

iBYTES

The digital switchover – an overview

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The digital switchover – an overview

We receive our television signals through an aerial (usually a roof aerial), a satellite dish, cable or broadband connection. The digital switchover affects any TV that receives its signal through an aerial, which will be a large proportion of UK households. The reason the digital switchover is happening is because analogue television in the UK is broadcast on a radio spectrum which is now full to capacity with the five terrestrial channels, including all of the regional services that have their own channel to broadcast on to prevent interference. This means that there is no room for more analogue terrestrial channels to be broadcast. The digital switchover will offer more terrestrial channels for use in the future.

The existing analogue networks are being converted, to deliver six national digital terrestrial networks or 'multiplexes', each of which can hold six or more channels. The BBC operates one of the multiplexes whilst ITV digital and other networks operate the remaining ones. When the digital switchover happens we will no longer be able to watch our old analogue TVs as the analogue terrestrial channels will stop broadcasting from our transmitters and the new digital channels will broadcast instead. Without a digital TV or a digital set-top box to convert our analogue TV, the digital channels cannot be received through our aerials. The digital terrestrial channels are free to view but an alternative to a set-top box to convert our TV is to pay a subscription for a satellite or cable service, such as Sky or Virgin Media (which will also give us additional channels), or to pay a one-off cost for a freesat service to receive our TV broadcasts through a satellite dish.



"Analogue television in the UK is broadcast between 470MHz and 854MHz. Apart from a couple of gaps used by radar and emergency services, the five terrestrial channels take up all of that space and it's full!"

There are 47 channel slots in that spectrum, but each area has its own allotted set of channels so that regional and overseas services don't overlap and interfere with each other. These are the facts of analogue broadcasting and nothing can be done to change them.

So, in order to allow more than five channels without resorting to cable or satellites, a new system was proposed. Using more efficient digital compression techniques, it's possible to squeeze far more video into the same frequencies. The spectrum was divided into six so-called 'multiplexes', each of which was to hold six or seven channels. One would be operated by the BBC, the rest by ITV digital and other networks.



As it turns out, some of the multiplexes have had far more than six or seven channels squeezed into them. Com 6/Arq B, for example, has 19, which is why ITV2+1 has such dreadful picture quality. Fortunately there are so many things wrong with ITV2+1 that a few compression artefacts are a long way down the list of complaints.

Each multiplex takes up a range of 8MHz so, even allowing for regional variations, some frequencies are being freed to be used by broadcasts other than television. Some of the frequencies required for the 4G mobile phone network, which went up for auction recently, are only available because they won't be full of Bargain Hunt or The Vicar of Dibley!"



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"Television signals can be received via an aerial, satellite, cable or broadband connection. Switchover affects any TV that receives its signal from an aerial.

If you use an aerial, it will receive its signal from a transmitter. In the UK, there are more than 1,150 transmitters organised into around 80 transmitter groups that switch to digital one by one. Each group has a main switchover transmitter and local relay transmitters.

Before switchover, local relay transmitters are only able to transmit an analogue TV signal. After switchover, for the first time, all transmitters including local relay transmitters will transmit a digital signal and increase the number of channels available from around 5 to around 15.

Why is it important that I understand which transmitter I am watching?

Your switchover date and the number of channels you receive will depend on which transmitter you receive your signal from. Signals from nearby transmitters often overlap, so you may have a choice of which one you can watch. One may give you a better signal than another, or increase the number of services you can receive.

If you are watching a main transmitter you will receive more than 40 digital channels. If you are watching a relay transmitter you will receive around 15 digital TV channels.

Use our predictive postcode checker to find out which transmitter you are likely to be watching and your alternatives. If you want to point your aerial towards another transmitter you need to contact a qualified installer."

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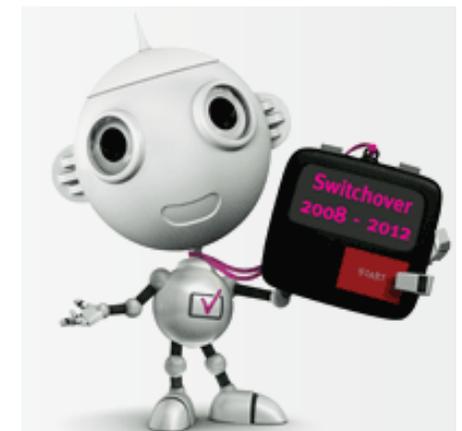
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Introducing Ted ...

Ted is a pensioner living in the Midlands. He has an old analogue television that he bought 20 years ago and realises that he will need to get a new television soon, before the digital switchover happens in his area. He is doing some research into what is available and all the services and features the different televisions offer. Ted is keen to get his new television in time for the London 2012 Olympic Games as he is a huge sports fan and wants to optimise his viewing of the events. Ted and his wife, Maureen, also love to watch films so they want to get a TV which offers them a much better viewing experience than their old TV. They currently own a DVD player and either buy or rent films to watch through this.

Ted and Maureen also have a second-hand desktop computer, which their son gave to them three years ago when he bought a new one. They use a dial-up connection to connect to the internet, which they use to keep in contact with their family and friends by email and Facebook; Maureen would really like to get Skype (a VoIP programme) so that she can see her family when she talks with them on the phone and to reduce the phone bill. From doing some basic research by reading the papers and searching on the internet, Ted has realised that he could combine some TV services and computer features into one system, which would enable him to upgrade some computer features at the same time.

The features that Ted is going to research are HDTV, Blu-ray vs DVD, 3D and IPTV services. He is also going to look at the differences between dial-up and broadband internet as Ted and Maureen are getting frustrated with the slow speed of their internet connection.

In edition 1 of *iBytes*, we looked at some related issues that are relevant to Ted: defining a consumer's requirements, using price comparison websites and disposing of old technology.



The Digital Divide

When we are looking at a topic such as this, it is important to remember that a 'digital divide' exists. In the UK this means that some households can afford technology but other households cannot; and other households may not have the latest technology because they choose not to (they may be fearful of technology they are not familiar with, they may not have access to broadband where they live or they might think they would never use the technology).

Ted and Maureen are pensioners; we haven't been told what their income is but we might make an assumption that they do not want to spend a large amount of their money on a TV system. We might also expect them to choose a system that will have an element of future-proofing built in – they won't want to spend more money in another five years or so if their chosen TV system becomes redundant.



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What is HDTV?

Most new TVs available to buy come 'HD-ready', but what does this mean? Since the early 1960s, televisions in the UK have used the same encoding system, up until recently. A Standard Definition TV, otherwise known as the PAL (Phase Alternating Line) system, has 720 pixels across by 576 vertically (a total of 414,720 pixels). In contrast, HDTV (high definition television) technology can have 1920 x 1080 (2,073,600) which gives much better picture quality, clarity and colour definition.

Although the viewing experience is much better with HDTV, the quality of a picture on an HD-ready TV will depend on the source of the broadcast as well as the quality of the TV (HDTVs vary in the number of pixels). An HD-ready TV will scale whatever source it is fed to fit the screen but the quality of the scaling mechanism of HDTV varies considerably from manufacturer to manufacturer and model to model, meaning picture quality can vary greatly. Remember, not all programmes are yet broadcast in HD which means your new HD television won't be as good for these programmes.

Advantages	Disadvantages
Better picture quality	Picture quality can vary between manufacturers
Better colour	More expensive than standard TVs
	Not all programmes are broadcast in HD

See if you can fill in some of the blanks in the table, looking at pros and cons of HD-ready TVs.



"Today in the UK we are witnessing a revolution that is transforming our television viewing experience. That revolution is HDTV (High Definition Television).

HDTV technology offers truly superb picture quality with a depth and clarity that has to be seen to be believed. Conventional TV's which use the PAL standard, with 576 visible lines, offer a level of detail that doesn't come close to the 720 or 1028 lines provided by HDTV.

The difference in quality becomes more apparent when you compare the total number of pixels (the individual dots that create a picture) provided by PAL with 720 across and 576 vertically and Full HD with 1920 across and 1080 vertically. PAL offers a total of 414,720 (720 x 576) pixels while Full HD (1920 x 1080) can generate an astounding 2,073,600 pixels.

HDTV has arrived in response to the poorer quality Standard Definition (SD) format. You might be more familiar with this SD format as the PAL system in the UK. It has been around for a long time, since the early 20th Century in fact. Large flat panel displays quickly exposed the shortcoming of the old SD format with low resolution PAL signals on larger screens often producing a grainy picture which lacks sharpness.

Note: Once you have bought your HD Ready TV you are not necessarily done with SD. More and more broadcasts are being offered in High Definition, but not everything is available in the new format. You might not be willing to spend more on an HD subscription from the likes of Sky or Virgin Media, in which case it is important to look for a flat panel TV which copes well with the old SD signal. We will be covering more of this aspect of buying a TV later in this guide.

You may have already started looking at HDTV's in your local electrical showroom and noticed that they come with different resolutions, usually 1366 x 768 and 1920 x 1080; does this mean that the 576 lines (PAL) coming down through my aerial will not work with my new HDTV? Don't worry! You don't have to be concerned with matching an incoming TV signal with the resolution of the TV screen.

Your new HDTV will take the incoming 576 lines from a PAL signal and 'Scale' it to fit the resolution of your screen; in the case of a TV with a resolution of 1366 x 768, it will take a Sky HD signal (1080 lines) and scale the signal down to fit the screen.

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How does HDTV it work?

Instead of using the conventional 576 lines to plot a TV picture, HDTV uses 720 or 1080 lines. In addition, the pixels in each of those lines are closer. This results in a hugely improved picture quality, clarity and colour definition.

Standard Definition v High Definition

Note: Remember that the quality of your picture depends on the source of the broadcast as well as the quality of your TV. You can watch Freeview (576 lines) on a Plasma or LCD screen, but the quality will not be as good as Sky HD (1080 lines). A Plasma or LCD TV will actually scale whatever source it is fed to fit the screen. The quality of the scaling mechanism of an HDTV differs greatly from manufacturer to manufacturer and model to model, producing widely differing results in terms of picture quality."

A brief comparison of broadband and dial-up internet

Broadband	Dial-up
Faster speeds: from 512kbps to 8Mbps (24Mbps with latest technology)	Slow, speed of only 56kbps
Does not tie up the telephone line	Uses the telephone line so telephone can't be used at the same time as the internet
A wireless network can be set up allowing several devices to connect to the internet at once	Only 1 device can use the internet at a time
The more bandwidth available, the faster videos can be streamed	Streaming of video is very slow and not reliable
Reliable connection	Not always reliable – you could get disconnected in the middle of doing something
Always connected to the internet	Only connect to the internet when dial-up is used
Costs more than dial-up if not frequently used	Cheaper if used infrequently – only connect when being used
More susceptible to hackers – anti-virus software is required	More secure

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What is Blu-ray?

When we first started recording programmes from our televisions and renting films, we used video tapes. Compared with today's technology, video tapes were poor quality and bulky and couldn't store large amounts of data. More recently, we have used DVDs which are higher quality, can store more data and are far less bulky. Blu-ray is an optical disc format jointly developed by the Blu-ray Disc Association (BDA), a group which includes Apple, Dell, Hitachi, HP, LG, Mitsubishi, Panasonic, Samsung, Sharp and Sony. The format was developed to enable recording, rewriting and playback of high-definition video, as well as storing large amounts of data. A Blu-ray player can also be backward-compatible, so can read CDs and DVDs as well as the Blu-ray discs. The name Blu-ray comes from the optical disc technology used: a CD or DVD uses a red laser to read and write data, whereas a Blu-ray uses a blue-violet laser which has a shorter wavelength and allows data to be stored more closely together, thereby taking up less storage space. A Blu-ray disc has more than five times the storage capacity of a DVD: they can hold up to 25GB on a single-layer disc compared to a DVD capacity of 4.7GB. The picture of a Blu-ray is sharper than a DVD and even better than HDTV. Blu-ray players can also come with extra features, e.g. enabling connection to the internet.

Another increasingly common way we can record and store TV programmes now is on a hard drive in a set-top box, although this doesn't allow us to buy or rent the latest film – we need a DVD or Blu-ray player, or a subscription service that will stream the film to our TV.

Advantages	Disadvantages
Play DVDs as well as Blu-rays	More expensive to buy discs
Bigger storage capacity	Less choice of titles available than on DVD
Better quality picture	

See if you can fill in some of the blanks in the table above looking at the pros and cons of Blu-ray compared with DVD.



"What is Blu-ray?"

Most Blu-ray players sold in the UK are part of the Sony PlayStation 3.

Blu-ray is the latest development in the world of DVD players and discs. A Blu-ray disc gives a sharper and more detailed picture than a standard-definition DVD. The picture is even better than HDTV broadcasts.

If you have a high-definition TV and you want the best picture quality, your choice is simple: buy a high-definition Blu-ray player. To find the best model check our Blu-ray player reviews page.

Blu-ray also has some extra features. For example, BD-Live-enabled players let you connect to the internet, download extras such as games and trailers, and even interact with other connected users.

The future: Blu-ray players or film downloads?

The Blu-ray format is rapidly becoming more popular as people upgrade from DVD players. (Blu-ray machines also play older DVDs so your old collection won't become obsolete.)

Disc sales grew by a healthy 358% last year, more than two million Blu-ray capable machines have been snapped up, and it's predicted that by 2012, more than one in three film discs bought in western Europe will be Blu-ray.

This growth sounds impressive, but isn't all it seems. Many Blu-ray players sold in the UK are part of Sony PlayStation3 (PS3) video games machines rather than standalone players.

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Many, if not most, buyers are likely to be buying the PS3 mainly as a games machine – the Blu-ray player is almost incidental.

And while sales of Blu Ray discs saw a 123% increase in sales in 2009, rising to 8.4 million units in the UK, this only equates to 3.4% of total video sales. It's still dwarfed by the 256 million standard DVD discs sold which account for 96.3% of the market.

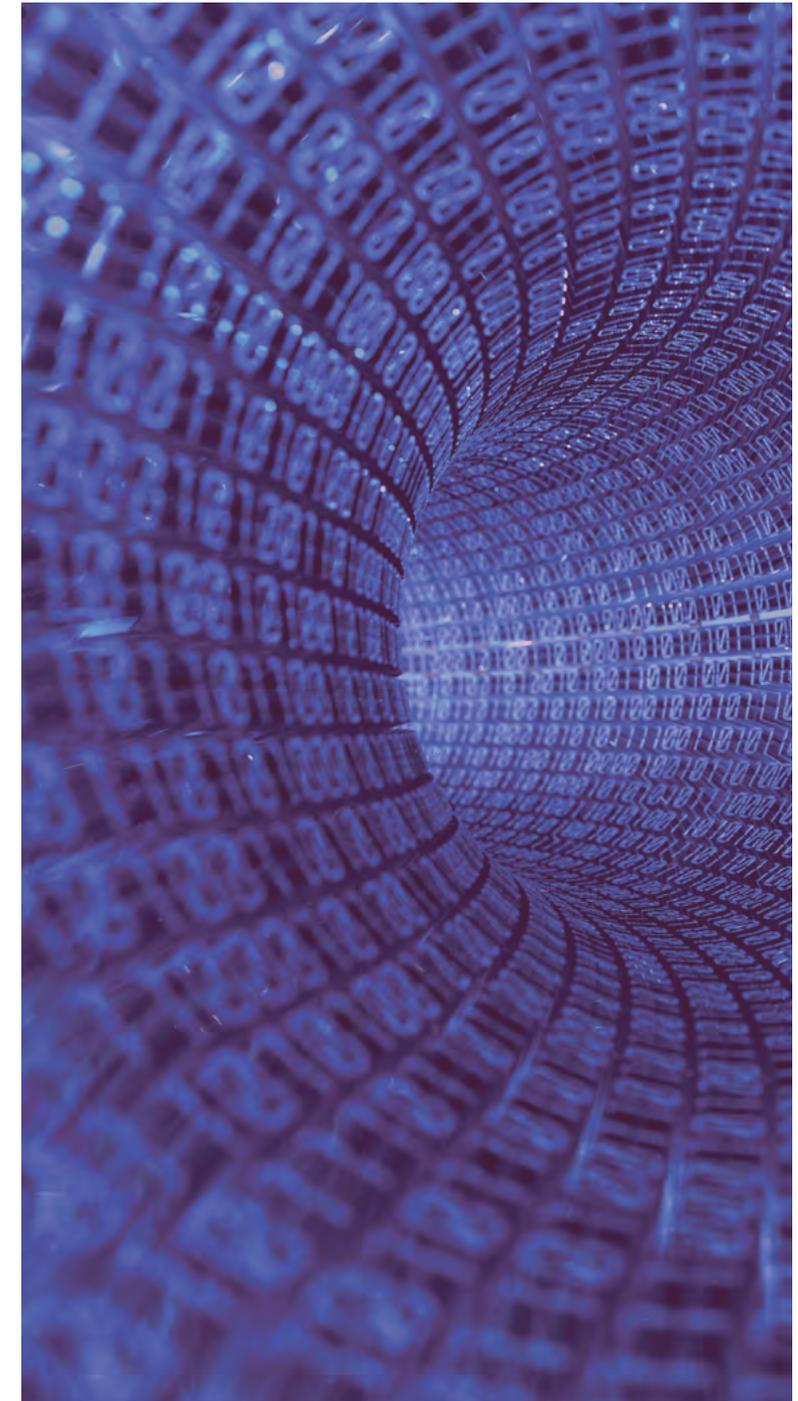
Another fact to consider is film downloading, which increased by 4,080% in 2009 – a trend that will accelerate with the rise of internet-capable TVs.

With the advent of faster broadband, it's increasingly convenient to download a film from Sky, Virgin, or Apple's iTunes rather than rent or buy it on disc."



"Blu-ray (not Blue-ray) also known as Blu-ray Disc (BD), is the name of a new optical disc format jointly developed by the Blu-ray Disc Association (BDA), a group of the world's leading consumer electronics, personal computer and media manufacturers (including Apple, Dell, Hitachi, HP, JVC, LG, Mitsubishi, Panasonic, Pioneer, Philips, Samsung, Sharp, Sony, TDK and Thomson). The format was developed to enable recording, rewriting and playback of high-definition video (HD), as well as storing large amounts of data. The format offers more than five times the storage capacity of traditional DVDs and can hold up to 25GB on a single-layer disc and 50GB on a dual-layer disc. This extra capacity combined with the use of advanced video and audio codecs will offer consumers an unprecedented HD experience.

While current optical disc technologies such as DVD, DVD±R, DVD±RW, and DVD-RAM rely on a red laser to read and write data, the new format uses a blue-violet laser instead, hence the name Blu-ray. Despite the different type of lasers used, Blu-ray products can easily be made backwards compatible with CDs and DVDs through the use of a BD/DVD/CD compatible optical pickup unit. The benefit of using a blue-violet laser (405nm) is that it has a shorter wavelength than a red laser (650nm), which makes it possible to focus the laser spot with even greater precision. This allows data to be packed more tightly and stored in less space, so it's possible to fit more data on the disc even though it's the same size as a CD/DVD. This together with the change of numerical aperture to 0.85 is what enables Blu-ray Discs to hold 25GB/50GB. Recent development by Pioneer has pushed the storage capacity to 500GB on a single disc by using 20 layers."



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What difference does 3D make?

3D is one of the latest innovations in the way we can watch TV and films. You might enjoy the experience of viewing a 3D movie, such as Avatar and Harry Potter, or you might think it is just a gimmick and not worth spending the extra money and having to wear silly glasses for this viewing experience! So what is 3D technology and why do we have to wear the glasses?

3D is also known as stereoscopy and refers to the way our eyes see slightly different views and the way our brain then transforms these two images into one image. The word 'stereo' originates from a Greek word meaning solid. Our eyes project two slightly different images onto our retinas and then our brain transforms these images into a stereoscopic image. A standard picture on film is taken with only one lens and therefore doesn't give a true sense of depth. By using two lenses to take an image, with the lenses separated by the distance that separates our eyes (50-75mm), 3D photography can imitate the way our eyes see what is in front of us and give an appearance of depth to the image.

3D technology tries to replicate how our eyes see. 3D glasses are designed to give each of our eyes a different perspective of the same image. In the cinema, the glasses can be anaglyph glasses (red and blue) where a film is projected twice in the two colours and then the brain puts the images together; or the glasses can be polarised where images are projected in two different rotations.



3D TV uses different technology to the cinema. Viewers can either wear electronic glasses that have shutter lenses, which open and close very quickly allowing only one eye to see the screen at once; or a less common 3D TV system uses a special TV screen where very thin strips show a slightly different perspective to each eye.

Advantages	Disadvantages
A much more realistic viewing experience	Mostly have to wear special glasses to view
Exciting, especially for films	Very few programmes made in 3D
	3D TVs are more expensive than standard TVs
	The glasses are expensive to buy, especially for a whole family to watch at once

See if you can fill in some of the blanks in the table above looking at the pros and cons of 3D TV.



"In 1838, Sir Charles Wheatstone first described the process of stereopsis: the process by which humans perceive three dimensions from two highly similar, overlaid images. Or, the process by which Avatar looks like a mind-blowingly immersive alien landscape instead of a bunch of brightly coloured fuzz.

3D technology has come a long way since Wheatstone developed his stereoscope, then used to view static images and eventually pictures. Now we get to wear Wayfarer knock-offs and enjoy 3D films, television shows and video games.

For some people, seeing cool images might be enough. But others might be curious how Pandora was brought to life, or how TRON: Legacy zapped them into its glowing world. The answer is both reassuringly simple and inordinately complex, depending on who you ask and how you look at it.

How do 3D films work? What's the difference between polarity and anaglyph (we'll get there), and what are the next steps for 3D gadgets and imagery?

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Have a look below for a breakdown of how today's "it" technology functions. Plus, we put in some sweet looking pictures. What's not to love?

Big words! Academic nomenclature! Relax, this is actually the easy part. 3D, or "stereoscopy," refers to how your eyes and brain create the impression of a third dimension. Human eyes are approximately 50 mm to 75 mm apart – accordingly, each eye sees a slightly different part of the world. Don't believe me? Hold up a pen, pencil or any other thin object. Close one eye. Now switch.

The image on either side should be pretty similar but slightly offset. These two slightly different images enter the brain, at which point it does some high-powered geometry to make up for the disparity between the two images. This disparity is "3D" – essentially, your brain making up for the fact that you're getting two different perspectives of the same thing.

This is also, essentially, what modern 3D technology is trying to replicate. All those silly sunglasses and silver-coated projectors are all designed to feed your individual eyes different perspectives of the same image. Easy, right?

Well, yes. It is pretty easy for your brain to figure out the disparity between the two images. Your brain can automatically figure out all the angles and math and geometry to sync the images. The hard part is getting a camera to do the same thing, and to get those individual images to your individual eyes without butchering the whole effect.

Films

Film has been one of the pioneers of 3D, thanks to its hefty budgets and some technological daring. There are largely two ways 3D has been achieved in motion pictures: anaglyph and polarised glasses.

Anaglyph is a fancy way of referring to the red-and-blue glasses we used to wear. By projecting a film in those colors – one in red, one in blue – each eye would get an individual perspective and your brain would put the 3D effect together. Other colors could be used, providing they were distinct enough to be separated on screen. This technique, however, didn't allow for a full range of color and had a tendency to "ghost," or have the once-distinct images bleed into one another. Not cool.

Much more common is the use of polarised glasses, which take advantage of the fact that light can be polarised, or given different orientations. For example, one image can be projected in a horizontal direction while the second can be projected in a vertical direction. The corresponding glasses

would allow horizontal polarisation in one eye and vertical polarisation in the other. The problem is that this kind of 3D requires you to keep your head still, à la A Clockwork Orange. Tilting your head can distort how the waves get to your eyes, messing with the color and 3D effect. Also not cool.

This is the tricky part. To counteract this, 3D now uses rotational polarity, meaning the film being projected actually has two different spins to it. The glasses then pick up those opposite rotations – clockwise in one eye, counterclockwise in another eye – to separate the image. Now you can tilt your head or place it on your boy/girlfriend's shoulder and still be able to watch the movie.

Television

It's possible to use the same techniques in film projectors for home theaters, but you would need some serious cash. Films use special silver-coated screens that are much better at reflecting light back to the viewing audience. Your television, unfortunately, is not silver-coated. There are, however, two ways to get 3D at home: active and passive.

The most common, active 3D, involves wearing those electronic RoboCop glasses. The glasses are synced up to your television and actively open and close shutters in front of your eyes, allowing only one eye to see the screen at a time. This sounds like a recipe for a stroke, but the shutters move so quickly that they're hardly noticeable. These shutter lenses are made possible because of the refresh rate on televisions. 3D-enabled televisions have high image refresh rates, meaning the actual image on screen is quickly loaded and reloaded. Through the glasses, you receive one constant image instead of a flicker.

Passive systems are less common but run much like your 3D film. These televisions have a thin, lenticular screen over the standard display. A lenticular screen is made up of a series of incredibly thin magnifying strips that show a slightly different perspective of the screen to each eye, as illustrated above. While this technology doesn't require bulky, expensive glasses, it can limit the image quality. Essentially, each eye only sees one half of the screen at any given time. For example, if a screen had 100 pixels, 50 pixels would be magnified and sent to the left eye and the other 50 pixels would be magnified and sent to the right eye. In practice, your brain is actually able to put the two images together and retain the entire 100 pixel fidelity. "

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TV meets computer

An alternative to watching a television in our sitting room is to use a computer, or even a hand-held device such as a smart phone. So if we miss our favourite programme we can watch it on BBC iPlayer or one of the other 'catch-up' services. IPTV (Internet Protocol Television) is the way that TV is streamed to us via our broadband internet connection, rather than through the normal radio frequencies or cable or satellite, to our computer or smart phone. But we often don't want to watch our favourite TV programmes on our computer, particularly if the screen is relatively small and our study isn't as comfortable as our living room! So there are increasingly becoming available devices that enable us to receive this IPTV content to our TVs in our living rooms: digital TV set-top boxes, media boxes such as Apple TV and the Slingbox, and games consoles such as the PS3 and Xbox Live. More recently, internet-connected TVs are becoming available which also allow apps such as Skype and Twitter to be downloaded, making the TV a more interactive experience. Other services we can receive through internet-TVs include YouTube and Facebook.

TV Services available through IPTV include BBC iPlayer, ITV Player, 4oD, demand.five and Sky Player. They offer live TV, 'catch up' TV and also 'pay per view' subscription services. LoveFilm offers a subscription service for streaming films to our internet-TVs, computers or games consoles rather than buying or renting a film on DVD or Blu-ray.

Media boxes, such as the Apple TV and Slingbox, are connected to our TVs and generally use our home wireless connection to stream content via our computers to our TVs, allowing us to watch IPTV on our TV rather than on our computer screen. The Slingbox even allows us to access our home TV setup over the Internet, to watch TV or recordings when we are away from home.



"What is Internet TV?"

In the UK, we're seeing an increasing number of digital TV services being delivered over a Broadband Internet connection - Services include the BBC iPlayer, BT Vision, Virgin's On Demand service, Sky Anytime+, Seesaw and YouView.

These online services offer TV programmes and movies "on-demand" for viewing on your TV set, on your computer, or on a mobile device. The content is most commonly delivered (or "streamed") using something called IPTV, which stands for Internet Protocol TV.

To access online TV services, you will need a broadband connection, and to be able to connect a suitable Internet-enabled TV, or set-top box to your Broadband line. Many services can be accessed from a computer or a smartphone."



"Internet Protocol Television IPTV is the new way of watching TV on a system that has a browser and internet available. Due to improvements in internet speed IPTV has been made possible and with the ever increasing broadband speeds will become more and more popular. The quality of IPTV service providers has become better and better. Today there is pressure on for every channel to make it's media available on the internet."



"With the launch of YouTube in 2005, the video streaming phenomenon truly began and, for the first time, users could view clips of skateboarding dogs or cats falling about without the hassle of installing third party applications. Internet providers baulked at the increased strain on their capacity and rapidly started expanding their bandwidth to cope.

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The launch of the BBC's iPlayer in 2007 upped the ante again, providing full length television shows any time of the day. Despite shows only being available for seven days after broadcasting, the service has been a tremendous success, with the BBC reporting more than 18 million users streaming videos each week.

The caveat is that you have to sit in front of your computer. Instead of lounging on the sofa to gaze at your 42in plasma screen, internet streaming entails perching in front of a considerably smaller screen, inevitably producing an inferior experience.

However, the push out of the study and into the living room has already begun – iPlayer is available on many games consoles as well as numerous digital TV set-top boxes, of which the implementation works rather well. The golden magic box we are waiting for – streaming music from Spotify and streaming television from YouTube and iPlayer – has yet to appear.

The little-known Apple TV and SlingCatcher devices give us a glimpse at how these eventual devices may work.”



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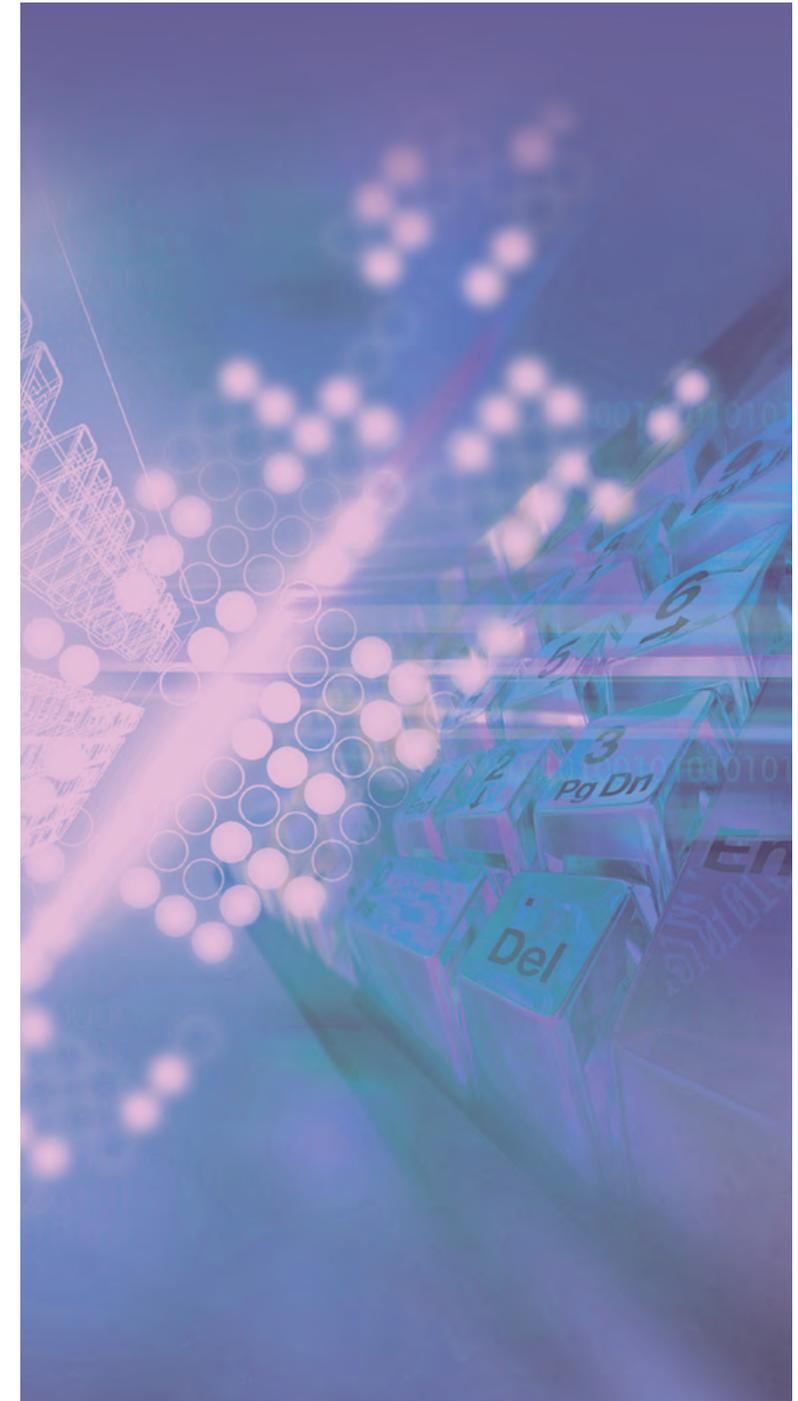
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Ted's decision

So, what TV system should Ted and Maureen buy?

Below is a re-cap of what Ted and Maureen require from their TV and computer:

- A TV with digital capability before the digital switchover happens in their area
- High quality viewing experience for both sports and films
- A method of viewing films, such as their current DVD player
- An internet connection with a good speed
- The ability to use email
- The ability to use Facebook
- Possibly the ability to use Skype

Ted has done his research and decided that there are several options available to him and Maureen when they buy their new TV:



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Teacher's Guide

This edition of *iBytes* is meant to help candidates see how changing technologies affect their everyday life and how factors such as demographics and income can affect the access to technology we have in the home. There are some short activities after each section, some of which can be done in class and others might be suitable for homework or extension activities at the end of a lesson. The crossword on the next page will test a candidate's understanding of the topics and terms covered.

Specification criteria map:

	Content specification	Page number in specification
The digital switchover	2.1.2, 2.1.9, 2.3.10	8, 11, 17
The digital divide	2.1.9, 2.3.5, 2.3.10	11, 15, 17
HDTV	2.1.9	11
Connecting to the internet	2.1.1, 2.1.2, 2.1.5, 2.3.10	7, 8, 10, 17
Blu-ray	2.1.9	11
3D TV	2.1.9	11
TV meets computer	2.1.2, 2.1.9, 2.3.5	8, 11, 15

 The digital switchover – an overview

 Introducing Ted ...

 What is HDTV?

 What is Blu-ray?

 What difference does 3D make?

 TV meets computer

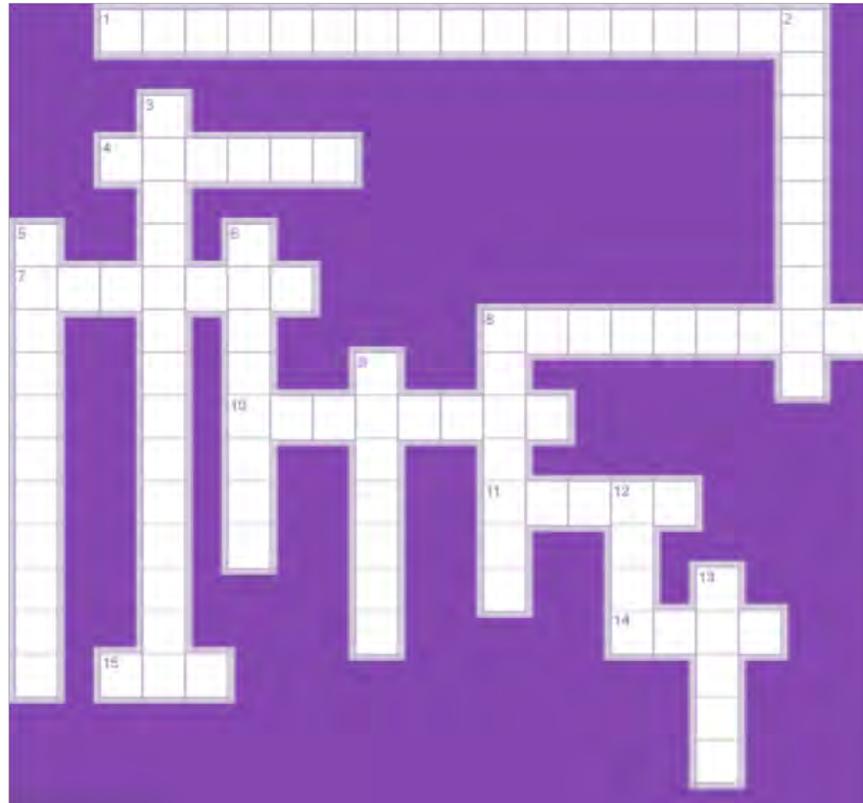
 Ted's decision

 Teacher's Guide

 Crossword



Crossword



Across

1. a list of features a user needs a system to have
4. a slow method of receiving the internet into our home, using a telephone line and modem
7. a social networking app that can be downloaded onto an internet-enabled TV
8. a measure of the amount of data that can be transferred per second across the internet
10. TV channels that cannot be received on our TV after the digital switchover happens in our area
11. the type of waves used to transmit TV signals
14. a method of using the internet to make a phone call
15. the colour of laser used to read and write data to a DVD

Down

2. a method of receiving subscription TV channels using a dish mounted on the wall of our house and a set-top box
3. a term used to describe the difference in access to digital technology between different households, often affected by income
5. the way our eyes see slightly different views and combine them into one image in our brain
6. a hardware device used to stream TV via our computer to our television
8. an optical disc developed by the BDA, which can hold up to 25GB of data
9. we usually have to wear these to view 3D TV or films
12. A term for the way we use our broadband connection to stream content to our TV
13. if we use have a slow internet connection, the streaming of this might not be possible

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Do you have a **passion** for technology?

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