



SEPTEMBER 1996

VOLUME 12, #7

## IMPORTANT TI NEWS:

### THE 1997 LIMA MUG CONFERENCE

This spring 1997 all TI show will be back in Lima again. Everybody who attended agrees that the Cleveland groups did an outstanding job last May, but the effort apparently wore them out emotionally and financially. They don't want to do the 1997 MUG Conference and neither do other area user groups. So, the Lima User Group will host the 1997 event. A specific date hasn't been set yet, but probably it will be Saturday of Memorial Day weekend. Jim Krych has agreed to handle arrangements for the 1997 Jim Peterson achievement awards.

### THE 1996 CHICAGO TI FAIRE

The following message was recently posted on the comp.sys.ti internet newsgroup:

From: "Gary Cox" <gary.cox@st.jude.org>

Just a note to everyone on behalf of the Chicago TI Users Group that the 14th Annual Chicago TI User Group computer faire will be held November 9th at the Evanston Public Library. The library is located at 1730 Orrington Ave. in Evanston, Illinois (just slightly north of Chicago). For more information write to the Chicago TI Users Group, P.O. Box 7009, Evanston, IL 60204-7009 or call Hal Shanafield at (847) 864-8644. This is the same location as last year. Information on hotels are incomplete at this time but I'll post that information as I get it.

### FEST WEST '97

The date has been changed to Saturday April 5, 1997. It will be at the San Jose California Civic Auditorium and is sponsored by the South Bay TI User Group and Don O'Neil. Their ad in the August 1996 Micropendium lists some really great door prizes. Write the group at 3297 Woody Lane, San Jose CA 95132 or phone 408-934-0352.

### A REAL CLASSIC COMPUTER SYSTEM FOR SALE

The following was posted recently on the internet. I (Charles Good) have seen this particular computer system in action at the owner's home. It is truly a one of a kind system, very impressive. The system was video taped for one of the past MUG conferences.

From: LAB <labtech1@nextek.net> Date: 5 Aug 1996 04:30:57 GMT

I am considering selling my complete TI 99/8 system. First I want it to go to a GOOD home (not some chop shop to be cut up and experimented with) The system includes

1 TI 99/8 console (has built in speech, pascal, advanced basic all of which work)

1 TI P-box and interface card and cable to attach to the console

1 TI double density disk controller coded to work with the 99/8

3 512k memory expansion cards

3 128k memory expansion cards ... might be a 4th one will check

2 RS232 cards (maybe there is only one.... will check)

1 personality card (myarc) coded to work with the 99/8

(this is I believe the ONLY working hard drive system for a 99/8)

1 5MEG external hard drive with clock option

Numerous books and manuals, lots of original TI development disks full of software and information on the 99/8. There is also 2 extra 99/8 mother boards in various stages of completion (I has the mapper chip) also 99/8 joysticks. extra power supply etc etc....

OK, I do not plan to give this system away, so if you want to argue price.... don't waste my time or yours. I am asking \$1200.00 FIRM!!!! This is a ONE of A KIND, and probably the ONLY one that works fully, with all the extras.. I know that TI only made 3 of the 512K cards and only 2 had full ram when I got them (all 3 are fully populated now) This unit will NOT be shipped out of the United States, and if you plan to dissect the unit don't contact me, I only want the computer to go to a serious collector that will appreciate it. I just have TOO much computer stuff here and need to weed some of it out. You can leave voice mail messages about purchasing this system at 614-522-1477

### "FINISHED" SCSI EPROM RELEASED AND MAILED TO OWNERS

I just got the presumably bug free SCSI eprom v1.07 dated 7-1-96 in the mail from Western Horizon Technologies. This should let me use the SCSI card on my 99/4A system. All previous file handling problems are said to be resolved. There is no DSK1 emulation and a disk based disk manager capable of reading and deleting and adding to subdirectories still has to be finished.

### KUB PATTON'S MBX SYSTEM WEB SITE

Can you believe it, a world wide web site dedicated to the Milton Bradley MBX system. I published a review of this

NEXT PAGE

## Bits, Bytes & Pixels

a few years ago and my review has been incorporated into the site. This device really was years ahead of the competition. Included in this newsletter are screen shots and other features from Rob's web pages. The site is located at <http://www.sundial.net/~rob/>

**\*\*DONE\*\***

LOADERS, MODULAR PROGRAMMING, LINKAGES, AND OVERLAYS  
by Merle Vogt  
(continued from June 1996 Lima Newsletter)

### SECTION 1.2. MINI MEMORY LOADER.

THIS LOADER IS BUILT INTO THE ROM AREA OF THE MINI MEM CARTRIDGE. IT IS ALWAYS THERE. ALSO, ALL THE UTILITIES AND THE REF / DEF TABLE FOR THE UTILITIES ARE IN THAT ROM SO NO INITIALIZATION FOR THEM. SO HERE THE INITIALIZATION PHASE IS MAINLY ALLOCATING THE BOUNDS WHERE YOUR CODE IS TO GO. THERE IS MORE ROOM FOR YOUR CODE. THE UTILITIES ARE IN ROM >6000 AS IS THE REF / DEF TABLE FOR THEM. THE REF / DEF TABLE FROM YOUR DEF'S IS PLACED IN >7000 RAM, STARTING AT >7FFB, PRECEEDING DOWNWARDS THRU >7FF0, >FFEB, >7FE0, ETC.

THE LOADER STARTS PLACING YOUR CODE AT >A000, THRU >FFE0. BUT, SINCE THERE ARE NOT ANY UTILITIES OR REF / DEF TABLE IN LOW RAM THE LOADER CAN MOVE DOWN TO >2000 AND USE THRU >3FFF. SO YOU CAN RUN A SLIGHTLY LARGER PROGRAM BY USING THE MINI MEM LOADER.

NOTE::: ALL THE ADDRESSES OF ALL THE UTILITIES ARE DIFFERENT BECAUSE THEY ARE IN ROM >6000. THEIR REF / DEF TABLE IS ALSO IN ROM AT >6F38, THRU >6FFF. THERE IS HERE A SPLIT REF / DEF TABLE BECAUSE YOUR DEF'S GO INTO RAM >7FFB, DOWNWARDS.

ALL OF THIS IS FAIRLY TRANSPARENT TO YOU WHEN YOU " LOAD AND RUN " BUT YOU MUST KNOW THE SCORE IF YOU HAVE TO DEBUG A BOMBED OUT PROGRAM. STUDY THE MINI MEMORY MANUAL, PAGE 72, WHERE THE ADDRESSES OF THE UTILITIES ARE LISTED. REMEMBER, LOOK FOR YOUR DEF'S IN >7FFB, AND DOWNWARDS.

### SECTION 1.3. THE LOADER IN X-BASIC.

THIS ONE IS DIFFERENT IN MANY ASPECTS THAN THE OTHER TWO. IT MAKES EXTRA WORK FOR YOU IF YOU CREATE ASSEMBLY MODULES. AS COMPENSATION IT, COMBINED WITH X-BASIC PROGRAMS, GIVES YOU ENTRY INTO THE AREA OF " DYNAMIC " OPERATING, RATHER THAN " STATIC ", OF THE PREVIOUS LOADERS. BY "DYNAMIC" I MEAN THAT YOU CAN RUN AN X-BASIC PROGRAM AND HAVE IT LOAD ASSEMBLY MODULES BY A " CALL LOAD " COMMAND. THE LOADER IS INVOKED AND IT PLACES YOUR MODULE INTO RAM. YOU DO NOT PRELOAD ANY CODE. YOU MUST, OF COURSE, FIRST CREATE THE MODULE AND ASSEMBLE IT, AND HAVE IT SAVED ON DISK. X-BASIC WILL CARRY ON FROM THERE.

THE EXTRA WORK RESULTS BECAUSE THE X-BASIC DOES NOT PROVIDE AN INITIAL REF / DEF TABLE, AND OMITTS SOME UTILITIES. SEE THE E / A MANUAL, PAGE 415, 416. THE ADDRESSES OF THE UTILITIES ARE AGAIN ALL DIFFERENT. THE LACK OF THE REF / DEF TABLE REQUIRES THAT YOU MUST CODE " EQU " (EQUATE) COMMANDS IN YOUR ASSEMBLY INSTRUCTIONS, FOR EACH AND EVERY SYMBOL NAME YOU WISH TO USE. THESE ARE RESOLVED INTO REAL ADDRESSES THEN BY THE ASSEMBLE STEP, NOT BY THE LOADER. SEE RALPH MOLESWORTH, PAGE 119, FOR SOME EXAMPLE EQUATES.

NOW LET US EXAMINE THE DYNAMIC ASPECT. YOU WOULD USE ASSEMBLY ROUTINES OUT OF X-BASIC TO GAIN THE MUCH GREATER SPEED OF MACHINE CODE. IN THE X-BASIC CODE YOU WOULD FIRST PLACE THE "CALL LOAD" COMMANDS TO LOAD THE ASSEMBLY CODE. THIS DOES NOT "RUN" THE ASSEMBLY ROUTINE. FOR EXAMPLE, SUPPOSE YOU WERE GOING TO USE THREE ASSEMBLY MODULES. NEAR THE BEGINNING OF THE X-BASIC CODE YOU WOULD PLACE THESE LINES:::

```
200 CALL INIT
210 CALL LOAD("DSK1.SUBRT1OBJT")
220 CALL LOAD("DSK1.SUBRT2OBJT")
230 CALL LOAD("DSK1.SUBRT3OBJT")
```

THIS PLACES THE THREE ROUTINES INTO MEMORY, AND MAKES "LINK" ENTRIES INTO A REF / DEF TABLE; WHICH STARTS AT OUR OLD FRIENDLY ADDRESS >3FFB, THENCE DOWNWARDS; FOR EACH DEF IN YOUR CODE. THERE IS NO OTHER TABLE.

THEN YOU CAN CODE "CALL LINK" LINES IN THE X-BASIC CODE; AT ANY LOCATION AND AS OFTEN AS NEEDED TO EXECUTE THE ROUTINES. ADDITIONALLY, THERE ARE FOUR SUBROUTINES; NAMED "NUMAS6", "NUMREF", "STRAS6", AND "STRREF". THESE GIVE THE CAPACITY TO " PASS " NUMERIC DATA AND STRINGS, ( PARAMETERS ), FROM X-BASIC TO THE ASSEMBLY AND RESULTS BACK TO X-BASIC. STUDY THE E / A MANUAL, PAGES 284, THRU 290, ABOUT THESE.

CONSIDER AN EXAMPLE. SUPPOSE THAT A MODULE "SUBRT1" COULD ACCEPT FOUR NUMBERS FROM X-BASIC, THEN SUM THEM, THEN SEND "SUM" BACK TO X-BASIC. WE WOULD HAVE THIS LINE IN THE X-BASIC:::

```
2000 CALL LINK("SUBRT1",NA,NB,NC,ND,SUM)
```

IN THE ASSEMBLY PROGRAM THE ROUTINES "NUMAS6" AND "NUMREF" WOULD GET THE VALUES IN NA, NB, NC, AND ND FROM X-BASIC AND SEND "SUM" BACK TO X-BASIC.

### SECTION 1.4.

NOW, BACK TO MINI MEM, BRIEFLY. HERE YOU CAN USE TI BASIC, (NOT X-BASIC), TO RUN "DYNAMIC" JOBS. TECHNIQUE IS SIMILAR TO THAT ALREADY DISCUSSED. THERE ARE PRO AND CON ASPECTS.

CON... THE BASIC PART OF THE SCHEME RUNS MORE SLOWLY.

PRO... IF THE BASIC PART IS LIMITED TO THE OPERATIONS OF LOADING AND EXECUTING THE ASSEMBLY MODULES, THEN PROBABLY THE BEST COMPROMISE IS MADE. THE WHOLE SYSTEM WOULD RUN AT ALMOST ASSEMBLY SPEED. INVOKING THE E / A "LOAD AND RUN" CAN BE AVOIDED. ALSO THERE ARE VERY USEFUL UTILITIES WHICH CAN BE CALLED THRU "XMLLNK", "GPLLNK", AND "DSRLNK". THESE ARE NOT DIRECTLY AVAILABLE TO BASIC, ONLY THRU ASSEMBLY SUBROUTINES.

"SPLLNK" IS ESPECIALLY VALUABLE AS IT GIVES ACCESS TO A NUMBER OF USEFUL SUBROUTINES, WHICH CAN BE USED IN THIS ENVIRONMENT BUT CANNOT BE USED IN X-BASIC. "DSRLNK" ALSO NOT AVAILABLE IN X-BASIC.

SEE THE MINI MEMORY MANUAL, PAGES 38 - 45.

MORE INFORMATION ABOUT LOADERS WILL BE PRESENTED IN THE NEXT PARTS OF THIS SERIES. EXAMPLES WILL BE PRESENTED TO FURTHER CLARIFY PROCEDURES.

PART 2. MODULAR PROGRAMS USING THE E / A SYSTEM.

IN THIS PAPER I WILL GO INTO MODULAR PROGRAMMING, AND LINKAGES. IT IS CLEAR THAT SOME VERY LARGE PROGRAMS HAVE BEEN CREATED FOR THE 99/4A. CONSIDER "LEGENUS". IT FAR EXCEEDS THE RAM CAPACITY OF THE 4A. SO IT IS CLEAR THAT IT TOOK MODULAR PROGRAMMING TO MAKE THIS WORK.

SPECIAL WARNING>>>>> IT ALSO REQUIRED " OVERLAYS " BUT I WILL GET INTO THAT SUBJECT IN PART 4 OF THIS SERIES.

SO, WE BREAK A LARGE JOB INTO A NUMBER OF SMALLER PARTS, CALLED "MODULES" EACH HAS CERTAIN TASKS TO PERFORM, BUT IS SMALL ENOUGH FOR US TO PROGRAM IT WITHOUT EXCESSIVE EFFORT.

SECTION 2.1.

LET US EXAMINE SOME PROCEDURES. I WILL CREATE CODE FOR A "MAIN" MODULE, (SOMETIMES CALLED "DRIVER"), AND TWO SUBMODULES. NOTHING EXOTIC; JUST SHORT ROUTINES TO ILLUSTRATE PRINCIPLES WITHOUT OBSCURING LEARNING.

THE "MAIN" MODULE IS THE MASTER CONTROLLER. THERE IS A FRAGMENTARY EXAMPLE IN E / A MANUAL, PAGE 413. THE KEY ELEMENTS IN THIS ARE THE REF'S AND DEF'S. CAREFULLY STUDY TO UNDERSTAND HOW THEY TIE TOGETHER.

DEF..... MEANS DEFINE... IN THIS COMMAND YOU NAME, (DEFINE), ALL THOSE DATA ITEMS THAT YOU DEFINE IN THIS CODE BLOCK WHICH WILL BE USED IN OTHER MODULES, PLUS THE NAME OF THE MODULE. SEE THIS EXAMPLE:::~::~:

DEF MAIN

" MAIN " IS THE NAME GIVEN TO THE MODULE. THE DEF IS THE FIRST LINE OF THE CODE. IT DEFINES "SYMBOLS", EACH WILL HAVE A RAM ADDRESS IN YOUR CODE. NOTE LINES 2 AND 3 HAVE A NUMBER OF REF ENTRIES, SEE SECTION 2.3.

IN THE E / A SYSTEM INITIALIZATION PLACES A REF / DEF TABLE IN LOW RAM AT ADDRESSES >3F3A THRU >3FFF. THE DEF'S THAT YOU CREATE ARE PLACED INTO ADDRESSES >3F30, >3F28, >3F20, >3F18, ETC; DOWNWARDS, AS REQUIRED. THIS IS WHERE YOU LOOK IF DEBUGGING IS NECESSARY.

SECTION 2.2. CONSIDER THIS EXAMPLE CODE.

```

1      DEF    MAIN
2      REF    ENTER1,ENTER2,DATA1,MESSG2
3      REF    WAIT4,VMBW,SCROL,SCROL2
4      FIN    DATA    10
5      ALL    TEXT    'THAT IS ALL - HIT A KEY '
6      MYWS   BSS     32
    
```

```

7      MAIN   STMP    R12
8              MOV    R12,@EJ+2
9              B      @M2
10     EJ     LWPI    0
11              B      #R11
12     M2     LWPI    MYWS
13              CLR   @DATA1
14     LOP1   BL      @ENTER1
15              LI    R0,>200
16              LI    R1,MESSG2
17              LI    R2,16
18              BLWP  @VMBW
19              BL    @SCROL
20              BL    @ENTER2
21     C      @DATA1,@FIN
22              JL    LOP1
23              LI    R0,>200
24              LI    R1,ALL
25              LI    R2,24
26              BLWP  @VMBW
27              BL    @SCROL2
28              BL    @WAIT4
29              B      @EJ
30     END
    
```

SECTION 2.3.

IN MAIN WE HAVE DEFINED, DEF, ONLY THE MODULE NAME, " MAIN ". THE REFERENCE, ( REF ), HAS A LONG LIST OF SYMBOLS WHICH ARE USED IN THIS MODULE AND ARE DEFINED ELSEWHERE. IF ANY NAME IS OMITTED FROM REF BUT IS USED IN AN INSTRUCTION THEN THERE WILL BE A SYMBOL HOLE IN THE CODE THAT THE LOADER CANNOT RESOLVE AND YOU BOMB OUT. WE HAVE REF'D TO A UTILITY, "VMBW".

THE REST OF THE REF NAMES WILL BE DEFINED IN THE TWO SUBROUTINES " ENTER1 " AND " ENTER2 ". REF'D SYMBOLS APPEAR IN LINES 13, 14, 16, 18, 19, 20, 21, 26, 27, AND 28. AT ASSEMBLY TIME ALL THESE CREATE HOLES, ( = 0000 ), IN THE CODE. THE LOADER FILLS THESE BY TRACKING THE REF'S BACK TO THE MATCHING DEF'S. IF YOU REF A SYMBOL AND HAVE NOT A DEF FOR IT LOADER CANNOT WORK.

IN THE E / A SYSTEM INITIALIZATION PLACES A REF / DEF TABLE IN LOW RAM AT ADDRESSES >3F3B THRU >3FFF. THE DEF'S THAT YOU CREATE ARE PLACED INTO ADDRESSES >3F30, >3F28, >3F20, >3F18, ETC; DOWNWARDS, AS REQUIRED. THIS IS WHERE YOU LOOK IF DEBUGGING IS NECESSARY.

This series will be continued in the October Lima newsletter

\*\*\*DONE\*\*\*

STOP THE PRESSES!!

Run out and purchase the September 1996 issue of COMPUTER SHOPPER. On page 608 Stan Veit has an article "What ever happened to the TI9900 cpu?". The article tells the history of the 99/4, the 99/4A, Black Firday, and beyond.

\*\*DONE\*\*

From: Tom Mills <twills@TheRiver.com>  
Subject: TI List Server

Guess what? The TI Community now has its own internet List Server! For those who do not know what a list server is, it is a email address that you use to send messages to everyone who has subscribed to that server. The "subscription to the new TI list server is \$0.00. In other words, it's FREE.

The list server will be administered by Tom Mills and will be an extension of the SouthWest Ninety Niners User Group of Tucson, AZ.

To subscribe to the TI List Server, send an email to the following address:

"majordomo@theriver.com" (without the quotes)

Leave the subject line BLANK and include the following as the message BODY:

"subscribe ti99" (without the quotes of course)

Please remember not to include your signature file in the message body.

As soon as you are approved, you can use the TI99 list server to your hearts content. This list server will not be moderated, as the TI community is a very reliable group of people. However, I chose to not have it as an open list server (that is the ability to subscribe to it without my approval) as a way to keep nosy non-TIers off the list server.

After you are approved, just send your message to ti99@theriver.com. Everyone who has subscribed to the list server will receive you email. Also, to find out who is on the server, send a message to majordomo@theriver.com (with a BLANK subject line) and "who ti99" (without the quotes) in the main body. Again, please do not include your signature file in the message.

Pass the word around about this new TI service. I'll be looking forward to hearing from lots of TIers in the near future.

\*\*\*\*\*  
Tom Mills	
Cactus Patch Sysop	Whoever is happy
SouthWest 99ers U.G.	will make others happy too.
P.O.Box 17831	
Tucson, AZ 85731-7831	Anne Frank (1929-1945)
| | |  
|-----|  
| E-Mail: twills@theriver.com -or- twills@pima.gov |  
\*\*\*\*\*

\*\*DONE\*\*

\*\*\*\*\*  
\* BITS, BYTES & PIXELS \*  
\* Published by Lima OH \*  
\* 99/4A User Group \*  
\* \*  
\* Material contained herein \*  
\* may be copied by any user \*  
\* group as long as credit \*  
\* is given. DV80 files of \*  
\* most articles in BB&P can \*  
\* be obtained by sending a \*  
\* disk and return postage. \*  
\* \*  
\* ADDRESS- P.O. Box 647 \*  
\* Venedocia Ohio \*  
\* 45894 \*  
\* Internet address: \*  
\* good.6@osu.edu \*  
\* \*  
\* Published monthly except \*  
\* July and August \*  
\* ----- \*  
\* GROUP OFFICERS \*  
\* President-Jennifer Poling \*  
\* 419-667-3100 \*  
\* Vice Pres-Heather Poling \*  
\* 419-232-2135 \*  
\* Treasurer-Leonard Cummings \*  
\* 419-738-3770 \*  
\* Newsletter editor and \*  
\* Librarian-Charles Good \*  
\* 419-667-3131 \*  
\*\*\*\*\*



Texas Instruments 99/4A Computers



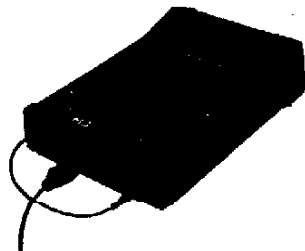
**3 Reasons why the MBX System  
is the number 1 add-on to  
The Texas Instruments Home Computers**

Three exciting units make up the MBX Expansion System: the console with an action-input keypad; the triple-axis analog joystick; and the headset microphone. These three components, together with a special group of Solid State Speech cartridges, introduce you and your computer to a unique audio and video experience.

The console and headset microphone allow you to use Voice Recognition, in which your spoken words direct screen action. The console also offers you a built-in, easy-to-access keypad and outstanding Speech Synthesis.

The triple-axis analog joystick features a control knob that offers up to 360 degree object rotation for smoother, more sophisticated control of screen action.

Here's more about the three units...



**The Console**

The Console offers Speech Synthesis at it's finest. You hear computer-generated speech that is well-modulated with a variety of tones and pitches. Built right into the console is a 64-position keypad, so you can respond quickly and with more flexibility to screen action.

**Headset Microphone**

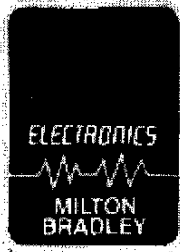
The microphone, combined with the electronics of the console, lets you use the Voice Recognition... technological wizardry in which your spoken words control screen action. Talk into the headset microphone and the computer responds to your commands.



**Full analog Joystick**

Features up to 360 degree object rotation and left-to-right, front-to-back proportional control of all movements. Its unique pistol grip is comfort-designed to eliminate joystick fatigue. With the auxiliary control buttons and a quick-trigger button.



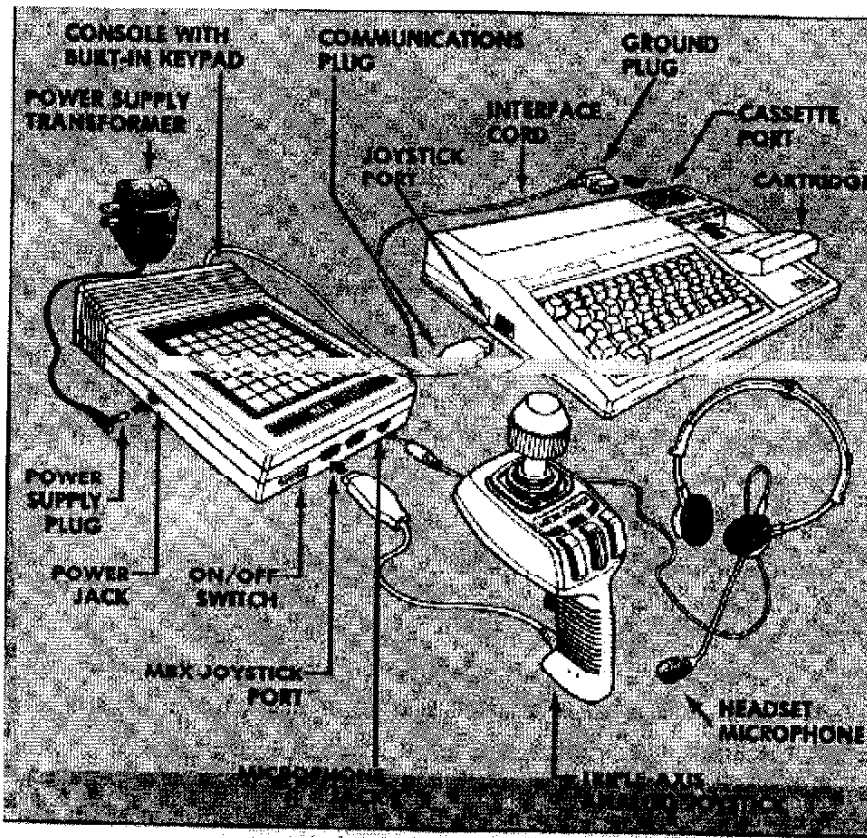


## Texas Instruments 99/4A Computers

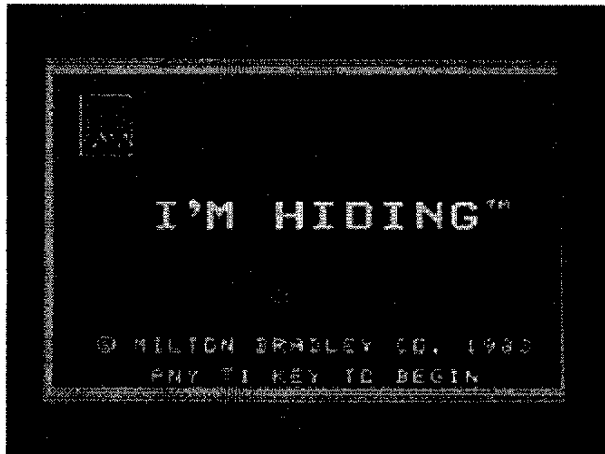
MILTON BRADLEY COMPANY **MBX** EXPANSION SYSTEM & SOLID STATE SPEECH CARTRIDGES

### System Setup

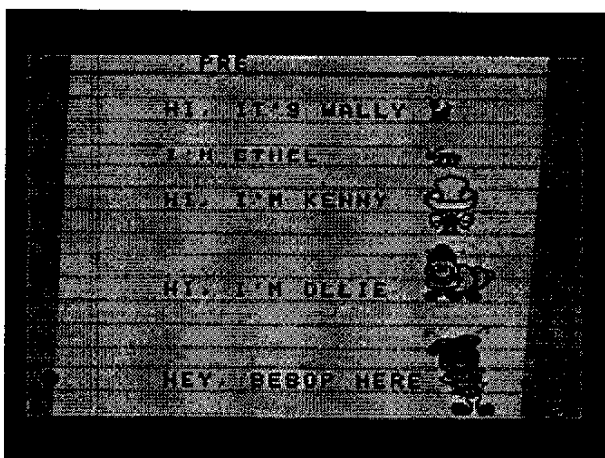
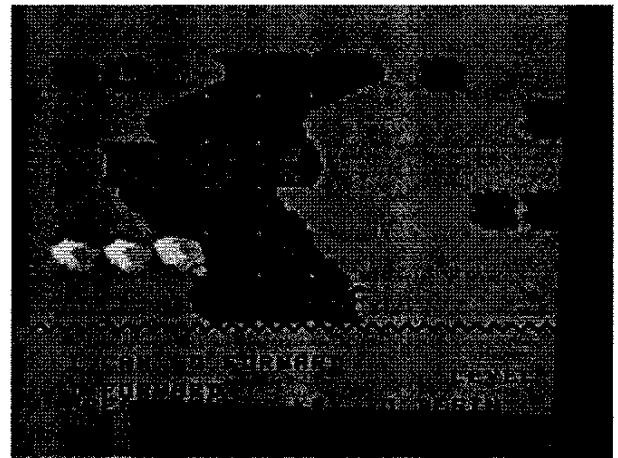
From the original users manual



# I'm Hiding



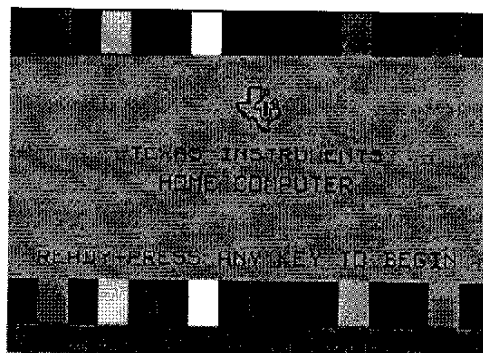
# Terry Turtle's Adventures



These are screens from two game cartridges that require the MBX system



Above is the MBX user guide cover



**Texas Instruments 99/4A Computers**