

The New 16-Bit Machines

by Paul Knapp

On January 5, 1985, at the Winter Consumer Electronics Show in Las Vegas, Nevada, the New Atari Corporation made two startling announcements: first, that Atari was earnestly examining the possibility of relocating in Nevada some major facilities; and second, the introduction of a new line of 16/32 bit computers.

The first announcement is of interest as it indicates both a possible decline in the tendency to manufacture outside North America, and also the development of home manufacturing to serve the home market. Although the second announcement is the focus of this article, both are indicative of the type of bold and thorough business campaign one has come to associate with Mr. Jack Tramiel. The motto of the New Atari Corporation is 'Power without the Price'. The new line of 16/32 bit home computers is clearly in keeping with this creed.

It is difficult for me to present a brief overview of the new home computers without sounding biased (I am unabashedly and thoroughly impressed with what I have seen to date); therefore, I will make a special effort to be clear about what is known, what is suggested by the manufacturer, and what is pure speculation.

As of the writing of this article, I have had but the barest exposure to the new xxxST Computers. The computers on display at the CES were running programs burnt into ROM cartridges or stored on RAM drives along with the necessary data. My examination of the machines was limited to viewing the computers running graphics demos, the GEM desktop environment, and a couple of games which showed the use of the mouse. Given these remarks, let me now explain the 130ST and 530ST computers to the degree possible, saving in-depth descriptions until we have had the opportunity to take one apart from both the hardware and the software perspectives.

The Machines—Target Users

The New Atari Corporation has targetted these new machines at the 'Home Computer Market'. I must admit that, despite my nine years experience in all areas of computing, I don't know what a home computer is; however, whether you use these machines in the home or office you are getting what may prove to be the most revolutionary computer offering of the last five years, and probably of the next several as well!

The 130ST and 520ST machines are identical

except for the respective amounts of main memory—128K and 512K RAM—and therefore, I will refer to them as the 'ST' machines. These computers are the most powerful, fully featured (ie. screen, keyboard, CPU, peripheral communications, and disk drive are considered standard) personal computers available, and are also intended to be priced well below those of the non-existent competition. Some have speculated on a base price of \$1000.00 US for the 520ST with monochrome monitor and single disk drive—impressive if possible, stupendous if the \$1000.00 barrier is beaten.

130ST/530ST-Hardware

The ST machines are packaged in three attractive silver-grey plastic components: the Keyboard-CPU; the Monitor with optional integral 3 1/2" floppy and optional 3 1/2" hard disk; and the separate 3 1/2" floppy disk drive. The keyboard housing contains the sculptured IBM Selectric layout of keys, a 'T' shaped cursor control pad with some special function keys, an 18 key numeric keypad, and the Central Processor main memory and peripheral connections.

The system memory consists of 192K ROM, expandable to 320K with plug-in cartridges containing the operating system and system support routines including graphics support routines, 32K RAM for bit-mapped graphics, and 128K or 512K main RAM for programs and data.

The graphics system supports a 512 color palette and three graphic modes: 320x200 pixels in 16 colors, 640x200 in 4 colors, and 640x400 in monochrome. From the graphics demos I viewed, I found the display to be very fast and flicker-free.

The central processor is a Motorola 68000 running at 8 megahertz. This processor features a 16 bit data bus with instruction pre-fetch, 8 32-bit data general purpose registers, 8 32-bit address registers, a 24 bit address bus, 7 levels of interrupt (the interrupt structure used in the STs is currently unknown), and 56 instructions supporting 14 addressing modes on 5 data types. This is a very powerful and mature processor which has received ample acclaim from hackers all the way to NASA.

These machines contain Direct Memory Access (DMA) which is presumably support for high-speed—(1.33 Megabytes/Second)—access to the 10 Megabyte 3 1/2 inch hard disk, or the 250k/500k 3 1/2 inch floppy disc, depending on storage density chosen. The maximum disk configuration appears to be 1

hard drive and 2 floppy drives, ample for home, school, or office.

The STs also contain standard RS-232 serial and Centronics parallel interfaces, high-speed hard disk interface, floppy disk interface, joystick and mouse ports, a sophisticated 3 channel sound generation chip with separate volume and frequency controls, MIDI interface potential, and a real-time clock.

130ST/530ST-Software

There is little software currently available for these machines. The computers themselves will not be shipping until the beginning of the second quarter. They have been developed with an Operating System rather than with the usual home or games machine design of having all system routines accessed through ROM address calls. The operating system — TOS, and the desktop operating environment — GEM have been produced in conjunction with Digital Research — developers of the 'CP/M' family of operating systems, languages, and support products. The advantage of having an operating system is that software may be more easily 'ported' or transferred from other operating systems to TOS than would have been possible had simple ROM address calls been used. This will increase both the speed with which popular software products will move onto the Atari hardware, and the number of products which will become available.

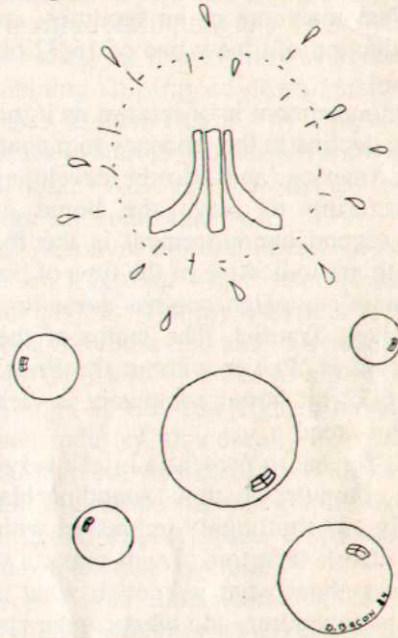
Currently, the only programming languages available are interpreted BASIC and Logo; however, I expect other language and support products to be available when, or shortly after the STs become available.

Operating System-Environment

The operating environment follows the format developed at XEROX Palo Alto Research Centre and recently exemplified in the Apple Corporation's Macintosh computer. The screen is highly graphic, using Icons or symbols to denote disk, files, and the like. One uses the cursor keys or the two-button mouse to move the arrow-like cursor to point at objects on the screen/desk. Although the GEM environment and TOS operating system are single-tasking in design, (ie. you may do only one thing at a time), you may choose to put several pieces of paper on your desk and slide one out from under another using the mouse.

We will provide a more detailed examination of this powerful and very user-friendly environment in a later issue, once we have had sufficient time to explore it ourselves. Until then, suffice it to say that the New Atari Corp. has put forth the most powerful, and yet, inexpensive personal computer on the market today.

In future articles we will assist you in exploring the 130ST and 520ST in terms of how it fits into the home, school, and office; we will review the software and support products for this line as they become available and provide across manufacturer comparisons so that you may see how well these machines out-perform the Apple II and Macintosh, the IBM PC and PC Junior, the Commodore 128, and other personal computers.



Atari's Sound System (cont'd)

```
390 POKE 53764,F3
400 REM *
410 POSITION 21,10
420 ? F1;" ";F3;" "
500 GOTO 270
```

Check Data

```
0 REM CHECK DATA FOR HIGH PASS FILTER
TEST
10 DATA 7464,594,365,611,367,598,12,97
2,886,154,76,105,624,152,939,155,773,8
1
110 DATA 7413,635,922,834,4,37,640,0,1
05,819,131,636,561,519,819,31,641,79
200 DATA 6919,603,605,597,557,552,336,
560,344,638,259,92,98,642,265,26,108,6
37
410 DATA 1184,237,113,834
```

BIT 0

Setting bit 0 causes the timing system to use the 64 KHz clock instead of the 15 KHz clock. Because of this higher clock rate, all sounds will be generated at a higher frequency (pitch). For a demonstration of this effect, examine the program that was used in conjunction with the BITs 6 & 5, the CLOCK RATE TEST.