Unit 12 Flash memory

1 Flash-based gadgets

Flash memory is used in many handheld devices. Match the descriptions (1–6) with the pictures (a–f).

1 This handheld console lets you play games stored on ROM game cards, which have a small amount of flash memory to save user data, for example high scores.

2 This flash memory card is used as 'digital film' to store images on a digital camera.

3 This wireless LAN card allows laptop and PDA users to access the Internet from any Wi-Fi access point.

4 This USB flash pen drive is the latest mobile drive for your computer.

5 It looks like an ordinary watch, but this USB drive from Edge Tech can store up to 1GB of flash memory. It will let you save and transfer your photos, songs and data files easily.

6 This flash-based player provides everything you need to play music and store data on the go. It also comes with a built-in FM radio and voice recorder.

a .....

b .....

c .....

d .....

e .....

f .....

2 Memory in a flash!

A Look at the title of the text on page 58. Why is it a suitable title for an article about flash memory? Read the first paragraph of the text to find out.

B Read the whole text and answer these questions.

1 What is flash memory?

2 What are the differences between RAM memory and flash memory?

3 What can devices which use multi-level cell technology do?

4 What are the differences between flash drives and external hard drives?

5 What is the advantage of using U3 technology in flash drives?

6 How much data can a flash memory card hold?

7 What is the name of the flash card created by Sony for its digital cameras?

Memory in a flash!

Flash memory is a type of **non-volatile** memory that can be electronically erased and reprogrammed. Its name was invented by Toshiba to express how much faster it could be erased – 'in a flash', which means 'very quickly'.

Unlike RAM, which is **volatile**, flash memory retains the information stored in the chip when the power is turned off. This makes it ideal for use in digital cameras, laptops, network switches, video game cards, mobile phones and portable multimedia players. In addition, it offers fast read access times (although not as fast as RAM), with transfer rates of 12MB per second. Unlike ROM chips, flash memory chips are rewritable, so you can update programs via software.

Inside the chip, data is stored in several floating gate transistors, called **cells**. Each cell traditionally stores one bit of data (1 = erased and 0 = programmed). New devices have a multi-level cell structure so they can store more that one bit per cell. The chips are constructed with either **NOR** or **NAND** gates. NOR chips function like a computer's main memory, while NAND works like a hard drive. For example, in a camera, NOR flash contains the camera's internal software, while NAND flash is used to store the images.

Flash memory is used in several ways:

- Many PCs have their BIOS (basic input/output system) stored on a flash memory chip so it can be updated if necessary.
- Modems use flash memory because it allows the manufacturer to support new protocols.
- **USB flash drives** are used to save and move MP3s and other data files between computers. They are more easily transported than external hard drives because they use **solid-state** technology, meaning that they don't have fragile moving parts that can break if dropped. However, USB flash drives have less storage capacity than hard drives.
- New **U3 smart drives** allow users to store both applications and data. They have two drive partitions and can carry applications that run on the host computer without requiring installation.
- **Flash memory cards** are used to store images on cameras, to back up data on PDAs, to transfer games in video consoles, to record voice and music on MP3 players or to store movies on MP4 players. They are as small as a stamp, and capacity can range from 8MB to several gigabytes. The only limitation is that flash cards are often not interchangeable between devices. Some formats include: CompactFlash, Secure Digital, MultiMedia Card, miniSD card, and xD-Picture Card. Sony has its own product called the Memory Stick, used in its digital still cameras, video camcorders and the PlayStation Portable. The photos stored in a digital camera can be offloaded to a computer via cable or wirelessly. Another option is to have a **flash card reader** permanently connected to your PC; you simply eject the card from the camera and put it into the reader instead of having to plug the camera in.

The future of hard drives may be **hybrid** hard drives. Hybrid hard drives combine a magnetic hard disk *and* flash memory into one device. This allows computers to boot, or start, more quickly, and also reduces power consumption.

SanDisk's card readers read and write to just about every flash memory card

C Find words or phrases in the text with the following meanings.

1 permanent; able to hold data without power (lines 1–5) non volatile
2 able to be rewritten many times (lines 10–15) rew ritable
3 different sections of a disk drive or storage area (lines 40–45) driive parpations
4 to make a copy of a file so that the original is not lost (lines 45–50) back up
5 transferred to another device (lines 60–65) offload
6 a peripheral device that reads and writes flash memory cards (lines 60–65) flash card reader
7 a product that integrates two different technologies (lines 65–70) hybrid

3 Language work: word building

A Look at the HELP box and then, using affixation, conversion and compounding, try to make as many words as you can from *blog, mail* and *print*. Use a dictionary and the Internet to help you.

blog	mail	print
blogger (a person who writes a blog)	*to mail* (the verb form) Напечатайте что-то…	*printout* (the pages produced by the printer)

B Choose the correct word in brackets to complete this description of a digital voice recorder. Use a dictionary to help you.

Olympus WS-320M digital voice recorder

Slim, attractive, and highly functional, the Olympus WS-320M digital voice recorder packs 1GB of internal flash memory into its **1** (lighted/lightweight/lighten) housing, letting you record up to 277 hours of high-quality audio in WMA format. It's ideal for **2** (record/recordable/recording) notes or long lectures, interviewing people, or capturing song ideas before they disappear. As an added bonus, the WS-320M can store up to 266 WMA or MP3 songs for high-quality stereo **3** (player/playback/playoff).

The WS-320M features five separate file **4** (folds/folding/folders), capable of holding 199 files each, so you can organize nearly 1,000 files by subject, theme or other category. Users also have the choice of four recording modes: HQ for high-quality audio, LP and SP for extended recording times, and ST HQ for stereo recording. And thanks to the voice **5** (activation/activate/active) option, users don't need to press a single button to start recording – the WS-320M will record as soon as the built-in microphone picks up sound.

Perhaps the most convenient feature, however, is the built-in USB **6** (connector/connect/connected), which eliminates the need for a USB cable. Once this is connected, you can **7** (downloadable/download/upload) music files, images or documents from your PC, in effect turning the recorder into a small hard drive. You can even transfer voice recordings to your computer for **8** (store/storage/storeroom) or multimedia use.

HELP box

Word building

We can create new words from existing words in three main ways:

- Affixation (adding a prefix or suffix)

  Adding a prefix:
  volatile ⟶ ***non-****volatile*
  date ⟶ ***up****date*

  Adding a suffix:
  erase ⟶ *eras****able***
  install ⟶ *install****ation***

- Conversion (turning a noun into a verb, or a verb into a noun, etc.)

  network (noun) ⟶ *to network* (verb)

  *We **networked** all the PCs in the office.*
  *We created a **network** of all the PCs in the office.*

- Compounding (putting two or more words together)

  hand + held ⟶ *handheld*

  *I bought a new **handheld** last week.*

  Compounds can be written as two separate words (**flash card**), as two words joined with a hyphen (**solid-state**), or as one word (**handheld**). Unfortunately, there are no rules, and some compounds even change spelling over time. For example, **web site** began as two words, then became hyphenated (**web-site**) and is now written as one word – **website**. Always check your dictionary or Google if you are not sure.

  In pronunciation, compounds normally have the main stress on the first part, and the secondary stress on the second part, for example **'video ,game**.

4 Describing flash drives

A **Listen to a salesperson at his stand at a consumer electronics show describing two flash products to a potential customer. Which product (a or b) is the visitor most interested in?**

a The Dragon flash drive

b The Dragon MP4 player

B **Listen again and tick (✔) which features the salesperson mentions for each device.**

Features	Dragon flash drive	Dragon MP4 player
Back up computer data	✔	☐
Transport files between PCs	☐	☐
Audio and video playback	☐	☐
FM radio tuner	☐	☐
Voice recorder	☐	☐
Games	☐	☐

C **Listen again and answer these questions.**

1 What is the storage capacity of the Dragon flash drive?

2 How do you connect it to the computer?

3 According to the salesperson, what are the advantages of a USB flash drive over a DVD or an external hard drive?

4 Some portable media players are also known as MP4 players. Why?

5 What is the screen size of the Dragon MP4 player?

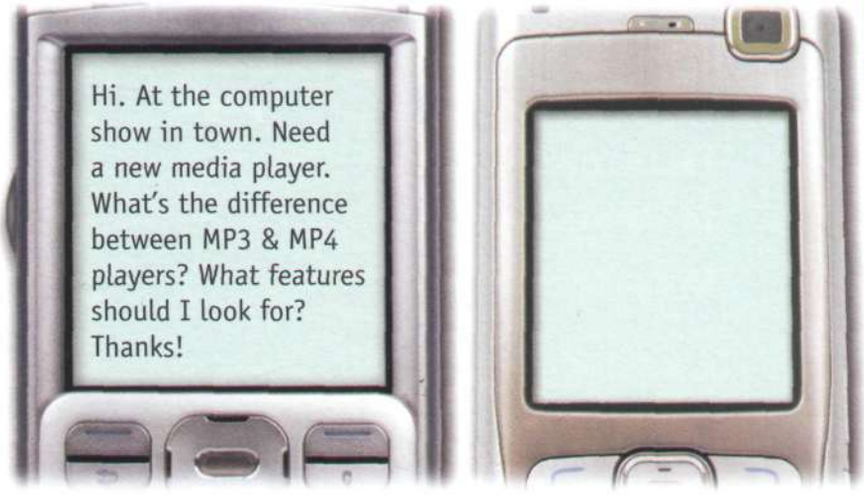
6 How long does the battery last?

An MP4 player

USB drives are typically designed to attach to a key ring, such as the Cruzer Freedom USB flash drive

D **In pairs, choose a flash-based device that you own and describe it. Use the *Useful language* box and the features and questions from the listening text to help you.**

E **You have received a text from a friend at a computer show. Write a short reply.**



Useful language

It has a storage capacity of …

It features … and …

It supports multiple formats: … and …

You can … and …

Its battery life is …

5 Vocabulary revision

Solve the clues and complete the puzzle. Look at Units 10–12 to help you.

Across

4 Thousandth of a second, abbreviated to *ms*, used to measure the access time of hard drives. millisecond

6 Floating gate transistors are called _____ in flash memory technology.

7 Prefix meaning *very large* or *one thousand million*. tera

11 Acronym for *light amplification by stimulated emission of radiation*. laser

12 Capable of being deleted. removable

Down

1 Concentric ring on the surface of a disc when the disc is formatted.

2 _____ nonvolatile memory retains its data when the power is switched off.

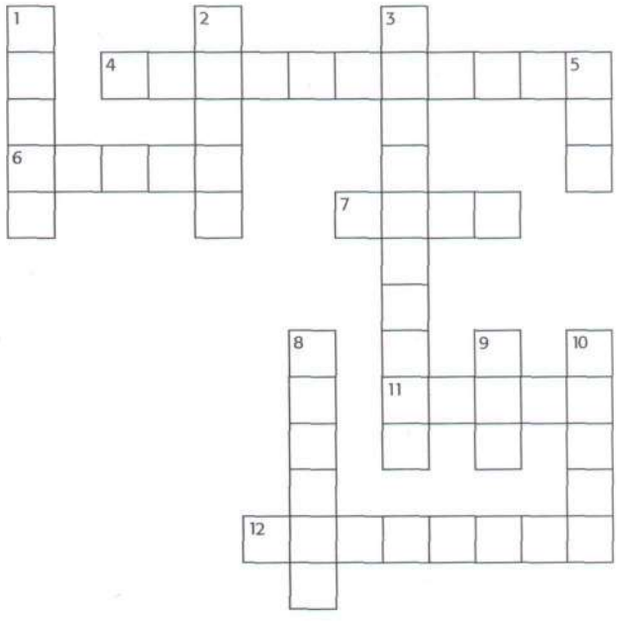
3 CD-RW means Compact Disc _____ rewritable.

5 Abbreviation of *digital versatile disc*. DVD

8 To write information on a disk or storage area. burning

9 Type of external bus or connector that plugs into the computer. USB

10 The physical mechanism that accepts, reads and writes data on a disk. head



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