

## WIZZDOM

A newsletter for the owners of Dick Smith WIZZARD and Funvision computers  
Issue 1. Written by Barry Klein.

### **EDITORIAL**

My policy will be to concentrate on programming in WIZZARD BASIC. Contributions are invited from you, however, as I have to type everything by hand, the size of the newsletter may have to be limited.

### Format of the newsletter

When possible, there will be an article about some aspect of the WIZZARD, such as the hardware description in this issue.

There should also be regular features:

- CURSES - errors or 'bugs' in WIZZARD BASIC
- SPELLS - ways of getting around the CURSES
- PRESTIDIGITATION - programming tricks or undocumented features

### Description of the WIZZARD.

It is my opinion that knowledge of a computer's hardware can lead to 'better' and more interesting programming, hence this article.

NOTE: although only the WIZZARD is mentioned, all information is equally applicable to the FUNVISION.

The WIZZARD, when set up for BASIC programming, consists of 4 items:

1. the main console and power pack (hardware)
2. BASIC cartridge (firmware)
3. cassette tape unit (hardware)
4. cassette tapes with programs (software)

### The console.

The console contains the microprocessor, a 'video display processor', memory, a sound generator and other items to allow correct operation of the computer. The processor is a 6502A, operating at 2MHz. (This is the fast version of the processor used by ATARI, APPLE and COMMODORE, but the WIZZARD is not compatible with these, or any other computer.)

The 'Video Display Processor' (VDP) is a Texas Instruments (TI) TMS9929. This VDP is also used in the TI99/4, the Spectravideo and the John Sands SEGA SC3000. The VDP has 15 colours and 'transparent', four operating modes (only one of which can be used by the WIZZARD) and 32 sprites (which the WIZZARD cannot use through BASIC).

There are three sets of memory devices in the console:

1. Video memory, associated with the VDP and not accessible by the 6502A. This is used to produce the displayed picture. The area of video memory beyond that required for actual display is used to store the BASIC program and variables. Total 16k.
2. Read-only memory, used to initialise the WIZZARD at switch-on and RESET. A cartridge must be in the slot for it to work. This memory contains the 'CREATIVISION' message. Total 2k.
3. Read/write memory (commonly but incorrectly called 'random access' - ROM is also random access). Used by BASIC for variables not associated with the program. This is the only RWM accessible with PEEK and POKE. Total 1k (one, kilobyte).

The sound generator is a TI SN76489. This chip can be driven by POKE as well as SOUND. It has three tone channels and a noise channel.

A Motorola MC68B21 'Peripheral Interface Adaptor' interfaces the sound chip to the processor and also provides the keyboard/joystick interface and the cassette interface.

There are other chips also in the console which give address decoding and other functions. One of these is an analogue device which combines the three colour signals from the VDP into a composite signal for the modulator to transmit on Channel 1. This is a TBA520.

BASIC cartridge

The cartridge will contain two or three ROMs in groups of 8k and 4k. Different versions are around, distinguished by the copyright date in the 'VTL BASIC' message. All versions have 'bugs' and some features work differently in different versions. Those I know about will appear under 'CURSES' later in this newsletter. The character set used is contained in this cartridge, using ½k bytes. Total 12k.

Cassette tape unit.

The WIZZARD cassette is powered from and controlled by the WIZZARD console. It is designed specifically for program storage and replay. It cannot be used as an audio recorder without modification. It is a stereo unit - the left channel for data record and replay and the right channel for audio replay. Both channels are erased when it is recording. The WIZZARD controls the motor of the unit, but this is over-ridden for fast forward and rewind.

Cassette tapes

These are the standard 'compact cassette'. Good quality, standard audio tapes can be used without difficulty, but notes must be taken of the counter readings if you want to find a program on a long tape. Short 'computer' cassettes (C5 or C10) are better for finding programs quickly, but each costs almost as much as a good C60.

REFERENCES

ROM TV game - schematic, Video Technology Ltd  
TMS9918A/TMS9928A/TMS9929A Video Display Processors, Texas Instruments Incorporated, Data manual  
SN76489 Sound Generator Controller, Texas Instruments Incorporated, Data Sheet  
Make music with your Computer (Compumuse music synthesiser), P. Vernon, Electronics Australia August 1983 p90  
MC6821 Peripheral Interface Adaptor, Motorola Semiconductor Products Inc., Data. Sheet  
1979 Data Catalog, Synertek Inc. (6502 microprocessor and memory)

CURSES

The following errors are those that I have found in WIZZARD BASIC, 1983.

The logical operators 'OR' and 'AND' do not work with string expressions e.g. IF A\$="Y" OR A\$="YES" THEN 500 gives ERROR 15.  
 Array subscripts should not be array elements or functions e.g. S(L,RND(3)) always returns S(L,3) and S(L(1),K) gives ERROR 4.  
 Negative numbers should be written as (-n) e.g. 2E(-20).  
 The following table list problems with BASICs function routines.

<u>Function</u>	<u>Expected value</u>	<u>Actual value</u>
SGN(-3)	-1	-2
SQR(0)	0	ERROR 17 (div. by zero)
SQR (1E20 )	1E10	1.43731E10
SQR(1E(-10))	1E-5	0
SQR(1E(-20) )	1E-10	1.43731E-10
INT(-1E6)	-1E6 or -1000000	-100000 (-1E5)
INT(8800000)	8.8E6	ERROR 06 (overflow)

Please tell me of any CURSES you may find, especially in other versions of BASIC.

SPELLS

Instead of SQR(X) use X\*\*0.5 (although this will still fail for 0 )  
 Another way would be IF X<>0 THEN X=X\*\*0.5 .

NOTE: -1E6 is only displayed incorrectly - the last zero is missing.  
 1E-5 " " " " - the significant one is missing, so zero is given

PRESTIDIGITATION

CRUN,N and CLOAD,N display "PROGRAM LOADING" instead of the program.  
 POKE 851,1 prevents PRINT and LIST from displaying to the screen.  
 POKE 851,0 returns to normal.

Location 846 seems to be associated with TAB.

Locations 218 and 219 define where the next character will be PRINTed on the screen, but they probably interact with 846.

The top LH corner is L219=208 and L218=0.

The bottom RH corner is L219=210 and L218=256.

The screen will scroll only when L218 is of the form  $n*32+2$   
 where n is from 0 to 7

Setting L219 outside the range 208 to 210 may cause real problems.

PRESTIDIGITATION (cont.)

Locations 512 to 515 are set by the initialisation sequence to 8, 248, 63 and 255 respectively. If any of these are altered, then the next time the RESET button is pressed, the WIZZARD will perform a 'power-on' restart, which will clear any program in memory.

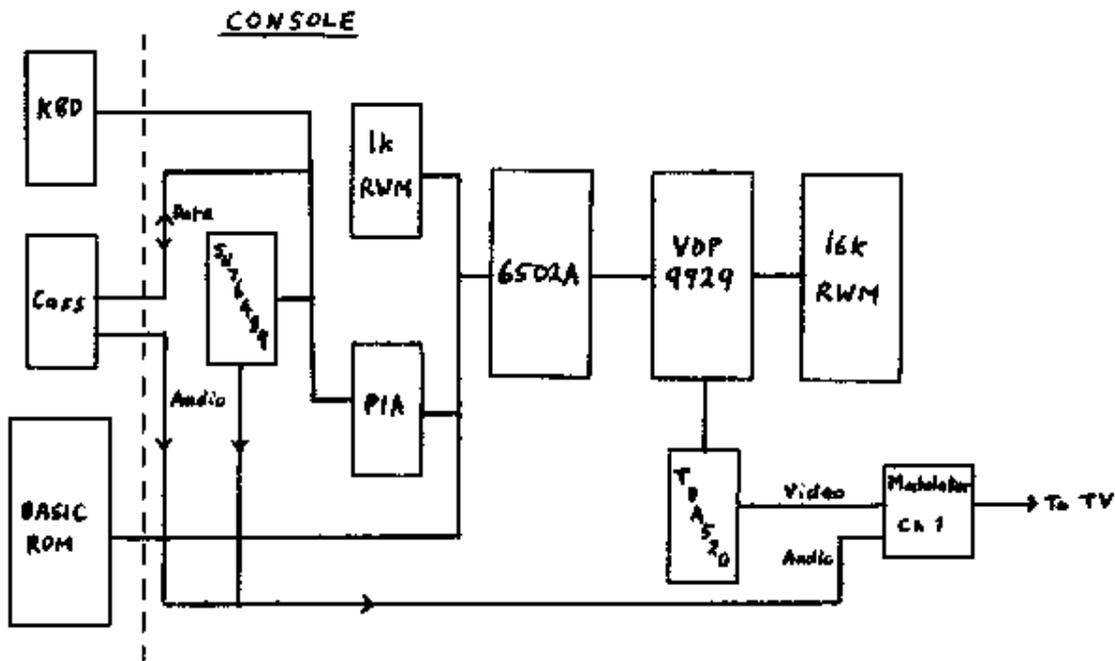
A description of the sound generator chip is in the Compumuse article in Electronics Australia listed earlier. The programs will work with the following changes:

- change all statements N=253 to N=4098
- change OUT statements to POKE statements
- reduce the number of loops in the time delay FOR-NEXTs
- other, obvious, variations are required

Note: the WIZZARD is not fast enough to produce an acceptable birdsong from listing 2.

The clock for the sound generator runs at 2MHz on the WIZZARD.

Finally, I'll leave you with a block diagram of the WIZZARD.



This newsletter was produced by B.L.Klein, B.Eng.(Elec), Grad. Dip. of Computer Science, M.I.R.E.E. , June 1984.