Selecting a home computer

Computers are becoming a part of our daily lives. Using a computer is somewhat like driving a car. We don't need to know how a car's engine works to be able to drive it. Similarly, we can use computers without knowing everything about the "inside workings."

Shopping for a home computer can seem like trying to understand a foreign language. If you understand the basics of home computers and know what questions to ask, you will have more confidence in shopping for and purchasing a home computer.

More information can lead to better decisionmaking and, thus, to satisfaction. What you purchase will depend on what you expect a computer to do and how much you can spend.

Consider your own requirements carefully. A computer's features may appear neither obvious nor important to you as a prospective buyer, yet an inappropriate machine could present unexpected limitations after the sale.

The memory space might not be sufficiently expandable; the keyboard or the display might be inadequate; the software you want might not be available for that computer.

A wealth of information about microcomputers is now readily available. Trade magazines and books feature descriptions of typical home computers and tips on how to buy and use them effectively. Computer user groups, adult education and community college courses, and acquaintances who own computers are excellent resources.

This publication will help you choose a home computer by presenting information about computer hardware and software, and suggesting questions to ask yourself and your vendor *before* you buy.

What do I want the computer to do for me?

This should be the first question you ask as you consider purchasing a home computer. Make a list of things for which you expect to use the computer. The list will be helpful when you compare various computer systems. In general, evaluate the capabilities of computers, rather than specific brands.

A computer can be a multipurpose tool. It can perform bookkeeping functions, keep inventories, write letters, play games, and teach—as well as turn lights and appliances on and off. Each function will require different operating capabilities (hardware and software).

To answer the question of what to use a computer for, a basic knowledge of hardware and software is necessary. *Hardware* refers to the physical components of a computer system, such as the keyboard, CPU, or monitor.

Software is a set of instructions (usually on a disk or tape) that performs functions as specified by the user. We will examine each of these in more detail.

What is hardware?

The basic unit of a home computer is a *CPU*—central processing unit. CPU's vary according to the amount of data they can process at one time. A 16-bit CPU can process information internally faster than an 8-bit CPU can, although speed is not a very important consideration for most home uses.

The CPU carries out commands received from the user through the keyboard. Some keyboards have several additional special function keys to perform specific tasks. These function keys may erase the computer's display,

delete a character, etc. Most keyboards produce upper- and lowercase letters, but some may not. Some software requires lowercase letters.

Groups of instructions may be stored in the microcomputer by using its internal memory. There are two types of internal memory. *Read only memory,* ROM, consists of permanently installed instructions to the computer. ROM may contain a programming language such as BASIC, as well as the procedures to be followed when the computer is turned on. The information in ROM is not lost when the computer is turned off.

Random access memory, RAM, is a temporary storage area for your use. Any information contained in RAM is lost when the computer is turned off. RAM is measured in kilobytes (K); one K is made up of 1,024 bytes.

One byte represents one character. Thus, a computer with 64 K of RAM can store internally more than 64,000 characters. The amount of RAM you will need in your home computer system depends on the operating system and software you will use. Some programs require 32 K of RAM; others, as much as 256 K RAM.

Since information in RAM is lost every time the computer is turned off, mass storage devices are necessary to store this information and load it back into RAM when necessary.

Storage devices use a magnetic medium to record information, and several types are available. A hard disk drive accesses data the fastest, has the largest amount of storage, and is the most expensive.

Floppy disk drives can store from 200 K to 400 K of information on each diskette. They're slower than hard disk drives but faster than cassettes. A

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system with two floppy disk drives is preferred to a single drive system because it can hold a program in one drive and data in the other. This reduces the number of times you'll have to switch disks in and out of the drives.

A third method of storing data is with a cassette tape. Cassette tapes are slower and hold fewer data than floppy disks. They are the least expensive means of storing small programs and data. Many home computer users start with a cassette system and then change to a floppy disk drive as they use the computer more.

Characters generated by the CPU or input through the keyboard are displayed on monitors or television sets. Monitors are similar to television sets, but without tuners and with higher resolution to enable them to form characters and graphic displays more precisely.

Monitors may display more characters across the screen than a TV, showing you more information. TV's are often in color, which improves the display of graphic images.

If you decide to use your TV as a computer display, remember that computer use and television viewing will compete with each other. A special adapter may be required to use your TV with your computer.

The information shown on a monitor can be printed out on a printer, providing you with a permanent copy (or hard copy) of the output. There are several types of printers available, but the two most popular are letter-quality and dot-matrix.

The letter-quality printer usually costs more and is slower, but it produces printing almost identical to a typewriter. If you plan to do a lot of word processing that requires high quality output, the letter-quality printer is a good choice. It uses a printing wheel similar to the typing elements on electric typewriters that can be changed for various type styles.

The dot-matrix printer is faster and less expensive than the letter-quality printer, but it produces a lower quality of print. New models print in two or three modes, such as a low quality draft mode and a high quality letter mode. It does this by printing over the same line two or three times, so the higher quality mode will be slower. Most dot-matrix printers will also handle graphics. They provide a variety of print styles, and they will meet most people's needs.

A *modem* is a device that allows your computer to communicate with other computers by transforming your computer's electrical pulses into audible tones for transmission over phone lines. Modems vary according to the speed which they transfer data, measured as a baud rate. A 300-baud modem transmits about 30 characters per second; a 1,200-baud modem, about 120. If you plan to do much communicating with your computer, a 1,200-baud modem will reduce your long-distance phone charges.

What is software?

Software provides instructions to a computer and is the link between you and your computer. The hardware we just described is useless without good software. In the long run, your software investment may exceed your hardware investment.

You should shop for software *before* you decide on hardware. This will give you some guidelines on what hardware you'll need and also on the brands of hardware with which the software is compatible. Software is designed for specific brands of hardware. Be sure that the hardware and software you purchase are compatible.

There are many types of software on the market, depending on your needs. Table 1 lists some of the general types (there are many other types and uses of software). Prices and capabilities vary widely.

Evaluate the software you are interested in as thoroughly as possible. Examine the documentation that accompanies the program, to see if it is easy to understand. Try running the program if possible (it is usually possible and should be highly recommended). A number of computer periodicals are available that provide excellent reviews of software (see the list on page 3).

How much do I want to spend for a computer?

This is probably the second most important question to ask yourself. The price of home computer systems varies from about $600 to over $7,000. Obviously, comparing costs and system capabilities becomes very important. Look for a hardware system within your price range. Balance your computer needs against your budget.

As you shop for a computer, keep in mind what you want the computer to do right now and what you want it to

Table 1.—*Home computer software types and uses*

Software type	Example uses
Business uses	Accounting, payroll, record keeping, inventory control, word processing
Education	Tutorials, drills, exercises, logic
Games	Entertainment, education
Utility	Operating systems, communications, file handling

do in the future. Some systems allow you to start with the basics and provide "add on" or expansion capabilities to meet future needs. Less expensive machines are suitable as starter computers. There is no "best system" for everyone.

You will need to budget for software in addition to the cost of the basic hardware. It can be expensive. Word processor programs can cost as much as $500—data base management programs up to $700. Bargains are available to the careful shopper.

Some computers come equipped with "bundled" software when you buy a computer system. User groups and magazines can be a source of inexpensive programs that perform many common functions. Investigate all available resources before you buy.

Anticipate additional expenses that accompany a home computer purchase:

- You'll need blank storage disks or cassette tapes and a small TV set or video monitor.
- A desk, chair, and lamp are also part of the typical home computer workspace.
- Budget for a magazine subscription, a few books, and a class or two to help you get started.
- Set aside some money for last-minute surprises such as a printer cable or surge protector.

And be sure to budget enough *time* to become familiar with your computer and to learn to use it effectively.

Besides the availability of particular software, other factors may determine which computer is best for you. These include estimated data storage requirements, planned future enhancements (such as additional memory), suitability of a particular computer dealer, and available financing.

Remember that the total cost of a home computer system will include not

only the initial hardware (CPU, CRT, and tape or disk drive), but also software, and add-on hardware such as a printer and modem. Computer maintenance and repairs should be part of your considerations.

Conclusions

Plan to spend plenty of time with your computer after you purchase it to learn new ways to use it. Remember: it promises to be an exciting new tool for you. Before purchasing a home computer, be sure you:

- have a good idea of what computer applications you want and need;
- check for information with friends or colleagues who already own a computer;
- shop in different stores to compare brands and models; and
- test the demonstration model for ease of use and understandable instructions.

Here are some suggested questions to ask your salesperson:

- How long has your store been in business?
- What services does it offer (both before and after purchase)?
- Does your store carry software as well as hardware?
- How extensive is the product line?
- Does your staff have special expertise in a particular area (home use, small business, games, etc.)?
- Are training sessions available? How expensive, how extensive, and how frequent are they?

The more you know about the dealer's policies, the easier it will be to make your buying decisions. Before you buy, obtain answers to the following questions:

- Does the store have a repair facility? If not, who can service your computer?
- What is the policy on repairs?
- How long do repairs generally take?
- Does the shop usually repair circuit boards or swap them for new ones?
- Is a variety of replacement components available from stock?
- If not, where is the nearest supplier and how quickly will the parts arrive?
- Is a computer like yours available for loan while your system is in the shop?

- Will a technician make service calls at extra cost?
- How soon after purchase should you expect delivery?
- What are the payment terms?
- What kind of warranty does the computer manufacturer provide?
- Does the dealer offer any additional guarantees?
- Will the dealer bench-test your new machine before you take possession?
- What kinds of problems can you expect to have with your computer?
- Does the store buy back equipment or make trades? Under what circumstances?
- Will the dealer accept telephone inquiries from new users who are curious or confused about some aspect of their system?

Some computer periodicals

Byte
McGraw-Hill Inc.
P.O. Box 590
Martinsville, NJ 08836

InfoWorld
CW Communications Inc.
375 Cochituate Road, Box 837
Framingham, MA 01701-9987

Personal Computing
Hayden Publishing Co.
P.O. Box 2941
Boulder, CO 80321

Personal Software
Hayden Publishing Co.
4 Disk Drive, P.O. Box 1473
Riverton, NJ 08077-7073

Computer terms

These are some of the terms commonly used by computer owners and computer salespeople. These terms are intended to help you speak "computerese."

Access. The ability to communicate with a computer or computer-connected equipment.

Bit. The basic unit of computer memory. An abbreviation for *bi*nary dig*it,* the term refers to a single digit of a binary number—a *0* or a *1*—that is, the smallest unit of information recognized by a computer. For example, the binary number 101 is composed of 3 bits.

Baud. A measurement of communication speed between computers. For example, 300 baud is about 30 characters per second.

Boot. The sequence of events that enables a computer system to be made operational—in effect, to reset or turn on the machine. ·

Byte. A group of 8 bits, usually treated as a unit. One byte can store one unit of information. Memory capacity of a computer is measured in bytes.

Cassette. A standard tape cassette, an inexpensive way to store programs and data.

Character. Any information that can be stored in one byte. Examples are letters of the alphabet.

Computer graphics. Programs that allow the user to create geometric shapes, intricate designs, and pictures, often in color.

Computer literacy. Understanding the language and functions of computers.

CP/M. A disk operating system developed by Digital Research, Inc., that has become popular among microcomputer users.

CPU. Central processing unit. The heart of the computer, the CPU performs the basic arithmetic and logic functions and supervises the operation of the entire system. In a personal computer, the CPU is a single integrated chip.

CRT/monitor/video screen. Cathode ray tube, the TV-like device that displays the computer commands, programs, games, etc. With less expensive computers, a traditional TV is often hooked to the computer; others use monitors designed just for them.

Dedicated. Assigned to a single device or purpose.

Disk or "floppy" disk. A flexible, circular piece of plastic, coated with magnetic material, used to store and retrieve programs and data.

Disk drive. An electromechanical device that stores information on, or recalls information from, a disk.

Disk operating system. A set of programs that perform the housekeeping functions of a computer. They control data transfer, file management, and data display functions, among other things.

Files. Organized collections of related data stored on magnetic tapes or disks. Files can either be recorded from the computer's memory or retrieved by the computer from a disk and placed in its memory.

Hard disk. A rigid disk made of hard, plasticlike material, used to store and retrieve programs and data. Though more expensive than a floppy disk, a hard disk is far more permanent and has much greater storage capacity.

Hardware. All of the mechanical and electronic components of a computer system—for example, electronic chip, printer, monitor, etc.

Joystick. A device or lever connected to the computer that moves objects around on a screen. Used with video games. Also referred to as a *paddle.*

K. Kilo, a prefix meaning a thousand. Used before the word *byte* to denote memory capacity. Each kilobyte equals 1,024 bytes, but *K* generally is used to mean about 1,000. A typical personal computer has a memory ranging between 5 K and 256 K.

Keyboard. The typewriterlike mechanism on which computer commands are entered. Some computers come with keyboards; with others, keyboards must be purchased separately. Keys can be raised, like those on a typewriter, or flat (printed on a plastic membrane).

Language. Commands and statements that, when put together, allow communication with computers. Examples are BASIC, FORTRAN, COBOL, and PASCAL.

Logo. A programming language developed to introduce children to using computers as problem-solving tools.

Memory. A device or series of devices capable of storing information in the computer temporarily or permanently, in the form of patterns of binary 0's and 1's. In many personal computers, memory can be expanded by adding hardware.

Menu. A list of choices in a computer program displayed on the screen, to guide the user or.to indicate the contents of a disk.

Microcomputer. A self-contained, desktop computer whose central processing unit consists of one or a few large-scale integrated units.

Microprocessor. A central processing unit that is composed of one or more semiconductor chips.

Modem. Derived from the words *mod*ulate and *dem*odulate. A device attached to the computer to convert the computer's digital signals for transmission to other computers over telephone lines.

Personal computer. A small computer based on a microprocessor. Not all microprocessors, however, are personal computers. A microprocessor can be dedicated to single tasks as diverse as controlling a machine tool or a video game.

Ports. The connections on a computer that allow it to interact with other equipment such as printers or modems.

Printer. A device for producing paper (hard) copies of data output by a computer.

Printer cable. A cable that transmits data from a computer to a printer.

Program. A series of instructions carried out by the computer in sequence. The program must be written in a language the computer understands.

RAM. Random access memory. The part of the computer memory that is used to write programs and to store data in the form of variables. RAM is gone when the machine is turned off. RAM is necessary to operate a CP/M program.

ROM. Read only memory. This part of the computer memory contains the basic interpreter language instructions. ROM is locked into the computer. It can't be erased, changed, or used by the programmer.

Run. When a computer is given a program to execute, the program is said to be *running.*

Semiconductor. An element, usually silicon, that carries a positive or negative charge. Semiconductor technology has made possible the manufacture of extremely small electrical circuits.

Software. The programs and instructions governing the operating of the computer that direct it to perform specific functions—in contrast to *hardware.*

Store. To enter data into a memory device.

Surge protector. An electrical device that protects computers from power disturbances.

User friendly. What all computer "illiterates" hope for: a computer system that is easy and nonthreatening to use and understand.

Variable. A quantity that may assume one or many values.