



Output devices

By the end of this unit you should be able to:

- Explain the use of the various output devices

Unit at a glance

- Output devices are the parts that allow you to obtain information from the computer in the form of text, images or sounds. Output devices include:
 - Monitors.
 - Printers.
 - Speakers.
 - Multimedia projectors.

In Unit 1 you learned that the monitor is an output device. Output devices are instruments that produce data from the computer in a form that can be used by a human or another computer.

After the monitor, the **printer** is the most commonly used output device. The printer is a device that takes the information on your screen and transfers it to paper or a **hard copy**. There are two basic classes of printer – impact and non-impact.

Impact printers

Impact printers use a printhead containing a number of metal pins which strike an inked ribbon placed between the printhead and the paper.

The general features of impact printers are:

- They create the characters by striking the paper.

- They print on most types of paper.
- Multiple (carbon) copies may be printed at once.

The disadvantages of impact printers are:

- Some users find them noisy.
- Their speed is relatively slow.
- They do not print **transparencies** (documents printed on clear plastic film).

There are several types of impact printers including daisy-wheel and line printers. However, most of these are no longer used. **Dot-matrix printers** are impact printers that ‘draw’ a character from a series of dots. They are cheap and durable, but very noisy. Print speed, at 30–550 characters per second, is very fast, but the quality is low compared to other types of printer (Figure 3.1).

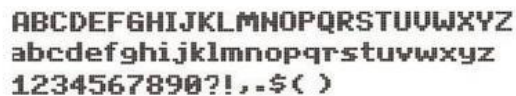


Figure 3.1 A dot matrix printout

Dot-matrix printers are suitable when the quality of the finished document is not very important. They are still used for the preparation of bills and invoices in places such as hospitals and stores where carbon copies are needed. Some years ago these printers were the most popular, but people now choose laser and inkjet printers, which are capable of higher printing speeds, superior quality and good colour at affordable prices.

Non-impact printers

Non-impact printers are much quieter than impact printers as their printing heads do not strike the paper. The general features of non-impact printers are:

- Higher character-per-second print speed.
- As the name suggests, no contact between the print head and the paper.
- Can print transparencies.
- Can print on most types of paper in black-and-white and colour.

The main types of non-impact printer are laser printers, inkjet printers and thermal printers (Figure 3.2).



Figure 3.2 A laser, B inkjet and C thermal printers

- **Laser printers** are relatively expensive, but the price of them is coming down. These printers use a laser beam and dry powdered ink to produce the print on the paper. A laser printer can produce about 400 pages of letter-sized paper per minute with high print quality, including full-colour photo-quality prints.

- **Inkjet printers** are cheaper than laser printers, but they are slower and produce lower-quality prints. Inkjet printers are actually a non-impact variation of dot-matrix printers. A matrix of fine jets is used to squirt ink at the paper. Inkjet printers operate quietly at fairly high speeds, and the print is of an appropriate quality for most home and business purposes.
- **Thermal printers** use special heat-sensitive paper. Characters are formed by heated needles being placed in contact with the thermal paper, forming darkened dots. A thermal printer is quiet and relatively fast. However, there are several disadvantages including the high cost of paper, no choice of print colours and low durability of the prints. Some calculators that print on rolls of paper and some cash registers use thermal printing. Thermal printers are also used in automated teller machines, credit-card machines and prepaid phone card dispensers.

Another form of thermal printing is **dye sublimation**. These printers use heat to transfer the ink from coloured ribbons into a gas that cools into a glass-like substance on the paper. Dye sublimation printers produce the highest-quality graphics, with bright images of photographic standard. These are among the most expensive printers on the market and are used by businesses such as advertising agencies and photo studios.

- **Plotters** are used to produce high-quality, accurate, large-sized drawings. They are normally used for computer-aided design (CAD) and computer-aided manufacture (CAM) applications such as printing plans for houses or automobile designs.

Multimedia projector

A **multimedia projector** takes the image from a computer screen and projects it onto a larger screen or wall so that it can be seen by a large audience. Multimedia projectors are

usually equipped with a remote-controller device that gives the computer instructions, such as moving from one display page to another.



Figure 3.3 Multimedia projector

Modem

A **modem** (a contraction of the words 'modulator-demodulator') is a device used to allow computers to communicate with each other using telephone lines. Some modems are installed in the system unit. Other modems are external devices. The modem changes a signal from the digital format which computers use, to an analogue format that can be transmitted along the telephone line. The modem on the receiving computer converts the analogue signal back to digital form. Therefore, a modem serves a combination of input and output functions.



Figure 3.4 Internal and external modems

Speakers

A speaker produces output in the form of sound. Some computers have built-in speakers. However, external speakers such as the ones shown in Figure 3.5 are also commonly used.



Figure 3.5 Computer speakers

A **speech synthesiser** is a device that takes data from a computer and outputs it as spoken words, often by combining a series of **phonemes** or short sound elements. The speech synthesiser 'reads', or sounds out, any text that is displayed on the screen. This feature is useful for the visually impaired and for persons learning a new language. Speech synthesisers can be in the form of a card that is inserted into the computer, a box that is attached by cables, or a program that uses the computer's in-built sound card (Figure 3.6).



Figure 3.6 A speech synthesiser

To do

Identify the use and benefits of each output device.

My glossary

Write definitions of the following terms.

Dot-matrix printer	Multimedia projector
Dye sublimation colour printer	Non-impact printer
Impact printer	Plotter
Inkjet printer	Printer
Laser printer	Speech synthesiser
Modem	Thermal printer

Examination-type questions

- 1 The manager of Cheapo Enterprises is investing in output devices for his business. He is getting several dot-matrix printers at a bargain price. The three workers in his small office are strongly opposed to this purchase.
- a List three output devices other than printers. (3 marks)
 - b State the use of each of the devices you have listed in a. (3 marks)
 - c Other than the price, what are two reasons why the manager would choose a dot-matrix printer? (2 marks)
 - d What are three reasons why the office workers would object to this purchase? (3 marks)
 - e (i) Suggest three types of printer that the manager could purchase instead of dot-matrix printers. (3 marks)
 - (ii) State two advantages of each of the printers you have suggested. (6 marks)
- 2 a Arrange the following types of printers in order from cheapest to most expensive:
Laser
Dye sublimation
Dot matrix
Inkjet (4 marks)
- b Explain the difference between impact and non-impact printers. (2 marks)
 - c Clearly explain the purpose for which each of the following devices is used:
 - (i) Speaker
 - (ii) Speech synthesiser
 - (iii) Multimedia projector
 - (iv) Modem (8 marks)
 - d Describe the business uses of each of the following devices:
 - (i) Thermal printer
 - (ii) Plotter (6 marks)