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HOCUS

TIPS & TIDBITS

Home Computer
Users Spotlight
a monthly publication of the
Milwaukee Area 99/4 Users Group



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MILWAUKEE AREA USER GROUP
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Next Group Meeting - 2nd Saturday
February 11, 1989 - 12 noon t 4 PM
Waumatoso S & L - 7500 West State

North Sub-Meeting - 1st Tuesday
February 7, 1989 - 7 PM til 1 PM
Security S & L - 5555 N Pt Washington

South Sub-Meeting - 3rd Tuesday
January 17, 1989 - 7 PM til 10 PM
Franklin State Bank - 7000 So 76th

Membership Dues \$10 - Family \$15

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Memory Full:

When your computer is turned on, it reserves 1554 bytes for file manipulation. This is equivalent to CALL FILES(3). Using the command CALL FILES(2) will free up 518 bytes of memory and CALL FILES(1) will free up 1036 bytes. With memory expansion and nothing loaded, SIZE should show 11840 Bytes Stack Free and 24488 Bytes Program Free Space. Load your program and enter SIZE again. Now the Program Free Space should decrease showing the space your program has occupied. Enter RUN and then FCTN (4) to break. SIZE now should show a decrease in both, telling how much memory is used up by Variables, Arrays, CALLs, GOSUBs etc.. In addition, while running your program, each disk file or printer port that is opened will access an additional 518 bytes until it is closed.

So don't use GOSUBs unless the SUB routine is used several times; keep variable names short; dimension arrays only in the size and quantity needed; use OPTION 1 if arrays do not use 0's. Each line number uses 2 bytes so combine lines as much as possible. Convert numeric variables into string variables for storage in the 32K MX allowing larger programs in console memory.

TI Writer Little Known Tips:

CTRL K - deletes all text to the right of the cursor.

CTRL V - moves the cursor to the beginning of the line.

FCTN 0 - moves line numbers off screen displaying more text.

To print out file with line numbers select PrintFile and enter L P10 note: maximum line length printed is 74 characters per line.

The last line number is referred to as E. Thus DeleteLines <Enter> 23 E <Enter> deletes lines 23 to the End. When not in Word Wrap, Control (U) Shift (M) Control (U) will insert the CR carriage return symbol.

Spreadsheet data from MULTIPLAN can be stored in DVBO format by selecting PRINT TO FILE instead of SAVE FILE. The file can then be edited and/or merged into TI-Writer.

Maze Maker
by Steve Karasek

This program will print mazes for you to solve. It asks for the number of mazes to print, then for the level of difficulty, from 0 to 9. Level 0 is a VERY trivial maze (a child's first maze, perhaps), while level 9 is fairly challenging. The level number is printed at the top of the maze.

No matter what level you select, the maze will be printed to fill as much of the page as possible, so the lower-level mazes will have wider pathways which are easier for young children. There will always be exactly one path from Start to Finish.

The higher-level mazes take a while to compute. In particular, level 9 mazes take over 20 minutes each. You can always start up the program and come back a few hours later. The program keeps track of how far it has gone in computing each maze by displaying a line of the form M / N on the screen, where N is the number of squares in the maze and M is the number of squares the program has computed a path to. When M equals N, the maze is done and is sent to the printer.

If your printer is not named "PIO", change the name in line 110. The last part of this line sets the printer line spacing to 7/72 inch. If you do not have an EPSON-compatible printer, you will have to change this to the codes needed by your printer to set the line spacing. If you can't set it to 7/72 inch, set it to 8 or (preferably) 10 lines per inch.

The !'s and numbers at the end of each line are the checksums for Tom Freeman's CHECKSUM program, and are not needed by the maze program.

```
*****
* MAZE - THE PROGRAM *
*****
```

```
100 RANDOMIZE :: OPTION BASE
1   :: DIM M(39,39):: INPUT "
HOW MANY MAZES? ":2 :: PRINT
1223
110 INPUT "LEVEL OF DIFFICUL
TY(0-9)? ":L :: IF L<0 OR L>
9 THEN 110 ELSE OPEN #1:"PIO
",OUTPUT :: PRINT #1:CHR$(27
);"A";CHR$(7);!131
120 N=INT(L+1)*4+(L=4 OR L=9
):: X=90/N :: S=INT(X):: S=S
+(X-S)!138
130 PRINT #1:"Start";TAB(30)
;"Level";L :: FOR X=1 TO N :
: FOR Y=1 TO N :: M(X, )=0 :
: NEXT Y :: NEXT X :: IF N=3
9 THEN 150 !174
140 FOR X=1 TO N :: M(N+1,X)
,M(X,N+1)=16 :: NEXT X !203
150 C,X,Y=1 :: DISPLAY ERASE
ALL AT(12,12):"1 /";N*N ::
```

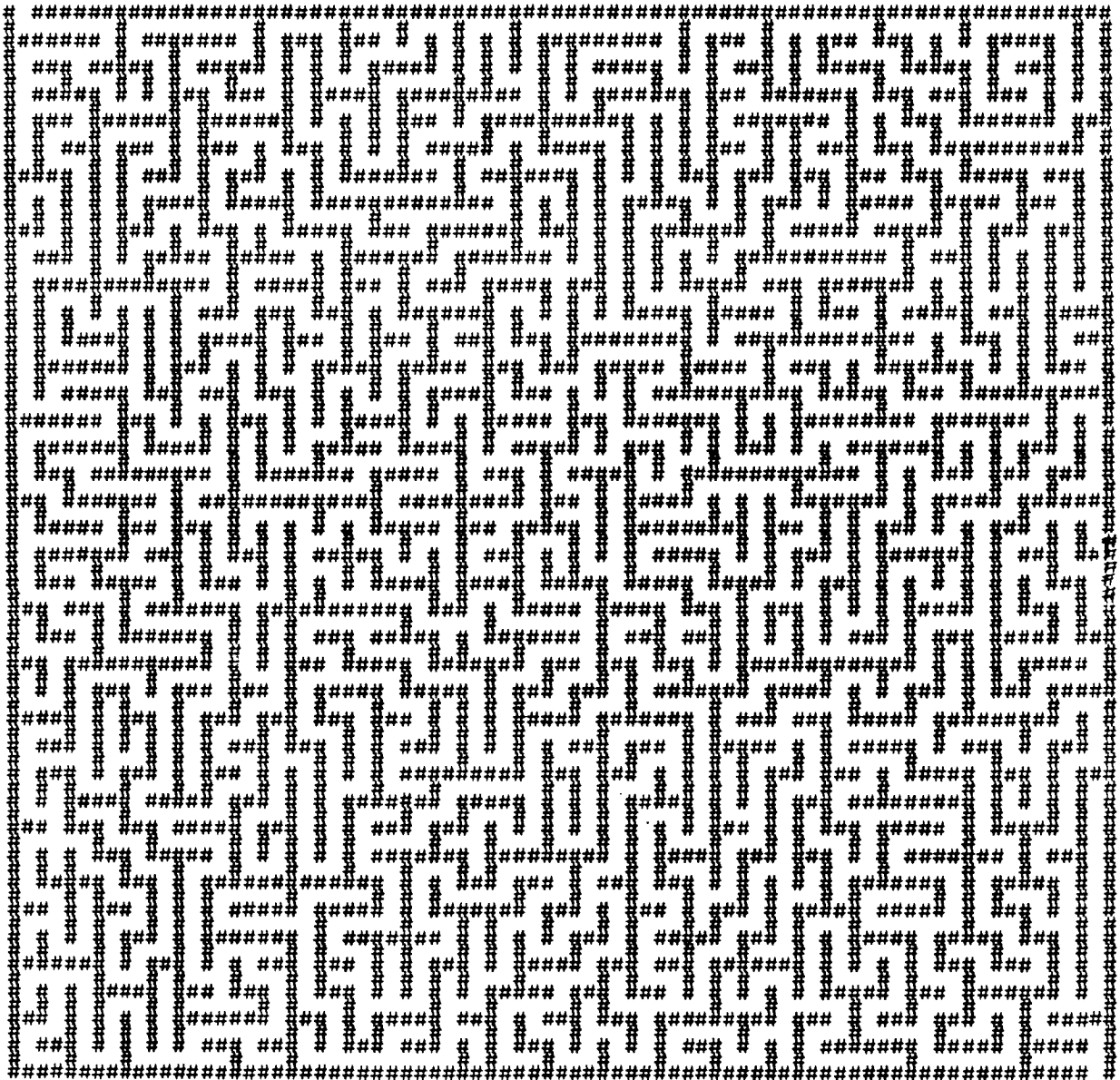
```
ON ERROR 290 !059
160 V=INT(RND*4):: DX=X+(V=0
)-(V=1):: DY=Y+(V=2)-(V=3)::
K=M(DX,DY):: IF K THEN
160 !229
170 M(X,Y)=M(X,Y)+2^V :: IF
INT(W/2)*2=W THEN W=W+1 ELSE
W=W-1 !125
180 X=DX :: Y=DY :: M(X,Y)=M
(X,Y)+2^W :: C=C+1 :: DISPLA
Y AT(12,9)SIZE(4):USING "##
#" :C :: IF C=N*N THEN 240 !0
53
190 IF X<N THEN IF M(X+1,Y)=
0 THEN 160 !198
200 IF Y<N THEN IF M(X,Y+1)=
0 THEN 160 !199
210 IF Y>1 THEN IF M(X,Y-1)=
0 THEN 160 !117
220 IF X>1 THEN IF M(X-1,Y)=
0 THEN 160 !116
230 X=INT(RND*N)+1 :: Y=INT(
RND*N)+1 :: IF M(X,Y)THEN 19
0 ELSE 230 !248
240 ON ERROR STOP :: PRINT #
```

```
1   :: PRINT #1:"#";TAB(S+1);R
PT$( "#",S*(N-1)+1):: S=S
-1 :: S=RPT$( " ",S):: X=RP
T$( "#",S)!069
250 M(N,N)=M(N,N)+8 :: FOR Y
=1 TO N :: FOR W=1 TO S :: P
RINT #1:"#";:: FOR X=1 TO N
:: PRINT #1:S$;!076
260 IF M(X,Y)AND 2 THEN PRIN
T #1:" ";ELSE PRINT #1:"#";!
084
270 NEXT X :: PRINT #1 :: NE
XT W :: PRINT #1:"#";:: FOR
X=1 TO N :: IF M(X,Y)AND
8 THEN PRINT #1:S$;ELSE PRI
NT #1:X$;!244
280 PRINT #1:"#";:: NEXT X :
: PRINT #1 :: NEXT Y :: S=S+
1 :: PRINT #1 :TAB(S*N-4);"
Finish":CHR$(12):: Z=Z-1 ::
IF Z>0 THEN 130 ELSE END !0
20
290 ON ERROR 290 :: RETURN !
60 !159
```

EXAMPLE OF A MAZE FROM "MAZE MAKER"
by Steve Karasek

Start

Level 9



Finish

Do you enjoy playing the 'CONNECT THE DOTS' game ??
Here is an easy fun way to play an elaborate advanced version of it.
Simply printout a level 9 MAZE and go on from there. This may produce a too
highly skillful time consuming game for some of you couch potatoes so I guess
you could start out with an easier lower level Maze.

Techo Time 64K bytes of Memory on the 16 bit bus

by Lou Amadio and Geoff Trott

Ever since I first read about the "16 Bit 32K Memory In The Console" by Ron Marissen about 6 months ago I have been curious to find out just how much difference it would make compared to the standard 32K as provided by TI (on the 8 bit data bus). The project, however, was put off for a long time for one reason or another.

Recently, an opportunity arose to do some hardware hacking, so I approached Geoff Trott. Geoff did not need much persuading as he enjoys the odd hardware project, especially after many long hours editing the TISHUG News Digest. With the availability of 32K byte static RAM chips, we naturally wanted to use these as they are a good deal cheaper (per byte) than the 8K chips which Ron Marissen used in his original version. Ron described how to install 4, 8K RAM chips over the 2 system ROM chips. Although we now had 32K in one chip we still had to use 2 chips as each host chip in the console (the system ROMs) were only connected to half of the data bus of the TMS9900 CPU.

Apart from the 32K chips (2 of), we also needed another control chip. Geoff settled for a 74LS21 (dual quad input AND gate). Where the original article called for a total of 7 chips, Geoff managed to do it with only 3 - this simplified the construction considerably. So in fact, we ended up installing 64K byte of static RAM of which only 32K byte were required by the CPU. We were wondering whether we could bank switch the remaining 32K bytes, but this would require special software to be written. Geoff then struck upon the idea of manually switching different banks of this "free" 32K memory within the normal address range of the CPU (see notes on enhancements).

In the process of installing the 32K chips, Geoff decided to remove the 6810 Console (scratch pad) RAM (256 bytes) in order to give better access to some PCB tracks and simplify the circuit. The scratch pad RAM would now be part of the "free" 32K and thus was quadrupled in size to a full 1024 bytes. The normally unavailable 768 bytes could now be used for some unique utility software requiring high speed RAM, such as interrupt routines or load interrupt routines. Routines using this area would not be corrupted by running any current program.

This is how we initially used the new static memory:

32K CPU RAM on the 16 bit data bus

Low memory >2000 to >3FFF

High memory >A000 to >FFFF

1K Console RAM on 16 bit data bus

1K bytes available at >8000 to >83FF

The above memory could have battery back-up if required.

How did it perform?

Improvements in speed were expected since access to the 32K was now done as a "WORD" (16 bits) rather than as a "BYTE" (8 bits), and also due to the elimination of memory "wait states" which were incorporated by TI into the design to allow for slow access memory chips. With all timings in microseconds, reading a word or byte takes .667 instead of 2, while writing a word or byte takes 1.5 instead of 4.333.

It was found that power requirements of the console were marginally reduced with this modification (including 2 6810 RAM chips removed).

The following programs were superficially tested in order to quickly gauge the performance of the new memory expansion.

TI-Writer - approximately 30% faster for Replace String; approximately 50% faster for enter/delete functions.

Multiplan - approximately 30% faster.

Parsec - no difference?

TI Runner - noticeably faster

Buck Rogers - noticeably faster

TI Artist - satisfactory

Munchman - noticeably faster

Computer War - too fast?

The following programs did not work with the 16 bit 32K, possibly due to the way that the programs access VDP RAM:

Tennis, Ant Eater, River Boat Rescue, Submarine Commander.

How to do it

The instructions and diagrams below describe how to install the new memory chips. This article is not intended to be a step by step guide and anyone not thoroughly familiar with hardware hacking should consult the advice of their local "techo".

Minimum parts required are: 2 of 62256, 32K x 8 bit static RAMs

2 of 24 pin IC sockets

1 of 74LS21, dual quad input AND gates

- 1) Locate and remove the system ROM chips (U610 and U611) on the TI99/4A mother board and solder IC sockets in their place. These chips are in sockets in order to facilitate removal of the 32K memory expansion at a later date, if required. A good solder sucker is recommended for this step to prevent possible damage to the PCB or the chips. (Note that it is possible to add the 32K without removing any chips, but extra chips will have to be installed and other tracks/pins cut.)
- 2) Remove and discard the two Console (scratch pad) RAM chips (U608, U609 - part number 6810). This step frees up an input to stop the wait state generator as well as allowing the expansion of the scratch pad RAM to a full 1K byte.
- 3) Desolder pin 8 of U507 from the motherboard, cut the base of the pin and bend it out for further connection. You may find it easier to completely remove this chip, bend out pin 8, then replace it.
- 4) Carefully bend the legs of the 62256 chips in a little (mind static electricity) so that they will sit firmly on top of the host chips. Bend out pins 1, 2, 20, 22, 23, 26, 27 and 28 of each 62256 prior to installation to facilitate wiring later.
- 5) Place one 62256 chip over U610 and the other over U611, facing them the same way as the host chip. Pins 1, 2, 27 and 28 of the 62256s will hang over the end of the ROMs. Solder as per instructions below. Do not forget to mark each set in some way so that the bottom chips (U610, U611) are inserted into their correct sockets on the mother board.
- 6) Bend legs 7 and 14 of the 74LS21 in a little and bend all other pins out for further connections. Locate this chip over U507 (facing the same way) and solder as per instructions below.

Make the following connections using thin gauge insulated single core wire where necessary:

Pin 1 of both 62256s to pin 3 of U504 (A0(H)).

Pin 2 of both 62256s to pin 1 of U504 (A2(H)).

Pins 3 to 14 of 62256s to pins 1 to 12 of host ROM (U610 or U611).

Pins 15 to 19 of 62256s to pins 13 to 17 of host ROM (U610 or U611).

Pin 20 of both 62256s to pin 8 of 74LS21 (CS(L)).

Pin 21 of both 62256s to pin 19 of host ROM.

Pin 22 of both 62256s to pin 11 of U602 or pin 9/10 of U508 (DBIN(L)).

- Pin 23 of both 62256s to pin 6 of U503 (A3(H)).
- Pins 24 to 25 of 62256s to pins 22 to 23 of host ROM (U610 or U611).
- Pin 26 of both 62256s to pin 2 of U504 (A1(H)).
- Pin 27 of both 62256s to pin 16 of U608 (WE(L)).
- Pin 28 of both 62256s to +5 volts.
- Pin 1 of 74LS21 to pin 14 of U504 (>2000 page select).
- Pin 2 of 74LS21 to pin 10 of U504 (>A000 page select).
- Pin 3 of 74LS21 not connected.
- Pin 4 of 74LS21 to pin 9 of U504 (>C000 page select).
- Pin 5 of 74LS21 to pin 7 of U504 (>E000 page select).
- Pin 6 of 74LS21 to pin 9 same chip (expand the selection gate).
- Pin 7 of 74LS21 to pin 7 of U507 (host chip).
- Pin 8 of 74LS21 to pin 20 of both 62256s (for chip select) and pin 12 of U606 (to disable the wait states and 16 to 8 bit converter).
- Pin 10 of 74LS21 to pin 8 of U507 (scratch pad RAM select). Note: pin 8 of U507 should be disconnected from the mother board.
- Pin 11 of 74LS21 not connected.
- Pin 12 and 13 of 74LS21 to pin 14 same chip.
- Pin 14 of 74LS21 to pin 14 of U507 (host chip).

Enhancements

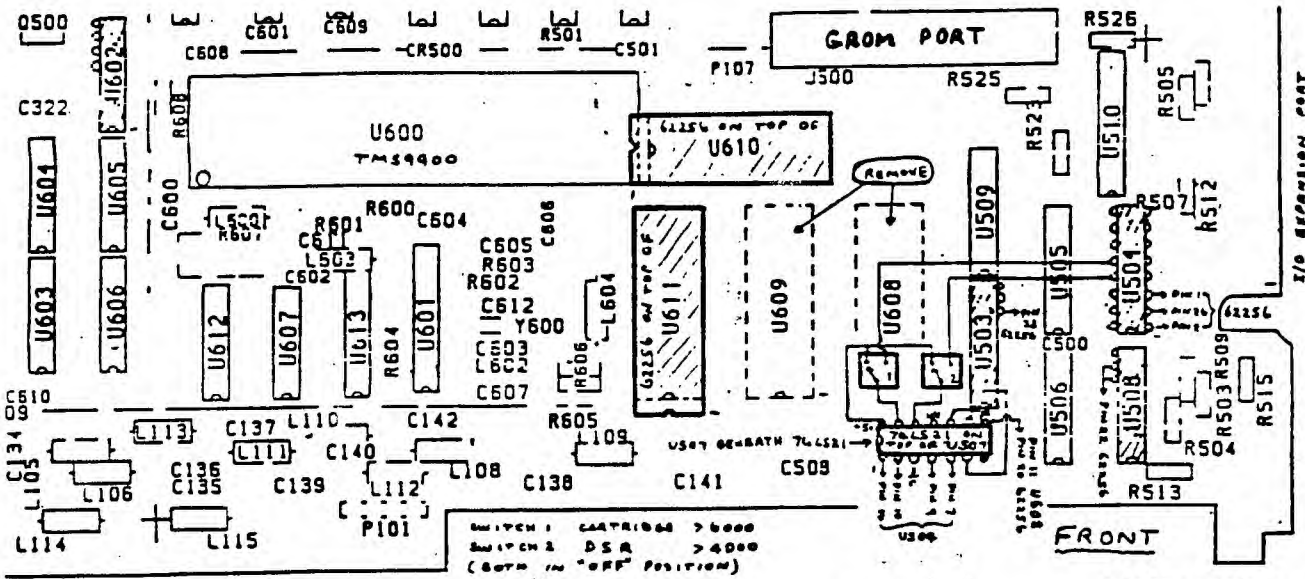
The following enhancements were intended to make use of the available "free" 32K arising from installing 2 of 62256 chips inside the console. These modifications should only be carried out with caution. Depending on how the switching is arranged, the possibility exists for two lots of memory chips to be accessed simultaneously within the same address space. The results could be fatal! (to the chips that is!)

- 1) It is possible to invoke memory in the 8K cartridge space (>6000 to >7FFF) simply by installing a double throw switch from pin 12 (or 13) of the 74LS21 to pin 13 of U504 (>6000 page select). If pin 12 is linked to pin 14 as per instructions above, this link must be removed and the connection to pin 14 is wired as one of the switch positions (see diagram). This memory space must not be used by any other cartridge or device while this switch is active. It is advisable that this requirement be incorporated as part of the switching. Switch pin 12 of 74LS21 to +5 volts (pin 14 of 74LS21) to de-activate this function.
- 2) The DSR space (>4000 to >5FFF) can also be made available in static RAM by switching pin 12 (or 13 if already used) of 74LS21 to pin 12 of U504 (>4000 page select). Switch pin 12 of 74LS21 to +5 volts (pin 14 of 74LS21) to de-activate this function. The same precaution with respect to accessing more than one active memory applies as mentioned above.

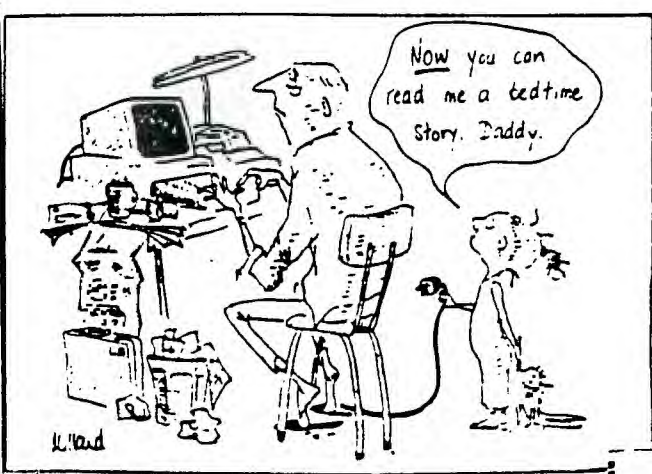
If all of these modifications are carried out, then you have effectively used 49K bytes out of the 64K byte upgrade. The remaining 15K bytes cannot be easily used at this time. Perhaps what we need now is some sort of indicator to show that all is working as intended?

Watch this space!

The next hardware project will describe how to produce a truly versatile "SuperModule" containing Minimax, Editor Assembler and 4 manually switched 8K byte banks of battery backed RAM at >6000.



32K ON THE 16 BIT DATA BUS - T.I. 99/4A



I got busy this month and actually did some programing. The first program was written because of inspiration I got when talking to Irwin Hott at the Milwaukee Faire. Irwin said there is no word processor on the TI for blind people, even though the TI is well suited for them with the inexpensive, quality speech synthesizer and easy operating system it uses.

The second program, which I am sure has been written in a similar form by someone else in the past, is a utility which I needed to print out the first program. It must be used with XB because of the requirement of a LINPUT statement (so that commas will be input.) It will print out up to 7 screen lines per line number, and will automatically adjust the left margin after 75 lines so you can get the printout shown on the next page. You must adjust the paper back to top of form yourself. If you don't have an Epson compatible printer you may have to change the codes in lines 140 and 460. In line 140 the codes tell the printer to print condensed, double strike at the left margin input in line 130. Line 460 adjusts the left margin over 33 columns at each pass.

You should be advised that printer manufacturers don't recommend that you turn the platen manually with the power on. I've been doing it on my Gemini 10X for years with no problem though. You can always reinsert the paper and use the line feed button on the printer to adjust the paper as well.

WORD PROCESSOR FOR THE BLIND:

This program could also be used as a typing tutor with your eyes closed, or just as a demo of the speech capability of the TI. If you change the PRINT #1 statements to PRINT you could make it into a BASIC word processor. The program requires BASIC because it needs the TE II module in order to work. Because it uses BASIC you are not able to input strings containing commas from disk. you can put commas in your text and print them out. You just can't get them off from disk!

The program uses a file named MENU when you press the AID key. You will need to make this up using this or another word processor. It should contain the following lines:

FUNCTION KEY LISTING?

1. DELETES THE LAST WORD.
2. INSERTS 1 OR MORE LINES B 4 SOME LINE NUMBER?
3. ERAYSSSES A LINE AND LETS U CHANGE IT?
4. STOPS THE PRO-GRAM. ENTER CONTINUE TO PRO-CEED?
5. BEGINS A DISK SAVE OR LOAD. DEFAULT IS DISK 1. TEXT?
6. PRO-CEEDS TO PRINT OUT THE FILE.
7. IS AID?
8. LETS YOU RE-DO ALL TEXT STARTING AT SOME LINE?
9. REEDS BACK THE LAST TO LINES.
- UP. AIRO TELLS THE CURRENT LINE NUMBER.
- RIGHT. AIRO TELLS THE COLUMN NUMBER?
- DOWN. AIRO LISTS THE FILE.
- LEFT. AIRO SPELLS A LINE OUT SLOWLY
- USE ENTER? FOR CARRAGE RETURN?
- TO DELETE A LINE PRESS FUNCTION 3. THEN ENTER 1 SPACE FOR NEW TEXT.

As each word is entered it is spoken. (When you hit the space bar.) The Term Emulator only pronounces letters for text written in lower case, so I wrote a conversion routine so the words would be pronounced, while still keeping the letters in lower case. If over 7K of memory is used (about 3 pages) a warning is issued. There is also a bell for the left margin like on a typewriter. There is no screen display. You may have a problem importing files from TI Writer. I assume it is because of the use of commas. Some files do load OK.

You can input text at a 25 WPM rate. This includes the words being spoken back. You have to type at a slow, steady pace for best results, especailly when typing double letters, as in "good".

If anyone uses this program I would appreciate hearing from them. You can use any printer. Thats why I didn't add printer sensitive options like tabs and left margins. You can add those yourself!

John Wineke 109 Franklin St. Lake Mills, Wi 53551

MADAREA 99ER NEWS

```

100 DIM W$(200)
110 OPEN #1:"SPEECH",OUTPUT
120 PRINT #1:"INPUT PRINT WI
DTH?"
130 INPUT C
140 PRINT #1:C
150 PRINT #1:"INPUT PAGE LEN
GT?"
160 INPUT PL
170 PRINT #1:PL
180 I=I+1
190 PRINT #1:"LINE";I
200 CALL KEY(O,K,S)
210 IF B<1 THEN 200
220 IF K>96 THEN 680
230 IF K>32 THEN 700
240 IF K=32 THEN 460
250 ON K GOTO 1020,200,260,1
820,200,930,1190,1500,1270,1
290,190,780,520,1700,910
260 IF W$(I)<>" THEN 280
270 W$(I)=A$
280 IF W$(I)<>" THEN 330
290 I=I-1
300 A=LEN(W$(I))
310 A$=W$(I)
320 B=1
330 IF A$="" THEN 200
340 FOR J=LEN(A$)-1 TO 2 STE
P -1
350 A=A-1
360 IF SEG$(A$,J,1)="" THEN
380
370 NEXT J
380 PRINT #1:"DELETE"
390 IF J>1 THEN 420
400 A$=""
410 GOTO 200
420 A$=SEG$(A$,J,1)
430 IF B<>1 THEN 200
440 B=0
450 GOTO 540
460 PRINT #1:B$
470 A$=A$&C$
480 B$=""
490 C$=""
500 IF F=1 THEN 520
510 GOTO 700
520 F=0
530 IF G=1 THEN 590
540 W$(I)=A$
550 I=I+1
560 A=0
570 A$=""
580 GOTO 200
590 IF A$="" THEN 1940
600 W$(H)=A$
610 M=M+LEN(A$)
620 IF M<7000 THEN 650
630 CALL SOUND(220,1000,0)
640 PRINT #1:"MEMORY GETTING
FULL!"
650 G=0
660 A$=""
670 GOTO 190
680 B$=B$&CHR$(K-32)
690 GOTO 710
700 B$=B$&CHR$(K)
710 C$=C$&CHR$(K)
720 A=A+1
730 IF A<>C THEN 200
740 CALL SOUND(100,2000,0)
750 F=1
760 A=0

```

```

770 GOTO 200
780 OPEN #2:"PIO"
790 S=0
800 FOR E=1 TO I
810 S=S+1
820 IF S<>PL+1 THEN 860
830 PRINT #1:"PAGE IS DONE.
PRESS ANY KEY?"
840 INPUT B$
850 S=0
860 PRINT #2:W$(E)
870 NEXT E
880 CLEAR #2
890 PRINT #1:"FILE IS PRINT
ED?"
900 GOTO 190
910 PRINT #1:W$(I)&A$
920 GOTO 200
930 PRINT #1:"START OVER AT
WHICH LINE?"
940 INPUT S
950 F:=K=S TO I
960 W$(K)=""
970 NEXT K
980 I=S
990 A=0
1000 A$=""
1010 GOTO 190
1020 OPEN #2:"DSK1.MENU",DIS
PLAY ,VARIABLE B0
1030 A$=""
1040 PRINT #1:Y$
1050 IF EOF(2)=0 THEN 1030
1060 CLOSE #2
1070 GOTO 190
1080 FOR S=1 TO I
1090 PRINT #2:W$(S)
1100 NEXT S
1110 CLOSE #2
1120 GOTO 190
1130 I=0
1140 I=I+1
1150 INPUT #2:W$(I)
1160 IF EOF(2)=0 THEN 1140
1170 CLOSE #2
1180 GOTO 190
1190 PRINT #1:"CHANGE WHICH
LINE?"
1200 A$=""
1210 INPUT H
1220 IF H>=I THEN 1190
1230 G=1
1240 A=0
1250 PRINT #1:"ENTER NEW TEX
T?"
1260 GOTO 200
1270 PRINT #1:"COLUMN";A
1280 GOTO 200
1290 PRINT #1:"START LIST LI
NE NUMBER?"
1300 A$=""
1310 IF L<I THEN 1350
1320 PRINT #1:"LAST LINE IS"
;I
1330 PRINT #1:L
1340 GOTO 1290
1350 F:=L=L TO I
1360 FOR J=1 TO LEN(W$(L))
1370 Y$=SEG$(W$(L),J,1)
1380 IF Y$>" THEN 1410
1390 Z$=Z$&Y$
1400 GOTO 1430
1410 K=ASC(Y$)
1420 Z$=Z$&CHR$(K-32)

```

```

1430 NEXT J
1440 PRINT #1:"LINE";L;Z$
1450 Z$=""
1460 CALL KEY(O,K,S)
1470 IF K=32 THEN 200
1480 NEXT L
1490 GOTO 200
1500 PRINT #1:"SPELL WHICH L
INE NUMBER?"
1510 A$=""
1520 IF A$="" THEN 1540
1530 W$(I)=A$
1540 IF L<=I THEN 1570
1550 PRINT #1:"LAST LINE IS"
;I
1560 GOTO 1500
1570 FOR S=1 TO LEN(W$(L))
1580 Y$=SEG$(W$(L),S,1)
1590 IF Y$>" THEN 1630
1600 PRINT #1:"//40 12B"
1610 PRINT #1:Y$
1620 GOTO 1650
1630 PRINT #1:"//50 160"
1640 PRINT #1:Y$
1650 IF SEG$(W$(L),S,1)<>"
THEN 1670
1660 PRINT #1:"SPACE"
1670 NEXT S
1680 PRINT #1:"//50 160"
1690 GOTO 200
1700 PRINT #1:"ENTER FILE NA
ME?"
1710 INPUT A$
1720 IF A$<>" THEN 1740
1730 A$="DSK1.TEXT"
1740 PRINT #1:Y$
1750 OPEN #2:A$,DISPLAY ,VAR
IABLE B0
1760 PRINT #1:"I SAVES FILE?
2 ABORTS? 3 INPUTS FILE."
1770 CALL KEY(O,K,S)
1780 IF K=49 THEN 1080
1790 IF K=50 THEN 190
1800 IF K=51 THEN 1130
1810 GOTO 1770
1820 PRINT #1:"INSERT LINES
B 4 WHICH LINE?"
1830 INPUT K
1840 PRINT #1:"INSERT HOW MA
NY LINES?"
1850 INPUT L
1860 FOR S=I+L TO K+L STEP -
1
1870 W$(S)=W$(S-L)
1880 NEXT S
1890 I=I+L
1900 FOR S=K TO L
1910 W$(S)=""
1920 NEXT S
1930 GOTO 190
1940 I=I-1
1950 FOR S=H TO I
1960 W$(S)=W$(S+1)
1970 NEXT S
1980 GOTO 190

```

```

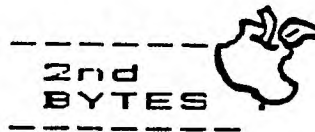
100 ! 2B COLLECTOR PRINT UTILIT
Y BY JOHN WILSON OF MADAREA
99ERS, MADAREA, WI
110 ! XB REGISTERED. LIST PRO
GRAM TO BE PRINTED TO DISK 1
FIRST. EXAMPLE: LIST "D
SK1.PRINT2B" THEN RUN THIS P
ROG.
120 OPEN #1:"PIO"
130 INPUT "START PRINT AT WH
AT COLUMN?" I
140 PRINT #1:CHR$(15)&CHR$(2
7)&CHR$(71)&CHR$(27)&CHR$(77
)&CHR$(C)
150 OPEN #2:"DSK1.PRINT2B",D
ISPLAY ,VARIABLE B0
160 INPUT #2:A$
170 IF A=75 THEN 420
180 PRINT #1:SEG$(A$,1,28)
190 A=A+1
200 IF LEN(A$)<29 THEN 380
210 PRINT #1:SEG$(A$,29,28)
220 A=A+1
230 IF LEN(A$)<57 THEN 380
240 PRINT #1:SEG$(A$,57,28)
250 A=A+1
260 IF LEN(A$)<85 THEN 380
270 PRINT #1:SEG$(A$,85,28)
280 A=A+1
290 IF LEN(A$)<113 THEN 380
300 PRINT #1:SEG$(A$,113,28)
310 A=A+1
320 IF LEN(A$)<141 THEN 380
330 PRINT #1:SEG$(A$,141,28)
340 A=A+1
350 IF LEN(A$)<169 THEN 380
360 PRINT #1:SEG$(A$,169,28)
370 A=A+1
380 IF EOF(2)=0 THEN 160
390 CLOSE #2
400 CLOSE #1
410 END
420 A=1
430 PRINT "READJUST PAPER, T
HEN PRESS ENTER"
440 A=JT B$
450 B=B+33
460 PRINT #1:CHR$(27)&CHR$(7
7)&CHR$(B)
470 PRINT #1:
480 GOTO 180

```

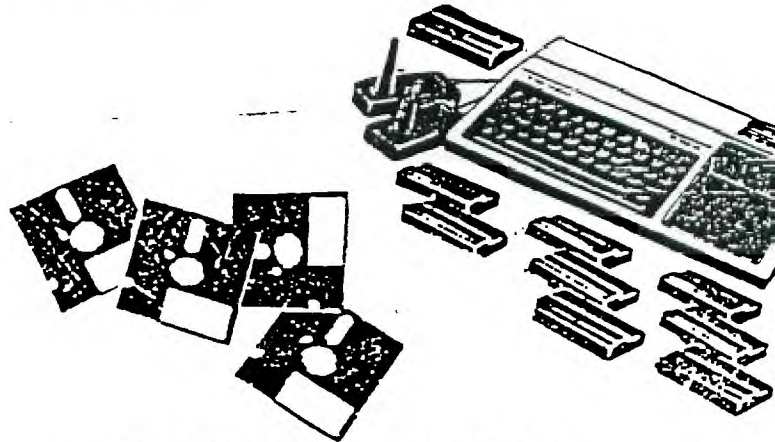

...continued from page 1

Cleaners and Solvents:

WD40 is an excellent solvent but a lousy lubricant as it attracts dirt and sometimes eats at plastic so should only be used to clean up gunk on metal. Never try using it to revitalize used printer ribbons. It may gum up your printhead pins. DENATURED alcohol is a good cleaner however regular isopropyl alcohol is not recommended, it leaves a residue. To clean printer print heads, insert a 4 layer lint-free cotton cloth in place of the ribbon. Obtain an aerosol can of Color TV Cleaner (Radio Shack #64-2320) or equivalent. Make sure the label states that it contains silicone will not harm plastic and has a plastic tube to plug into the spray nozzle. Now gently spray the cloth next to the pin guide, turn on the printer and print out a paragraph. Move the cloth to a clean spot, spray another shot of fluid and do another print out. Repeat as necessary.



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