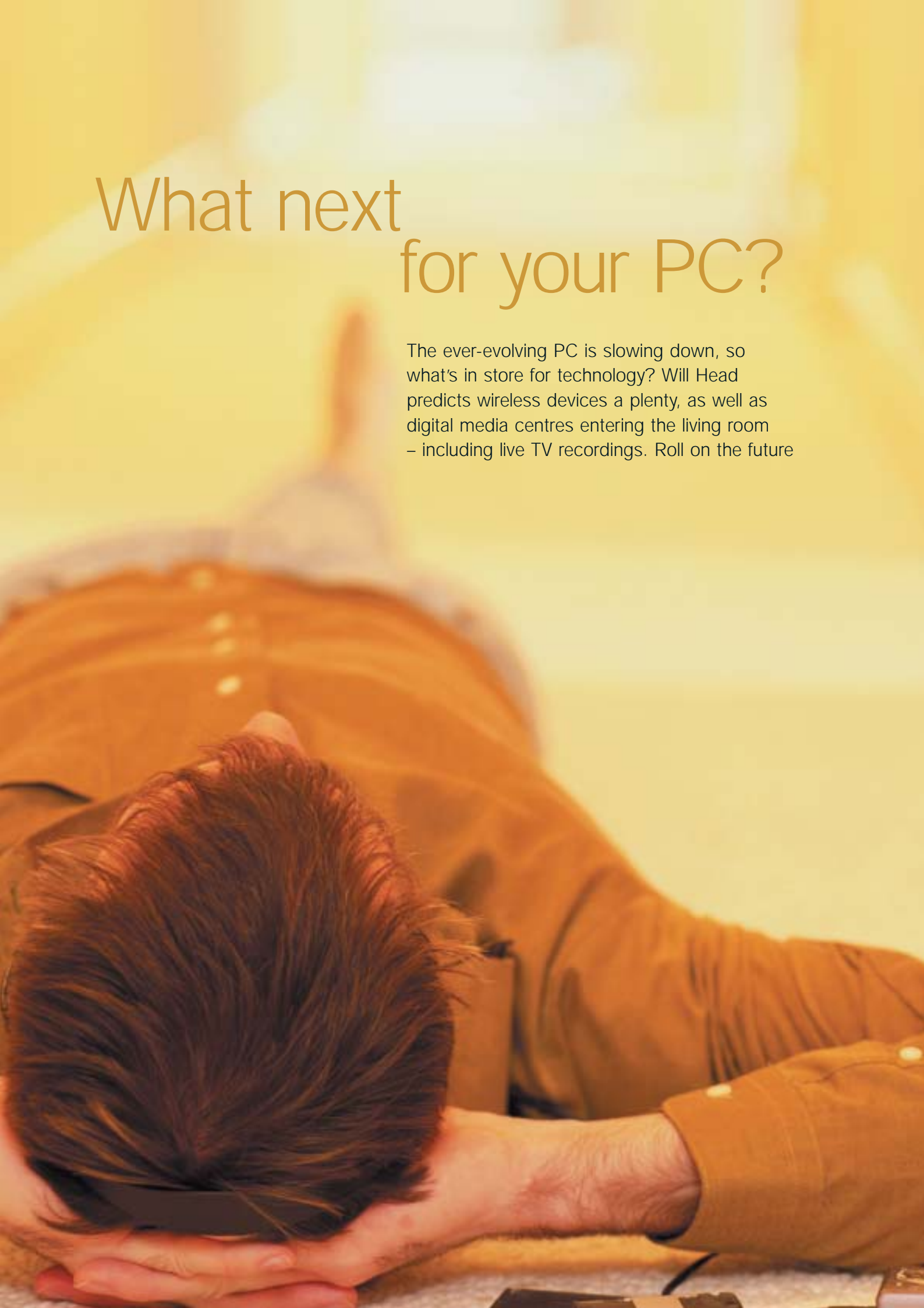# What next
for your PC?

The ever-evolving PC is slowing down, so what's in store for technology? Will Head predicts wireless devices a plenty, as well as digital media centres entering the living room – including live TV recordings. Roll on the future

The humble desktop PC that we know, love and at times hate is over 20 years old. Processors have got faster, hard drives bigger and connectivity has improved but design has pretty much stayed the same. Lately, however, the PC has reached somewhat of a plateau.

Tasks that used to make your PC cry out – decoding digital video, encoding MP3s or inputting a beefy spreadsheet – no longer have this effect as greater processing power and more memory ease the pain. In fact, unless you're into digital video editing there aren't many applications that the modern PC can't easily take in its stride.

There's still a market for bigger, better and faster systems but it's no longer as compelling an upgrade. Compare your PC of today with the one you had 10 years ago when Word took three minutes to load and a reboot gave you time to boil the kettle, have a steaming cuppa and wash up the mug afterwards.

Now the PC's processing power and storage capacities are sufficient for most users' needs, computer technology can branch out into unforeseen territories. Wireless networks, tablet PCs, live TV you can pause, games in the living room, constant internet access on the move – all emerging areas that would previously have seemed impossible due to the cost of the components involved.

Wired for sound

One recent development that looks set to continue is wireless technology. Bluetooth, a short-range cable-replacement standard, looks set to gain a boost thanks to Microsoft lending its official support. The company's new Bluetooth keyboard and mouse not only dispenses with desktop tangles, but your PC can also talk to other Bluetooth devices within its vicinity.

Bluetooth is still largely an add-on technology, rather than an integral part, but its true usefulness won't be achieved until devices have this capability as standard. If your palmtop, phone, PC and printer are all Bluetooth-enabled then they can happily pass information among themselves. And for the traveller this means fewer cables to worry about.

Bluetooth also cuts down on the number of adapters and converters you need. But it's not quite as simple as that. For a start you have to ensure the two devices you wish to connect support the same profile (the wireless equivalent to plugs and sockets).

Wireless is also making inroads into the traditionally wired network area. Wi-Fi (or 802.11b) enables devices to communicate over a distance of up to 100m and integrates neatly into an existing wired network. The main down side of Wi-Fi is its maximum transfer rate of 11Mbps (megabits per second), although this is set to rise with the introduction of the 802.11a and 802.11g standards. For office use, though, 11Mbps is fast enough and can copy the flashiest of PowerPoint presentations quite speedily, but it doesn't provide sufficient bandwidth for live video at a decent resolution.

The two new standards – 802.11a and 802.11g – up the available data rate to 54Mbps, which should easily be able to cope with video streaming. Of the two,

2007: A DAY IN THE LIFE OF JESSICA HOME

8.40am Jessica Home is making breakfast when she gets a video email. Her son is away at university and wants some help with cooking instructions. Jessica calls up a recipe on the tablet PC/palmtop next to the cooker, which lists all the ingredients needed and video clip instructions on how to prepare the meal. The PDA has a wireless link to the home broadband connection, and gives her the option to buy the ingredients online and have them delivered later that day.

Wherever Jessica is in the house, her wireless device configures with the home wireless network system allowing her not only to call up information about other rooms in the house but also access the videophone system and the broadband internet connection.

10.00am The last couple of days have been extremely hot and Jessica's palmtop flashes an alert that the Intel smart environment garden system has a message for her. Picking up her device she wanders into the garden and checks the message. The sensors buried in the soil are able to tell her exactly how much water is needed to keep the plants healthy. She has to be quick, though, as she plans to go into town to do some shopping. Despite most things being available online she still enjoys going to the shops and having a proper look at what she's buying.

802.11g has the advantage of being backwards compatible with 802.11b (although at the lesser speed of 11Mbps), while 802.11a has been on the market longer. Whatever the outcome, wires look set for the chop in favour of convenience and less clutter.

Dancin' in the key of life

In addition to lending its support to Bluetooth (along with Wi-Fi networking) Microsoft is pinning its hopes on two similar but differently targeted products: tablet PCs and smart displays. Tablets PCs dispense (in some cases) with keyboards in favour of handwriting recognition and a drawing stylus. Smart displays, on the other hand, add intelligence to a formerly dumb display device.

Tablet PCs are aimed at the corporate user while smart displays are destined for the home, although the irony that smart displays run Windows XP Professional Edition (rather than Home) seems lost on Microsoft.

The tablet PC is a nice idea but it currently has a few down sides: price and ease of use. Keyboards may have originally been designed to slow us down and they're not an ideal device for use on the move, but they are very good at what they do. Add on a shallow learning curve and you can see why the keyboard has remained the primary computer input device for so long.

And it's the keyboard that's proving such a great problem for the tablet PC. Tablet PCs come in two flavours: pure

tablets and convertibles. Pure tablets are just that – not a keystroke in sight – whereas convertibles straddle the gap between notebook and tablet.

The problem with pure tablets is that keyboards are so useful it's hard to function without one – at the most you'll be able to stretch to notetaking and the odd email. Given the price of these devices that's not a great investment, so anyone below director need not apply.

Preaching to the converted?

Convertibles, on the other hand, run the risk of being compared to notebooks and invariably come off worse in the price/performance stakes. And then there's the problem of switching from notebook to tablet mode – it involves turning, twisting and swivelling the device. It's awkward and clunky and not what you'd expect from a product costing the best part of £2,000.

But now a third category has appeared: half pure tablet, half convertible. Those clever chaps at HP have come up with the idea of a removable keyboard. It clips to the back of the device when not in use, swings easily into use and can be dispensed with entirely when not required.

Tablet PCs are also currently limited in their processing power. A Pentium 4 chip, even in its mobile form, doesn't lend itself to lightweight designs. Tablet PCs need to house either a last-generation PIII chip or an alternative low-power offering. However, with Intel's new Centrino (formally called Banias) chip on the horizon, this could all change. See Behind the news on page 28.

11.00am The city centre is off limits to cars and has been for several years, so Jessica wanders to the bus stop just in time to see the bus disappear around the corner. Not to worry, though, as the bus stop itself has a wireless device that connects using a GPRS modem (a packet-based wireless communication service) to each bus on this particular route. Using GPS (global positioning system) technology the location of the next bus flashes up on her PDA with its estimated time of arrival.

Smart displays are designed with the home user in mind. Rather than being tied to a desktop PC, the smart display allows you to pick up the monitor, move away from your desk and continue to use the system.

The display communicates with the desktop over a wireless network (currently Wi-Fi, although future technologies can be utilised). The touch-sensitive device has limited input capability, but should be fine for web browsing.

Although smart displays are expensive at the moment, their prices should fall over time. The other problem, as with anything based on the 802.11b standard, is the inability to stream live video. However, as smart displays can run over future wireless networking standards this should be solved soon.

Getting theatrical

The computer is continuing its slow creep from the office to the living room with the advent of HTPC (home theatre PCs). An HTPC can not only replace a DVD or MP3 player but, when combined with the right software, it can become a complete home entertainment centre. While power and performance are the overriding factors in the office, ease of use, aesthetic design and minimum noise are far more important if the PC is to become a permanent addition to the lounge.

SFF (small form factor) PCs are the norm – usually half the size of a traditional model – with components specially chosen to co-ordinate with the design and cut down on noise. Underclocking – that is, deliberately reducing the speed of a

12.00am There are many targeted advertising campaigns configured to link with all wireless devices when people step into the main shopping centre. Jessica has chosen a set of preferences on her PDA that only alerts her to special offers – the rest she has opted to ignore. This type of advertising has superseded static billboard images as businesses look to new ways of enhancing the consumer's experience.

The pioneering of this technology was first seen at the start of the decade with targeted text message campaigns on consumer's mobile phones. However, with the advent of 3G (third-generation) technology and mobile phones becoming part of most standard palmtops, there is now much more potential to enrich the advertising message.

1.00pm Walking into one of the main supermarkets, Jessica plugs her palmtop into a cradle on top of her trolley. She attempts to bring up her shopping list that she thought she had synced across from her home system. Unfortunately it appears she forgot to do it. Luckily this supermarket chain introduced wireless hotspots for all its stores at the end of last year.

Purchasing time on the supermarket connection there and then (it will be added to her bill when she comes to pay at the till), she connects to her home system, finds the right file and saves it on to her PDA. Now she formats it in a way that the trolley cradle understands, enabling her to find exactly where everything is in the supermarket simply by following the directions on the PDA screen.

3.45pm Walking past a record shop a targeted advert is shot across to Jessica's PDA which has picked up on her previous purchases from the record shop. The ad is an MP3 clip of a new single and it works – Jessica listens a couple of times, decides she likes the song and clicks on the 'purchase single' option embedded in the clip. This downloads the whole track to her PDA for a small cost.

component in order to lower noise (the opposite of overclocking) – is sometimes employed. Why run a processor at full speed with a loud fan when it can provide all the functions you require at a lower speed which needs less cooling?

VIA has this market in mind with its Mini-ITX motherboard format. This compact design measures just 170x170mm and some models even include fanless processors, reducing noise further. Shuttle's SFF boxes are also used by HTPC enthusiasts due to their compact design and innovative cooling solutions.

4.50pm Jessica just has one more store to visit – Digital Heaven. She wants a camera module for her PDA. Devices all connect digitally, so it makes buying products like this very simple as she doesn't have to worry about connections and software.

Reality shift

Showshifter is one such application that changes the perception of the PC. Designed as a digital media centre, when combined with a supported TV card it allows you to make timed digital recordings and even pause live TV. This is possible due to the PC's ability to record and play back TV at the same time. When you click pause Showshifter starts recording then, when you resume, the PC starts playback while continuing to record the programme. You can then skip forwards and back within the segment you've recorded.

Showshifter provides a DVD interface, so you can play your favourite movies, and the ability to manage audio CDs and MP3s stored on the hard drive. It integrates with electronic TV programme guides, so setting up a recording is simply a matter of choosing the relevant show and clicking record.

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6.00pm Finally returning home, Jessica wants to relax and watch television. Her other children are now at home and busy using the PC to play computer game classic Seleriw IV. Years ago if someone in your family was using the computer it meant waiting for them to finish, or hoping you had another computer somewhere else in the home to use.

Now there's even more powerful processors with double-system graphic cards, Jessica's 'transformable' home system is able to multitask like never before. Using two plasma screen connections the kids play games on one display, while Mum is able to use the broadband connection to connect to VI-OD, the internet-based news service.

The latest compression technique, Mpeg-8, allows crystal-clear streaming media to be delivered across the web. Jessica then chooses from the latest blockbusters and, following the news, will sit back to watch her film, slipping on her Bluetooth headphones to drown out the noise of the children.

Developments in the HTPC arena haven't gone unnoticed by the watchful eye of Microsoft, which has come up with its own solution in the form of Windows XP Media Center Edition. Formally known as Freestyle, Media Center combines a similar feature set as Showshifter with an easy-to-use interface.

Unlike Showshifter (and other Microsoft products), however, you can't simply purchase Media Center and install it yourself. To combat the problems of hardware conflicts, Microsoft only supplies the software to partners that then build a Media Center PC. This ensures all the components work together as intended.

Media Center is currently only available as a US edition, but hopefully it shouldn't be long before we see a UK-specific version.

Movie magic

The problem with the HTPC is, despite plenty of functionality and features, its PC background means it's only suitable for those with some technical know-how. Prices are also high compared to other consumer electronics devices.

If advanced TV recording is the only facility you're after then a device designed solely for this purpose is already available. Tivo is essentially a PC – except you'd never know it. It has a 50MHz processor, 16MB of RAM, 40GB hard drive, TV tuner and it even runs Linux, the free Unix-like operating system.

Tivo's interface is easy to use and there's no messing around with command prompts or file locations. To record, simply browse through the list of programmes that are on and tell Tivo to record it. It can even communicate with a satellite or cable box and change channel via infrared so you won't miss a recording if your set-top box is on the wrong channel.

But that's not all – Tivo can record a series of programmes without you scheduling each one separately. Book a Season Pass for the US comedy *Friends,* for example, and all forthcoming episodes will be automatically recorded for you. Tivo can even record things for you based on Wishlists – if you're a fan of Steven Spielberg's work then set up a Wishlist for this director and Tivo will automatically record all programmes relating to him.

When Tivo's not recording anything you've asked it to, it tries its hand at suggestions. This starts off as a random set of recordings, but you can give recorded programmes a Thumbs Up or Thumbs Down. Tivo will then learn what you like and record more of the same.

Tivo's live pause feature has the added advantage that it's always recording the channel you're currently watching. If you miss the first 10 minutes of *EastEnders*, providing Tivo was on the right channel, you can rewind it and start from the beginning. All programmes are recorded digitally on the hard drive, with up to 40 hours available depending on the quality setting you choose.

Tivo can record a series of programmes without you scheduling each one separately. Book a Season Pass for *Friends* and all forthcoming episodes will be recorded

Of course, for Tivo to act intelligently it needs good programme data to go on. Buying a Tivo requires not only the purchase of the unit itself but a subscription to the channel data, which will set you back £10 a month or £200 for the machine's lifetime.

Tivo collects new data daily by dialling up a central server, which also provides software updates if any are available. Tivo is incredibly easy to use, but its takeup in the UK hasn't been that great. Sky offers a similar system called Sky+, which only works with its satellite system but without the predictive recording features.

One of the problems facing such devices is that they do so much (and so much that's new) that it's hard to sum them up in one catchy sentence. Talk to existing users, however, and they rave about them. Some rarely watch live TV anymore, instead creating a virtual channel of their own.

Tivo may not have turned the UK market around yet, but its acceptance among existing users is promising. Hard disk recording is set to continue, with devices like Panasonic's DMR-HS2 DVD recorder that also features a hard drive for storing programmes before you burn them to disc. Hopefully we will see future devices combined with Tivo's intelligence.

Boxing clever

The PC has also crept into the living room in the form of Microsoft's Xbox console. With its Intel processor, nVidia graphics, hard drive and USB-derived game ports, there's no denying its heritage. Where Xbox differs from a PC as a games machine, however, is in its ease of use. Want to play a game? Simply put in the disc – no installing, no upgrading drivers, no getting the latest patches.

You can use the Xbox to play CDs (it can even rip them to an internal hard drive) and view DVDs, but that's about it as far as home entertainment goes. Future models could see greater video playback capabilities and maybe Tivo-like functionality. It's already made its first step into the lounge – where it goes next is up to Microsoft.

Personal services

According to Intel spokesman Ken Anderson, the future of the PC won't lie in one single device but in two or three that are personal to each user.

Intel's research shows that people want to be connected, but don't necessarily care how or what devices they use to do it. The patterns showed busy and mobile lifestyles, with professionals accounting for a fair chunk. However the most mobile group was teenage girls – capable of conducting a conversation over text message, while also using instant messaging apps and talking on the phone.

Road warriors are also after constant connections, mainly through wireless access points – such as stations and airports – while on the move.

Intel's paper *A Day in the Life – 2007* (starts on page 98) shows an interesting view of the future. The technologies that Intel predicts are not groundbreaking – the main difference is the proliferation and interconnection of the technology available that changes the way we use it.

Devices will get smaller and faster, but on the whole they'll remain the same. Connections between various devices will increase and, as a result, our usage models will change. As technology matures, prices will also decrease.

The future of the PC in terms of hardware is already here. How we use, interact and communicate with it, however, will dictate its course. ■