

Computer system

Practice 2

The Bus System

Introduction. The bus system.

Today we are going to see different bus system, the southbridge and northbridge etc.

What is the bus system? The bus system is the connection between the main groups of components, such as CPU, the memory and the (I/O) devices,

Types of Buses (Data, addresses and control).

We have three main types of Buses.

1. A data bus can transfer data to and from the memory of a computer, or into out of the CPU.
2. An address bus transfers information about where the data should go.
3. A control bus is computer bus that is used by the CPU to communicate with devices that are contained within the computer.

The size of a bus is important because it determines how much data can be transmitted at one time. For example, a 32-bit bus can transmit 32 bits of data, and 64-bit bus can transfer 64 bits of data.

Every bus has a clock speed measured in MHz or GHz.

An address bus is measured by the amount of memory a system can retrieve. A system with a 32-bit address bus can address 4 gibibytes of memory space. Newer computers using a 64-bit address bus with a supporting operating system can address 16 exbibytes or approx. 18446744073 GB of memory locations, which is virtually unlimited.

Southbridge and Northbridge. What is it?

Northbridge is one of the two chips located in the direction towards North in the motherboards. The main function of Northbridge is to manage the communication between the CPU and parts of motherboards. It directly towards Front Side Bus (FSB). Other names for Northbridge are host bridge and Memory Controller Hub (MSH).

Function of Northbridge:

- CPU to Memory Communications.
- High-Speed Graphics.
- Bus Speed.

Advantages of Northbridge:

- High Performance.
- Efficient Graphics Handling.

Disadvantages of Northbridge:

- Heat Generation.
- Complexity.

Southbridge is another chip of the logical chipset architecture. It is located to the South of Peripheral Component Interconnect (PCI) bus in the motherboard. The main function is to control the IO functioning. The North bridge is the medium that connects South bridge and Central Processing Unit. IO Controller Hub is the other name given to South bridge for its functionality.

Functions of South Bridge

- Peripheral Management.
- Legacy Support.
- System Management.

Advantages of South Bridge

- Versatile Connectivity
- Cost-Effective.

Disadvantages of South Bridge

- Slower Data Transfer.
- Dependent on North Bridge.

Input / Output System.

I/O (Input/Output) is an information processing system designed to send and receive data from a computer hardware component, device, or network.

Data can be sent between devices over a network. Without I/O, computers would not be able to communicate to other systems or devices.

A **peripheral device**, or simply **peripheral**, is an auxiliary hardware device that a computer uses to transfer information externally. A peripheral is a hardware component that is accessible to and controlled by a computer but is not a core component of the computer.

A peripheral can be categorized based on the direction in which information flows relative to the computer:

- The computer receives data from an *input device*; examples: mouse, keyboard, scanner, game controller, microphone and webcam
- The computer sends data to an *output device*; examples: monitor, printer, headphones, and speakers
- The computer sends and receives data via an *input/output device*; examples: storage device (such as disk drive, solid-state drive, USB flash drive, memory card and tape drive), modem, router, gateway and network adapter

Connections and ports on the motherboard.

Motherboards has two categories of ports, **internal** and **external**. Internal ports are for the core components of a computer which reside inside the case. External ports are for peripherals and they reside outside the case, usually at the rear.

Here are some of the most common **internal ports** on a modern motherboard:

1. CPU socket - Where the CPU or processor plugs in.
2. CPU power connector - Power cable connection for the CPU.
3. ATX power connector - Power cable connection for the system.
4. DIMM/RAM Memory slots - Connectors for system memory or RAM.

5. PCIe slots (x16, x2, x1) - Expansion card slots, including the graphics card.
6. M.2 connection - Solid-state drive connection.
7. SATA ports - Modern internal hard drive ports.
8. Front panel connector - Connection for USB, and audio ports on the front or top of the case.
9. Front panel header - Connection for LED/RGB lighting, power switch, and reset switch.
- 10.USB headers (3.1, 2. etc.) - Connection for rear USB ports on the motherboard.
- 11.CMOS battery - Bios battery for when there's no system power.
- 12.Fan headers - Connection for the case and system fans.

External Motherboard Ports (Rear Ports)

Here are some of the most common external ports on a modern motherboard:

1. PS/2 - Used for older PS/2 interface keyboards.
2. USB - Connection for USB peripherals including keyboards, mice, hard drives, audio equipment, and more.
3. HDMI/DisplayPort/VGA - They're all video or display connectors to output video or audio to a monitor.
4. Ethernet /RJ-45 - Connection for wired internet.
5. Analog/Digital Audio - Connections for speakers and digital audio equipment, including home theater systems.

Secondary storage units and types.

Secondary storage is persistent storage for noncritical data that doesn't need to be accessed as frequently as data in primary storage or that doesn't have the same performance or availability requirements. Primary storage typically requires costly, high-performance storage systems, whereas secondary storage systems can function effectively on economical, lower-performing devices that are more appropriate for long-term storage.

Secondary storage might include hard disk drives (HDDs), solid-state drives (SSDs), optical disks, USB flash drives, floppy disks or other devices.

Organizations often turn to secondary storage to support three primary use cases:

1. **Backup and DR.** Backup and DR data might reside on a variety of media and systems, usually determined by its volume and how easily and quickly it can be restored.
2. **Archival.** Archival data is information that is no longer accessed with any regularity but must be maintained and be accessible if needed, such as data related to internal governance or legal compliance regulations.
3. **Noncritical active data.** Many organizations store data that they don't access very frequently but still want it close at hand in case they need it, or they might need to access the data regularly, but performance and availability are not overriding considerations.

Storage capacity.

Storage capacity refers to how much disk space one or more storage devices provides. It measures how much data a computer system may contain. For an example, a computer with a 500GB hard drive has a storage capacity of 500 gigabytes. A network server with four 1TB drives, has a storage capacity of 4 terabytes. Storage capacity is often used synonymously with "disk space." However, it refers to overall disk space, rather than free disk space. For example, a hard drive with a storage capacity of 500GB may only have 150MB available if the rest of the disk space is already used up. Therefore, when checking your computer to see if it meets a program's system requirements, make sure you have enough free disk space to install the program. If you need more disk space, you can increase your computer's storage capacity by adding another internal or external drive.

Personal conclusion.

With this work I studied different types of storage, how does it work. I searched some interesting information about bus system, those types and bridges. So, now I have more knowledge about computer system.

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