LEARNING THE TERMINOLOGY

By Dennis Thorp

Fortunately, I took the first draft of this article to your conscientious editor for proofreading, and watched him struggle to get through it. The problem, it soon became clear, wasn't that he didn't like it — he didn't understand one word of it. It might as well have been written in Russian — the language was that foreign. We finally decided to start by defining certain commonly used terms. I would like to make one thing perfectly clear: computers are very difficult to understand, but not difficult to use. When I was selling computers, the average customer could be doing useful work within 30 minutes and difficult tasks within a few hours. Understanding exactly how the computer works is not necessary, but understanding some of the terminology is, if we are to make intelligent, informed buying decisions.

To illustrate my point, I am going to reproduce a portion of an ad that appeared in the January 20th edition of the *Wisconsin State Journal:*

XYZ Brand XT Turbo
Switchable 4.77/8 MHz, 256K (expandable to 640K), 360K floppy, 20MB Seagate, Monographics card & Monitor, 150W power supply, AT-style keyboard, 1-year warranty
Grand Opening Special $899.00

XYZ Brand AT
Switchable 6/10 MHz, 512K (expandable to 1MB), 1.2 MB floppy, 200W power supply, AT-style keyboard, 1-year warranty.
- with 20MB Seagate, Mono-graphics card & monitor$1,499.00
- with 20MB Seagate, EGA card & monitor $1,949.00

This ad provides all the necessary facts for an informed buyer to make an intelligent purchasing decision about these machines, and by the end of this article, the reader will hopefully understand this information.

WHAT IS A COMPUTER?

At the heart of every computer is a **central processing unit** (or CPU)
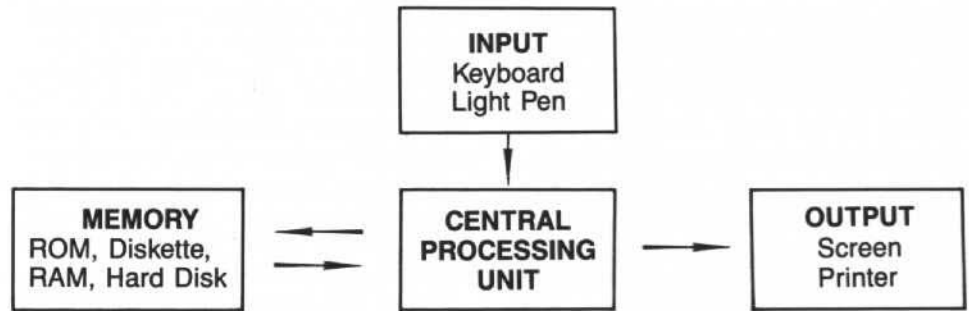

Figure 1. The main components of a computer.

which performs the commands you specify. This unit carries out arithmetic, makes logical decisions and so forth. In essence, the CPU is the "brain" of the computer. The **memory** of a computer allows it to "remember" numbers, words and paragraphs, as well as the list of commands you wish the computer to perform. The **input units** allow you to send information to the computer; the **output units** allow the computer to send information to you. The relationship of these four basic components of a computer are shown in Figure 1.

In a Personal Computer (PC), the CPU is contained in a tiny electronic chip, called a **microprocessor.** As a computer novice, it will not be necessary for you to know about the electronics of the CPU, but it is necessary to know that the type of microprocessor is one of the main distinguishing characteristics of the different types of computers. Figure 2 will hopefully clear up some of the confusion about the PC, XT, AT and 386 machines. For now, view the CPU as a magic device somewhere inside the case of your computer and don't give it another thought!

To keep things simple, I will refer to all models and brands of personal computers as "PC's". No reference to the IBM Personal Computer is meant, unless I specifically word my remarks that way. The main input device of the PC is the computer keyboard. We will discuss the special features of the keyboard at a later time. For now think of the keyboard as a typewriter. By typing symbols on the keyboard, you are inputting them to the computer.

The PC has a number of output devices. The most basic is the "TV screen" (sometimes called the video monitor or **video display**). You may also use a printer to provide output on paper. In computer jargon, printed output is called **hard copy**.

There are four types of memory in any PC: **ROM, RAM, hard disk**, and **diskette**. Each of these types of memory has its own advantages and disadvantages. I will attempt to make the memory as versatile as possible by combining the good features of each.

ROM stands for "read only memory." This type of memory can be read by the computer (that is, the CPU), but you cannot record anything in it. The ROM is reserved for the computer language which the CPU utilizes. This language will be discussed later. For now, just remember that ROM contains the information necessary for the computer to understand your commands. This information is pre-recorded in the factory and is permanently situated in ROM.

RAM stands for "random access memory." This is the memory which you can write into. If you type characters on the keyboard, they are then stored in RAM. Similarly, results of calculations are kept in RAM awaiting output to you. There is an extremely important feature of RAM which you should remember:

Important: If the computer is turned off, then RAM is erased

Therefore, RAM may not be used to store data in permanent form. Nevertheless, it is used as the computer's main working storage because of its great speed. It takes about a millionth of a second to store or retrieve a piece of data from RAM.

To make permanent copies of programs and data, we may use either the hard disk or the diskette file. A diskette drive records information on flexible diskettes which resemble phonograph records. The diskettes are often called "floppy disks" or just "floppies", and they can store several hundred thousand characters each! (A double-spaced typed page contains about 3,000 characters.) Diskette drives come in different sizes and capacities. The eight inch disk was once common, but is seldom seen anymore. The five and one quarter inch disk has been the standard for the last several years, and some machines are now coming with three and one half inch disks. Remember that "K" is shorthand notation for Kilobyte, or 1024 characters. Round that off to 1000 for simplicity. A Megabyte or "MB" is one million characters. The standard disk drive used to be the 360K. This is a 5¼" Double Sided Double Density (DS DD) drive. Then came the 1.2 MB drive. It looks like the same physical size, but it is Double Sided Quad Density (DS QD). The 1.2 MB drives can usually read 360 K diskettes, but it doesn't work the other way. The newest entry is the 3½" drive and it too has two capacities: 720 K and 1.4 MB. This is not meant to confuse you, only to begin to bring up the **"compatability problem."** If Superintendent A has developed programs he wishes to share with Superintendent B, they may be out of luck if their diskette drives are of a different size and capacity. Beware of this one!

Now I am going to jump on two of my "favorite" terms: "User friendly" and "State of the Art". In the early 1980's, every PC and piece of software tried to describe itself as "user friendly" to convey to the consumer that it was easy to understand and use. **Doonesbury** had a whole series of cartoons based on that term alone. Many early purchasers became very disillusioned when they found that neither the hardware nor the software was "user friendly" as advertised. One of the popular brands is being marketed as "state of the art". You might well ask "from what year?" In researching this article, I had more fun with this part

than any other. I was also more outraged! It turns out that what they have done is take 1981 technology, in the case of the IBM model 25 and 30, stick it in a new case and call it "state of the art". The model 50 is 1984 technology and only when you get to the model 80 do you get 1987 technology. The prices are about three times too high on all models, in my opinion. Those of you who require "name brand" recognition would do well to shop around and read a little before jumping into a purchase. Even your vendors may have been seduced. Refer back to Tom Harrison's article on the "will-fit" market in the last issue of the *Grassroots.* There is a "will-fit" market in microcomputers, also. I also discovered that for $99.00 I could install a 3½" 720K drive in my present computer and then I too would have a "state of the art" machine.

Hard disks have followed a path similar to the floppy diskettes. With a hard disk, the storage media is permanently sealed into a case and that case is then installed in your machine. Dust and dirt particles cannot get at it. That is one of the reasons I recommend them for use on a golf course. Floppy drives eventually get dirty and then you will "eat" your disks and destroy the information on them. Hard disks are defined by a size and an access time. For example: 20 MB (65 MS) — 20 megabyte storage capacity with an access time of 65 milliseconds. Larger capacities and faster access times are correspondingly more expensive.

Now I hope you have enough information to interpret the ad at the beginning of the article and in Figure 2. Let's go through them step by step: Any PC that says it is PC or XT compatible has a microprocessor designated as an 8088 and can slow itself down to 4.77 MHz (Megahertz). That is the clock speed of the original IBM PC. Most programs will run perfectly well at faster speeds. XT is shorthand for "Expanded Technology". The 8086 in the IBM PS/2 Model 25 and 30 is a brother of the 8088. Any AT (Advanced Technology) compatible machines have an 80286 microprocessor and speeds vary from 6-16 MHz and any machine that has 386 in the name has an 80386 processor. Remember that the 8088/8086 machines were available in 1981, the 80286 machines available in 1984 and the 80386 was released in 1987, unless you are IBM and then you discontinued the PC, XT and AT in 1987 and rereleased them as the different models of the Personal System 2.

Back to my examples: 256K and 512K refer to the amounts of RAM on the motherboard (main system board inside the box, containing the CPU and the microprocessor). 360K and 1.2MB refer to the sizes of the 5¼" floppy drive included and 20MB Seagate refers to the size and brand name of the hard disk. Monographics refers to the Green or Amber monitor that comes with the system and that it will display graphics on the screen. Not all monochrome cards will display graphics on the monitor and it is a desirable feature. The size of the power supply, keyboard style and warranty information are self explanatory, with this

Figure 2.		$599	$999	$1,250	$2,450
	Base System	PC-XT Compatible Turbo System	PC-AT Compatible Turbo System	PC-AT Compatible Super Turbo	PC-AT 386 Compatible Super Turbo
Intel processor:		8088	80286	80286	80386
Speed:		4.77/8.MHz	6/10MHz	10/12MHz	16MHz
RAM on motherboard		640K	640K	640K	1024K
Floppy drive:		360K	1.2MB	1.2MB	1.2MB
Power supply:		150W	220W	220W	220W
Keyboard style:		PC-AT 84 Keys	AT Deluxe 101 Keys	AT Deluxe 101 Keys	AT Deluxe 101 Keys
Monitor:		12" high-resolution monochrome graphic monitor with swivel base			
Printer port:		Parallel	Parallel, Serial & Clock Calendar card		
Additional features:		Hercules Compatible Monochrome graphics card			
		Full documentation; 10 Omni Disks preformatted for PC; FREE software			
Mono Graphic System with Seagate Hard Drives					
20MB (65MS)		$ 939	$1339	$1590	$2790
30MB (65MS)		$ 997	$1397	$1648	$2848
40MB (28MS)		$1174	$1575	$1825	$3025
60MB (39MS)		$1249	$1649	$1900	$3100
EGA Color System ●Basic System features plus ●Enhanced graphics adapter ● 14" EGA color monitor with **Seagate Hard Drives**		$1070	$1470	$1721	$2921
20MB (65MS)		$1410	$1810	$2061	$3261
30MB (65MS)		$1468	$1868	$2118	$3319
40MB (28MS)		$1645	$2045	$2296	$3496
60MB (39MS)		$1720	$2120	$2371	$3571

note: The original IBM PC came with a 63 watt power supply and those desiring to install a hard disk must also replace the undersized power supply.

I have gone way longer on the topic of hardware than I originally intended, but I feel that this amount of detail is necessary background information before we get into the more interesting topics of "what the machine can do for us as superintendents" and "what software will help me". One comment on software before I close: There are literally thousands of software programs available and they all have some use. It is kind of like choosing a mate — there is no accounting for taste. As a matter of fact, my wife and I use different word processing programs. Hmmm?

Tentative topic for next issue: Telecommunications and the "Turf Grass Information File".