1 How Are Various Styles of System Units on Desktop Computers, Notebook Computers, and Mobile Devices Different?

The system unit is a case that contains electronic components of the computer used to process data. On desktop personal computers, most storage devices also are part of the system unit. On notebook computers, the keyboard and pointing device often occupy the area on top of the system unit, and the display attaches to the system unit by hinges. On mobile computers and devices, the display often is built into the system unit. With game consoles, the input and output devices, such as controllers and a television, reside outside the system unit. On handheld game consoles, portable media players, and digital cameras by contrast, the packaging around the system unit houses the input devices and display.

2 What Are Chips, Adapter Cards, and Other Components of the Motherboard?

The motherboard, sometimes called a system board, is the main circuit board of the system unit. The motherboard contains many electronic components including a processor chip, memory chips, expansion slots, and adapter cards. A computer chip is a small piece of semiconducting material, usually silicon, on which integrated circuits are etched. Expansion slots hold adapter cards that provide connections and functions not built into the motherboard.

3 What Are the Control Unit and Arithmetic Logic Unit Components of a Processor, and What Are the Four Steps in a Machine Cycle?

The processor, also called the central processing unit (CPU), interprets and carries out the basic instructions that operate a computer. Processors contain a control unit that directs and coordinates most of the operations in the computer and an arithmetic logic unit (ALU) that performs arithmetic, comparison, and other operations. The machine cycle is a set of four basic operations - fetching, decoding, executing, and storing - that the processor repeats for every instruction.

4 What Are the Characteristics of Various Personal Computer Processors, and How Are Processors Cooled?

A multi-core processor is a single chip with two or more separate processor cores. Two common multi-core processors are dual-core and quad-core. A dual-core processor is a chip that contains two separate processor cores. A quad-core processor is a chip with four or more separate processor cores. Intel produces the Core processor family for high-performance personal computers, the Pentium and Celeron processor families for basic personal computers, and the Xeon and Itanium processor families for workstations and low-end servers. AMD manufactures Intel-compatible processors, which have an internal design similar to Intel processors. Some devices have a system on a chip processor that integrates the functions of a processor, memory, and a video card on a single chip. Heat sinks/pipes and liquid cooling technologies are used to dissipate processor heat. A heat sink is a small ceramic or metal component that absorbs and disperses heat. A smaller device called a heat pipe cools processors in notebook computers. Some computers use liquid cooling technology, which uses a continuous flow of fluid(s) to transfer heated fluid away from the processor.

5 What Is a Bit, and How Does a Series of Bits Represent Data?

Most computers are digital and recognize only two discrete states: off and on. To represent these states, computers use the binary system, which is a number system that has just two unique digits - 0 (for off) and 1 (for on) - called bits. A bit (short for binary digit), is the smallest unit of data a computer can process. Grouped together as a unit, 8 bits form a byte, which provides enough different combinations of 0s and 1s to represent 256 individual characters. The combinations are defined by patterns, called coding schemes, such as ASCII and Unicode.

6 How Do Program Instructions Transfer in and out of Memory?

When a program starts, the program's instructions and data are transferred to memory from storage devices. The program and operating system instructions are in memory, and the program's window appears on the screen. When you quit the program, the program instructions are removed from memory, and the program no longer is displayed on the screen.

7 What Are the Various Types of Memory?

Memory usually consists of one or more chips on the motherboard or some other circuit board in the computer. The system unit contains volatile and nonvolatile memory. Volatile memory loses its contents when the computer's power is turned off. Nonvolatile memory does not lose its contents when the computer's power is turned off. RAM is the most common type of volatile memory. ROM, flash memory, and CMOS are examples of nonvolatile memory. RAM (random access memory), also called main memory, consists of memory chips that can be read from and written to by the processor and other devices. ROM (read-only memory) refers to memory chips storing permanent data and instructions that usually cannot be modified. Flash memory can be erased electronically and rewritten. CMOS (complementary metal-oxide semiconductor) technology uses battery power to retain information even when the power to the computer is turned off.

8 What Are the Purpose and Types of Expansion Slots and Adapter Cards, and What Are the Different Slots for Flash Memory Devices?

An expansion slot is a socket on the motherboard that can hold an adapter card. An adapter card, sometimes called an expansion card, is a circuit board that enhances functions of a component of the system unit and/or provides a connection to a peripheral. A sound card enhances the sound-generating capabilities of a personal computer. A video card, also called a graphics card, converts computer output into a video signal that displays an image on the screen. A memory card is a removable flash memory device that you insert and remove from a slot in a personal computer, a game console, a mobile device, or card reader/writer. A USB flash drive plugs in a USB port on a computer or mobile device. A PC Card slot or an ExpressCard slot holds a PC Card or ExpressCard module.

9 What Is the Difference between a Port and a Connector, and What Are the Differences among the Various Types of Ports?

A port is the point at which a peripheral attaches to or communicates with a system unit so that it can send data to or receive information from the computer. A connector joins a cable to a port. A USB port, short for universal serial bus port, can connect up to 127 different peripherals together with a single connector. A FireWire port can connect multiple types of devices that require faster data transmission speeds. Bluetooth technology uses radio waves to transfer data between two devices. A SCSI port attaches the system unit to SCSI peripherals, such as disk drives and printers. An eSATA port connects an external SATA hard disk to a computer. An IrDA port allows wireless devices to transmit signals to a computer via infrared light waves. A serial port transmits data one bit at a time. A MIDI port connects the system unit to a musical instrument.

10 What Are the Types of Buses in a Computer?

A bus is an electrical channel along which bits transfer within the circuitry of a computer, allowing devices both inside and attached to the system unit to communicate. The data bus transfers actual data, and the address bus transfers information about where the data should reside in memory. The size of a bus, called the bus width, determines the number of bits that the computer can transmit at one time. The larger the bus width, the faster the computer transfers data. A computer has a system bus, or front side bus (FSB); possibly a backside bus (BSB); and an expansion bus.

11 What Is the Purpose of a Power Supply, and How Does It Keep Cool?

A power supply is the component of the system unit that converts wall outlet AC power into DC power for the computer to use. A fan built directly into the power supply keeps it cool. Some have variable speed fans, and many newer computers have additional fans near components in the system unit. Notebook computers can be placed on a cooling pad to help disperse heat.

12 How Do You Clean a System Unit on a Personal Computer or Mobile Device?

Before cleaning the exterior of a computer or mobile device, turn it off, and if necessary, unplug it from the electrical outlet, remove the battery, and disconnect all cables from the ports. Use compressed air to blow away dirt from any openings on the case, such as drives, slots, ports, and fan vents. Use an antistatic wipe to clean the exterior of the case and a cleaning solution on a soft cloth to clean the screen. While working inside the case, be sure to wear an antistatic wristband. If you do not feel comfortable cleaning the inside of the case, you can have a professional or computer company clean it for you. Use a vacuum and compressed air to remove dust inside the case.