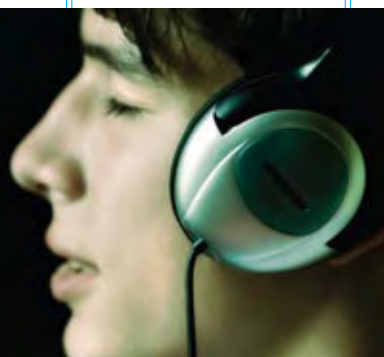




Music on the Move

Digital music players are our new best friends, but what's the technology that lets you bop to your favourite beats, anytime, anywhere?



There was a time when portable music meant packing up your flute, lute or violin and hitting the bandit-ridden road. That all changed in 1877 when Thomas Edison invented the phonograph and made recorded music a reality.

When the first MP3 (short for MPEG Audio Layer III) burst onto the scene in 1998, music lovers applauded at full volume. The MPMan by SaeHan Information Systems of South Korea provided an alternative to portable cassette and CD players, and soon MP3 devices were bouncing around in pockets while delivering sweet music sans skips, scratches or static.

But how does this mini music marvel work? To understand its

technology, we first have to understand the MP3 format. Because uncompressed music files can be quite large - a 4-minute song uses roughly the same data contained in a 10,000-page plain text document - digitised music first had to be streamlined.

To reduce the number of bytes in a song, an algorithm "listens" to the song and removes the parts of it that the human ear can't hear. It also eliminates softer sounds normally masked by louder ones. Quality is reduced but it's negligible. Through this process the algorithm can make a song file up to 12 times smaller, allowing data to be downloaded faster and stored in impressive quantities. A 120 GB

iPod Classic can hold up to 30,000 tracks versus just 2,500 if the songs were uncompressed.

Once the music has been condensed it is transferred to the player, usually via a USB port. To remember so many songs, today's devices use two main types of memory: flash, which has no moving parts; and hard drive, which is slightly more fragile because data is stored on a series of magnetic plates that spin as the information is read and recorded. Because a hard drive can hold significantly more data than flash memory, its players are big and heavy compared to light-weight flash-memory players.

But as well as storing audio data in the memory disk, digital music files are also embedded with an ID3 tag that holds artist, album and track information. A microprocessor reads this information and displays it on a built-in LCD screen. When the user selects a track, the microprocessor sends instructions to a digital signal processing chip, which in turn pulls the files from the memory and then compresses the data via an algorithm.

Next, the decompressed bytes are relayed to a digital-to-analogue converter that transforms the digital information to analogue sound waves. These waves are boosted by a built-in amplifier and sent to an output jack. When you plug headphones into the jack and let the music play, you are enjoying the results of the MP3 player, what U2 front man Bono has termed "the most interesting artistic creation in pop since the electric guitar." ■

The iPod Nano

The new 4th generation kid on the block.

Weighing just 36.8 grams, the 4th Generation iPod nano has joined the green revolution. It is mercury-free, PVC-free and comes with a recyclable aluminium body. (See p.107 to read about the problem of e-waste.)

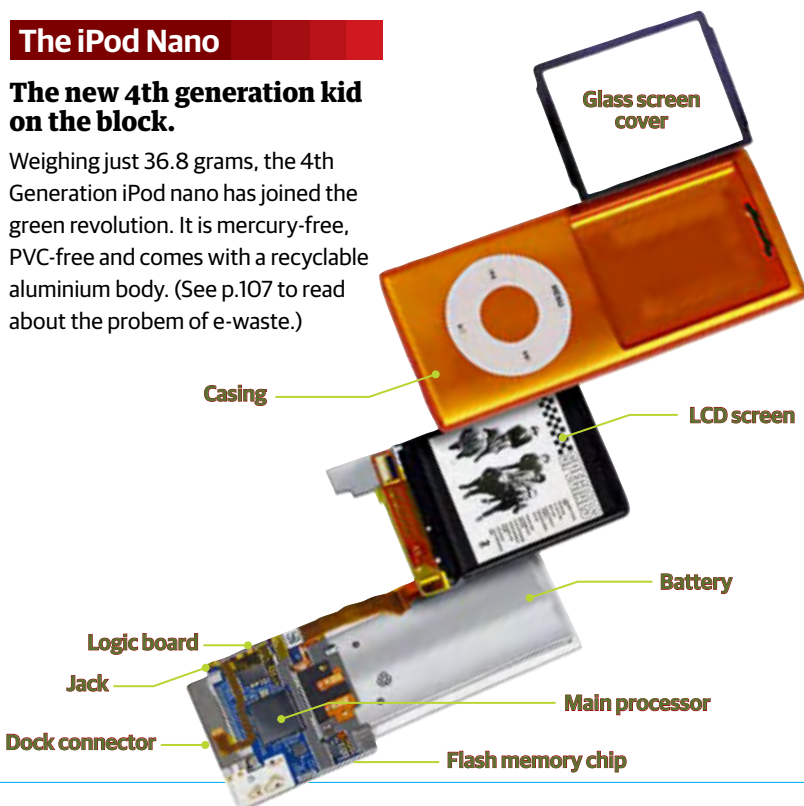


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