| Input Devices | Application | Advantages | Disadvantages |
|---|---|---|---|
| **Manual Input Devices** | | | |
| **Keyboard** | *touch* | | |
| • Converts key strokes into binary digits<br>• Carries out the commands of function keys such as 'Edit', 'PgUp' | • used to manually input text into the computer<br>• used to type commands and instructions to computer systems | • most common means of entering text<br>• relatively inexpensive | • data entry can be time consuming<br>• continued use can cause repetitive strain injury<br>• errors in transaction are common<br>• speed of input depends on the user's experience |
| **Mouse** | *touch* | | |
| Sends positional information to the computer, by clicking or scrolling of mouse buttons | • acts as an interface between the user and the computer<br>• to issue commands directly to the computer | • commands can be given directly to the computer (e.g. page down)<br>• can activate commands by selecting icons directly | • hand-to-eye coordination can be a problem<br>• shifting between keyboard and mouse can be confusing |
| **Joystick** | *touch* | | |
| Similar to a vehicle gear shift, but with buttons for different commands | Generally used in game playing, but is also useful in virtual reality and controlling robot movements | Ideal for games such as car racing and combat | User has to become skilled at the sensitive movements of the joystick |
| **Touch Screen** | *touch* | | |
| Allows the user to press parts of the screen to activate different functions. Various options are displayed on the screen and the presses what they want. When the finger touches the screen it blocks the light from the area of the screen. It uses this area to determine the correct option. | • used to communicate information<br>• are located in public places such as restaurants and shopping malls where transactions can be made and information given | • user friendly<br>• easy way to input options and choices<br>• can be used by children and the physically challenged who are unable to use other input devices | • a limited number of values can be displayed on one screen at a time<br>• more expensive than a standard monitor |

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| Scanner | light | | |
|---|---|---|---|
| used to capture an image in hard copy and create a digital copy of the image | Conversion of hard copy images to soft copy can be used to import and export documents and images across different applications | • relatively cheap and easy to install <br> • depending on use, flat-bed or hand-held scanners can be chosen | • the quality of the image depends on the quality of the hard copy, scanner and scanner sotware |
| Key-to-disk | Machine-readable | | |
| Data is entered using a keyboard to magnetic disks or tapes | Generally used only when large amounts of data have to be processed from source documents into machine-readable format before being analysed | • data can be prepared off-line <br> • data can be validated by the program as it is being entered | • requires human and computer resources <br> • expensive |
| Voice-recognition system | sound | | |
| Data is input in audio form. The input is analysed for commands which are then processed | Allows users to dictate text or give commands directly to the computer | • the user can speak at normal rates for dictation | • the voice recognition system must be trained to recognise voice patterns <br> • software cannot interpret all English meanings |

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| Input Devices | Application | Advantages | Disadvantages |
|---|---|---|---|
| **Direct data entry devices** | | | |
| **Barcode reader** | *light* | | |
| Barcodes are groups of bars of different widths and are found on almost every product you buy. The codes are read into the computer using a wand or a fixed scanner/ | Different groups of bars represent different numbers which are often printed above or below the barcode. These numbers represent its country of origin, manufacture and item code. also useful in packaging | • fast and accurate in product identification<br>• data can be input much faster than it takes to be keyed in<br>• not easily damaged and can normally still be read if they are creased or not stuck onto a flat surface<br>• can be printed using a normal printer and ink and so are cheap to produce | • details and the order of data stored on the strip cannot be changed easily the price of the product is not included in the barcode |
| **Point of Sale Terminal (POST)** | *laser* | | |
| Data collected from the barcodes is used to produce information and update the database | Goods are automatically re-ordered | Large amounts of data can be input very quickly and accurately | Same limitations as for barcode reader |
| **Optical Character Recognition (OCR)** | *laser* | | |
| Text and graphics are scanned as soft copy which can be edited, reformatted and reprinted | Can be sued to input large blocks of typed text | Can speed up the typing process | • accuracy of the text can be poor<br>• not appropriate for handwritten documents |
| **Magnetic Ink Character Recognition (MICR)** | *magnetic* | | |
| Data is printed as special | Used by banks to process | • is quick and highly | • has limited applications |

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| characters using magnetic ink. This data is translated into text values | cheques, by printing additional bank details (branch, account, number) | efficient<br>• it is a fast, accurate way of inputting large volumes of data that is in the required format<br>• both humans and machines can interpret the data<br>• not easy to forge | • as the use of cheques becomes obsolete, its use is in decline |
|---|---|---|---|
| **Optical Mark Recognition (OMR)** | *light* | | |
| Similar to OCR, however it relies on the presence or absence of precisely positioned marks on a form being read by a special scanner. This data is then processed by the system | Popular with lotteries and multiple choice question sheets issued by examination boards | Data input is very fast and accurate | • there is a limit to the number of responses<br>• incorrect or inconsistent marking of the sheet may result in the data being rejected |
| **Smart card** | *magnetic* | | |
| A magnetic strip is placed on a plastic card containing encoded data about the owner of the card. The data is processed by a computer when the card is swiped | Used to store data on debit, credit, loyalty, phone and other cards | • can be used to store financial transactions<br>• transactions are fast<br>• saves the user from carrying cash | • can be damaged<br>• may soon be replaced by embedded microchips |
| **Musical Instrument Digital Interface (MIDI)** | *sound* | | |
| Can be used by musicians to create, manipulate and store sounds into a computer | Used to store music from instruments or voice or editing | Once stored, the data can be arranged in many ways | Special software must be used to translate the music into a musical score |

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## Other Input Devices

### Light Pen

This is a light sensitive device that looks like a pen. When the light pen is moved across the screen, its position can be detected. A user can write on the screen the same way they write on a piece of paper so it feels very natural. It is therefore suited for drawing images or signatures. It can also be used to make selections from a menu that was displayed on the screen.



### Graphics Pad and Tablets

These are flat pressure-sensitive surfaces that are commonly used in Computer Aided Design. The user draws on the graphics tablet



with a pen-like device known as a stylus. The drawing appears on the monitor inside a program designed for this method of input. Another device that can be used with graphics tablet is called a puck. It resembles a mouse but does not rely on a ball. The graphics tablet keeps track of its position. It can do so even if the puck is not on the surface of the tablet. Graphics pads and tablets are used for tracing drawings and in engineering and art designs.

### Digital Camera

A digital camera is a device that utilises a lens in order to take photographs by capturing light on some sort of media. The media on which images are stores is the main difference between a digital camera and a normal camera. Digital camera



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uses digital methods to capture and store images unlike normal cameras which use film. Digital cameras generally use tiny light-sensitive diodes that convert the light into electrical charges. The light from the object passes through filters that separate it into its red, green and blue components. The intensity of each component is measured using diodes. The data is then stored on digital media such as memory cards, floppy disks or even writable CDs and DVDs.

Each digital camera has a particular resolution given in pixels that determines the quality of the image that can be stored. A pixel is a dot in an image whether the image is on screen or on paper. The term resolution refers to the number of pixels that a device can produce, display or store in a particular area. The higher the resolution, the more pixels are used to provide fine details in images.

**Advantages**

- convenient method of capturing images for computer applications such as web pages. Since images are stored in a digital format it is simply a matter of transferring them via cables to the computer.
- photographs can be viewed as soon as they are taken

**Disadvantages**

- the quality of the images is not as high as for those stored on film
- high- quality images take up a lot of space
- digital cameras use up batteries at an incredible rate

**Sensors**

A sensor is a type of input device that collects specific kinds of data directly from the environment and transmit it to a computer.

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**Biometric Systems**

Biometric is the science of measuring individual body characteristics. Biometrics is used as a form of identity access management and access control. It is also used to identify individuals in groups that are under surveillance.

They can be divided into two main categories:

- **Physiological:** related to the shape of the body. Examples include, fingerprint, face recognition, DNA, hand and palm geometry, iris recognition and odour/scent.
- **Behavioural:** related to the behaviour of the person. Examples include typing rhythm, gait and voice.

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