CAD HARDWARE

It is used to describe the physical equipment (electronic circuitry) and its peripherals (mouse, printer). The term "hardware" is used to cover all those pieces of equipment which are used to implement computer programs. These includes the computer with its memory and CPU, means of storing programs on disk or magnetic tape, the display screens, various devices for inputting instructions to the computer i.e., keyboards, etc. and output devices which can give "hard/soft copy", i.e., projectors/printers, plotters etc. Hardware consists of the graphics workstations, graphics input and output devices. Computer software include: the operating system which controls the basic house-keeping operations in the computer and software packages like those used for geometric modeling, and application software for design, analysis and synthesis.

The CAD hardware and its available features have an important influence on the convenience, productivity. and quality of the user's output.

The hardware for a typical *CAD* system consists of the following components: (1) one or more design workstations, (2) digital computer, (3) Input & output devices. and (4) storage devices as follows:



Figure 24.5 Configuration of a typical CAD system.

In addition, the CAD system would have a communication interface to permit transmission of data to and from other computer systems. thus enabling some of the benefits of computer integration

The Design Workstation

A workstation is a special computer designed for technical or scientific applications.

Workstations offer higher performance than mainstream personal computers, especially with respect to CPU, graphics, memory capacity, and multitasking capability.

Workstations were optimized for the visualization and manipulation of different types of complex data such as 3D mechanical design, engineering simulation (e.g., computational fluid dynamics), animation and rendering of images, and mathematical plots

Workstations offer multiple displays, graphics tablets, 3D mice etc

Many kinds of workstations are available:

- CAD Workstations (Design etc)
- Computational Workstations (Large sets of data, complex calculations etc)
- Video editing
- Creative work like animations etc

For CAD applications, the workstation must include a graphics display terminal and a set of user input devices. The display terminal must be capable of showing both graphics and alphanumeric text. It is the principal means by which the system communicates with the user. For optimum graphics display, the monitor should have a large color screen with high resolution.



Graphics Terminal

A terminal or desktop computer that displays graphics.

An input/output device that can accept and display picture images as well as text. Computer is intelligent that it can receive and process data itself and respond Terminals were not always intelligent

Today using Keyboard and monitor, enter and get data from computer







Operator Input Devices

Various devices *are* available for data input on graphics workstations. Most systems have a keyboard and one or more additional devices specially designed for interactive input. These include a mouse, trackball, spaceball, joystick, digitizers, button boxes. Some other input devices used In particular applications are data gloves, touch panels, image scanners, and voice systems.





Operator Input Devices









Input Devices

- The user input devices permit the operator to communicate with the system. To • operate the CAD system, the user must be able to accomplish the following: (1) enter alphanumeric data, (2) enter commends to the system (perform various graphics operations, and (3) control the cursor position on the display screen. To enter alphanumeric data, an alphanumeric keyboard is provided. A conventional type writer like keyboard allows the designer to input numerical and alphabetic characters into the system. The alphanumeric keyboard can also be used to enter commands and instructions to the system. However, other input devices accomplish this function more conveniently. Special function keypads have been developed to allow entry of a command in only one or two keystrokes. These special keypads have from 10 to 50 function keys, depending on the system. However, each key provides more than one function, depending on the combination of keys pressed or which software is being used. Another input device for entering commands to a CAD system is the *electronic tablet*, an electronically sensitive board on which an instruction set is displayed, arid commands arc entered using an electronic pen.
 - Cursor control permits the operator to position the cursor on the screen to identify a location where some function is to be executed. For example, to draw a straight line on the screen, the endpoints of the line can be identified by locating the cursor in sequence at the two points and giving the command to construct the line. There are various cursor control devices used in CAD, inducting pucks, mouse's, joysticks, trackballs, thumbwheels, light pens, and electronic tablets. An input device for entering coordinates from an existing drawing into the CAD system is a *digit/t.er*, which consists of a large flat board and an electronic tracking element such as a puck that can be moved across the surface of the board to record x and y-coordinate positions.

Plotters and Other Output Devices

- Monitor (LED, LCD, CRT etc)
- Printers (all types)
- Plotters
- Projector
- LCD Projection Panels
- Computer Output Microfilm (COM)
- Speaker(s)
- Head Phone
- Visual Display Unit











Plotters and Other Output Devices



https://www.youtube.com/watch?v=SmubQ3-3Wuc











Plotters and Other Output Devices











The Central Processing Unit - CPU

The central processing unit (CPU) is the part of the computer that carries out software functions and instructions.

In order to translate instructions and run computer software, the CPU must perform four tasks. First, the CPU locates the set of instructions from the computer program. Then, the CPU decodes these instructions into their parts. With this task, the CPU interprets what is necessary for each operation. The different parts of the CPU are responsible for unique tasks. After decoding information, the CPU will execute the program's instructions. The different parts of the CPU work together so that the software can run. Finally, the CPU writes back the outcome of the execution into memory.





Secondary Storage

A secondary storage device refers to any storage device that is internal or external to the computer. It can be any storage device beyond the primary storage that enables permanent data storage. A secondary storage device is also known as an auxiliary storage device or external storage



Further study

• <u>https://www.brainkart.com/articl</u> <u>e/CAD-System-Hardware 6432/</u>