

## Input Devices

Computer Devices that input information in the computer. Input basically means getting data into the computer to be processed.

**ex:**

Keyboard, Numeric Keypads, Mouse, Touchpad, remote control, joysticks, touch screen, magnetic strip readers, chip readers, scanners, digital cameras, microphones, sensors, barcode reader, webcam, video cameras etc.

Let us discuss each one in detail one by one with examples:

## Keyboard



In computing, a **keyboard** is an input device, partially modeled after the typewriter keyboard, which uses an arrangement of buttons or keys, to act as mechanical levers or electronic switches

A keyboard typically has characters printed on the keys and each press of a key typically corresponds to a single written symbol. However, to produce some symbols requires pressing and holding several keys simultaneously or in sequence. While most keyboard keys produce letters, numbers or signs (characters), other keys or simultaneous key presses can produce actions or computer commands.

In normal usage, the keyboard is used to type text and numbers into a word processor, text editor or other program. In a modern computer, the interpretation of key presses is generally left to the software. A computer keyboard distinguishes each physical key from every other and reports all key presses to the controlling software. Keyboards are also used for computer gaming, either with regular keyboards or by using keyboards with special gaming features, which can expedite frequently used keystroke combinations. A keyboard is also used to give commands to the operating system of a computer, such as Windows' Control-Alt-Delete combination, which brings up a task window or shuts down the machine.

### What are the F1 through F12 keys?

Commonly known as "function keys", F1 through F12 may have a variety of different uses or no use at all. Depending on the installed operating system and the software program currently open will change how each of

these keys operate. A program is capable of not only using each of the function keys, but also combining the function keys with the ALT and/or CTRL keys, for example, Microsoft Windows users can press ALT + F4 to close the program currently active.

Below is a short-listing of some of the common functions of the functions keys on computers running Microsoft Windows.

F1 :- Almost always used as the help key, almost every program will open the help screen when this key is pressed.

F2 :- In Windows commonly used to rename a highlighted icon or file.

F3 :- Often opens a search feature for many programs including Microsoft Windows.

F4 :- Open find window. , Alt + F4 will close the program currently active .

F5 :- In all modern Internet browsers pressing F5 will refresh or reload the page or document window.

F7 :- Commonly used to spell check and grammar check a document.

F8 :- Function key used to enter the Windows startup menu,

F10 :- In Microsoft Windows activates the menu bar of an open application.

F11 :- Full-screen mode in all modern Internet browsers.

F12 :- Open the Save as window in Microsoft Word.

## Numeric Keypads



A **numeric keypad**, **numpad** or **tenkey** for short, is the small, palm-sized, seventeen key section of a computer keyboard, usually on the very far right. The numeric keypad features digits 0 to 9, addition (+), subtraction (-), multiplication (\*) and division (/) symbols, a decimal point (.) and Num

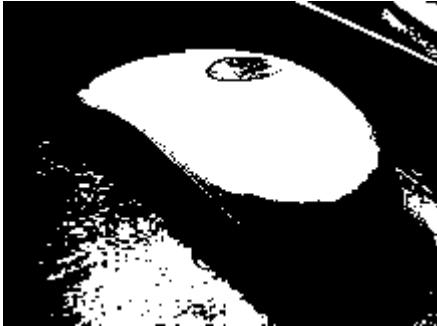
Lock and Enter keys.<sup>[1]</sup> Laptop keyboards often do not have a numpad, but may provide numpad input by holding a modifier key (typically labelled "Fn") and operating keys on the standard keyboard. Particularly large laptops (typically those with a 17 inch screen or larger) may have space for a real numpad, and many companies sell separate numpads which connect to the host laptop by a USB connection. It also provides a calculator-style keyboard for efficient entering of numbers.

Numeric keypads usually operate in two modes: when Num Lock is off, keys 8, 6, 2, 4 act like an arrow keys and 7, 9, 3, 1 act like Home, PgUp, PgDn and End; when Num Lock is on, digits keys produce corresponding digits.



## Pointing Devices(Mouse/TouchPad)

### Mouse



A mouse is a small handheld device pushed over a horizontal surface.

A mouse moves the graphical pointer by being slid across a smooth surface. The conventional roller-ball mouse uses a ball to create this action: the ball is in contact with two small shafts that are set at right angles to each other. As the ball moves these shafts rotate, and the rotation is measured by sensors within the mouse. The distance and direction information from the sensors is then transmitted to the computer, and the computer moves the graphical pointer on the screen by following the movements of the mouse. Another common mouse is the optical mouse. This device is very similar to the conventional mouse but uses visible or infrared light instead of a roller-ball to detect the changes in position.

### Touchpad

A touchpad or **trackpad** is a flat surface that can detect finger contact. It's a stationary pointing device, commonly used on laptop computers. At least one physical button normally comes with the touchpad, but the user can also generate a mouse click by tapping on the pad. Advanced features include pressure sensitivity and special gestures such as scrolling by moving one's finger along an edge.



### Joysticks



Joystick elements: 1. Stick 2. Base 3. Trigger 4. Extra buttons 5. Autofire switch 6. Throttle 7. Hat Switch (POV Hat) 8. Suction Cup

A **joystick** is an input device consisting of a stick that pivots on a base and reports its angle or direction to the device it is controlling. Joysticks are often used to control video games, and usually have one or more push-buttons whose state can also be read by the computer. A popular variation of the joystick used on modern video game consoles is the analog stick.

The joystick has been the principal flight control in the cockpit of many aircraft, particularly military fast jets, where center stick or side-stick location may be employed.

Joysticks are also used for controlling machines such as cranes, trucks, underwater unmanned vehicles, wheelchairs, surveillance cameras and zero turning radius lawn mowers. Miniature finger-operated joysticks have been adopted as input devices for smaller electronic equipment such as mobile phones.

## Touchscreen



A **touchscreen** is an electronic visual display that can detect the presence and location of a touch within the display area. The term generally refers to touching the display of the device with a finger or hand. Touchscreens can also sense other passive objects, such as a stylus. However, if the object sensed is active, as with a light pen, the term touchscreen is generally not applicable.

The touchscreen has two main attributes. First, it enables one to interact directly with what is displayed, rather than indirectly with a cursor controlled by a mouse or touchpad. Secondly, it lets one do so without requiring any intermediate device that would need to be held in the hand. Such displays can be attached to computers, or to networks as terminals. They also play a prominent role in the design of digital appliances such as the personal digital assistant (PDA), satellite navigation devices, mobile phones, and video games.

## Scanners

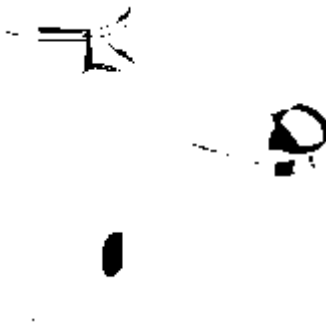
In computing, a **scanner** is a device that optically scans images, printed text,



handwriting, or an object, and converts it to a digital image. Common examples found in offices are variations of the *desktop (or flatbed) scanner* where the document is placed on a glass window for scanning. *Hand-held scanners*, where the device is moved by hand, have evolved from text scanning "wands" to 3D

scanners used for industrial design, reverse engineering, test and measurement, orthotics, gaming and other applications. Mechanically driven scanners that move the document are typically used for large-format documents, where a flatbed design would be impractical.

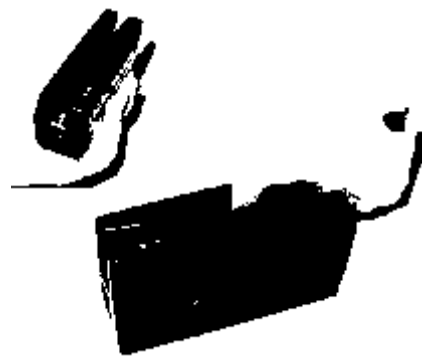
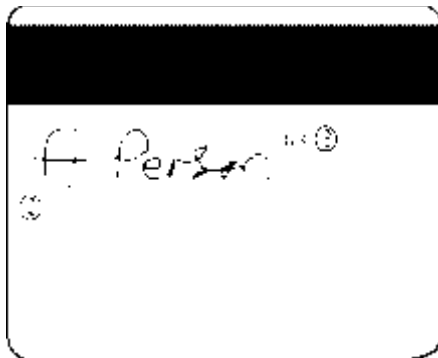
## Sensors



A **sensor** is a device that measures a physical quantity and converts it into a signal which can be read by an observer or by an instrument.

ex : Sensor Water Tap in Malls and Multiplex

## Magnetic Strip Card Readers



A **magnetic stripe card** is a type of card capable of storing data by modifying the magnetism of tiny iron-based magnetic particles on a band of magnetic material on the card. The magnetic stripe, sometimes called a **magstripe**, is read by physical contact and swiping past a reading head.

A number of ISO standards, define the physical properties of the card, including size, flexibility, location of the magstripe, magnetic characteristics, and data formats. They also provide the standards for financial cards, including the allocation of card number ranges to different card issuing institutions.

There are three tracks of data on the magnetic stripe. Typically the data on each of the tracks follows a specific encoding standard, but it is possible to encode any format on any track. A mag-stripe card is cheap compared to other card technologies and is easy to program. The magnetic stripe holds more data than a bar code can in the same space. While a mag-stripe is more difficult to generate than a bar code, the technology for reading and encoding data on a mag-stripe is widespread and easy to acquire. Magnetic stripe technology is also susceptible to misreads, card wear, and data corruption.

## Chip Card & Chip Readers

A **smart card**, **chip card**, or **integrated circuit card (ICC)**, is any pocket-sized card with embedded integrated circuits. There are two broad categories of ICCs. Memory cards



contain only non-volatile memory storage components, and perhaps dedicated security logic. Microprocessor cards contain volatile memory and microprocessor components.

## Microphones



A microphone is a device that converts mechanical energy waves or sound into electrical energy waves. Speaking into a microphone excites (moves) a diaphragm that is coupled to a device that creates an electrical current proportional to the sound waves produced.

Microphones are a part of everyday life. Microphones are used in many applications such as telephones, tape recorders, karaoke systems, hearing aids, motion picture production, live and recorded audio engineering, FRS radios, megaphones, in radio and television broadcasting and in computers for recording voice, speech recognition, VoIP

## Barcode reader

A **barcode reader** (or **barcode scanner**) is an electronic device for reading printed barcodes. Like a flatbed scanner, it consists of a light source, a lens and a light sensor translating optical impulses into electrical ones. Additionally, nearly all barcode readers contain *decoder* circuitry analyzing the barcode's image data provided by the sensor and sending the barcode's content to the scanner's output port.



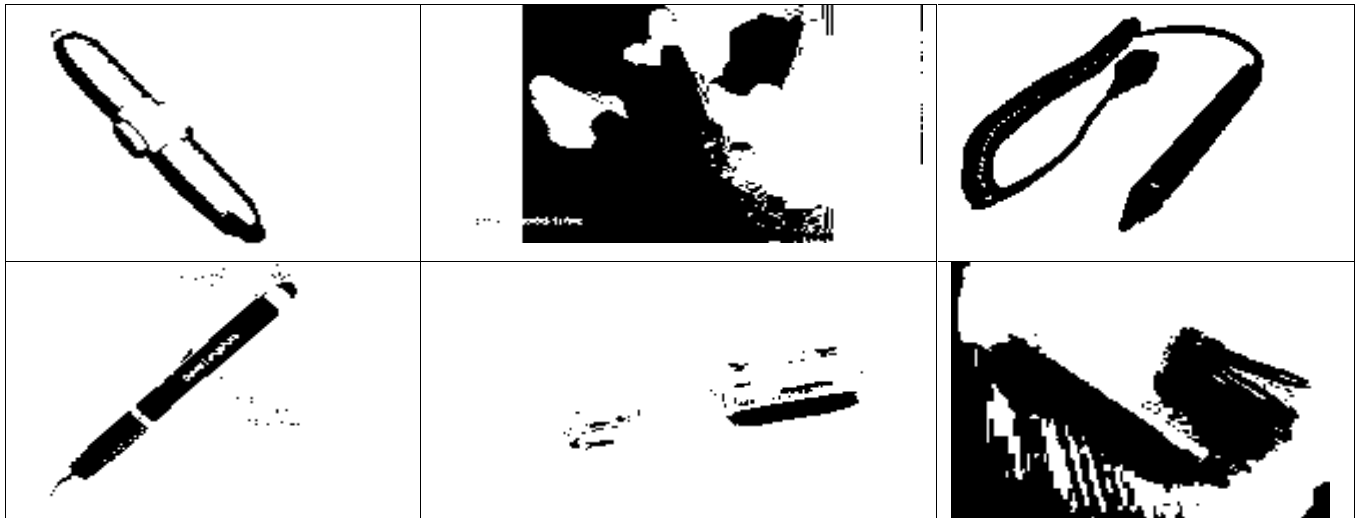
## Webcam



A **webcam** is a video capture device connected to a computer or computer network, often using a USB port or, if connected to a network, ethernet or Wi-Fi.

The most popular use is for **videotelephony**, permitting a computer to act as a **videophone** or **video conferencing station**. This can be used in messenger programs such as **Windows Live Messenger**, **Skype** and **Yahoo!** messenger services. Other popular uses, which include the recording of **video** files or even still-images, are accessible via numerous **software programs**, applications and devices.

## Light Pen



A **light pen** may refer to any of the following:

1. A **light pen** is a light-sensitive pointing input device commonly used to select or otherwise modify text or data on a screen. Used with a CRT monitor, these devices were an early form of manipulating and highlighting data on the screen. In the picture is an example of a woman using a light pen to highlight text on the screen.  
Light pens were originally developed around 1955 and in the 1960s, they became more commonly used with graphics terminals, like the IBM 2250. In the 1980s, light pen usage expanded to home computers, like the BBC Micro computer. Some graphics cards also included a connection for a light pen.  
Today, light pens are no longer used due to the invention of touch screens.
2. The term **light pen** may also refer to a pointing input device utilizing a light that is commonly used during a presentation. The light pen can be a very focused flashlight-type of device or a laser pointer, allowing a user to direct viewers' attention to a specific area, like a picture or text, in the presentation.
3. A **light pen** may also be used to describe the pen (stylus) used with a **graphics tablet**.

- **OUTPUT DEVICES**

An **output device** is any piece of computer hardware equipment used to communicate the results of data processing carried out by a computer system to the outside world.

In computing, input/output, or I/O, refers to the communication between an information processing system (such as a computer), and the outside world. Inputs are the signals or data sent to the system, and outputs are the signals or data sent by the system to the outside.

Computer output devices deliver data that has been processed by the computer to the user. There are a variety of devices that produce data in different forms including audio, visual and hard copy. Computer output devices are types of peripheral hardware connected to a computer, using cables or over a wireless network.

#### Examples of output devices:

- Monitors
- Printer
- Plotter
- Speaker

### **Monitor**

The most common computer output device is the monitor or computer screen. Monitors create a visual display from processed data that users can view. They come in a variety of screen sizes and visual resolutions.

#### • **CRT Monitors**



The CRT (**Cathode Ray Tube**) monitor creates a picture out of many rows or lines of tiny colored dots. These are technically not the same thing as pixels, but the terms are often used interchangeably. The more lines of dots per inch, the higher and clearer the resolution. Therefore 1024 x 768 resolution will be sharper than 800 x 600 resolution because the former uses more lines creating a denser, more detailed picture. Higher resolutions are important for displaying the subtle detail of graphics.

#### **Advantages of CRT's**

- Significantly lower cost compared to CRTs, because the technology has matured.
- Color fidelity, so essential for graphic artists, has not been matched by LCDs.
- Contrast ratio allows perception of true black. Darks are darker.
- Ability to adjust (multisync) images.



- Good for basic web surfing as well as uses requiring crisp, color-rich graphics and sharp text.
- Work better at multiple resolution.
- Displays full motion video better.
- Give you more pixels, translating to greater screen detail and ability to view more of a document without scrolling.
- Screen images viewed from side angle are as good as when viewed straight-on (no dilution of clarity or color.)
- Modern versions may include a sleep-mode for energy efficiency.
- Many now available with flat viewing screens for less glare, viewing convenience.
- Strong glass screen can withstand routine handling, and is not easily damaged by casual touch.

### Disadvantages of CRT's

- Radiation Emission; ELF from 60 Hz to 75 Hz and VLF from 10kHz to 30kHz
- Larger size takes up more desk space; the bigger the screen, the bigger the footprint.
- Heavy weight, 40 lbs and more.
- Heavier size limits easy and convenient movement.
- Expends more energy and throws off heat.
- Measurement differs from usable screen area. EX: a 19" CRT provides about 18" of usable screen area.
- Less off-the-desk mounting options available.

### • LCD Monitors



LCD (**Liquid Crystal Display**) displays were used on laptop computers before the technology improved enough to make the jump to desktop monitors. An LCD monitor consists of five layers: a backlight, a sheet of polarized [glass](#), a "mask" of colored [pixels](#), a layer of liquid crystal solution responsive to a wired grid of x, y coordinates, and a second polarized sheet of glass. By manipulating the orientations of crystals through precise electrical charges of varying degrees and voltages, the crystals act like tiny shutters, opening or closing in response to the stimulus, thereby allowing degrees of light that have passed through specific colored pixels to illuminate the screen, creating a picture.

Flat panel monitors usually use LCD or plasma to create output. Light is passed through liquid crystals to create the pixels.

- **TFT Monitors**



A TFT monitor uses *Thin-Film Transistor* technology for the ultimate LCD display. LCD monitors, also called flat panel displays, are replacing the old style cathode ray tubes (CRTs) as the displays of choice. Nearly all LCD monitors today use TFT technology.

The benefit of a TFT monitor is a separate, tiny transistor for each pixel on the display. Because each transistor is so small, the amount of charge needed to control it is also small. This allows for very fast re-drawing of the display, as the image is re-painted or refreshed several times per second

Prior to TFT, *passive matrix* LCD displays could not keep up with fast moving images. A mouse dragged across the screen, for example, from point A to point B, would disappear between the two points. A TFT monitor can track the mouse, resulting in a display that can be used for video, gaming and all forms of multimedia.

### **Advantages of LCDs**

- Light weight; can be about 15 lbs for a thin LCD.
- Smaller footprint on desk leaving, freeing up work area on the user's desk.
- Flicker free screen.
- More usable display area than on comparably sized CRTs.
- Low frequency radiation is practically eliminated.
- Easy adjustment, storage, and movement
- Energy efficient, using only 1/3 to 1/2 the electricity of CRTs, and they don't generate heat.
- Potentially less eyestrain due to reduced screen glare.
- Good for basic web surfing.
- Newest TFT liquid crystal technology has provided LCDs in competitive position with CRTs for image and color clarity.

- OLED, a new technology (Organic light-emitting diodes) in limited use presently in handheld personal video players, uses little power and provides a better image than present LCD technology; it thus holds the promise of making up for a significant weakness in LCD image quality.
- Plentiful mounting arm options available, enabling these light LCDs, whether computer or TV monitor to be ergonomically raised off the work surface.

### Disadvantages of LCD's

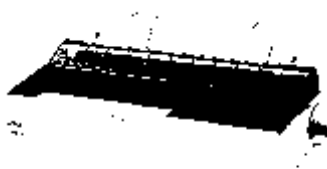
- Fragile screen; may result in both screen and backlight lamp damage if touched or handled. Thus, not recommended in environments where it may be handled roughly.
- Contrast ratio causes darkness to not be displayed true. Darkest areas may be viewed as dark gray rather than black.
- Designed only for one optimum resolution; can't adjust images.
- Best view of screen is straight-on, limiting clarity and colors of information for those viewing from an angle.
- The backlight is the potential weak link and its failure can be costly. Many warranties only cover it for 1 year.

All monitors rely on a video card that is located on the computer motherboard or in a special expansion slot. The video card processes the computer data into image details that the monitors can display.

### Printer

Printers produce a hard copy version of processed data such as documents and photographs. The computer sends the image data to the printer, which then physically recreates the image onto an object.

- **Dot Matrix Printer**



The term dot matrix printer is specifically used for impact printers that use a matrix of small pins to create precise dots. The advantage of dot-matrix printers is that they can produce graphical images in addition to text; however the text is generally of poorer quality.

Dot matrix printers were one of the more common types of printers used for general use, such as for home and small office use. Such printers

would have either 9 or 24 pins on the print head. 24-pin print heads were able to print at a higher quality.

- **Ink Jet Printer**



An **inkjet printer** is a type of computer printer that reproduces a digital image by propelling variably-sized droplets of liquid material (ink) onto a page. Inkjet printers are the most common type of printer and range from small inexpensive consumer models to very large and expensive professional machines. A high-pressure pump directs liquid ink from a reservoir through a gun body and a microscopic

nozzle, creating a continuous stream of ink droplets.

The ink droplets are subjected to an electrostatic field created by a charging electrode as they form; the field varies according to the degree of drop deflection desired.

### **Advantages**

- Inkjets have the advantage of practically no warm up time and lower cost per page.
- They can print finer, smoother details through higher print head resolution.
- Lowest purchasing cost.

### **Disadvantages**

- The lifetime of inkjet prints produced by inkjets using aqueous inks is limited; they will eventually fade and the color balance may change.
- Because the ink used in most consumer inkjets is water-soluble, care must be taken with inkjet-printed documents to avoid even the smallest drop of water, which can cause severe "blurring" or "running." Similarly, water-based highlighter markers can blur inkjet-printed documents.
- The very narrow inkjet nozzles are prone to clogging with dried ink. The ink consumed cleaning them - either during cleaning invoked by the user, or in many cases.

- **Laser Printer**

A **laser printer** is a common type of computer printer that rapidly produces high quality text and graphics on plain paper. Laser printers employ a xerographic printing process. A laser beam projects an image of the page to be printed onto an electrically charged rotating drum coated with selenium.

Color laser printers use colored toner (dry ink), typically cyan, magenta, yellow, and black (CMYK). Laser printers use a toner cartridge that combines the photoreceptor (sometimes called "photo conductor unit" or "imaging drum") with the toner supply bin, the waste toner hopper, and various wiper blades.

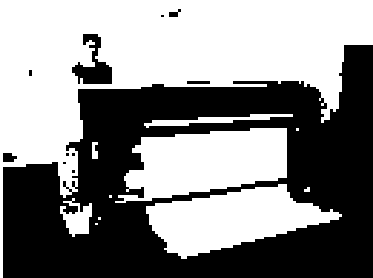
#### **Advantages**

- Colour printing is possible
- Print quality is good
- Noiseless
- Printing speed is high

#### **Disadvantages**

- Not be the printer of choice for everyone, Due to the cost.

- **Plotter**



A plotter is an output device used to produce hardcopy.

Plotters are used for a variety of applications, which include drawing graphs, making maps, plotting civil engineering drawings and machine components. Plotters work on the principle of a human hand holding a pen and moving it on paper. Plotters are normally very slow output devices because of excessive mechanical

movement required during plotting but still plot much faster than a draughtsman and the output is of better quality. Plotters are of two types: flatbed and drum type.

#### **Advantages**

- Very good for line drawings where accuracy and simplicity are necessary.
- Used for blueprints and maps.

#### **Disadvantages**

- They aren't designed for printing ordinary photographs

## Speakers/Headphones



Computers produce audio data that require output devices such as speakers and headphones to deliver the sound to the user. Audio data is created by the computer and then sent to the audio card, which is located in an expansion slot. The card translates the data into audio signals, which are sent to the audio output device.

An important feature of the sound card and speakers is the type of interface found on the computer. One important feature is the MIDI or the **Musical Instrumental Digital Interface**. MIDI is a set of rules that allow synthesizers, musical instruments, and computers to exchange data. This is an important feature because if a sound cards supports MIDI, then the computer can play the sounds found in games and CD-ROMS.

### Advantages

- Very simple to operate.
- Speaker's help blind people who would otherwise have difficulty using a computer.
- Speakers can be useful for alerting computer users, even when they're busy.

### Disadvantages

- They can take up a fair amount of desk-space, compared to headphones.
- They can distract people around you therefore disrupting a communal work area.

## LCD Projector



An **LCD projector** is a type of video projector for displaying video, images or computer data on a screen or other flat surface. It is a modern analog of the slide projector or overhead projector. To display images, LCD (liquid crystal display) projectors typically send light from a Metal halide lamp through a prism that separates light to three poly silicone panels – one each for the red, green, and blue components of the video signal. As polarized light passes through the panels (combination of

polarizer, LCD panel and analyzer), individual pixels can be opened to allow light to pass or closed to block the light. The combination of open and closed pixels can produce a wide range of colors and shades in the projected image.

### **Advantages**

- Use to displaying video, images or computer data on a screen or other flat surface.
- LCD panels can be cheaply manufactured as well, and that keeps the cost of LCD projectors very low with the comparison of other projector.

### **Disadvantages**

- LCD projectors sometimes are dead pixels. If one of the millions of tiny little pixels dies, it will often project a square that does not change colors on the projection screen.
- Usually, screen door effect (spread over images, picture, movie) is most noticeably seen in video and moving images as well as closely examining an image.