL HCHAR(2,3,F+32):: CALL H
CHAR(3,1,G+32):: CALL HCHAR(
3,2,H+32):: CALL HCHAR(3,3,I
+32)
150 CALL MAG :: CALL HCHAR(9
,1,ASC("-"),9):: CALL VCHAR(
1,9,ASC(":"),9)
160 CALL CODE(C$):: CALL CHA
R(32+COD,C$):: PRINT CHR$(32
+COD):: COD=COD+1 :: CALL K
EY(O,K,S):: IF S<>O THEN END

170 NEXT I :: NEXT H :: NEXT
G :: NEXT F :: NEXT E :: NE
XT D :: NEXT C :: NEXT B ::
NEXT A
180 SUB MAG :: FOR R=3 TO 1
STEP -1 :: FOR C=3 TO 1 STEP
-1 :: CALL GCHAR(R,C,X):: C
ALL BIGPIXEL(R*3,C*3,X):: NE
XT C :: NEXT R :: SUBEND
190 SUB BIGPIXEL(A,B,C):: FO
R R=0 TO 2 :: CALL HCHAR(A-R
,B-2,C,3):: NEXT R :: SUBEND

200 SUB CODE(C$):: C$="" ::
FOR R=1 TO 8 :: BP=1 :: MSB,
LSB=0
210 FOR C=4 TO 1 STEP -1 ::
CALL GCHAR(R,C,X):: MSB=MSB+
((X-32)*BP):: CALL GCHAR(R,C
+4,X):: LSB=LSB+((X-32)*BP)
220 BP=BP*2 :: NEXT C :: IF
MSB>9 THEN C$=C$&CHR$(55+MSB
)ELSE C$=C$&STR$(MSB)
230 IF LSB>9 THEN C$=C$&CHR$
(55+LSB)ELSE C$=C$&STR$(LSB)
240 NEXT R :: CALL CHAR(140,
C$):: SUBEND
```

£ = #

NB £ = #

Dedicated to our dear friend Jim Peterson who died this year

### TIGERCUB TIPS #12

Copyright 1984 Tigercub  
Software  
156 Collingwood Ave.,  
Columbus Ohio 43213

If you have taken a course in computer programming, one of your homework assignments was probably to write a program that would find all the possible combinations of letters in a 5-letter word.

The following version can handle words of 3 to 6 letters, lists the combinations alphabetically, eliminates duplicates (when the word has two of the same letter), does not require a DIM statement, and is fast. It also works with numbers. If you work those scrambled-word puzzles in the newspapers, you'll find it handy.

```
100 CALL CLEAR :: PRINT TAB(
5);"TIGERCUB ANAGRAMMER": :!
by Jim Peterson
110 INPUT "TYPE A 3-,4-,5- O
R 6-LETTER WORD ":A$: :: W=L
EN(A$):: IF (W<3)+(W>6)THEN
110
120 PRINT :: FOR J=1 TO W ::
B$(J)=SEG$(A$,J,1):: NEXT J
:: FOR J=2 TO W :: IF B$(J)
>=B$(J-1)THEN 160
130 T$=B$(J):: FOR L=J-1 TO
1 STEP -1 :: B$(L+1)=B$(L)
140 IF B$(L-1)>=T$ THEN 150
:: B$(L)=T$ :: GOTO 160
150 NEXT L
160 NEXT J
170 FOR A=1 TO W :: FOR B=1
TO W :: IF B=A THEN 340
180 FOR C=1 TO W :: IF (C=A)
+(C=B)THEN 330
190 IF W=3 THEN 250
200 FOR D=1 TO W :: IF (D=A)
+(D=B)+(D=C)THEN 320
210 IF W=4 THEN 260
220 FOR E=1 TO W :: IF (E=A)
+(E=B)+(E=C)+(E=D)THEN 310
230 IF W=5 THEN 270
240 FOR F=1 TO W :: IF (F=A)
```

```
+(F=B)+(F=C)+(F=D)+(F=E)THEN
300 ELSE 280
250 W$=B$(A)&B$(B)&B$(C):: I
F W$<=V$ THEN 330 ELSE 290
260 W$=B$(A)&B$(B)&B$(C)&B$(
D):: IF W$<=V$ THEN 320 ELSE
290
270 W$=B$(A)&B$(B)&B$(C)&B$(
D)&B$(E):: IF W$<=V$ THEN 31
0 ELSE 290
280 W$=B$(A)&B$(B)&B$(C)&B$(
D)&B$(E)&B$(F):: IF W$<=V$ T
HEN 310
290 PRINT W$&" " ;:: G=G+1 ::
V$=W$ :: ON W-2 GOTO 330,32
0,310,300
300 NEXT F
310 NEXT E
320 NEXT D
330 NEXT C
340 NEXT B
350 NEXT A
360 PRINT : " " ;G;"TOTAL C
OMBINATIONS." : : : G=0 :: V
$="" :: GOTO 110
```

And still another automatic music-maker. This one doodles around the keyboard in the key of A, with automatic bass accompaniment.

```
100 RANDOMIZE
110 DIM N(30)
120 F=220
130 FOR J=0 TO 36
140 X=X+1+(X=12)*12
150 IF (X=2)+(X=5)+(X=7)+(X=
10)+(X=12)THEN 180
160 Y=Y+1
170 N(Y)=INT(F*1.059463094^J
)
180 NEXT J
190 K=8
200 K=K-INT(5*RN D+1)+INT(5*RN
ND+1)+(K>21)*2-(K<1)*2
210 IF (K<1)+(K>21)THEN 200
220 CALL SOUND(-999,N(K),0,N
(K)*2,0,N(K)*3.75,30,-4,5)
230 GOTO 200
=====
100 CALL CLEAR
110 REM - programmed by Jim
Peterson May 20, 1984
120 PRINT "TIGERCUB MAGIC SQ
UARE MAKER": : " A magic squa
re is a conse-": "cutive seri
es of numbers": "arranged in
```



```

a square in such"
130 PRINT "a way that each h
horizontal": "row, vertical ro
w, and long": "diagonal row w
ill add up to": "the same tot
al.": :
140 PRINT " This little prog
ram will": "create an odd-ord
er magic": "square of any des
ired size,": "starting with a
any desired": "number.": :
150 PRINT " Squares of 3,5,7
or 9 size": "will be printed
on the": "screen. The progra
m can be": "modified to output
larger"
160 PRINT "sizes to a printe
r.": :
170 INPUT "SIZE OF SQUARE?(o
dd number) ":S
180 IF (S<3)+(S/2=INT(S/2))T
HEN 170
190 INPUT "STARTING NUMBER?
":SN
200 N=SN-1
210 CALL CLEAR
220 DIM G(31,31)
230 R=1
240 C=INT(S/2)+1
250 N=N+1
260 IF N=S^2+SN THEN 450
270 G(R,C)=N
280 IF (R-1=0)+(C+1>S)THEN 3
50
290 IF G(R-1,C+1)<>0 THEN 33
0
300 R=R-1
310 C=C+1
320 GOTO 250 ! # is shift 3
330 R=R+1
340 GOTO 250
350 IF (R=1)*(C=S)THEN 400
360 IF (R>1)*(C=S)THEN 420
370 R=S
380 C=C+1
390 GOTO 250
400 R=2
410 GOTO 250
420 R=R-1
430 C=1
440 GOTO 250
450 IF (LEN(STR$(SN+S^2))+1)
*S>28 THEN 530
460 FOR R=1 TO S
470 FOR C=1 TO S
480 PRINT STR$(G(R,C));" ";
490 NEXT C
500 PRINT : :
510 NEXT R
520 GOTO 550

```

```

530 PRINT "TOO LARGE FOR SCR
EEN."
540 REM - ADD PRINTER ROUTIN
E HERE - # is shift 3
550 PRINT : : "PRESS ANY KEY
TO CHECK"
560 CALL KEY(O,K,ST)
570 IF ST=0 THEN 560
580 FOR R=1 TO S
590 FOR C=1 TO S
600 X=X+G(R,C)
610 NEXT C
620 PRINT "ROW #";STR$(R);"
=";X
630 X=0
640 NEXT R
650 FOR C=1 TO S
660 FOR R=1 TO S
670 X=X+G(R,C)
680 NEXT R
690 PRINT "COLUMN #";STR$(C)
;"=";X
700 X=0
710 NEXT C
720 R=1
730 C=1
740 FOR J=1 TO S
750 X=X+G(R,C)
760 R=R+1
770 C=C+1
780 NEXT J
790 PRINT "RIGHT DIAGONAL=";
X
800 X=0
810 R=1
820 C=S
830 FOR J=1 TO S
840 X=X+G(R,C)
850 R=R+1
860 C=C-1
870 NEXT J
880 PRINT "LEFT DIAGONAL=";X
890 END

```

TIGERCUB TIPS #13

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I'm told that someone actually found a practical use for my number-scrambling routine, so here is an expanded version.

It will scramble any sequence beginning with 1 and ending with any number less than 256 or any number greater than 256 which is evenly divisible by any number less than 256 and greater than 1, within the limits of computer memory.

In Extended Basic with Memory Expansion, the limit is about 10,700; if you reformat it to Basic and run it bare bones, you might get close to 13,000.

```
100 CALL CLEAR :: OPEN #1:"P
IO",OUTPUT
110 INPUT "HIGHEST NUMBER? "
:HN :: IF HN<256 THEN TN=HN
:: XX=1 :: GOTO 150
120 FOR TN=255 TO 2 STEP -1
:: IF HN/TN=INT(HN/TN) THEN 1
40
130 NEXT TN :: PRINT HN;"IS
NOT DIVISIBLE BY":"ANYTHING
LESS THAN 256 - ":"CANNOT U
SE" :: GOTO 110
140 XX=HN/TN
150 DIM M$(50)
160 CALL CLEAR :: FOR J=1 TO
TN :: M$(J)=M$(J)&CHR$(J)::
NEXT J :: FOR J=1 TO XX ::
M$(J)=M$(1):: NEXT J :: FOR
J=1 TO HN :: TT=1+INT((J-1)/
255)
170 RANDOMIZE :: X=INT(XX*RN
D+1):: IF LEN(M$(X))=0 THEN
170 :: ! # is shift 3
180 Y=INT(LEN(M$(X))*RND+1)
190 PRINT #1:ASC(SEG$(M$(X),
Y,1))+TN*(X-1);
200 M$(X)=SEG$(M$(X),1,Y-1)&
SEG$(M$(X),Y+1,LEN(M$(X))):
NEXT J
=====
```

Here's a little routine you can use to jazz up your title screen or text.

```
100 CALL CLEAR
110 DATA "THIS IS A DEMONSTR
ATION","OF THE","TIGERCUB SO
FTWARE","TWO-WAY PRINT ROUTI
NE"
112 FOR T=1 TO 4
113 READ M$
120 IF LEN(M$)/2=INT(LEN(M$)
/2) THEN 135
```

```
130 M$=M$&" "
131 GOTO 140
135 M$=M$&" "
140 L=LEN(M$)
150 C=16-L/2
160 FOR J=L/2 TO 1 STEP -1
170 CALL HCHAR(10+T*2,C+J,AS
C(SEG$(M$,J,1)))
180 CALL HCHAR(10+T*2,16+L/2
-J,ASC(SEG$(M$,L-J,1)))
190 NEXT J
200 NEXT T
=====
```

Did you ever go through your checkbook 5 times in order to add up your gas bill, then your electric bill, etc.? With this little handy-dandy, you can do it all in one pass.

```
100 CALL CLEAR
110 REM - ADDER-UPPER by Ji
m Peterson
120 A$="ABCDEFGHIJKLMNQRST
UVWXYZ"
130 DIM C$(26),T(26)
140 PRINT " ADDER-UPP
ER": : :
150 PRINT "WITH THIS PROGRAM
YOU CAN GO THROUGH YOUR CHE
CKBOOK, OR ANYTHING ELSE, AN
D ADD UP AMOUNTS IN SEVERA
L CATE-"
160 PRINT "GORIES ALL AT ONE
TIME.": :
170 PRINT " FIRST, LIST THE
CATEGORIES":"YOU WANT TO ADD
UP.":" TYPE 'END' WHEN FINI
SHED.": :
180 PRINT " NEXT, ENTER THE
CATEGORY":"CODE AND AMOUNT F
OR EACH":"BILL."
190 PRINT : : "WHEN YOU HAVE
ENTERED ALL":"THE BILLS, TYP
E =": :
200 N=N+1
210 PRINT "CATEGORY #";N
220 INPUT " ":C$(N
)
230 IF C$(N)="END" THEN 340
240 W$=SEG$(C$(N),1,1)
250 IF POS(A$,W$,1)<>0 THEN
290
260 PRINT : "CODE LETTER ";W$
;" ALREADY USED - PICK A CO
DE LETTER."
270 INPUT W$
280 GOTO 250
```

```

290 X=POS(A$,W$,1)
300 A$=SEG$(A$,1,X-1)&SEG$(A$,X+1,LEN(A$))
310 X$=X$&W$
320 PRINT : "CODE LETTER FOR ";C$(N); " WILL BE ";W$: :
330 GOTO 200
340 C$(N)=" "
350 N=N-1
360 X$=X$&"="
370 IF FLAG=1 THEN 420
380 FLAG=1
390 PRINT : : "READY TO START
- " : : :
400 PRINT "WHEN FINISHED, TYPE =": :
410 INPUT "DO YOU WANT TO VERIFY EACH INPUT? ":V$
420 PRINT : "CODE (" ;X$ ;")"
430 INPUT Q$
440 IF Q$="=" THEN 600
450 IF POS(X$,Q$,1)<>0 THEN 510
460 PRINT "THAT IS NOT ONE OF THE CODES": :
470 INPUT "IS IT A NEW CATEGORY? (Y/N) ":Q$
480 IF SEG$(Q$,1,1)<>"Y" THEN 420
490 X$=SEG$(X$,1,LEN(X$)-1)
500 GOTO 200
510 Y=POS(X$,Q$,1)
520 INPUT "AMOUNT ?":A
530 IF SEG$(V$,1,1)="N" THEN 580
540 PRINT :C$(Y);A: :
550 INPUT "CORRECT? (Y/N)":L$
560 IF SEG$(L$,1,1)="Y" THEN 580
570 IF SEG$(L$,1,1)="N" THEN 420 ELSE 550
580 T(Y)=T(Y)+A
590 GOTO 420
600 FOR J=1 TO N
610 PRINT :C$(J);T(J)
620 TT=TT+T(J)
630 NEXT J
640 PRINT : "GRAND TOTAL OF ALL IS";TT
650 END
=====

```

And, did you ever wish that you could make numbers smaller, so that you could squeeze more of them onto a chart or graph? The problem is that resolution is so poor, at least on my TV screen, but maybe you'll

find a use for this.

```

100 REM - NUMBER SCRUNCHER -
    programmed by Jim Peterson
110 CALL SCREEN(5)
120 FOR S=2 TO 14
130 CALL COLOR(S,15,1)
140 NEXT S
150 CALL CLEAR
160 RANDOMIZE
170 DATA 75557,22222,25127,6
    1216,55571,74616,74757,71222
    ,75257,75711
180 FOR J=0 TO 9
190 READ C$
200 CH$(J)="00"&C$
210 NEXT J
220 CH=91
230 INPUT "NUMBER? ":RX
240 N$=STR$(RX)
250 IF LEN(N$)/2=INT(LEN(N$)
    /2)THEN 270
260 N$="0"&N$
270 FOR J=1 TO LEN(N$)STEP 2
280 P1=VAL(SEG$(N$,J,1))
290 P2=VAL(SEG$(N$,J+1,1))
300 FOR T=1 TO 7
310 Z$=Z$&SEG$(CH$(P1),T,1)&
    SEG$(CH$(P2),T,1)
320 NEXT T
330 CALL CHAR(CH,Z$)
340 Z$=""
350 P$=P$&CHR$(CH)
360 CH=CH+1
370 NEXT J
380 PRINT N$;" ";P$
390 P$=""
400 N$=""
410 GOTO 230

```

Almost OUT OF MEMORY.

Jim Peterson

TIPS FROM THE TIGERCUB

#33

Copyright 1986

TIGERCUB SOFTWARE

156 Collingwood Ave.

Columbus, OH 43213

Did you ever wonder how a computer sort actually worked? This program will let you actually see it in action. It will also show you the value being held in the temporary variable T\$, and the total number of

swaps and comparisons made.

Then you can change any of the variables and resort. Try AAA in the last position or ZZZ in the first. You will find that some of the fastest sorts are not so fast when a list is already almost in sequence.

```
100 CALL CLEAR :: CALL SCREE
N(16):: FOR SET=2 TO 9 :: CA
LL COLOR(SET,5,16):: NEXT SE
T :: ON WARNING NEXT :: RAND
OMIZE
110 DISPLAY AT(21,1)ERASE AL
L:">>>TIGERCUB SORT WATCHER<
<<": "Wait, please - genera
ting":"random array..." ::
DIM A$(101),B$(101),ST(25,2)
120 FOR J=1 TO 100 :: FOR L=
1 TO 3 :: B$(J)=B$(J)&CHR$(I
NT(26*RND+65)):: NEXT L :: X
=J :: A$(X)=B$(X):: GOSUB 10
20 :: NEXT J
130 DISPLAY AT(3,1)ERASE ALL
:"(1) BUBBLE SORT": "(2) SH
AKER SORT": "(3) SWAP SORT"
: "(4) SHUTTLE SORT": "(5)
EASY SORT"
140 DISPLAY AT(13,1):"(6) QU
ICK SORT": "(7) RESORT SORT
": "(8) SHELL SORT": "(9)
RESERVED": "Type number of
choice"
150 ACCEPT AT(21,23)VALIDATE
(DIGIT)SIZE(2)BEEP:K :: IF K
<1 OR K>10 THEN 150
160 DISPLAY AT(24,1):"Size o
f array? (10-100)" :: ACCEPT
AT(24,25)VALIDATE(DIGIT)SIZ
E(3):G :: IF G<1 OR G>100 TH
EN 160
170 ON K GOSUB 230,300,430,5
00,550,650,850,910,25000 ::
DISPLAY AT(22,1):W;"SWAPS":C
;"COMPARISONS" :: C,W=0
180 DISPLAY AT(24,1):"Choose
(1)Menu or (2)Resort" :: AC
CEPT AT(24,7)VALIDATE("12")S
IZE(1):Q :: IF Q=1 THEN 130
190 DISPLAY AT(24,1):"Change
which position? 0" :: ACCEP
T AT(24,24)VALIDATE(DIGIT)SI
ZE(-3):P :: IF P=0 THEN 210
ELSE IF P<1 OR P>G THEN 190
200 DISPLAY AT(24,1):"Change
to?" :: ACCEPT AT(24,12)SIZ
E(3):A$(P):: X=P :: GOSUB 10
20 :: GOTO 190
```

```
210 DISPLAY AT(22,1):" ":" "
:: GOSUB 1010 :: N=G :: ON
K GOSUB 240,310,440,510,560,
660,860,930,25010 :: DISPLAY
AT(22,1):W;"SWAPS":C;"COMPA
RISONS" :: C,W=0 :: GOTO 180
220 REM *BUBBLESORT*
230 CALL CLEAR :: GOSUB 980
240 FOR J=2 TO N :: C=C+1 ::
IF A$(J)>=A$(J-1)THEN 260
250 T$=A$(J):: GOSUB 1050 ::
A$(J)=A$(J-1):: X=J :: GOSU
B 1020 :: A$(J-1)=T$ :: X=J-
1 :: GOSUB 1020 :: W=W+1 ::
F=1
260 NEXT J :: C=C+1 :: IF F=
0 THEN 280
270 W=W+1 :: F=0 :: W=W+1 ::
N=N-1 :: GOTO 240
280 RETURN
290 REM *SHAKERSORT*
300 CALL CLEAR :: GOSUB 980
310 W=W+1 :: L=1 :: W=W+1 ::
R=N
320 W=W+1 :: F=0 :: FOR J=L
TO R-1 :: C=C+1 :: IF A$(J)<
=A$(J+1)THEN 340
330 T$=A$(J):: GOSUB 1050 ::
A$(J)=A$(J+1):: X=J :: GOSU
B 1020 :: A$(J+1)=T$ :: X=J+
1 :: GOSUB 1020 :: W=W+1 ::
F=1
340 NEXT J :: C=C+1 :: IF F=
0 THEN 410
350 W=W+1 :: R=R-1 :: C=C+1
:: IF R=L THEN 410
360 W=W+1 :: F=0 :: FOR J=R
TO L+1 STEP -1 :: C=C+1 :: I
F A$(J)>=A$(J-1)THEN 380
370 T$=A$(J):: GOSUB 1050 ::
A$(J)=A$(J-1):: X=J :: GOSU
B 1020 :: A$(J-1)=T$ :: X=J-
1 :: GOSUB 1020 :: W=W+1 ::
F=1
380 NEXT J :: C=C+1 :: IF F=
0 THEN 410
390 W=W+1 :: L=L+1 :: C=C+1
:: IF L=R THEN 410
400 GOTO 320
410 RETURN
420 REM *SWAPSORT*
430 CALL CLEAR :: GOSUB 980
440 FOR J=1 TO N-1 :: W=W+1
:: R=J :: FOR JJ=J+1 TO N ::
C=C+1 :: IF A$(R)<=A$(JJ)TH
EN 460
450 W=W+1 :: R=JJ
460 NEXT JJ :: C=C+1 :: IF R
=J THEN 480
470 T$=A$(J):: GOSUB 1050 ::
```

```

A$(J)=A$(R):: X=J :: GOSUB
1020 :: A$(R)=T$ :: X=R :: G
OSUB 1020
480 NEXT J :: RETURN
490 REM ***SHUTTLE SORT*****
500 CALL CLEAR :: GOSUB 980
510 FOR J=1 TO N-1 :: FOR JJ
=J TO 1 STEP -1 :: C=C+1 ::
IF A$(JJ)<=A$(JJ+1)THEN 530
:: T$=A$(JJ):: GOSUB 1050 ::
A$(JJ)=A$(JJ+1):: X=JJ :: G
OSUB 1020
520 A$(JJ+1)=T$ :: X=JJ+1 ::
GOSUB 1020 :: NEXT JJ
530 NEXT J :: RETURN
540 REM ****EASY SORT*****
550 CALL CLEAR :: GOSUB 980
560 W=W+1 :: D=1
570 W=W+1 :: D=2*D :: C=C+1
:: IF D<=N THEN 570
580 W=W+1 :: D=INT(D/2):: C=
C+1 :: IF D=0 THEN 630
590 FOR J=1 TO N-D :: W=W+1
:: Y=J
600 W=W+1 :: Z=Y+D :: C=C+1
:: IF A$(Y)<=A$(Z)THEN 620 ::
T$=A$(Y):: GOSUB 1050 :: A
$(Y)=A$(Z):: X=Y :: GOSUB 10
20 :: A$(Z)=T$ :: X=Z :: GOS
UB 1020
610 W=W+1 :: Y=Y-D :: C=C+1
:: IF Y>0 THEN 600
620 NEXT J :: GOTO 580
630 RETURN
640 REM *QUICKSORT*
650 CALL CLEAR :: GOSUB 980
660 W=W+1 :: L=1 :: W=W+1 ::
R=N :: W=W+1 :: T=O
670 T$=A$(INT((L+R)/2)):: GO
SUB 1050 :: W=W+1 :: J=L ::
W=W+1 :: JJ=R
680 C=C+1 :: IF A$(J)>=T$ TH
EN 710
690 W=W+1 :: J=J+1
700 GOTO 680
710 C=C+1 :: IF A$(JJ)<=T$ T
HEN 730
720 W=W+1 :: JJ=JJ-1 :: GOTO
710
730 C=C+1 :: IF A$(J)<>A$(JJ
)THEN 760
740 C=C+1 :: IF J>=JJ THEN 7
60
750 W=W+1 :: J=J+1 :: GOTO 7
30
760 C=C+1 :: IF J>=JJ THEN 7
80
770 W=W+1 :: H$=A$(J):: A$(J
)=A$(JJ):: X=J :: GOSUB 1020
:: A$(JJ)=H$ :: X=JJ :: GOS

```

```

UB 1020 :: GOTO 680
780 W=W+1 :: J=J+1 :: W=W+1
:: JJ=JJ-1 :: C=C+1 :: IF J>
=R THEN 800
790 W=W+1 :: T=T+1 :: W=W+1
:: ST(T,O)=J :: W=W+1 :: ST(
T,1)=R
800 W=W+1 :: R=JJ :: C=C+1 ::
IF L<R THEN 670
810 C=C+1 :: IF T=O THEN 830
820 W=W+1 :: L=ST(T,O):: W=W
+1 :: R=ST(T,1):: W=W+1 :: T
=T-1 :: GOTO 670
830 RETURN
840 REM ***RESORT SORT*****
850 CALL CLEAR :: GOSUB 980
860 FOR J=2 TO N :: C=C+1 ::
IF A$(J)>=A$(J-1)THEN 900
870 T$=A$(J):: GOSUB 1050 ::
FOR L=J-1 TO 1 STEP -1 :: A
$(L+1)=A$(L):: X=L+1 :: GOSU
B 1020
880 C=C+1 :: IF A$(L-1)>=T$
THEN 890 :: A$(L)=T$ :: X=L
:: GOSUB 1020 :: GOTO 900
890 NEXT L
900 NEXT J :: RETURN
910 REM *SHELLSORT*
920 CALL CLEAR :: GOSUB 980
930 W=W+1 :: M=N
940 W=W+1 :: M=INT(M/3)+1
950 FOR J=1 TO N-M :: FOR JJ
=J TO 1 STEP -M :: C=C+1 ::
IF A$(JJ)<=A$(JJ+M)THEN 970
:: T$=A$(JJ):: GOSUB 1050
960 A$(JJ)=A$(JJ+M):: X=JJ ::
GOSUB 1020 :: A$(JJ+M)=T$
:: X=JJ+M :: GOSUB 1020 :: N
EXT JJ
970 NEXT J :: C=C+1 :: IF M>
1 THEN 940 :: RETURN
980 REM *RENEW ARRAY*
990 FOR J=1 TO G :: A$(J)=B$
(J):: X=J :: M$=A$(J):: GOSU
B 1020
1000 NEXT J :: N=G
1010 DISPLAY AT(24,1):"A to
abort P to pause" :: RETUR
N
1020 RR=X
1030 IF RR>20 THEN RR=RR-20
:: GOTO 1030
1040 CC=1-(X>20)*5-(X>40)*5-
(X>60)*5-(X>80)*5 :: DISPLAY
AT(RR,CC):A$(X):: W=W+1 ::
GOSUB 1060 :: RETURN
1050 DISPLAY AT(22,14):"T$="
:T$ :: W=W+1 :: GOSUB 1060 ::
RETURN
1060 CALL KEY(3,K1,SS):: IF

```

```

SS=0 THEN 1090
1070 IF K1=65 THEN 130
1080 CALL KEY(3,K2,SS):: IF
SS<1 THEN 1080
1090 RETURN

```

Don't try timing these sorts, because the screen display distorts the speed. Option 9 has been left open so that you can add your own favorite sort routine, in the same format, starting in line 25000.

These routines may not be the most efficient forms, and their names may not be correct. If you know better ones, let me know!

```

=====
100 !BASKET WEAVING by Jim P
eterson
110 CALL CLEAR :: W=11 :: T=
2 :: CH$="ASASASASASASAS5FF
OFFFFOFFFFO" :: CALL CHAR
(142,CH$):: CALL COLOR(14,2,
W,13,2,W):: CALL SCREEN(W)
120 CALL HCHAR(1,1,143,768):
: CALL CHAR(134,CH$):: CH=14
2
130 FOR C=1 TO 31 STEP T ::
FOR R=1 TO 23 STEP T :: CALL
HCHAR(R,C,CH):: NEXT R :: F
OR R=24 TO 2 STEP -T :: CALL
HCHAR(R,C+1,CH):: NEXT R ::
NEXT C
140 CH=ABS((CH=142)*135+(CH=
134)*143):: RANDOMIZE :: T=I
NT(3*RND+2)
150 FOR R=1 TO 23 STEP T ::
FOR C=2 TO 32 STEP T :: CALL
HCHAR(R,C,CH):: NEXT C
160 FOR C=31 TO 1 STEP -T ::
CALL HCHAR(R+1,C,CH):: NEXT
C :: NEXT R :: CH=CH-1 :: W
=INT(14*RND+3):: T=INT(3*RND
+2)
170 IF CH=134 THEN CALL COLO
R(13,2,W):: GOTO 130 ELSE CA
LL COLOR(14,2,W):: GOTO 130
=====

```

The following routine will create a D/V80 file named GRAPHPAGE, to be loaded into TI-Writer as a 77x57 grid numbered along the left and bottom. Arrow keys can then be used to create a line graph of asterisks or whatever, annotated with text as

```

desired.! # is shift 3
100 OPEN #1:"DSK1.GRAPHPAGE"
,OUTPUT :: PRINT #1:TAB(4);R
PT$("_",75):: FOR J=57 TO 1
STEP -1 :: J$=STR$(J)
105 IF J<10 THEN J$=" "&J$
110 PRINT #1:J$&RPT$("!_",38
)&!" :: NEXT J
120 FOR T=1 TO 2 :: PRINT #1
:" " :: FOR J=1 TO 77 :: J$
=STR$(J)&" " :: PRINT #1:SEG
$(J$,T,1):: NEXT J :: PRINT
#1 :: NEXT T :: CLOSE #1
=====

```

```

1 !TO PRINT A HANDY REFERENC
E CHART OF ASCII TO HEX CODE
- MODIFIED FROM READING-BERK
S AUG 85 - # is shift 3
90 OPEN #1:"PI0" :: PRINT #1
:CHR$(27);CHR$(77);CHR$(5)
100 FOR X=32 TO 63 :: FOR Y=
X TO X+64 STEP 32 :: CALL CH
ARPAT(Y,Y$):: PRINT #1:Y;" "
;CHR$(Y);" ";Y$:: NEXT Y ::
PRINT #1:"" :: NEXT X
=====

```

```

100 CALL CLEAR :: CALL MAGNI
FY(2):: RANDOMIZE :: DISPLAY
AT(3,2):"TIGERCUB SPEED TY
ING TEST": :TAB(12);"SPEED"
:: T=10
110 DISPLAY AT(5,18):100-T :
: X=INT(26*RND+65):: CALL SP
RITE(#1,X,2,96,120):: FOR D=
1 TO T :: CALL KEY(3,K,ST)::
ON (K=X)+2 GOTO 120,130
120 T=T-1 :: GOTO 110
130 NEXT D :: T=T+1 :: GOTO
110

```

TIPS FROM THE TIGERCUB  
#34  
Copyright 1986

```

Steven Shouse of TIRUG
sent this improvement to the
GRAPHPAGE in Tips #33 -
100 OPEN #1:"DSK1.GRAPHPAGE"
,OUTPUT :: PRINT #1:TAB(4);R
PT$("_",75):: FOR J=57 TO 1
STEP -1 :: J$=STR$(J)
=====

```

```

100 CALL CLEAR
110 REM - SONG OF SAMARKAND
programmed by Jim Peterson -
Version 3
120 RANDOMIZE
130 CALL CHAR(94,"00")

```

```

0
1010 CALL SOUND(-999,J,0,880
-J,0,N(12)*3.75,30,-4,0)
1020 NEXT J
1030 GOTO 370
1040 CALL CHAR(32,"0")
1050 GOTO 390
1060 CV=CV+(CV=2)/2-(CV=1.5)
*.5
1070 GOTO 370
=====

```

For those of us who are still struggling along with one disk drive, this routine will transfer any number of D/V80 files, totalling up to about 42 sectors, from one disk to another in one pass, and will optionally save under changed names.

```

100 DIM M$(2000),F$(25),C$(25):: CALL CLEAR :: T$=CHR$(1)
)
110 DISPLAY AT(8,6):"TIGERCUB FILEMOVER" :: DISPLAY AT(15,1):"PRESS ENTER WHEN FINISHED"
120 F=F+1 :: IF F>25 THEN 130 :: DISPLAY AT(12,1):"FILENAME? DSK"&T$ :: ACCEPT AT(12,14)SIZE(-12)BEEP:F$(F):: IF F$(F)<>T$ THEN 120
130 F=F-1 :: FOR J=1 TO F :: ON ERROR 260 :: OPEN #1:"DSK"&F$(J),INPUT :: DISPLAY AT(12,1):"READING "&SEG$(F$(J),3,255)
140 X=X+1 :: LINPUT #1:M$(X) :: C=C+LEN(M$(X))
150 IF C>10000 THEN DISPLAY AT(20,1):"INSUFFICIENT MEMORY FOR "&SEG$(F$(J),3,255):: GOTO 190
160 IF EOF(1)<>1 THEN 140
170 X=X+1 :: M$(X)=T$ :: CLOSE #1
180 W=W+1 :: NEXT J
190 X=0 :: DISPLAY AT(15,1):"" :: DISPLAY AT(12,1):"INSERT COPY DISK AND PRESS":"ENTER"
200 CALL KEY(0,K,ST):: IF ST=0 THEN 200 :: DISPLAY AT(13,1):""
210 FOR J=1 TO W :: IF F$(J)=CHR$(2)THEN 230
220 DISPLAY AT(12,1):"FILENAME? DSK"&F$(J):: ACCEPT AT(12,14)SIZE(-12)BEEP:C$(J)230
NEXT J :: FOR J=1 TO W :: IF

```

```

F$(J)=CHR$(2)THEN 250 :: OPEN #1:"DSK"&C$(J),OUTPUT :: DISPLAY AT(12,1):"SAVING "&SEG$(C$(J),3,255)
240 X=X+1 :: IF M$(X)<>T$ THEN PRINT #1:M$(X):: GOTO 240 ELSE CLOSE #1
250 NEXT J :: END
260 ON ERROR STOP :: DISPLAY AT(22,1):"CANNOT OPEN "&SEG$(F$(J),3,255):: F$(J)=CHR$(2):: RETURN 180
=====

```

Here is a very ingenious idea published in the Corpus Christi UG newsletter by H. Macdonald. He could not find the author/newsletter which gave him the idea, so if you know, tell me and I'll print due credit.

I have modified it a bit. This short routine will load quickly and enable you to bypass loading and running the Menu Loader program on a disk when you already know the filename of the program you want to run.

Save the Menu Loader under the filename MENULOADER and save this routine under the filename LOAD - be sure to save it before you try it, because it erases itself!

```

100 CALL INIT :: CALL LOAD(-31806,16):: DISPLAY AT(12,1)ERASE ALL:"RUN MENULOADER? (Y/N)"

```

```

110 CALL KEY(3,K,S):: IF S=0 THEN 110 ELSE IF K=78 THEN 130 ELSE DISPLAY AT(12,1)ERASE ALL:"LOADING MENULOADER" :: RUN "DSK1.MENULOADER"
130 CALL CLEAR :: CALL LOAD(-31952,55,215,55,215):: END
=====

```

Here is one with a bit of a surprise at the end. Key the v,A in line 190 as FCTN V, CTRL comma, CTRL A.

```

100 CALL CLEAR :: CALL SCREEN(16)
110 DATA 80C0A09088445269,00
00000000007EB1,0103050911224
A96,0000000101010100,21409C2
A492A1CC0,9999336600001824
120 DATA 8482395492543903,00
00000000808080,E0B09880E7702
010,18244281423C0000,0F19030

```





```

7E1020408,000000FFB0808080
130 DATA 000F13E620221D00,0C
FB34670A22D000,814224FF,30DF
2CC641443B00,00F0C86F0447B87
F,000000FF01F901F9
140 DATA 80FFB08686808686,00
FF006666006666,00FF003F3F3F3
F3F,01FF01F9F9F9F9F9,8086868
086868093,00666600666600FF
150 DATA 00666600666600E6,3F
3F3F3F3F3F3F3F,F9F9F9F9F9F9F
9F9,0000000E01C3AE2,9380FF,
FF00FF,E600FF00070B0807
160 DATA 3F00FF00FF1988FF,F9
01FF00FF8744FF,1F09090FF3198
AFC
170 FOR CH=96 TO 129 :: READ
CH$: CALL CHAR(CH,CH$)::
NEXT CH
180 DISPLAY AT(1,14)ERASE AL
L:"ab" :: DISPLAY AT(2,13):
"cdefg" :: DISPLAY AT(3,14):
" hij" :: DISPLAY AT(4,12):"k
lmnopq"
190 DISPLAY AT(5,12):"rsssst
u" :: DISPLAY AT(6,12):"vwvw
xyz!" :: DISPLAY AT(7,12):"!
}}~v,A" :: DISPLAY AT(9,12)
:"TIGERCUB"
200 DISPLAY AT(11,12):"SOFTW
ARE" :: DISPLAY AT(13,7):"15
6 COLLINGWOOD AVE." :: DISPL
AY AT(15,7):" COLUMBUS OH 43
213" :: CALL HIGHCHAR
210 GOTO 210
220 SUB HIGHCHAR :: FOR CH=3
2 TO 129 :: CALL CHARPAT(CH,
CH$):: X$=SEG$(CH$,3,12)&SEG
$(CH$,13,4):: CALL CHAR(CH,X
$):: NEXT CH :: SUBEND
=====

```

Thanks to Ramon Martinez in the Orange County UG news letter - a double NEXT is accepted if the pre-scan is turned off.

```

100 J=1
110 !@P-
120 FOR J=1 TO 100 :: IF J/1
0<>INT(J/10)THEN NEXT J ELSE
PRINT J :: NEXT J
=====

```

A computer without a program is like a car without gas. If everyone who filled up at a self-service pump drove away without paying, how soon would all the gas stations be closed?

MEMORY FULL!

Jim Peterson  
TIPS FROM THE TIGERCUB

No. 69

Tigercub Software  
156 Collingwood Ave.  
Columbus, OH 43213  
\*\*\*\*\*

My three Nuts & Bolts disks, each containing 100 or more subprograms, have been reduced to \$5.00 each. I am out of printed documentation so it will be supplied on disk.

My TI-PD library now has almost 600 disks of fair-ware (by author's permission only) and public domain, all arranged by category and as full as possible, provided with loaders by full program name rather than filename. Basic programs converted to XBasic, etc. The price is just \$1.50 per disk(!), post paid if at least eight are ordered. TI-PD catalog #5 and the latest supplement is available for \$1 which is deductible from the first order.

```

In Tips #68 I published my
solution to Dr. Ecker's
challenge to alternately
assign X the value of A and
B without using IF...THEN or
any outside help. Computer
Monthly has arrived again
and his solution is better
than mine. Try it with any
two numbers -
100 A=2.765 :: B=-10
110 X=A+B-X :: PRINT X :: GO
TO 110

```

There has been controversy for years as to whether the TI's psuedorandom number generator is truly random. Dr. Ecker's "Computer Fun & Learning" column in Computer Monthly had a question - if you randomly generate numbers between 0 and 9, how

often will you get the same number twice in succession? Three times in succession? And etc. Since there are 10 numbers to choose from, it seems to me you would get 2 in a row 10% of the time, 3 in a row 1% of the time, 4 in a row .1%...etc. I wrote this to prove it -

```
100 RANDOMIZE
110 C=C+1 :: X=INT(RND*10)::
PRINT X;:: IF X=F THEN FL=F
L+1 :: CL(FL)=CL(FL)+1 :: PR
INT "" :FL;"=";CL(FL):"C=";C:
"%=";CL(FL)/C :: GOTO 110 EL
SE FL=0 :: F=X :: GOTO 110
```

After 10,000 tries, I had 2 in a row 8.75% of the time and 3 in a row .83% and 4 in a row .07% . Does that prove anything? I don't know.

(Dr. Ecker points out that those percentages could not ever quite add up to 100%!)

Here is another of my XBasic programs to write assembly source code -

```
100 DISPLAY AT(2,1)ERASE ALL
:"ASSEMBLY HELP SCREEN WRITE
R:"::" This program will wr
ite the":"source code for an
assembly":"routine which ca
n be linked"
110 DISPLAY AT(7,1):"from Ex
tended Basic to dis-":"play
any one of several help":"sc
reens at any designated":"ke
y press or input at any":"po
int in a program."
120 DISPLAY AT(12,1):" The o
riginal source code,":"autho
r unknown, was improved":"by
Karl Romstedt and further":
"modified by Bruce Harrison.
"
130 DISPLAY AT(20,1):"How ma
ny help screens?" :: ACCEPT
AT(20,24)SIZE(1)VALIDATE(DIG
IT)BEEP:N
140 FOR J=1 TO N :: H$=H$&"H
ELP"&STR$(J)&"," :: NEXT J :
: H$=" DEF "&SEG$(H$,
1,LEN(H$)-1)
150 DATA VMBW EQU >2024,V
MBR EQU >202C,KSCAN EQU
>201C,STATUS EQU >837C
```

```
160 OPEN #1:"DSK1.HELP/S",OU
TPUT :: PRINT #1:H$ :: FOR J
=1 TO 4 :: READ M$ :: PRINT
#1:M$ :: NEXT J
170 FOR J=1 TO N :: H$="HELP
"&STR$(J):: PRINT #1:H$&" L
WPI WS":" LI R13,HEL
PS"&STR$(J)
180 IF J<N THEN PRINT #1:"
JMP SAVSCR"
190 NEXT J :: H$=RPT$(" ",7)
200 PRINT #1:"SAVSCR CLR RO
":"H$&"LI R1,SAVIT":H$&"LI
R2,768":H$&"BLWP @VMBR":H$
&"LI R9,NEWSCR":H$&"MOV R
9,R1":H$&"MOV R2,R4"
210 PRINT #1:H$&"LI R3,>60
00":&"ADDOFF MOV B *R13+,*R9"
:H$&"AB R3,*R9+":H$&"DEC R
4":H$&"JNE ADDOFF":H$&"BLWP
@VMBW"
220 PRINT #1:"KEYLOO BLWP @K
SCAN":H$&"BLWP @KSCAN":H$&"C
B @ANYKEY,@STATUS":H$&"JNE
KEYLOO"
230 PRINT #1:"REPL LI R1
,SAVIT":H$&"BLWP @VMBW":&"RET
N LWPI >83E0":H$&"B @>6
A"
240 PRINT #1:"WS BSS 32
":&"SAVIT BSS 768":&"NEWSCR
BSS 768":&"ANYKEY BYTE >20":
H$&"EVEN"
250 DISPLAY AT(3,1)ERASE ALL
:" Enter data just as you"
:" want it to appear, in 24":&"l
ines. Press Enter for blank"
:"lines."
260 FOR J=1 TO N :: DISPLAY
AT(12,1):&"Ready for screen #
"&STR$(J):&"":"Press any key"
270 CALL KEY(O,K,S):: IF S=0
THEN 270 ELSE CALL CLEAR
280 ACCEPT AT(1,0):M$ :: PRI
NT #1:"HELPS"&STR$(J)&" TEXT
' "&M$&RPT$(" ",30-LEN(M$))
&" "'
290 FOR K=2 TO 24 :: ACCEPT
AT(K,0):M$ :: PRINT #1:H$&"T
EXT ' "&M$&RPT$(" ",30-LEN(M
$))&" "'
300 NEXT K :: NEXT J :: PRIN
T #1:H$&"END"
310 DISPLAY AT(3,1)ERASE ALL
:" Source code has been writ
-":"ten to DSK1 as HELP/S. T
o":&"assemble, insert Editor/
":&"Assembler module."
320 DISPLAY AT(7,1):&"Insert
Assembler disk in drive 1
```

```

.: "Select 2 ASSEMBLER": "Load
d Assembler? Y": "Source file
name DSK2.HELP/S"
330 DISPLAY AT(12,1): "Object
file name? DSK2.HELP/O": "Li
st file name? Press Enter": "
Options? R"
340 DISPLAY AT(15,1): "Load t
he resulting object": "file i
nto your program by": "CALL I
NIT ::": "CALL LOAD("DSK1.HE
LP/O") or,"
350 DISPLAY AT(19,1): "much b
etter, imbed it with": "ALSAV
E or SYSTEX."
360 DISPLAY AT(21,1): "Access
the screens in your progra
m by": " CALL LINK("HELP1")
": "CALL LINK("HELP2"), etc
."
370 CALL KEY(O,K,S):: IF S=O
THEN 370 ELSE CALL CLEAR

```

For instance, at any point in a program where keyboard input is required and user may not know what to do -

```

ACCEPT AT(24,1):M$ :: IF M$=
"HELP" THEN CALL LINK("HELP1
") and the first help screen
will pop up to give instruc-
tions. Press any key and the
previous screen reappears.

```

This time I am borrowing heavily from the TI\*MES news letter of England, which has also borrowed from the REC newsletter.

This one is useless, but is a remarkable example of compact complex programming. It shows that there is an algorithm for everything. See if you can figure out how it works -

```

100 CALL CLEAR :: FOR A=1 TO
2 :: FOR B=1 TO 4 :: X=2-AB
S(SGN(B-3)):: FOR C=1 TO X
: PRINT CHR$(84-7*A+5*B-8*X)
:: NEXT C :: NEXT B :: PRIN
T CHR$(A+31):: NEXT A

```

Another useless one that is easier to figure out -

```

100 DISPLAY AT(1,1)ERASE ALL
:"NUMBER OF MONTH(1-12)"
110 ACCEPT AT(2,12)SIZE(2)VA

```

```

LIDATE(DIGIT):A :: IF A<1 OR
A>12 THEN 110
120 DISPLAY AT(3,1):A;"x 4="
;A*4 :: A=A*4
130 DISPLAY AT(4,1):A;" +13="
;A+13 :: A=A+13
140 DISPLAY AT(5,1):A;"x 25="
;A*25 :: A=A*25
150 DISPLAY AT(6,1):A;"-200="
;A-200 :: A=A-200
160 DISPLAY AT(8,1): "Input d
ate (1-31):" :: ACCEPT AT(8,
19)SIZE(2)VALIDATE(DIGIT):B
:: IF B<1 OR B>31 THEN 160
170 DISPLAY AT(10,1):A;"+";B
;"=";A+B :: A=A+B
180 DISPLAY AT(11,1):A;"x 2="
;A*2 :: A=A*2
190 DISPLAY AT(12,1):A;"-40="
;A-40 :: A=A-40
200 DISPLAY AT(13,1):A;"x 50
=";A*50 :: A=A*50
210 DISPLAY AT(15,1): "Input
last two digits of year e
g 91:"
220 ACCEPT AT(16,16)SIZE(2)V
ALIDATE(DIGIT):B
230 DISPLAY AT(18,1):A;"+";B
;"=";A+B :: A=A+B
240 DISPLAY AT(19,1):A;"-105
00=";A-10500 :: A=A-10500
250 DISPLAY AT(24,1): "ANY KE
Y FOR ANOTHER"
260 CALL KEY(5,A,B)
270 IF B<1 THEN 260
280 RUN
290 END

```

One for the little ones - change the string to anything you want.

```

1 REM SILLY PROG BY S SHAW
MARCH 1991
2 ! did you see COMPUTER WAR
S-the film? It is said that
the star, who was required t
o type fast into a computer
3 ! could not type, so a pro
gram just like this one was
used to give a good effect!
4 ! now adjust it how you wi
sh and show your friends how
fast you can type
5 ! at end of text string pr
ogram will just stop with th
is listing but can be modifi
ed to do anything you wish!
6 !
100 A$="This is how a non-ty

```

```

pist can produce information
on screen quickly, without
"
110 A$=A$&"having to look at
what keys are being bashed!
Just bash keys and watch how
perfect text appears no matter
what you press."
120 CALL CLEAR :: PRINT A$:
: : : :
130 CALL KEY(5,A,B):: IF B<1
THEN 130
140 C=C+1 :: PRINT SEG$(A$,C
,1):: IF C=LEN(A$)THEN 160
150 GOTO 130
160 GOTO 160

```

And a very fast routine to find prime numbers -

```

100 ! FIRST 100 PRIMES
-QUICKLY-
110 ! Dr H B Phillips
from THE REC NEWSLETTER
March 1988 Vol 3 #2
120 DIM P(300),X(12)
130 A=0 :: B=1 :: D=0.5 :: E
=180
140 M=100 :: L=3 :: F=0
150 ! increase M for more - also
increase DIMs.
160 PRINT 2;:: C=B :: IF M=B
THEN END
170 L=INT((M/C)*L+F):: N=L+L
+B
180 FOR I=B TO INT((SQR(N)-B
)*D):: PP=P(I)
190 IF PP=B THEN 230
200 IF PP=A THEN PP=I+I+B ::
PRINT PP;:: P(I)=PP :: C=C+
B :: IF C=M THEN END
210 IF X(I)=A THEN X(I)=(PP*
PP-B)*D
220 FOR J=X(I) TO L STEP PP :
: P(J)=B :: NEXT J :: X(I)=J
230 NEXT I :: IF F=0 THEN S=
I
240 FOR I=S TO L
250 IF P(I)=A THEN PP=I+I+B
:: PRINT PP;:: P(I)=PP :: C=
C+B :: IF C=M THEN END
260 NEXT I :: F=(M-C)*L/E ::
S=L+B
270 GOTO 170

```

And a demonstration of how the INTERRUPT routine works independently of whatever else the computer is doing -

```

100 REM interrupt demo
110 REM
120 REM MACHINE LANGUAGE
130 REM ROUTINE LOADED AT
140 REM >2600 XB OR E/A WITH
32K
150 REM >7200 MINI MEM NO 32
K
160 REM
170 CALL INIT
180 XM=9728
190 MM=29184
200 LAD=XM
210 REM TEST XB OR MM?
220 CALL LOAD(XM,170)
230 CALL PEEK(XM,X)
240 IF X=170 THEN 270
250 REM NO 32K MUST BE MM
260 LAD=MM
270 A=LAD
280 REM LOAD M/C
290 CALL CLEAR
300 FOR D=540 TO 630 STEP 10
310 CHECK=0
320 FOR N=1 TO 10
330 READ X
340 CALL LOAD(A,X)
350 CHECK=CHECK+X
360 A=A+1
370 NEXT N
380 READ X
390 IF CHECK<>X THEN 490
400 NEXT D
410 REM POKE INTERRUPT
420 REM ROUTINE ADDRESS
430 REM INTO >83C4
440 CALL LOAD(-31804,LAD/256
)
450 REM JUST IDLE AWAY TIME
460 FOR N=1 TO 9940
470 NEXT N
480 STOP
490 PRINT "ERROR IN DATA STA
TEMENT ";D
500 STOP
510 REM EACH DATA STATEMENT
520 REM HAS 10 DATA BYTES
530 REM PLUS A CHECK SUM
540 DATA 192,236,000,092,004
,194,005,131,002,131,987
550 DATA 000,060,026,003,004
,195,006,236,000,094,624
560 DATA 203,003,000,092,060
,172,000,090,006,002,628
570 DATA 017,015,019,010,006
,002,019,004,002,000,94
580 DATA 002,039,010,083,016
,002,002,000,002,086,242
590 DATA 096,003,016,007,002
,000,000,119,010,083,336

```

```

600 DATA 016,002,002,000,000
,072,160,003,002,096,353
610 DATA 064,000,006,192,215
,192,006,192,215,192,1274
620 DATA 016,000,216,044,000
,094,140,000,004,091,605
630 DATA 000,015,000,000,138
,128,000,000,000,000,281
640 END

```

Run that, then press FCTN  
4. Enter LIST. Enter NEW. To  
stop it, enter BYE.

This is an oldie, but well  
worth repeating. You can use  
it to turn your cassette re-  
corder on and off, to add  
speech or music from tape to  
a running program. With the  
proper hardware, you could  
write a program to control  
almost anything from the  
cassette port. If it doesn't  
work, reverse the polarity  
of the remote. Ed Hall wrote  
this -

```

100 CALL INIT
110 CALL LOAD(16368,79,70,70
,32,32,32,36,252)
120 CALL LOAD(16376,79,78,32

```

```

,32,32,32,36,244)
130 CALL LOAD(8194,37,4,63,2
40)
140 CALL LOAD(9460,2,12,0,45
,29,0,4,91,2,12,0,45,30,0,4,
91,203,78)
150 PRINT "PRESS": " P Play":
" S Stop"
160 CALL KEY(3,A,B)
170 IF B<1 THEN 160
180 ON POS("PS",CHR$(A),1)+1
GOTO 160,190,200)
190 CALL LINK("ON"):: GOTO 1
60
200 CALL LINK("OFF"):: GOTO
160

```

And that is just about -

MEMORY FULL!

Jim Peterson

sjs- tips 69 repeats  
material from earlier TI\*MES  
but is unedited to benefit  
readers who are new to us or  
who missed this items first  
time round. Other readers-  
please bear with us! Ta. sjs

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HOW TO LOAD ALL CHARS FILES IF YOU  
AREN'T USING FUNNELWEB V5  
a letter to the BB&P editor [lima] from Tony McGovern

If you are using ALL CHARS mode in Word Processing (as distinct from  
Program editor) then a tab record will be written to file with  
Savefile. This tab record uses the basic EuroWriter format and this  
will LOCK UP any TI Writer version (including earlier Fw). The docs  
warn against this. V5 is the only one that can handle ALL tab  
records.

The work-around is to fool TI Writer into thinking it is inserting the  
file into an existing buffer by LF <enter>, 0 DSKX.FILENAME <enter>.  
this bypasses the tab record in the file being loaded. This wouldn't  
have been necessary if TI had not used an imcompatible tab record  
format in Euro Writer. Until the 40 col v5 is released, 40 col users  
will need to employ this trick to read A/C or E/W files, just as we  
always had to do to read E/W files until now.

[TI\*MES readers will be aware of a previous way round this by adding a  
dummy "correct" tab record to the end of the odd DV80 file. Tony's  
suggestion is of course faster! sjs]

BIT BUCKET #11, MAY 1988 By Art Byers  
MANUAL LABOR

This column was inspired by one sentence in a product review written by Harry Wilhelm of the Twin Tiers Users' Group: "One's first response — is the reaction to the owner's manual." Yes! I agree and then some!

I have previously expressed my dissatisfaction with my club's purchasing a hardware item for over \$250 and finding the manual was cheaply and poorly photocopied with some barely legible type. My feeling was that if the manufacturer cut corners this way, where else had saving money been put before quality? I suspect the negative feelings carried over to my appreciation of the product itself.

On the other hand, I have just purchased a new EPSON LX-800 Printer.

Now the LX-800 comes with what I consider one of the finest product manuals I have ever received — and please note the printer cost \$50 less than the hardware mentioned above that came with the poorly reproduced documentation.

The book, yes it is a real spiral bound book, comes professionally printed. It is well thought out. Explanations are in clear easily understandable English. Some printer manuals seem to have English type but Japanese Syntax!!

To further clarify any difficult portions, concrete programming examples are given. The manual has one chapter that can serve as a concise tutorial on how to program printer graphics using data statements. I never really fully understood how to do this until I read that section.

Furthermore, such things as changing print heads, setting dip switches, selecting foreign character sets, defining your own characters, etc. are covered in concise detail. Where needed for clarity, excellent line drawings of printer parts are supplied. I rate this among the best of the manuals I have ever received.

The manual for my previous printer was also pretty good, — in fact so good that I often gave photo copies of key pages to other club members whose printer manuals were obtuse, but it pales beside this new manual. Still it does cover one or two items in better detail — so it is obviously difficult to be all things to all users without writing an encyclopedia.

All in all, I was very pleased with the hardware itself and a major part of that is because the fine manual left me with a good understanding of its capabilities and the feeling that I could easily be in full control of my printer.

Kudos to the Epson company!!

Another good manual is the one that comes with the software, SPAD XIII mark 2. Here is an inexpensive software product and the manual is only a small booklet. None the less, it shows all signs of having been prepared with thought and care and it covers everything needed to use the software properly. Obviously, from both the above examples there is not necessarily a connection between price and quality of manual.

One of the ways the TI-99/4A distinguished itself from almost every other home computer that was on the market, when it first came out, was in the good quality, depth of detail, and understandability of the manuals supplied with the console. As a beginner's manual, the book "Beginner's Basic" that came with the plain console is excellent.

The intermediate book (for which you had to send away via mail order), Herbert D. Peckham's "Programming Basic with the TI Home Computer" was also a fine tutorial. If you were smart enough to go through these books along with the detailed "User's reference Guide", you gained a thorough foundation for going further into programming and using your computer. These three manuals prepared you very well for the TI Extended Basic reference book, a fine instruction manual in its own right.

Beyond this point, for various reasons of their own, TI held back needed information for advanced use of the expanded 99/4A system and their otherwise excellent manuals suffered from it. There were many important things omitted from the E/A and RS232 manuals as examples.

For another, where in the books readily available to the average user did TI explain the use of Tokens, how a merge file reorders line numbers of a Basic program, how to read the tokens in a Basic program and some of the many uses to which a merge file can be put? This information was spread by third party magazines and UG newsletters, not by TI. The problems TI made for themselves, oh say as compared to Apple, which was also a 48K computer (but of open to all architecture) at the same time, are well known.

To wind up this discussion, even 99/4A FAIRWARE often succeeds or fails on the quality and clarity of its documentation. It is a software truism that the more powerful it is- the more things it can do, the more complicated it becomes to use. No matter how well an author tries to make a powerful program user friendly, the first impression made by the "Docs" is all important. My favorite dictum "When all else fails, try reading the instructions" comes to naught when the manual is confusing and poorly constructed.

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## INTERLACING

by Col Christensen  
Brisbane User Group  
Australia

Maybe you've been formatting a disk using a program such as Rapidcopy and noticed that in the formatting options is one entitled interlace. This particular program supplies a default interlace value of 3 which we presume is the most suitable one to use. After a little practical research on the subject, some of the findings are presented here.

But firstly, what is this interlace. Well, it relates to the order in which the sectors are laid down on each track of a floppy disk. You already know that on a single sided disk there are 40 tracks or concentric rings of magnetic media formatted to accept data. On each track, the formatting procedure sets out 9 sectors on which our data can be stored and between each sector on the track, are quite a number of data bytes that the disk drive itself needs to guide it on its merry way.

Below is shown some orders of sectors on a disk track to illustrate the different interlaces from 1 to 5 only.

INTERLACE

- 1 0, 1, 2, 3, 4, 5, 6, 7, 8
- 2 0, 5, 1, 6, 2, 7, 3, 8, 4
- 3 0, 3, 6, 1, 4, 7, 2, 5, 8
- 4 0, 7, 5, 3, 1, 8, 6, 4, 2
- 5 0, 2, 4, 6, 8, 1, 3, 5, 7

One would expect that the order of sectors on each track would be 0 to 8 but such is not generally the case. Consider what would happen if this were the case. The disk is spinning at 300 rpm and in each revolution 9 sectors with their IDentity marks etc are whizzing past the disk drive head. In theory then this would be the fastest way to read data from a disk. You would need just ONE revolution of the disk to be able to read all 9 sectors on it.

But, suppose that sector 0 has been read and its contents placed in a suitable area of memory. The drive now looks for sector 1's ID mark but, unfortunately, in the time that has elapsed since sector 0 was read, the spinning of the disk has carried sector 1's ID past the head. What now then? Well, it simply waits for the next time sector 1 comes round, then swoops on it. So you can see that in this case the system is slowed down by relatively large waiting times.

If you follow across the sector order with an interlace of 2, you can see that after sector 0 is accessed, sector 5 passes by, maybe giving the drive time to get back to read sector 1 when it arrives. With most disk drives and the controller routines we are currently using, even this interlace is too fast.

Here, then, is a table of READ and WRITE times I have constructed from tests carried out.

\* different equipment and different file types or different programs accessing files MAY give quite different results \* [sjs]

To better measure the operation of the floppy system, all READ operations were from floppy to RAM disk and WRITE operations from RAM disk to floppy. this way, any variations in results can be attributed mainly to the floppy drive. The material copied was from an almost full disk of 64 non-fractured files and the software used was DM-1000.

INTERLACE	WRITE	READ
2	16m 8s	4m 2s
3	11m 11s	2m 45s
4	11m 19s	3m 1s
5	12m 15s	4m 2s

Conclusion:- With the disk drives and the TI disk controller I was using, the worst interlace to use would be 2. The best performance was obtained with an interlace of 3, the greatest benefit over interlaces 4 and 5 being in the speed of reading data from the disk.

Experiment for yourself - but the default 3 will tend to be the best to use for disks you are swapping with others!

=====



Kenneth Hughes  
220 Broadland Drive  
Lawrence Weston  
Bristol Avon  
BS 11 OPN

Dear Gary,

Here is an article on a subject I am interested in you might like to print in TI\*MES ,INTERNET,Ihave been reading with some interest the last couple of weeks in various magazines ie: The Computer Shopper,the American magazine WIRED etc.About netting it's Ups & Downs,you wouldn't believe how much publicity is being written on the subject.The most interesting idea is the BBC are going to get involved in the Net,so if you have a modem connected to your computer,you can get in touch with the BBC Networking Club.For a flat subscription fee of Twelve Pounds you can for a cost of a local call connect to the NET,part of the BBS called AUNTIE is a HELP facility for novices to connect to jungle six days a week.All internet facilities are available,BBCNC,electronic mail,file transfer,Use Net news groups,Multiple User Dimensions and The Worldwide Web,more advice available on 081-576-7799.

Another article about the Net in the same magazine is on junk mail on the net and it's disasterous effects it's having to other users,The junk mail called SPAM is clogging up the network so bad ,something will have to be done to stop the idiots who are doing it .There are thousands and thousands of internet worked computers in america and about 150,000 doubling every eight months in the UK.Years ago to get on the NET you had to use university or bussiness computers but nowadays it is to easy to do so,Spamming can cause the bringing down of the network for hours or days at a time.The Net is a useful resource and enjoyed by many people in the world,for recreation or special interest groups to urgent request for help.When the Net started it was a Bulletin Board for Academics etc. with one special rule no advertising for commercial purposes but that idea has gone out of the window,with the result of ruining for the masses.The dangers of spam,is a small posting of say 5K,posted to every news group would use up 50MB on the news server disc space which has to be paid for,as it goes from server to server there are over 100,000 it will eat up over 5,000 gigabytes(5 million megabytes)as it spreads across the net.In response to a spam the net will get over 500,000 E-mail users replying angrily to the spam,So more disc space used up.Vicious circle...If you would like to read more on the Spam issue try getting hold of a copy of Computer Shopper issue 80 Oct94.

One more item on the NET you may be interested in is some publications advertised recently,by RANDOM HOUSE publishers,for users of the net.Five books - Net Games,Net Guide,Internet Basics,Slick Tricks,Cruising Online.

Net Games - handbook on thosands of games active on-line,from fantasy to dungeon and dragons,tips and listings included....  
ISBN:0-679-75592-6

Net Guide - complete directory to cyberpossibilities from the bizarre to the practical.4000 listing included for internet and BBS's ....  
ISBN:0-679-75106-8

Internet Slick Tricks - full of shortcuts,concise explanations and tips for using the internet.also full of useful ideae's to recieve E-mail ,downloading and managing files ...  
ISBN:0-679-75611-6

Internet Basics - step by step guide on how to use your internet resources to the full,also on how to set up your modem,covering all commands on the internet for access points,user interfaces and research techniques ,all with clear instructions...  
ISBN:0-679-75023-1

Cruising Online - points you to all useful resources on Comuserve,Prodigy,and America Online helps you with all the features on the internet.All you need to get online and make the most of your time there...  
ISBN:0-679-75155-6

I hope I haven't dragged on to long but I thought you and others would like some useful information which can be passed onto others with the same interest as me.As I am an avid user of a modem with over fifty memberships to BBS's,I come into a lot of information over a period of time,Space,science fiction,and astronomy are my favourite passtimes on the BBS.I log onto any BBS of any computer,at the moment I am into WEFAX satellite pictures from space (weather and space pictures) downloaded from a club called R.I.G. remote image group..contact Ray Godden Tel.0923-720714 it's a very interesting subject,they have loads of images on disc for sale in many formats.

Well I hope that's some interest to some of you,all the best to all TI'ers....

-- KEN --

TEL. 0272-493161 (NEW NUMBER) 15/1/94

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### Positions up for grabs.

As of this issue, Alasdair Bryce and myself are leaving our positions of Membership Secretary and TI\*MES Editor respectively.

Should anyone like to try their hand at either of these jobs then please contact the Chairman - Trevor Stevens on 0623 793077. We will, however, continue in our current positions until someone fills these spots.

Many thanks to Alasdair for his support to the group through the years and for carrying out a good job!!

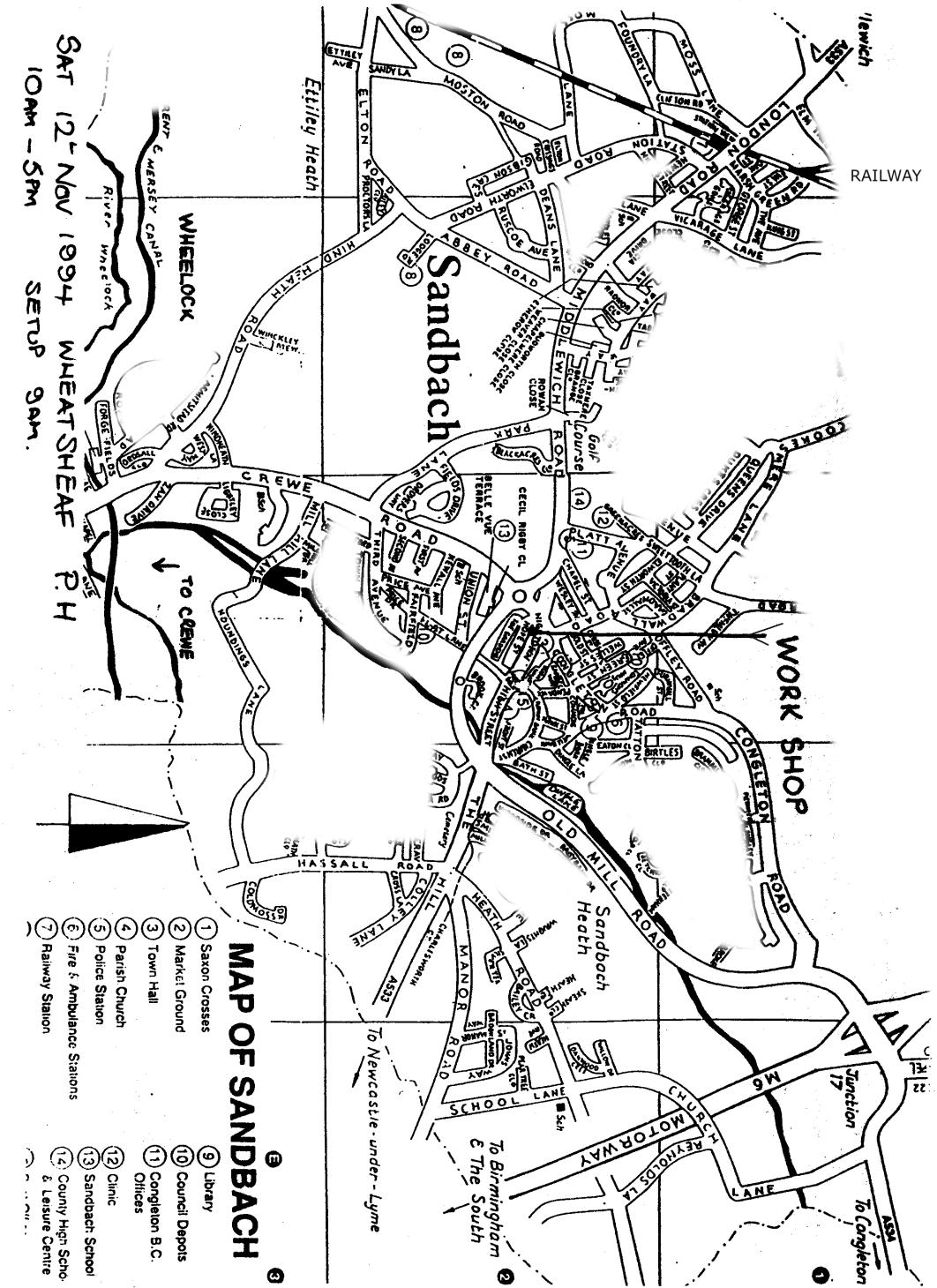
The applicant for the Editorship will have the loan of an expansion box with 32K memory, RS232 / parallel, and disk controller card ( When the Vice Chairman returns it!! ). So if you are a console only person this is the ideal way to try out the expanded system in return for some of your time.

In the next issue there will be two more systems up for sale. If you need more information now then please contact Alasdair. I couldn't fit the adverts in this time. Sorry Alasdair -- Ed..

## MODULE LIBRARY

TITLE	QTY in STOCK	PRICE
ADDITION AND SUBTRACTION 1	2	3.00
ADDITION AND SUBTRACTION 2	1	3.00
ADVENTURE COMPLETE WITH PIRATE TAPE	3	5.00
ADVENTURE MODULE	3	3.50
ALPINE	2	4.50
A-MAZING	10	2.50
BEGINNING GRAMMAR	7	3.00
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SPACE JOURNEY	1	2.50
STAR MAZE +	1	4.50
STATISTICS	1	4.00
TERMINAL EMULATOR II	3	5.00
TI LOGO + ORIG. FOLDER WITH MANUAL*	1	15.00
TI LOGO II + ORIG. FOLDER WITH MANUAL*	1	25.00
VIDEO CHESS	1	5.00
YAHTZEE	2	3.00

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