PLUS! Camcorder *buying guide inside*

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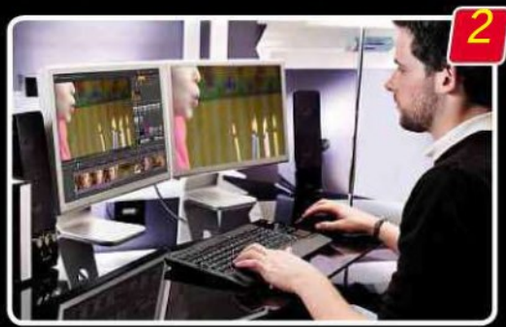

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THE COMPLETE GUIDE TO HOME VIDEO
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Welcome!

If you want to produce your own professional-looking home movies the easy way, this is the book for you!

Making videos should be a lot of fun, but it can also be a bit of a minefield. Lots of people run into problems and lose momentum before they even get started. But if you persevere, the rewards are really worth the effort.

Video is the most important and exciting medium of our times. Thanks to affordable cameras and software and free hosting sites such as YouTube, it has become a vital part of how we communicate on the internet. Best of all, it has produced an explosion of creativity that's every bit as vibrant as when cheap electric guitars and recording equipment changed the face of popular music in the 1970s. There's not much of the DIY spirit left in today's music charts, but take a wander through the crazy, inspired, moving and hilarious videos on YouTube and you'll see that, here, it's alive and well.

The aim of this book isn't so much to make video production easy. If that's all you want, shoot a video clip on your mobile phone and upload it to YouTube. What we will do is ensure that it's fun. We'll help you to produce stunning videos that will make your friends and family deeply suspicious as to whether you really made it yourself. We'll cover technical issues such as what camera and software to use and how to get the most from them. More importantly, we'll look at what makes a great video, and how you can channel technical skills towards your ultimate goal – capturing the attention and imagination of your audience.

Ben Pitt

Ben Pitt, Editor

Contents

With this complete guide to home video by your side, you'll soon be shooting and editing movies like a professional

Why make a video?

If video production seems daunting, our advice is to start with high expectations and a dose of enthusiasm

A huge number of people own a video camera, and many who don't probably have a capable video function on their digital camera or mobile phone. However, they rarely get around to producing videos.

There are three reasons for this. First, making a video involves a bit more commitment than most other creative pastimes. If you enjoy photography, you can pick up your camera and create a work of art in a few seconds. It takes three minutes to jam out a song on a guitar and half an hour to try a new cake recipe. Making a video takes longer, and it's not so easy just to pick up a video camera and dabble. A certain amount of premeditation is involved, from choosing a suitable subject to planning your shots or recruiting a troupe of collaborators.

Another reason is that – let's be honest – digital video can be annoyingly complicated. Batteries run out, wind noise spoils the soundtrack, editing software crashes and discs don't work in your DVD player. This can be incredibly disheartening when you've put time and effort into a project.

The third reason is that there's such a big disparity between what professional film and TV producers can do with million-dollar budgets and what you can do by yourself with a shoestring budget.

Have we put you off yet? Don't worry – there are plenty more reasons why you should consider producing your own videos.

Artistic licence

First, video (and film – we're talking about the same thing here) is simply the best artistic medium there is. OK, it's a subjective issue, but the wonderful thing about video is that it incorporates the storytelling and observational qualities of literature with the imagery of visual art, and it can include music in its soundtrack. Theatre can do all that, too, but video has the capacity to be much more intimate. The camera's lens gives you enormous flexibility to play with scale, and the editing process lets you manipulate space and time.

But what about all those hurdles that home video producers have to overcome? That's where this book comes in. We'll help you plan your productions, with tips on what to shoot and how to go about shooting it. If you've bought this book because you have an important family event or creative project that you want to capture, you already have a project in the making. If you're just looking for a new hobby, we'll help you find inspiration. A limited budget needn't be a drawback, either.

If you're wary of the amateurish plod of home videos, rest assured that this is by no means an inherent problem. When home videos fail to engage the viewer, it's usually because they don't play to the strengths of the medium. They don't have to be long, drawn-out shots accompanied by crackles and seasick-inducing wobbles. A video can explore a space and the interaction of people in it, guiding the viewer in ways that photos or the written word can't. It can tell a story with an exposition and conclusion, and play with tension and release to arouse an emotional response from its viewers. If that sounds too ambitious for a home video project, this book will show you that it's not.

The knowledge bank

And what of the frustrating technical problems that seem to be part and parcel of the video-production process? We can't promise to banish them forever, but we'll give you the know-how to find your way through them. In Chapter 1, we'll explain what you need to know to make an informed choice about which camera to use. In Chapter 4, we'll do the same for your PC and the software you'll be running on it. In Chapters 5 to 7, you'll find tips on how to manipulate video on your PC, from correcting problems to encoding files. Once you've finished this book, you'll feel in charge of your video productions, and never the other way round.

We won't deny that producing videos takes time, but doesn't anything that's truly rewarding require a bit of effort? Besides, the enjoyment is as much in the journey as in the destination.

How to use this book

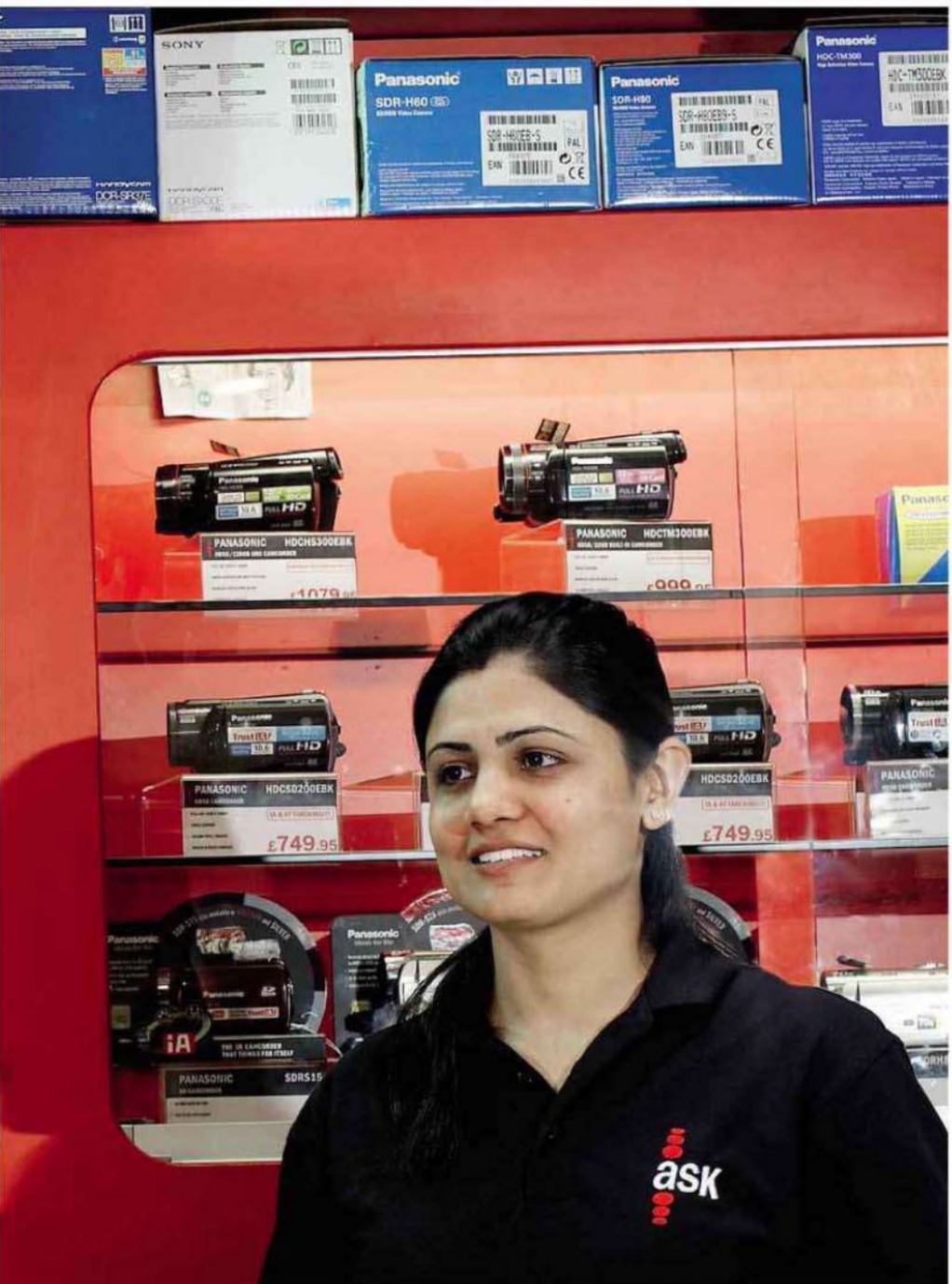
This book leads you through the process of making a video, from buying a camera and accessories through creative and technical camera techniques, kitting out your PC, editing the video and its soundtrack and finally to sharing the results. You can read it from start to finish, but feel free to dip into different sections as necessary. Where a page builds on information presented on other pages, we've tried to cross-reference them so you'll know where to turn. The final chapter covers some advanced techniques. If you're just starting out in video production, it's best to work through the rest of the book before you get stuck into these.

If you're thrown by a particular piece of jargon – and in video, there's quite a lot – turn to the glossary on page 124. We haven't shied away from using these terms because you'll inevitably encounter them elsewhere, so it's worth getting used to them. Don't be alarmed if we recommend shooting your children – that's just with the camera, you understand.

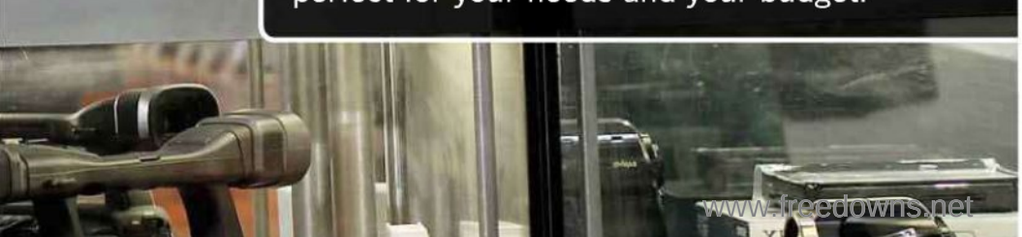
We've written this book to be relevant to anyone who's interested in video production, regardless of their equipment, experience or the type of videos they want to produce. However, we didn't want this to be at the expense of giving specific advice. We've therefore concentrated on digital video cameras rather than analogue formats such as Hi8, and on Windows PCs rather than Mac and Linux systems.

We've also picked out three editing packages that we feel are best suited to home users: Adobe Premiere Elements, Sony Vegas Movie Studio Platinum and Corel VideoStudio Ultimate. You can follow the vast majority of this book with any editing software, but if you're using one of these three programs you'll find specific advice on what buttons to press.

CHOOSING A CAMERA



Baffled by camera formats? Tempted by HD but don't know where to start? When it comes to buying a video camera you've never had more choice, but choice can be confusing as well as liberating. By the end of this chapter you'll be a camcorder guru, dishing out wisdom to shop assistants rather than being bamboozled by their sales pitches. If you're in the market for a new model, we'll make sure you buy one that's perfect for your needs and your budget.



IN THIS CHAPTER

Anatomy of a camcorder

If you're looking for a new video camera, prepare to be impressed – and not bewildered – by the features you can expect to find

Modern digital video cameras are seriously cool gadgets. They're more compact than ever, packed with fun features and, unlike lesser gadgets such as iPhones and MP3 players, serve a wholesome creative purpose. Not all camcorders are as feature-packed as the Panasonic HS300 pictured below, which costs almost £1,000, but this model provides us with a rundown of the features to look out for.

Power/mode dial
Switch between video capture, photo capture and playback.

Zoom rocker
Zoom in and out with this little lever. Good ones fall nicely under the forefinger and zoom at different speeds depending on how hard they're pushed.

Internal storage
Your camcorder may record to MiniDV tape, hard disk, 8cm DVDs or flash memory, or it may just use a memory card.

Viewfinder
This is a rarity these days but it's useful in bright sunlight when the screen is hard to see.

Battery
Camcorder batteries usually last around 90 minutes. Some camcorders let you charge one battery while using another.

Record buttons
Click once to shoot and again to stop. Most camcorders also have a dedicated button for taking still photographs.

Microphone and headphone sockets
These sockets let you attach an external microphone and monitor the results. Microphone inputs are sometimes built into the accessory shoe.

Image stabilisation
It's almost impossible not to shake the camera during handheld shooting, especially when walking or zooming in. This feature reduces the problem a little.

Microphone
The built-in microphone will either record stereo or 5.1 surround sound. The surround effect from these microphones isn't very effective, though.

Shoe
(Hidden behind this cover) Attach external microphones and lamps here. Canon and Sony use proprietary shoes that only accept their own-brand accessories, but this one is a standard shoe type.

Memory card slot
High-capacity SDHC cards are so cheap now that they're an attractive alternative to tape and hard disk. Some camcorders just use them for photos, but most record video to them, too. Sony camcorders use pricier Memory Stick Pro Duo cards.

Flash
Camcorders often make pretty decent stills cameras, and a flash can help. Some models include a video lamp that stays illuminated as you record.

LCD screen
These are nearly always 2.7in widescreens, but only some are also touchscreens. These let you do cool tricks such as focusing on a subject by touching it on the screen.

Lens
The lens should have a long zoom range, a wide aperture to capture lots of light and be able to produce a sharp picture. This means well-engineered optics, but also a fast and accurate autofocus system.

Lens ring
A ring or dial is much more precise than buttons for adjusting focus and zoom.

Sensor
Sat behind the lens, the sensor turns light into an electric signal. As a general rule, physically bigger sensors record higher-quality video. Having three sensors – one each for red, green and blue – helps too.

Face detection
A new trend among camcorders is the ability to spot faces and adjust the exposure and focus to make them look their best.

HD or SD?

Your first important buying decision is to choose between standard or high definition. So how good is HD – and do you really need it?

You can't avoid the hype surrounding high definition (HD). With five times more detail than standard-definition (SD) video, it's the most significant change to TV specifications since the introduction of colour. HD-Ready TVs fill the shops, and Blu-ray players – the HD equivalent to DVD – are available from just over £100. Making your own HD videos is easier than ever, too, with cameras costing as little as £100 and no shortage of HD-capable software.

With everything falling into place, it may seem that SD's days are numbered. That may be true, but it's not a foregone conclusion.

Some people are very excited about HD, but most people are much more interested in video-on-demand services such as the BBC's iPlayer and YouTube, even though quality is often worse than DVD. It's the convenience that most people care about, and picture quality comes a distant second.

The consumer electronics industry has misjudged the public's interests before. The Super Audio CD and DVD Audio formats were launched at the turn of the century, offering far better quality than normal CDs. However, consumers decided that CD is perfectly good enough, and in fact, even lower-quality MP3 is good enough – and more convenient.

Is there a future for HD?

So could HD go the same way as Super Audio CD? A Blu-ray film on an HDTV screen looks pretty spanking, but a DVD on the same screen is quite impressive, too. The difference is clear when you look for it – it's far more noticeable than CD versus Super Audio CD, for instance – but it's less obvious when sitting on the sofa across the room from a 32in TV. Even on a 50in TV, you're usually too engrossed in the story to be thinking about detail levels.

However, if there's one compelling argument for choosing an HD camcorder, it's VHS tapes. Dig out one of these things now and it looks awful. VHS didn't seem so bad a decade ago, but DVD has raised our expectations. It seems fair to say that the quality difference between DVD and Blu-ray is just as significant as it was between VHS and DVD. So perhaps in 2020 when you kick back with your new HD projector, your standard-definition home videos will start to look a bit grotty. So even if you don't yet own an HD-Ready TV, there's an argument for buying an HD camcorder.

So go for HD – what have you got to lose? Well, a few hundred quid, actually. A high-quality SD camera might set you back around £250, but HD models cost from £400 for a

decent entry-level model up to £1,000 for a top-of-the-range consumer model. You can get much cheaper HD cameras from less established brands, but in general you're better off with an SD camera than a bargain HD one.

Splashing out

Don't forget that you'll need an HDTV to watch HD video on, a Blu-ray player to play it, and possibly a Blu-ray writer for your PC, too, although there are workarounds for the latter.

> "If you don't own an HD TV, there's an argument for buying an HD camcorder. In decades to come your home videos will become more interesting"

YouTube has recently added HD support to its service, so perhaps your living room arrangements aren't so relevant.

Another downside of HD is that the footage is much harder for PCs to edit. It's typical that just when PCs are fast enough to manipulate video without being reduced to a snail's pace, video gets much harder to edit. With five times more pixels (1,920x1,080 rather than 720x576) in every frame, you can reasonably expect your PC to take at least five times as long to process each one. If your PC is more than a couple of years old there's a good chance you'll have to replace it in order to edit HD video. Once again there are workarounds, though – see our summary of Corel VideoStudio on page 61.

Another way round the problem is to find an HD camcorder that also lets you shoot video at SD resolutions. That way, you'll have HD capability when you need it, but you can also shoot in easily editable SD resolutions. However, cameras than can do this are fairly rare, so check before you buy if you need to shoot in SD as well as HD.

So there are the pros and cons – it's up to you to make a decision. But if you want our advice, go for HD because, well, it's a lot of fun.

● These four shots were captured with (from left) a £600 HD camera, a £400 HD camera, a £300 SD camera and a £200 SD camera. We've trimmed each image's width but not its height, so the four images together show the size of the video frame

Camcorder formats and standards

There's a lot of jargon in the world of digital video. Here we demystify the often confusing standards and acronyms

Let's be clear from the start: digital video formats are a nightmare. You think you've got your head around all the resolutions, frame rates and compression formats, and some enterprising company introduces a camera that's just that little bit different.

AVCHD, for example, is an established camcorder standard – but did you know that there are six different video and audio format combinations an AVCHD camera might record? And AVCHD is just one of a dozen or so video formats, and that's not counting the various forms of analogue camcorder such as Video8, Hi-8 and VHS-C. Actually, we're not going to count analogue cameras. This book is about digital video, so if you're using one of these older formats, it's time to go shopping. Even a cheap MiniDV model will give a massive boost to quality and convenience.

So take a deep breath. We're about to embark on a whirlwind tour of everything you need to know about video formats. It's going to get tough, and some of us won't make it through to the other side, but if you can get through these two pages we promise not to bore you again until page 96.

● Interlaced video, if left unchecked, produces jagged horizontal lines when shown on a flat-panel TV or computer monitor

PROGRESSIVE INTERWHAT?

Video consists of a fast succession of still images, known as frames. Film has 24 of these frames every second, which is enough to fool our brains into thinking we're looking at a moving image. Except, actually, it's not quite enough. If you look carefully, you'll notice that motion isn't as smooth as it could be. It seems to stutter slightly, and it's especially noticeable if the camera turns, or pans, slowly.

When TV came along, its inventors decided that 24 frames per second (fps) was too jerky, so they bumped it up to 50fps. This was much smoother, but all those extra frames generated more data than they could squeeze down the TV aerial. So some bright spark came up with the idea of only including half the picture in each frame, thereby halving the amount of data. TV signals were organised as lots of horizontal lines, so one frame would send all the odd-numbered lines and the next frame would send all the even ones. This is called interlaced video. These half-frames are known as fields, and you need two interlaced fields to make up a full frame of video.

Interlacing may sound a bit of a bodge, but it works. Or, at least, it worked. Old-fashioned TVs were designed to show interlaced footage, and the system really did deliver smoother motion. However, flat-panel TVs and computer monitors aren't designed for interlaced footage. They show a whole frame followed by the next one, so the picture must be de-interlaced before it can be shown on a flat-panel display.

This de-interlacing process is a headache. If you simply slot the odd and even lines together, anything that's moving in the picture takes on a jagged, sawtooth appearance because the fields were recorded $^{1}/_{50}$th of a second from each other. You could bin all the even lines, but then you lose half the detail. The third technique is to look at where parts of the picture are moving

and guess where they would be 1/50th of a second ago. This takes lots of computing power, and it doesn't always work very well.

So it turns out that interlaced video is a bit of a bodge after all when it's shown on a flat-panel TV. That's unfortunate, because all SD video – broadcasts, VHS tapes, DVDs and camcorders – is interlaced. Even most HD video is currently interlaced, which is a bit daft because you can't watch HD video on anything except a flat-panel TV. However, some camcorders – and nearly all Blu-ray discs – do away with interlaced. The alternative is called progressive scan, which simply means not interlaced. Once again, the downside is that motion looks a bit jerky. But it looks jerky like a film looks jerky – and film is cool, right? Progressive scan on camcorders is often described as having a 'film look'.

There are some arguments for interlaced video to continue. It's good for sports coverage, where smooth motion is crucial and there are lots of camera pans. It helps that de-interlacing is actually pretty good on the latest TVs, and nothing like the mess the first generation of plasma screens made of things. But essentially, progressive scan rules. You won't find it on standard-definition cameras, but some HD models from Panasonic, Canon, Samsung and others include it, usually as an option alongside interlaced. They all give it different names, but the most common label is to add a 'p' at the end of the resolution, such as 1080p.

RESOLUTION

This one's a bit easier. Standard definition (SD) uses 720x576 pixels per frame. SD widescreen uses the same number of pixels, but the picture is stretched into a widescreen shape. HD tends to be one of three resolutions: 1,280x720, 1,440x1,080 or 1,920x1,080. They're all widescreen, but the middle one uses stretched pixels to make a widescreen shape.

Resolutions are usually referred to by their horizontal resolution, so 1,280x720 becomes 720p (it's nearly always progressive scan), while the other two both have 1,080 lines so they'll be 1080i (if it's interlaced) or 1080p. It can be hard to tell 1,440x1,080 and 1,920x1,080 video apart from the specifications, but the latter is usually referred to as Full HD.

In practice, most HD camcorders record 1080i and/or 1080p Full HD. Some older AVCHD models record 1,440x1,080, as do HDV cameras. Most stills cameras that advertise an HD video function record 720p.

● Anything above the standard-definition 720x576 pixels is considered HD. Resolutions that aren't widescreen are stretched into shape when played back

DATA COMPRESSION

This is perhaps the biggest can of worms, but fortunately you don't need a PhD in video codecs to buy a camcorder. A codec is short for compression/decompression. The compression bit turns big files into smaller files, and the decompression bit reverses the process so you can do something useful with the file, like watch it. JPEG is a codec, and so are MP3 and MPEG2. Digital video generates staggering amounts of data, so in order for the tape, disk or memory card to store more than a few seconds of video, it must be compressed.

Some video codecs simply compress each frame like a JPEG. The DV format, used by MiniDV cameras, is an example of this. Other codecs, such as MPEG2, only update the areas of a frame that have changed since the previous frame. Because usually not a huge amount changes from one frame to the next, this produces much smaller files. However, one downside is that footage with lots of fast motion requires each frame to be described from scratch. Because the codec only budgets for a small amount of data, the result is blocky or smudged details. Another downside is that it's harder to decompress, especially in editing software where you're likely to be constantly jumping around from one clip to another.

MPEG4 is even more efficient than MPEG2, but it's also even harder for editing software to manipulate. It's a bit unfortunate, then, that most high-definition camera formats record MPEG4 video (AVC is a variant of MPEG4). The combined strain of the massive resolution and demanding codec makes it really hard work for PCs to edit. At least the files are nice and small, though. Footage from HDV cameras is high-definition MPEG2, so it's easier for PCs to manipulate than AVCHD.

Now let's look at some of the more tangible features on video cameras, such as the different storage formats.

Camcorder storage explained

There's a wide range of storage formats to choose from. Here we explain the differences, so you can choose the right camcorder

Whether you buy a second-hand camera or a brand-new model, one of the most important choices you'll have to make is the type of storage media that you want to use. There's a wide range of options to confuse matters. Some are better than others and some formats are outdated and should be avoided, even when buying a cheap second-hand model, or you could run into problems later. Here, we'll explain the differences, benefits and drawbacks of each type of storage.

FLASH MEMORY

Flash memory is the most popular storage type for camcorders, as it's cheap and robust. Cameras that use this type of memory have the same advantages as hard disk camcorders, but none of the same drawbacks, bar needing a fast PC to edit demanding formats such as AVCHD. However, you generally get less storage space than with a hard disk. Some camcorders have built-in storage; 16GB is common, which is enough for around two hours of HD footage.

You can usually add more space using memory cards. Some camcorders rely entirely on memory cards. Practically all flash memory-based camcorders use SDHC cards, which cost around £30 for a 16GB card, but 32GB cards are also available. Sony uses its own Memory Stick Pro Duo format, which costs around £60 for a 16GB card. In terms of cost and flexibility, flash-based cameras are the best choice.

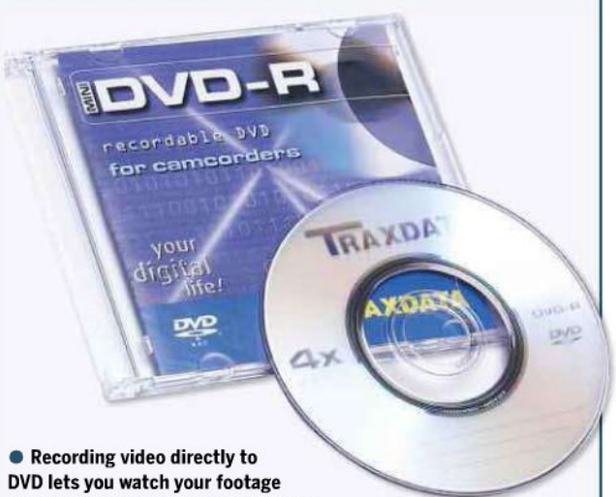
● Flash-based camcorders can have their capacity easily upgraded

DVD AND BLU-RAY

Camcorders that write to mini 8cm DVDs are uncommon, and there's little reason to choose one. They have a similar range of advantages to hard disks and flash memory, including the ability to preview, delete and manage your footage from the camera.

The main advantage of this format is that you can take a disc directly from the camcorder and watch it in your DVD player. The downside is that the discs are relatively expensive and can only record 30 minutes of standard-definition footage.

Mini Blu-ray models are also available, although most models have integrated hard disks, too. However, these are expensive and suffer from a similar range of drawbacks to DVD-based models. We recommend avoiding disc-based camcorders.



● Recording video directly to DVD lets you watch your footage on a regular DVD player. However, the format is relatively expensive and inflexible

HARD DISK

Hard disk-based camcorders aren't as popular as flash memory-based camcorders as they're more expensive, but you shouldn't necessarily rule them out. As the name suggest, these camcorders have a built-in hard disk to which footage is recorded.

The benefit of this system is that a large hard disk can record hours and hours of footage without your having to change tapes or memory cards. For example, a 120GB hard disk can record around 15 hours of HD footage – more than enough for a long holiday.

Hard disk camcorders are available in both HD and SD resolutions. Most HD models record video using the AVCHD format, which uses a high level of compression to keep file sizes relatively small, but it means that you will need a powerful computer to edit the footage.

Each time you press the record button on your camcorder, a new video file is created on the hard disk. The advantage of this system is that it's easy to review your footage on the camcorder. All you have to do is use the screen and control system to select a file for playback. If you don't like what you see, you can delete it. The space that's freed up can then be used to record more footage.

Files are transferred as quickly as the hard disk can deliver them to your computer, so it's easy to upload video after a day's shoot. The downside of this format is that hard disks are quite fragile, so dropping your camcorder can break the disk, which is then expensive to replace.

● **Hard disk camcorders write video to disks similar to those that are used in iPods. You can store more than a day's worth of video, but these models tend to be expensive.**

● **The MiniDV format is popular, and produces high-quality video**

MINIDV

Until recently most camcorders recorded video to MiniDV cassettes. These are capable of storing 60 minutes of digital video at either SD or HD resolutions.

The benefit of this storage is that the tapes are relatively cheap (around £7 for five), so you can keep your unedited footage archived on individual cassettes. It's also easy to carry a stack of them around, so you'll never run out of space to shoot new video.

MiniDV camcorders that shoot in SD resolutions record using the DV standard, which saves video as a series of discrete JPEG-like frames at a high bit rate. This produces high-quality video, and although the simple compression technique produces massive files, they're very easy for PCs to manipulate. MiniDV HD camcorders use the HDV standard, which uses the MPEG2 format at the same high bit rate as DV cameras. This more demanding format and the higher resolution makes it harder for PCs to edit, but nowhere near as hard as the AVCHD format used elsewhere.

MiniDV HDV camcorders can record at resolutions of up to 1080p, although most tend to record at 1080i, using an actual resolution of 1,440x1,080. While not required by the standard, MiniDV HDV camcorders can usually be switched to DV mode and record SD video.

Using cassettes has several major drawbacks. First, you need to capture the video to your computer by playing the tape back at its normal, real-time speed. So, capturing 60 minutes of video takes 60 minutes. Whereas other video cameras have USB ports, tape-based DV and HDV cameras use FireWire, which isn't as common on PCs and laptops as USB.

The other problem is that it's hard to review the video that you've already shot, as you need to line up the tape at the right point manually. Because tape is a linear storage format, you can't simply delete a clip and reuse the space easily: if you start recording over a bit of video you don't want, it's easy to record over a section you do want accidentally.

Camcorder buying guide

To get a camera that does what you want it to, you need to make sure you choose a model with all the features that you need

MANUAL CONTROLS

The only way you'll get video the exact way you want it is to have a camera with manual controls. Look for an aperture priority mode to control how much light comes into the camera, and a shutter priority mode to control how fast the camcorder takes each frame. A full manual mode will let you set both settings independently, allowing for a lot of creative effects.

One crucial feature is exposure lock. This fixes the camera at its current settings and prevents it from automatically changing the aperture or shutter speed. When used properly, this helps you shoot video at constant settings and gets rid of irritating problems, where the camcorder is constantly adjusting settings based on the current light level.

● **Manual controls let you choose how you want to shoot video and can give you significantly better results than by using the automatic settings**

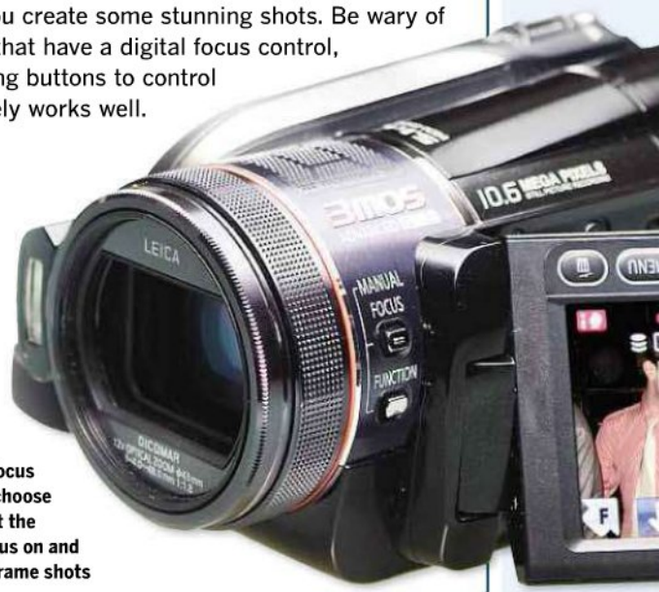
● **You'll find it hard to find a camcorder with a viewfinder, so you'll need to frame your shots using the screen**

VIEWFINDER

Many people like shooting video by looking through a viewfinder; however, you'll find it hard to find a modern camera that offers this facility. Instead, you'll need to use the camcorder's screen to shoot your video. It may not feel as natural at first, but the screen displays the same image as the viewfinder, so you can still frame your shots correctly.

FOCUS RING

For the best control over your shots, look for a camera that has a manual focus ring. This will let you choose which parts of the video you want in focus, and let you create some stunning shots. Be wary of cameras that have a digital focus control, as stabbing buttons to control focus rarely works well.



● **A manual focus ring lets you choose what you want the camera to focus on and helps better frame shots**

ZOOM LENS

To get closer to the action, you'll need a decent zoom on your lens. As with digital cameras, ignore the digital zoom figure, as this works by resizing the image digitally, reducing quality. Look for a zoom of at least 5x, but 10x is better.

The higher the zoom you use, the more noticeable hand-shake will be. You can combat this in several ways, though. First, a camera with image stabilisation can help keep your footage steady. For the best results, look for a camcorder with optical image stabilisation; digital stabilisation uses part of the camera's sensor to stabilise the image digitally and reduces image quality. Alternatively, use your camera on a tripod (see accessories on page 22).

● Zoom specs on a camera's lens; a high zoom range can get you close to the action

FORMAT

One of the major complexities about the way that camcorders shoot video regards the format that they use to record your footage (see page 12 and 13 for a more in-depth explanation of different formats). For the easiest life, it's best to choose a video camera that uses a well-recognised format, so that you can be sure that your video-editing software will work with it correctly.

For SD cameras, AVC or MPEG2 files are the best choice, and will work well with all our recommended software on pages 59-61. For HD, it's a bit more complicated. MPEG2, as used by tape-based HDV cameras, is a good choice, and is relatively easy to edit on moderately specified computers.

Solid-state or hard disk camcorders use newer video formats, which take up less space than MPEG2 but require more processing power to edit. There's a bewildering array of formats, and we've had problems with some of the proprietary ones working with some video-editing applications. For the maximum compatibility, make sure that you buy an HD camcorder with the AVCHD logo on it. This format is widely recognised and works with every video-editing application that we've recommended.

AVCHD

● Look for the AVCHD logo to ensure compatibility with your video-editing software

MICROPHONE

All camcorders have built-in microphones capable of capturing audio, and some are pretty good. However, there will be times where you need to use your own microphone, whether it's a hand-held microphone for interviews, or a wireless model you can clip on a subject to capture their speech clearly. The best camcorders have standard microphone inputs, so you can choose from a wide range of standard mics.

If your camcorder doesn't have a microphone input, you may still be able to attach an external mic by using an accessory shoe (see page 19). Typically, this route will limit your choice of microphone.

If you're planning to stick with your camcorder's onboard microphone, be careful of gimmicks such as surround sound. While this may sound as though your camcorder will be able to capture movie-style sound, the results are often far from good. Typically, you'll end up capturing sound from all around you, leaving you with lots of background noise.

● Sony's ECM-HW2 wireless microphone lets you get in close for clearer audio, but it only works with Sony camcorders with an Active Interface Shoe

OUTPUTS

Once you've used your camera to shoot video, there are several ways to view it – from putting the footage on your computer and editing it, to connecting the camcorder directly to your TV and watching it on that. It's important, then, that you have the right types of connector on your camcorder, TV and PC. Here, we'll take you through the options.

AV output

The AV output on cameras is used for an analogue audio and video connection to your TV. The connection is a proprietary one, so make sure you keep the cable that came in the box.

Depending on your camera, you'll probably have a choice of outputs on the AV cable. For video, there are two common outputs: composite (a single yellow phono plug) is for standard-definition video, and the quality is basic; component (red, blue and green phono connectors) is used for HD video, and the quality is very high.

More rarely, you may also have an S-video output, which is for standard-definition video and is slightly better quality than composite. Make sure that your TV has matching inputs.

● **Make sure your camera and PC have the right inputs and outputs**

HDMI

Most HD camcorders have an HDMI output for connecting to digital TVs. This connection carries full HD video and audio, so it's the only connection you need. However, the connection on camcorders tends to be mini HDMI (HDMI-C), whereas TVs have standard HDMI (HDMI-A) inputs. To use your camera's HDMI output, you need either a HDMI-C-to-HDMI-A converter (around £5) and a standard HDMI cable, or an HDMI-C-to-HDMI-A cable (around £15).

USB

The USB port on most modern cameras is used for taking video off the camera and storing it on your PC. For MiniDV camcorders, the USB connection is generally only for copying still images. Camcorders have mini USB connectors, and the correct cable should be provided in the box. If not, check your camera's manual carefully, so that you buy the correct cable type.

FireWire

FireWire ports on MiniDV cameras are used to copy video to your PC. Cameras will have a mini FireWire connector (4-pin), where as PCs will have standard FireWire (6-pin) inputs. You'll need a 4-pin-to-6-pin FireWire cable to connect your camera to your PC.

Can I shoot video on my stills camera?

The vast majority of digital cameras also let you record video, so you may be thinking that there's no need for a camcorder. However, that's not necessarily the case. Most stills cameras aren't as good as capturing video as a camcorder for several reasons. First, the resolution on a stills camera is generally lower than a camcorder's, with most cameras recording at 640x480 (VGA) or 1,280x720 (720p). Other problems include poor-quality audio, slow focusing and the zoom being disabled during video. There's usually a problem with frame rates, too. Some cameras capture video at a jerky 15fps, while others capture at 30fps, which is the American NTSC standard, not the UK PAL standard. Either of these frame rates can cause headaches during editing.

There are some exceptions. Panasonic's Lumix DMC-TZ7 (around £280) captures high-quality video and sound. Newer full-HD cameras capable of shooting high-quality video are becoming available, but they're expensive: Pansonic's Lumix DMC-GH1 costs over £1,000, and Canon's PowerShot SX1 IS costs around £450.

By all means, give your stills camera a go, but for the best results you'll need to buy a dedicated camcorder.

● **Pansonic's Lumix DMC-TZ7 is capable of shooting high-quality video, but for the best results buy a dedicated camcorder**

ACCESSORY SHOE

An accessory shoe is a vital way of being able to expand your camcorder's abilities, letting you add accessories such as lights and microphones. Be aware that most manufacturers have a proprietary accessory shoe, so you can only buy add-ons made to fit that particular socket. This often limits your choice to peripherals made by your camcorder's manufacturer.

● **An accessory shoe allows you to expand your camcorder's capabilities**

SENSOR SIZE

All camcorders have a sensor that records the image. Typically speaking, for the best-quality image you should look for camcorders with a large sensor. The larger the sensor, the more sensitive to light they are, and the less noise and better low-light performance you get.

As you've probably come to expect, sensor sizes are rather confusing and difficult to understand, as they're represented by bizarre fractions, such as $^1/_{1.3}$in or $^1/_{2.33}$in. The reasons for these archaic terms are a little beyond the scope of this book; all you need to know is that the larger the number, the bigger the sensor. So, a $^1/_6$in (0.1667in, in decimal) sensor is smaller than a $^1/_{2.33}$in (0.429in, in decimal).

You can pretty much ignore the megapixel rating of a sensor, as this figure is typically much higher than the resolution of the video, and the image from the sensor is resized down to match the resolution of the output video.

The other factor that affects your choice is the type of camcorder you're buying: SD or HD. SD cameras have a much lower resolution, so can get away with smaller sensors. HD video requires a lot more pixels, so to make sure that each pixel gets enough light, you need to have a larger sensor.

Typically, it's common to see SD camcorders that use a $^1/_6$in or $^1/_8$in sensor. Compact HD camcorders will use a $^1/_5$in or ¼in sensor, while high-quality models will use at least a ⅓in sensor, although larger ones can be found. Be wary of HD camcorders with very small sensors that don't have a high enough number of pixels to match the output video resolution, as the quality will be poor and the video upscaled at the end. For example, we've seen an HD camcorder with a $^1/_6$in sensor that's only capable of recording 1,470,000 pixels (1.47 megapixels), even though 1,920x1,080 video, which it's capable of producing, is actually 2,073,600 pixels (2.07 megapixels).

TOUCHSCREEN

It's becoming ever more common to see camcorders with touchscreens. These are usually a good choice, as they let you access controls quickly in a natural way.

One of the advanced features that you may want to look out for on a touchscreen camcorder includes spot focus, where you simply tap the area of the screen on which you want the camera to focus. This can make shooting video the way you want it incredibly easy.

In normal use touchscreens are easier than standard controls, as you can intuitively touch the interface and select clips.

● **A touchscreen makes a camcorder a lot easier to use**

Recommendations

Having trouble narrowing down which camcorder you want? Here we highlight some of the best available models

MiniDV Camcorder

SONY DCR-HC62E

Price Around £250 inc VAT

This standard-definition camcorder uses MiniDV cassettes and produces excellent-quality video. If you're just starting out making home videos, this camcorder's a great choice and excellent value.

SDHC Camcorder

CANON Legria FS200

Price: Around £256 inc VAT

Canon's tiny Legria FS200 is one of the best standard-definition camcorders around. It stores video on cheap, readily available SDHC cards and produces stunning videos that can be edited on any computer.

Memory Stick HD Camcorder

SONY HDR-TG3E

Price Around £399 inc VAT

This tiny AVCHD camcorder is great for carrying around with you on your travels. It produces decent picture quality, and its comfortable pistol grip means it's a good choice for holidays or anyone constantly on the move.

Memory Stick HD Camcorder

SONY HDR-CX11E

Price Around £530 inc VAT

High-quality HD video and built-in optical image stabilisation make this AVCHD camera an excellent choice for anyone looking to get the best results from their video. A 4GB MS Pro memory stick is included, but you may want to buy a larger stick.

Hard Disk HD Camcorder

CANON HG20

Price: Around £600 inc VAT

The 60GB hard disk means you can record over 22 hours of AVCHD video on the HG20. It's easy to use and perfect for anyone that wants to do a lot of shooting but doesn't want to carry around loads of tapes or memory cards.

MiniDV HD Camcorder

CANON HV30

Price Around £630 inc VAT

It may be expensive, but if you want top-quality results Canon's HV30 is the camcorder for you. It records HD video to MiniDV cassettes, so it's perfect if you want to keep an archive of the video you've shot.

www.nikon.co.uk/wheretobuy
0800 230 220

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D5000

2YEAR WARRANTY

For 2 year warranty on any camera and lens kit simply register your new Nikon purchase. Call 0800 408 5060 or visit www.nikon.co.uk/register.

Accessories

Get more from your video camera with a supporting cast of extra tools and gadgets

MEDIA

Stock up on MiniDV tapes, 8cm DVDs, SDHC or Memory Stick Pro Duo cards for your camera. SDHC cards' Class rating denotes their performance, so go for Class 4 or higher to ensure that they'll be fast enough to record HD video. A 16GB SDHC will store around two hours of HD or four hours of SD video.

PADDED BAG

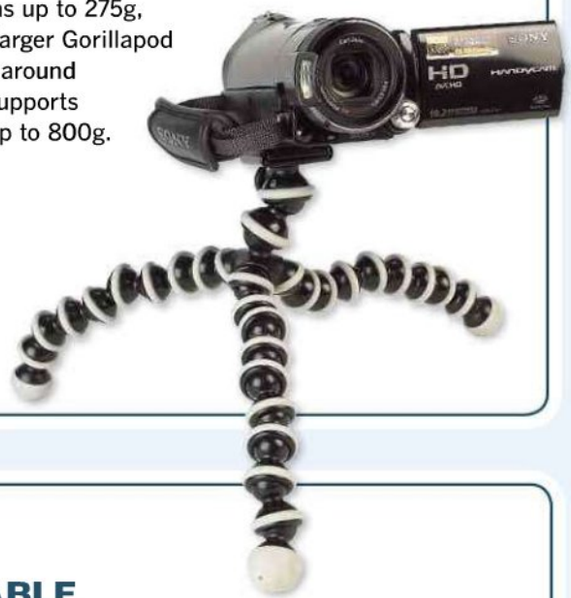
Keep your camera protected from knocks with a padded bag. Crumpler, Lowepro, Samsonite and others make bags specifically for video cameras, with space for other accessories.

If you just want to keep your camcorder in a normal bag, get a soft pouch to protect it from scratches, or just keep it in a woolly sock.

GORILLAPOD

There are lots of desktop tripods, but the Joby Gorillapod is in a class of its own. It acts as a mini tripod on a flat surface, but its bendy rubberised legs can wrap around virtually any object to get the height needed for a shot.

The original model costs around £13 and is suitable for cameras up to 275g, while the larger Gorillapod SLR costs around £30 and supports cameras up to 800g.



FIREWIRE CABLE

Tape-based video cameras that record in MiniDV or HDV format connect to PCs via FireWire, but a cable is rarely included. The socket on the camcorder and on laptop PCs is likely to be the smaller 4-pin type, while desktop PCs tend to use the larger 6-pin socket. Make sure the cable you buy has the right plug on each end.

If your PC doesn't have a FireWire input, an expansion card can be bought and easily fitted for around £25.

EXTERNAL MICROPHONE

If your camcorder has an accessory shoe, consider using an external microphone. The accessory shoes on some Canon and Sony camcorders incorporate an audio connection, which is tidy but limits you to same-brand microphones. Panasonic uses a standard passive shoe and microphone socket, so you can buy kit from microphone specialists such as Rode and Audio Technica.

External microphones usually give greater clarity than built-in models, and their foam windshields reduce wind noise. Rode's VideoMic (£80) is an excellent choice and its Stereo VideoMic (£120) is even better. External mics also tend to be better at rejecting unwanted sounds from the sides and behind. Audio Technica's ATR25 (£35) does well in this respect. To really cut down on unwanted noises, get the microphone nearer to the subject. A lavalier microphone such as Audio Technica's ATR35s (£20) clips to clothing and comes with a 20-foot cable.

SPARE BATTERY

Most HD camcorder batteries last for around 90 minutes, which may not be enough for a day trip. Spare batteries cost around £20 to £30, although those for Sony's cameras are nearer £50. Most batteries are charged by plugging the camcorder into the charger, so bear in mind that you may not be able to use one battery while charging another.

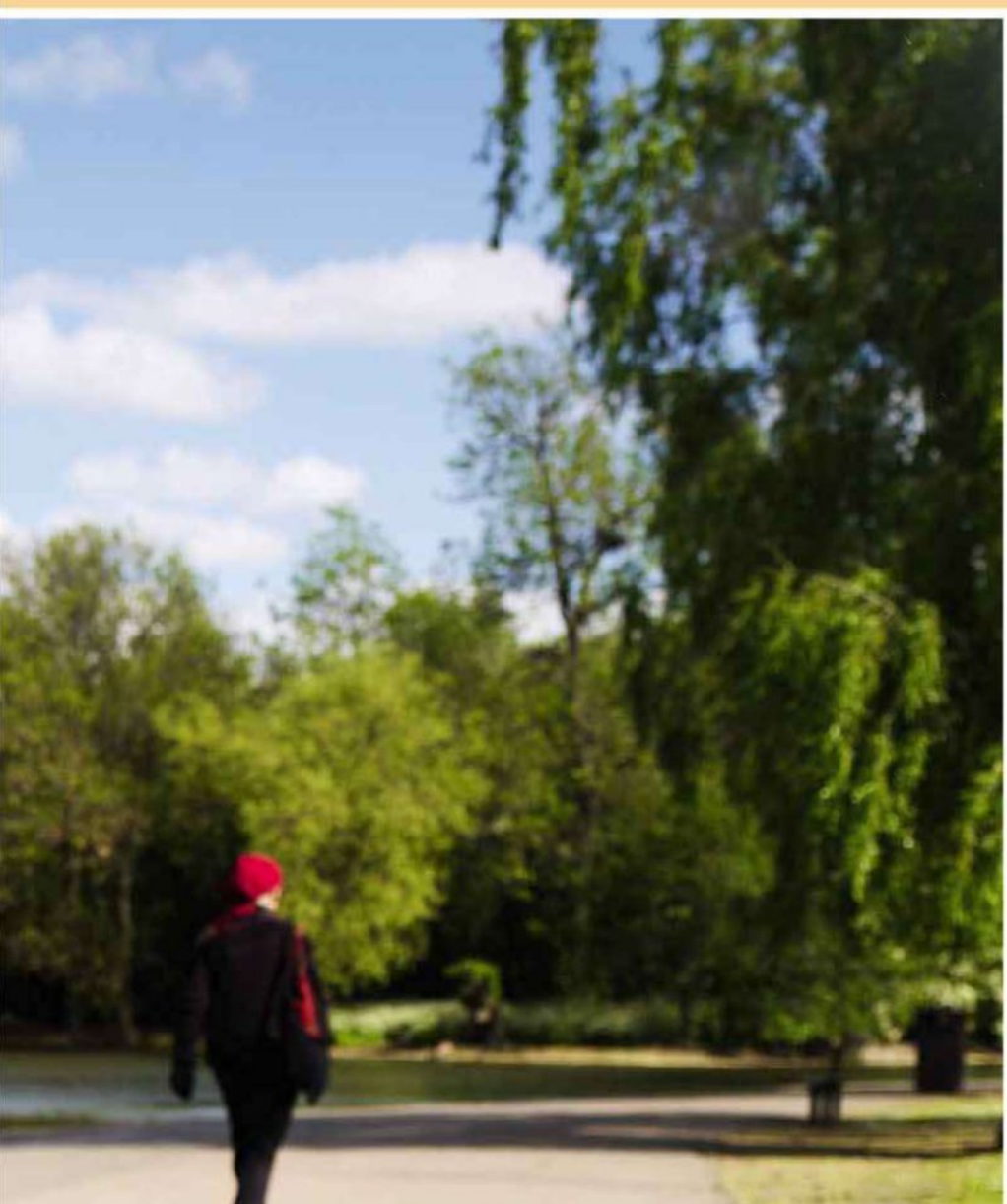
HDMI CABLE

Camcorders usually come with AV and component cables to connect to a TV, but few include an HDMI cable in the box. If you have an HD camera, it's worth buying one, as it's more convenient (with video and audio in a single cable) and offers better quality than the other types of video connection. Most cameras have a mini-HDMI (Type C) socket, so get a Type C-to-Type A cable.

TRIPOD

The best way of banishing amateurish wobbles in your footage is by using a tripod. Prices start at around £25, but spending more will buy you more rigid support, a quick-release platform and a taller maximum height. A fluid panhead and panhandle will let you make smooth, sweeping panoramic movements with the camera.

SHOOTING BETTER VIDEO



The secret to creating great home videos is knowing what to shoot, where to point the camera and how to capture shots that will make the editing process smoother.
By combining the storytelling skills of an author with the compositional techniques of a photographer, your videos will draw viewers in and keep them hooked until the final frame. It's important that those frames aren't wobbly, so we'll also look at how to banish shakes from your footage.

IN THIS CHAPTER

Choosing your subject

So you've got your video camera and you're all set to record. All you need now is for something interesting to happen!

Here's a list of events that make great subjects for a video: a trip to the zoo, a baby's first steps, a martial arts demonstration, a wedding ceremony, a hurricane. And here are some awful subjects for a video: a walk in the countryside, Christmas dinner, a sightseeing holiday, a trip to an art gallery, a sunset.

The distinction between these two lists isn't that one is inherently more exciting than the other. It's that the first set of subjects all include action. There may be few sights more enchanting than undulating mountains, the sun setting over the Acropolis or Aunt Josephine's winning smile, but for these you need a stills camera, not a video camera.

A photo captures a view and suspends it, immortalising every last intimate detail. Video is constantly moving, so it doesn't give the viewer time to reflect on an image at his or her own pace. Video isn't just interested in what something looks like, but also how it moves and what it sounds like. Point the camera at a static, silent subject and your video is running on a third of its creative power.

We don't want to discourage you from capturing a majestic sunset or great auntie's talent for reading out cracker jokes. However, each time you reach for your camera, ask yourself if the moment is best captured with a video or a photo. You can always incorporate slideshows into a video production, or even shoot the odd static video clip to intersperse with the more eventful shots. What you should avoid is a video production that consists entirely of static subjects.

Get the children involved in a project such as making their own cookery programme

Animals – whether they're exotic wild creatures or simply a family pet – are ideal subjects for home videos

Even so, you needn't wait for some jaw-dropping action to unfold in front of your eyes before you can start recording. Local wildlife can make interesting subjects, and you can't go wrong with younger members of the family. Children grow up fast, and often it's the little things like a favourite toy or a friendship that can be most interesting decades later.

CANDID CAMERAWORK

Another reason why children are such great subjects for a video is because they have a blissful lack of self-consciousness. They might be mildly distracted by your camera for a minute or two, but from then on they're unlikely to pay it much attention.

Sadly, teenagers and grown-ups aren't so relaxed in front of the camera. Lots of people become tense when a stills camera is pointing at them, so the sight of a video camera with its tendency to linger on a subject makes them run a mile. Put a video camera in someone's face and demand that they do or say something

interesting and they'll be put off being filmed by you ever again.

There is a solution, though: zoom. Whereas many stills cameras have a 3x zoom, video cameras typically have a zoom range of anything from 10x to 70x. Even with a basic 10x zoom camera, you can stand five metres away and your subject's face will fill the frame. So step back, zoom in, and the people you're recording will feel much less self-conscious. This camera position won't do any favours for sound quality and will increase the likelihood of camera shake, but if it means your videos are spared from having people constantly yelling, "Turn it off!", it's a fair sacrifice.

You still need to respect people's privacy, though. There's no law in the UK against recording people in public places, but it's bad manners to make someone feel scrutinised. This is true for members of the public, and equally so for friends and family. Ignore their feelings and you'll risk resentment every time you pick up your camera. However, be sensitive and they'll slowly get used to being recorded.

PART OF THE PROCESS

Perhaps the best way to make people feel relaxed in front of the camera is to get them involved in the production process. If they're willing participants from the start, they'll be more eager to shrug off their inhibitions.

A home video doesn't have to take the form of a fly-on-the-wall documentary. Why not produce a video postcard to send to distant relatives? Rather than record people milling about, ask them to tell the camera what they've been up to, show their latest school art project, tell a joke – anything. Structuring it as a message for relatives gives a useful framework for your production, and the relatives will probably appreciate it, too.

> "You don't need children to justify childish behaviour. Who says you need to be 10 years old to dress up as SpiderMan?"

When you've run out of family news, consider casting your attention further afield. Involving the kids is a great excuse to be more creative, and you can entertain them and yourself by producing your own TV shows. There are dozens of TV genres that you can try at home. How about a spoof news report or a holidaymakers' travel guide to your local area? You could turn a day in the life of your dog into a nature documentary, complete with David Attenborough-style narration.

Children with a gift for music, acting or dance will love having their talents immortalised on film, ready to be shown in years to come on Before They Were Famous programmes. And if their singing skills don't quite live up to their ambitions, how about letting them mime to their favourite song for a pop video? It's the ideal excuse for trying out all those over-the-top special effects in your video-editing software.

Of course, not everyone has an army of enthusiastic children to call upon. If all this talk of fun projects with the kids is making you feel left out, prepare yourself for the best money-saving tip of all: you don't need children to justify childish behaviour. So what if your Take That tribute video would look a little more convincing if you weren't going grey? And who says you need to be 10 years old to dress up as SpiderMan? Have fun with your video camera, and the enthusiasm you put into creating your videos might shine through to the end result.

30-SECOND WONDERS | The YouTube ultra-mini

In this internet-enabled age, viewers' attention spans are measured in seconds rather than minutes. Do a YouTube search for a particular subject and the chances are you'll be drawn towards the clips that are a few seconds long. After all, if a 30-second clip is a bit of a disappointment, you didn't waste much time watching it.

Many of these video miniatures comprise just a single shot, often with fairly ropey production standards. However, there's no reason not to put as much creativity and attention to detail into a 30-second video as you would for a 10-minute one. Think about the lighting and composition, add some music and you have your very own miniature work of art.

● **Possibly the best clip on YouTube: 44 seconds of a chameleon strutting in time to 50 Cent**

And the best thing about YouTube is that almost any subject is fair game. Party tricks, performing pets, rapping toddlers, snowball fights and comedy sketches are all perfect fodder for grabbing your 30 seconds of fame.

Telling a story

The craft of cinematography is finding the right shots to engage your viewer. To do so, you'll need to plan ahead

Video production is all about telling a story. It might be true or fictional, presented in chronological or non-linear order, but whatever format you choose, it's worth thinking about how to structure it to get your point across, and what kinds of shots will help you do this.

Professional film and video producers nearly always start a scene with an establishing shot. This introduces the location, lead characters and any other key features such as the time of day. Most often, it's a wide shot showing the entire location for the scene, or perhaps an exterior shot such as the outside of a building.

Establishing shots aren't just used in films and TV dramas. Factual programmes use them, too, and they're just as effective in home videos. If your video is set in your back garden, a wide shot of the garden is a good place to start. A holiday in Paris might start with a sweeping view of the city and the Eiffel Tower in the background. A visit to a theme park could begin with a shot of the main entrance, clearly showing the name of the park.

Introducing a location without your key characters can be useful to suggest a break in time between two scenes. Cutting directly from your children in the garden to them in the park can seem jarring. Interspersing it with a shot just of the park not only establishes the new location, but also lets the viewer subliminally accept that some time has passed since the garden scene. Another useful linking device is to show a short clip of people in transit. It may not be the most gripping sight but, like the scene it portrays, it gets you from A to B.

Start a scene with an establishing shot that introduces the location or the main characters

Closing shots are just as important. Big-budget films often use a crane to raise the camera slowly up above the actors, putting a decisive full stop at the end of the film. That's not much use to home video producers, but a similar effect can be achieved with a shot of your lead characters walking into the distance, or simply with a wide shot that mirrors the establishing shot you started with.

There are a few other storytelling techniques worth bearing in mind. Close-ups are typically used to help convey what someone is thinking or feeling, while medium shots reveal the interaction between characters. Before you adjust the zoom on your camera, think about whether it's more interesting to show what your subjects are doing or what they think about it.

Reaction shots are also useful. It's often just as interesting to see someone's face while they're listening as when they're talking, especially towards the end of a sentence as the listener grasps the speaker's point. Instead of darting the camera around to follow a conversation as you would with your eyes, don't be afraid to linger on someone who isn't speaking.

FAKING MULTIPLE CAMERAS

One of the best things about video production is the ability to show multiple angles of the same scene, exploring the space it inhabits and juxtaposing close-ups, medium and wide shots. Doing this is easy if you shoot a scene with multiple cameras or get actors to repeat their performance for each camera position, but less so if you're shooting a home video. It's not impossible to mimic the same techniques at home, though.

● **This shot may be light on action, but it can serve as a useful filler for joining other clips together**

Nearly all events last longer in real life than you'll want to include in your final edit. You can therefore afford to capture multiple angles of the same event and still have more than enough footage to work with. Try to capture a mixture of wide, medium and close-up shots from a variety of angles, looking for interesting juxtapositions between the various people in the frame. When you've found one, record it for a minute or two and then move on. While people remain in roughly the same locations doing the same thing, you can capture footage that can be edited together as if it was shot with multiple cameras.

When shooting the same thing from different angles, it's worth observing the 30-degree rule. This says that two camera angles must be at least 30 degrees apart for them to seem like sufficiently different viewpoints. Anything smaller becomes a jump cut, whereby the similarity between the two viewpoints makes the subject rather than the camera appear to jump from one position to another.

CUTAWAY SHOTS

We said earlier that it's worth making sure there's something happening in every shot, but there are times when a static, uneventful shot can be really useful.

When you're recording a presentation, speech or artistic performance, you won't want to pause recording for fear of missing an important bit. However, you don't want clips where you're wandering around or zooming in and out, as these look amateurish. As a result, your video ends up with just a single view from start to finish, and that's pretty dull to watch.

This is where the cutaway shot comes in. This is simply a cut from one shot to another and then back to the original again. Let's imagine you decide to move to a new position and zoom in a bit. This may take only five seconds, but now you've got five seconds of your feet in the middle of the shot. However, if at some point – perhaps before or after the main event – you capture a shot of the audience, you can use this to mask the unwanted camerawork without interrupting its soundtrack. The same technique is also perfect for cutting down the length of a long scene. Take the first and last few minutes of an hour-long speech, join them together with a cutaway shot and no one need be any the wiser.

The key to these cutaway shots is that they shouldn't show anything that ties them to a specific moment. This allows you to drop them in to the edited video whenever is convenient. An attentive audience or individual works well, but so too can a shot of an object in the room, or even a very wide shot so that the lack of lip sync isn't obvious.

Static shots can also be useful for creating your own menu backgrounds on DVD and Blu-ray discs. Rather than using your editing software's stock animated menus, a view of the wind blowing in the trees or any other simple, nicely composed shot that introduces the scene will give your discs a classy personal touch.

TIP

Whenever you capture a shot, always try to record five seconds of footage before the main action starts and keep rolling for at least five seconds after it has finished. You'll need this breathing space when editing to create a natural flow from one clip to the next.

Composing shots

The best cinematographers treat each frame of video as if it's a work of fine art – and there's no reason why you can't do the same

Even if you're just starting out in video production, it's not too early to get a little groundwork in cinematographic theory. This may sound a little off-putting, but it includes such insights as not wobbling the camera around, so really we're just talking about practical advice for getting the best results with your camera. There are various creative techniques that anyone can try, but first, let's get a few classic errors out of the way.

Don't zoom while shooting

The zoom control is extremely useful for framing shots and playing with perspective, but adjusting it while recording almost always looks amateurish. There are a few exceptions. A very slow zoom from a medium shot to a close-up can be useful for gradually raising the emotion of a clip – think *Mastermind* or a widow recounting her loss. A really fast zoom can be great for spoofing the clichéd camera techniques of 70s cop shows: "Who's that running out of the burning building?" Cue extreme close-up. "Why, it's Detective Hardy, and he's got the baby!" Cut to car driving through cardboard boxes, and so on.

Both of these techniques can be useful, but most home video cameras can't zoom slow or fast enough to pull them off. What you end up with is a camera that zooms indecisively, distracting the viewer. By all means use the zoom to frame your shots, but pause the camera while adjusting the zoom or be sure to leave these sections on the cutting-room floor when you come to edit.

Don't meander constantly

We move our eyes to a different viewpoint more or less frequently depending on what we're doing. It may be every second at a gig or while climbing a tree, every 10 seconds during a conversation or every minute during an

Pull back a little to give your subject space to move and you won't have to follow every movement and make your viewers seasick

● **Simplicity is the key to an eye-catching composition**

argument. When professionals edit video, they tend to mirror this behaviour in the frequency of cuts to different camera angles: a gunfight will be full of cuts but the preceding stand-off will use long, drawn-out shots.

The temptation for many people when they first pick up a video camera is to move it in the same way as they would move their eyes. This kind of camera movement is called panning, as in panoramic. However, darting about every few seconds usually results in unusable footage. It's impossible to pan a camera as quickly as you move your eyes, so the video ends up lolling about like it's chasing a fly around the room.

This isn't just distracting for your audience; it can make them feel physically nauseous. Motion sickness occurs when the forces of motion experienced by your body are at odds with the motion you see with your eyes, which is why you get it in a moving car but not when running. The same thing can happen when you're sitting on a sofa watching a video that's careering all over the place. Besides, even if your viewers manage to keep a lid on their lunch, fast panning results in a wash of motion blur, so there won't be much to look at anyway.

The vast majority of your shots should use a static camera position. This may mean you need to zoom out or step back a little so the subject doesn't wander out of frame, but this is vastly preferable to constantly following his or her every movement with the camera. When panning movement is unavoidable or you want to use it as a creative effect, make it as gentle and smooth as possible.

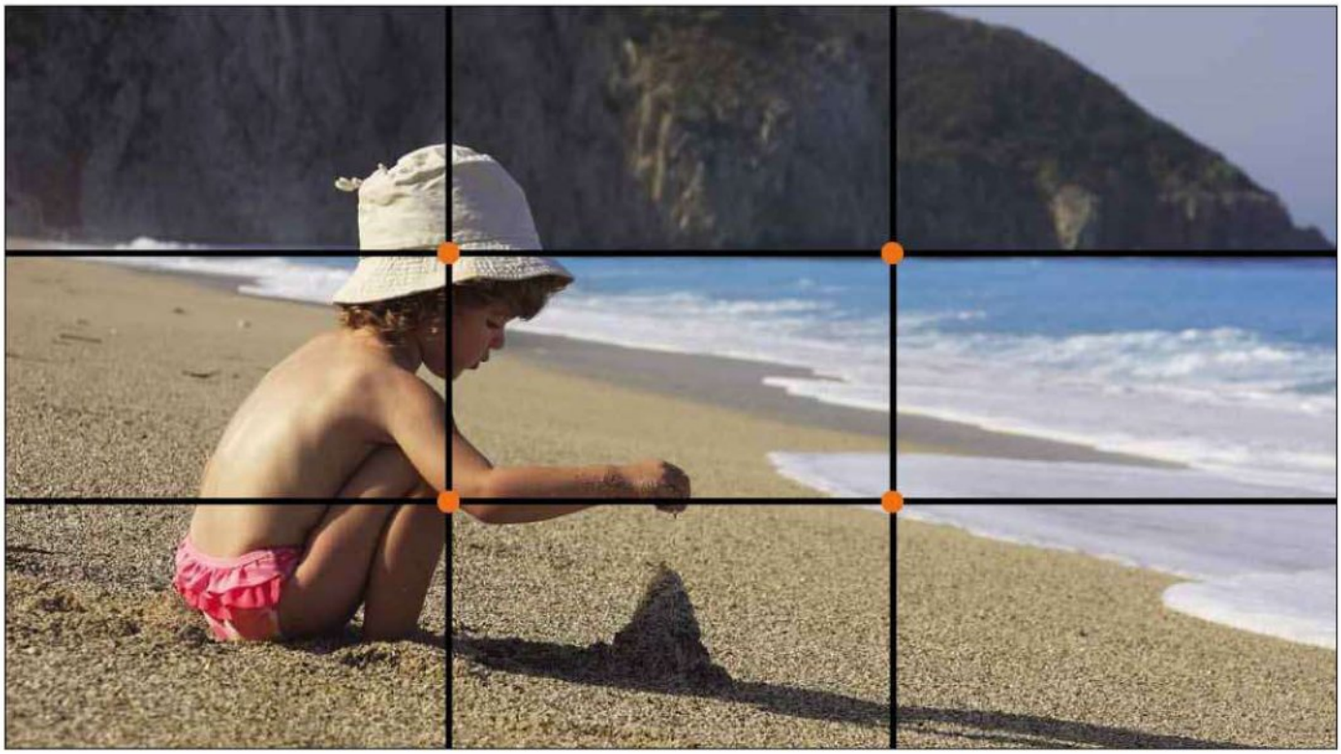
Don't shoot portrait

Now, we've nothing against shooting portraits. It's the portrait camera orientation that's a problem. This may be obvious, but it's a common mistake so it's worth mentioning.

Portrait-shaped photos are fine as you can simply rotate the photo when viewing it. This doesn't work for video, though. You'll have to use the clip with huge black bars either side, crop it so much that you lose more than two-thirds of the detail or rely on your viewers to tilt their heads sideways. In short, don't do it.

Don't just point and shoot

Nearly all home videos are shot from the exact location the camera operator happens to be standing at the time. Making a video is your chance to find interesting ways to see the world, so always try to find the camera position that goes further than that of the casual observer. Get on the same level as your subject, particularly when recording children and pets, and find the best position to show subjects' interaction with others and their environment.



Following the rule of thirds, where key visual elements are positioned one-third of the way from an edge of the frame, helps to give balance and contrast to a shot

ARTISTIC VISIONS

Video captures 3D space and places it within the confines of a two-dimensional rectangle. In this sense, it's a lot like photography and painting, and many of the same conventions apply. You may not aspire to create a visual masterpiece with every frame, but with a few simple theories under your belt you'll be poised to find the best shot in any situation.

Photographers have the luxury of being able to crop a 10-megapixel photo on a PC and still retain lots of detail. However, even Full HD video has only two megapixels per frame, so you won't want to squander detail by cropping on the PC. As such, it's important to frame the subject as best as you can while shooting.

Bold is beautiful

Human beings like to find order and structure in what they see, so simpler, bolder shapes and patterns are more pleasing to the eye. Try to keep backgrounds as simple as possible, either by changing your shooting position or by moving things around before you start shooting. It's particularly important to avoid background objects that look like they're growing out of someone's head. Once your viewers have spotted a plant that looks like rabbit's ears or a shelf that resembles an arrow straight through someone's head, they're not going to be able to concentrate on much else.

Other potential distractions include people or objects that are half in, half out of the frame. Choose between fully in or fully out; anything in between will be distracting. It's fine to crop someone's legs or body for a close-up, of course, or even the top of their head if you're really close, as long as the eyes are in shot.

Rule of thirds

Placing a person's face dead centre doesn't look great for two reasons. One is that there's likely to be a big chunk of wasted space at the top of the frame; it's more interesting to see someone's arms than the air above their head. The other is that although framing any subject dead centre makes no bones about what you want your viewers to look at, the interest falls off uniformly towards the edges of the frame. This leaves the composition looking shapeless.

The rule of thirds decrees that an image is more appealing when key elements are positioned one third of the way from an edge of the frame. Doing so carves up the space into more interesting shapes, giving a sense of contrast, balance or tension to the composition.

Placing the subject's eyes a third of the way down is a good rule of thumb, whether you're going for a full-length shot or a close-up. The rule of thirds works horizontally, too, so try positioning people to the left or right. The same applies for any other strong element of the

composition, whether it's the horizon, a tree or a pile of toy bricks. Vertical and horizontal lines should follow the imaginary lines of the rule of thirds, and people and key objects should ideally be placed at the intersection of these lines.

Leading lines

Not all lines are vertical or horizontal, of course. Diagonal and curved lines can be just as useful for framing a shot artistically. They can guide the viewer's eye like an arrow pointing towards the main focus of your shot. Meanwhile, parallel lines converging in the distance exaggerate the sense of depth, strengthening the illusion that the two-dimensional image is a three-dimensional world. To make the most of this effect, zoom out as much as possible, as this amplifies the sense of perspective in a shot.

It's not just discrete lines such as train tracks and telegraph poles that can lead the viewer's eye into the frame. The edges of a table or someone's arm is just as effective, or even a line that's suggested by a group of objects. A pyramid-shaped composition, as in a triangle that's wide at the bottom, is a classic composition that gives a sense of stability.

Converging diagonal lines exaggerate the sense of perspective in a shot, helping to convey depth and distance

Frames within frames

We like to hang paintings and photos in frames, and TV screens are built into frames, too. The same concept can be applied inside the video itself. You can use foreground elements to frame your subject, giving a bit of variety to the otherwise constant widescreen rectangle that frames the rest of your shots. Obvious examples include doorways, windows, arches and bows of trees, but less obvious objects such as a houseplant, table edge or the back of someone's head and shoulders can also work; it doesn't necessarily have to surround the subject completely.

If your main subject is off to one side, following the rule of thirds, adding a bit of foreground interest at the other side of the frame can give balance to the composition.

Space to move into

Video is all about motion, and this composition tip is particularly pertinent to video production. We've already discussed why it's best to zoom out a little so you can capture moving subjects without constantly having to chase them with the camera. However, there will be times when you'll need to pan the camera to follow moving subjects, or even to walk alongside your subject (we'll look into this further on page 35).

When you're tracking a moving subject, try to stay slightly ahead of the motion so the subject is constantly moving towards the centre of the frame. It's much more interesting to see where someone is heading rather than where he's just come from. A subject with its nose practically touching the edge of the frame will result in a composition with lots of dead space.

The same theory also applies to static subjects. If someone is facing slightly to the left, put him or her on the right half of the frame, facing towards the centre.

Rules? What rules?

Of course, there aren't really any rules when it comes to creativity. The ideas discussed here are just conventions that can set you off on the right track. As your confidence grows, you'll soon develop your own techniques to make your compositions come to life and give a unique style to your productions.

Perhaps the best way to learn is to pick up tips from the professionals. When you're watching TV or a film, look out for shots that use the above techniques, and for shots that deliberately disregard them. A lot of thought goes into the composition of every single frame, particularly in films and commercials, so try to develop a critical eye for how each shot is put together.

Other interesting cases include history documentaries, where the producers don't have a lot of dramatic action to put on the screen. These programmes often have to rely on the artistic skills of the camera operator to hold viewers' interest. When you're producing home videos of relatively sedate subjects, employing the same techniques can elevate your production's visual interest.

Managing light

Recording video is all about capturing light. Control the light and you'll have a tighter command of the look of your videos

So far we've talked about capturing people and objects, but a lens simply captures the light shining from or bouncing off them. When a film looks beautiful, it usually has a lot to do with how it is lit. Of course, home video producers don't have a lighting rig on hand, and although this equipment isn't prohibitively expensive, you'll get some funny looks if you start setting up light stands and umbrellas in the living room. That doesn't mean you can't try to control the available light, though.

Indoors, your main objective is to get as much light as possible on to your subjects. The dim lighting in a typical room usually results in noisy video, as the camera struggles to measure the available light accurately. Switching on extra lights, positioning lamps or getting a little closer to a window can make a big difference. Windows are particularly good sources of light. Not only are they bright, their large expanse creates soft shadows that are more flattering than a point source such as a light bulb.

After dark, you'll have to use artificial light. Usually you'll have to make do with what's available, but bear in mind that a lamp will be four times as bright when you halve its distance to your subject. Get a lamp too close, though, and you'll find it illuminates the nearest side too much, leaving the other side too dark. To avoid this problem, try bouncing light off walls. This lowers the effective brightness of a lamp but it gives softer shadows by turning the wall into an expansive light source.

Backlighting doesn't have to be a problem. Used creatively, it can highlight the edges of people and objects to help them stand out

When there isn't enough light, you'll see speckled patterns of noise across your videos

Outdoors, logic suggests that sunlight would be ideal. However, direct sunlight can have the same effect as a single light bulb, making parts of your subject so bright that the shadows look harsh. This is why shaded areas often give better results than direct sunlight.

Direct sunlight can also cause problems when it shines directly into the lens. The array of splodges and circles that appear in a video or photo when sunlight bounces around inside the lens is called lens flare. It can be used for dramatic effect, and some editing software even simulates it, but most of the time it's unwanted. It's relatively easy to eliminate, though: simply cast a shadow over the lens with your hand.

Backlighting can cause problems, too. Many modern video cameras use face detection to keep faces properly exposed, no matter how bright or dark the background is. Those that don't usually have a backlight function. When a bright background is making your subject appear too dark, hit the backlight button and the camera should rectify itself. Used carefully, backlighting can illuminate the outline of subjects in a flattering way. Try placing a lamp directly behind your subject and point it towards his or her head. Their shadow should eliminate any risk of lens flare, leaving an angelic halo of light around their head.

Keeping it steady

Shaking cameras trash detail and make viewers feel nauseous, but there are ways to move your camera smoothly

Next time you watch a film or television programme, notice how many shots use a static camera position and how many are moving. It may surprise you how rarely the professionals use moving cameras. That's because moving a camera smoothly enough to avoid disorienting the viewer isn't easy.

The biggest single difference between home videos and professional productions isn't the quality of the camera or how well subjects are lit. It's how well the camera moves. Many home videos wander and bump around almost constantly, and it makes it very hard for the viewer to follow what's going on.

Part of the problem comes from the fact that small shakes aren't that noticeable on a camera's LCD screen that measures just a couple of inches across. Play the video on a 32in TV, though, and it's a different matter.

The tiny size and low weight of home video cameras makes the problem worse. If you have a 5kg professional video camera on your shoulder, it takes quite a lot of effort to jiggle it about. For a 250g palm-sized camera, the slightest twitch in your hand will be transferred directly to the lens.

ROLLING FROM A STANDING POSITION

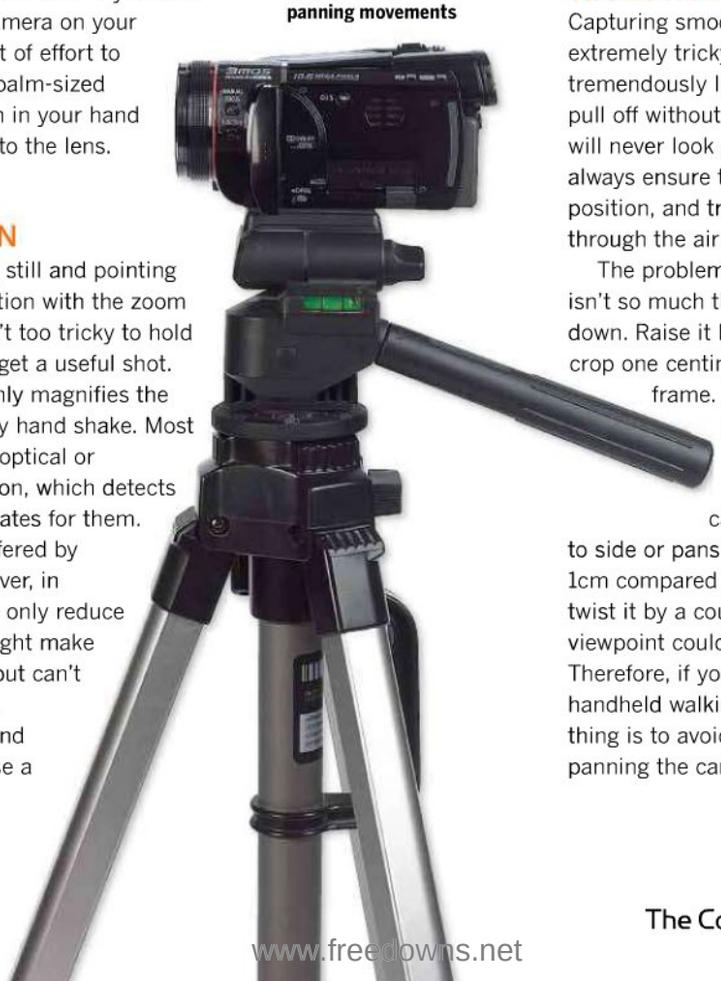
If you're standing or sitting still and pointing the camera in a fixed direction with the zoom at its widest position, it isn't too tricky to hold the camera still enough to get a useful shot. However, zooming in not only magnifies the image, it also magnifies any hand shake. Most video cameras have either optical or electronic image stabilisation, which detects small shakes and compensates for them. These features are often offered by editing software, too. However, in practice these systems can only reduce very small shakes. They might make larger wobbles less jittery but can't eliminate them completely.

If you want to zoom in and keep the camera steady, use a tripod (turn to page 23 for more details). Suddenly, you'll be able to use the long end of your camera's zoom without the image wobbling all over the place. Get one with a pan head – a handle that sticks out of the top of the tripod – and you'll be able to change the camera angle in smooth, controlled gestures.

This kind of movement, known as panning, is the easiest way to add some motion to your camera's view. Be careful not to make the movement too fast, though. Fast pans will be blurred and disorienting, but it's virtually impossible for a pan to be too slow.

It's also worth planning ahead when lining up a panning shot. For the best results, you should frame the second camera angle on the LCD screen, move to the first angle, hit record and make a slow, smooth but decisive pan back to the second angle.

A tripod with a pan handle and fluid head will let you make smooth panning movements



WALK THE WALK

Capturing smooth video while walking is extremely tricky, but done well, it's tremendously liberating. It's not impossible to pull off without extra hardware, but the results will never look great. If you want to give it a go, always ensure that the zoom is at its widest position, and try to make the camera glide through the air as if it's floating in space.

The problem with walking while shooting isn't so much that the camera bumps up and down. Raise it by one centimetre and it will crop one centimetre off the bottom of the frame. In a typical view covering a couple of metres, this won't be particularly noticeable.

The real problem is when the camera tilts back and forth, side to side or pans unintentionally. Tilt the lens by 1cm compared to the back of the camera or twist it by a couple of degrees and the viewpoint could change by as much as a metre. Therefore, if you're aiming for smooth, handheld walking shots, the most important thing is to avoid unintentionally tilting and panning the camera.

● **At around £700 the Steadicam Merlin isn't cheap, but it will give your moving shots a real professional look**

STABILISING ACCESSORIES

Professional Hollywood camera operators get to play with Steadicams, counter-balanced boom arms that iron out all the wobbles and allow them to walk – and even run – while the camera glides along serenely.

In 1976, the original Steadicam revolutionised the movie industry, which previously had to rely on an assortment of train tracks and crane-like boom arms (they're called dolly tracks and jibs) to achieve smooth camera movement. One of the Steadicam's first and most famous uses was in Stanley Kubrick's *The Shining*, where the camera follows Jack Nicholson's son as he rides his tricycle around the corridors of that creepy hotel.

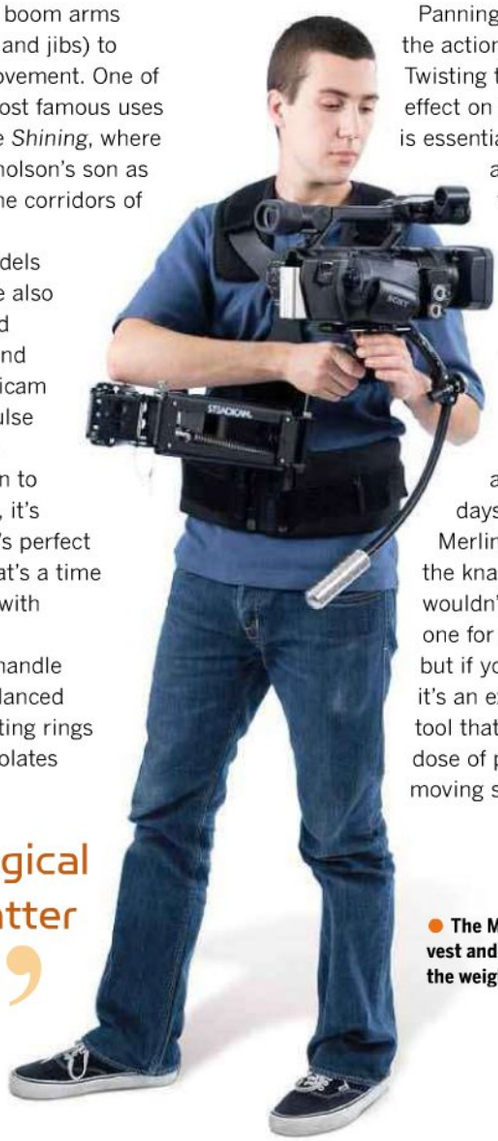
Professional Steadicam models cost megabucks, but the range also includes a model for home and semi-professional use. At around £700 including VAT, the Steadicam Merlin is certainly not an impulse purchase, but if you're serious enough about video production to spend that much on a camera, it's certainly worth considering. It's perfect for shooting weddings, and that's a time that's traditionally associated with blowing vast amounts of cash.

The Merlin is essentially a handle that's attached to a counterbalanced camera stand via a set of pivoting rings called a gimbal. The gimbal isolates any tilting movement in the handle from the plate and camera. In action, it looks almost magical the way it stays perfectly upright no matter how much the operator moves it around. However, it needs to be very finely balanced so that the centre of gravity is just above the gimbal. Otherwise, moving it around makes it swing like a pendulum. Fine-tuning the centre of gravity is fiddly, and may have to be done before each shot.

Panning the camera to follow the action can also be a problem. Twisting the handle has no effect on the camera – twisting is essentially another tilting action, so unwanted twists result in excessive camera shake. Therefore, to pan the camera, the operator must make very delicate nudges to a ring just above the gimbal.

This takes practice, and in the couple of days we spent using the Merlin, we didn't quite get the knack of it. As such, we wouldn't recommend hiring one for a special occasion, but if you can justify the cost, it's an extremely effective tool that will give a massive dose of professionalism to moving shots.

> "The Merlin looks almost magical in the way it stays upright no matter how much you move it around"



● **The Merlin is also available with a vest and articulated arm that takes the weight off your own arms**

Make your own video stabiliser

Here's how to capture silky smooth moving shots with the help of a tripod, some sticky tape and a few old coins

Commercial Steadicam products are all well and good, but if you don't have that kind of money, there are other options. We've tried various DIY techniques and found that the best by far is to modify a tripod with some weights.

Rather than isolating tilting hand movement from the camera, as the Steadicam systems do, this technique simply gives the camera and attached tripod more inertia. Inertia is an object's resistance to moving, changing speed or changing direction. The heavier an object is, the harder it is to move. As a result, small shakes have less effect on heavier objects.

Strapping the camera to a weighted tripod means it's harder to carry around. However, the increased weight doesn't just reduce shakes. It also makes deliberate motion much smoother. Because it's harder work to pan the camera by 90 degrees, for example, there's a tendency to pan more slowly, with a gentle acceleration and deceleration. This is good news for creating attractive moving-camera shots.

It would be easier to carry if the tripod was folded up, but spreading the weight on to each of the three extended legs increases the force needed to twist the camera. It's the same phenomenon that explains why it's harder work to spin a merry-go-round if its riders sit at the edge than if they sit in the middle. Tilting and panning motion creates the most violent shakes, so greater panning inertia reduces camera shake significantly.

One important issue to consider is where to hold the stabiliser. If you hold it from the top it will swing in a pendulum motion every time you start, stop or change direction. However, hold it at its centre of gravity – that is, the place where it would balance on your finger – and this pendulum motion is eliminated.

We used a Jessops TP327 tripod for our homemade stabiliser. It works well because there's a centre shaft with a handle, and it's relatively easy to adjust the weights so the centre of gravity falls just below the handle. Therefore, it's possible to hold the entire camera and tripod by cupping a forefinger just under the base of the handle. This works much better than clasping the centre shaft, as the small point of contact provides some isolation so that small, unintentional twists in the wrist aren't translated to the camera.

The more weight you add to the tripod, the more inertia it has, but too much makes it too heavy to carry. A stack of 40 2p pieces on the two back legs is a sensible compromise, while a smaller stack of 1p pieces is all that is needed on the front leg. This is because the handle sits slightly behind the tripod's centre shaft, so the weights must be a little back-heavy so that the centre of gravity lines up with the handle. The height of the camera can then be adjusted so the centre of gravity is at the right height to avoid pendulum motion.

This may all sound quite fiddly, but the whole process should take no more than 30 minutes, and the results are well worth it.

Adding weights to the legs of a tripod gives it more inertia and stops hand shakes being transferred to the lens

Hold the tripod at its centre of gravity and it should stay perfectly upright no matter how quickly you move it

CAMERA TECHNIQUES

Modern video cameras are bristling with controls and menus and can leave you not knowing where to start. You'll get a lot of mileage from just the record and zoom buttons, but there comes a time when those other controls really boost the quality of your videos. From adjusting exposure and white balance to making the most of your soundtrack, we'll help you locate the controls that really matter and show you how best to use them.

IN THIS CHAPTER

Understanding your camera's controls

Get to know your cameras buttons and menu options, find out which ones really matter and which ones you can safely ignore

Video cameras aimed at home users are usually incredibly simple to operate. A power switch, a record-pause button and a zoom control are often all you need to get started, and possibly all you'll ever need.

However, the chances are that at some point you'll need to delve a little deeper, and it may be worth adjusting a couple of settings when you first get your camera. Here's a rundown of the key features to look out for.

OPTIMISING QUALITY

Tape-based cameras' recording quality is usually fixed, but other types of camera often have a range of quality settings. These don't necessarily record more or fewer pixels; more often, they vary how much data is used to describe those pixels. As we saw in Chapter 1, video cameras use complex data compression to reduce the raw video signal to manageable file sizes. Quality settings let you vary how much data is used to record each second of video. A higher setting improves picture quality, particularly in scenes with lots of detail or fast motion, but means your camera and your PC's hard disk will be able to store less video.

As a general rule, we recommend using the top-quality setting, especially as storage is so cheap these days. A typical standard-definition camera records at up to 8Mbit/s, so an 8GB SDHC card will hold 128 minutes of top-quality video. AVCHD cameras can record at up to

24Mbit/s, storing 43 minutes on an 8GB card, although many models are limited to 16Mbit/s, giving 64 minutes of video. If you need a longer running time and can't afford more memory cards, test the camera's lower-quality settings to make sure you're happy with them before you shoot an important event. Hard disk-based cameras provide hours of storage so there's little reason not to use the top-quality setting. Just remember to transfer footage to the PC regularly so you have plenty of free space.

Another quality setting included on some HD cameras is an option to record interlaced or progressive-scan video. Progressive scan uses a slower frame rate that makes motion less smooth, but because films are progressive scan, this is often seen as positive as it gives video a film-like quality. Progressive scan has other benefits, too. Turn to page 12 for a full explanation, and experiment with the options to find your preference. In Panasonic's AVCHD cameras, progressive scan is referred to as Digital Cinema. Samsung calls it 1080/25p, while on Canon's cameras it's labelled PF25.

One option that isn't strictly a quality setting but does directly affect it is image stabilisation. Optical image stabilisation uses gyroscopic sensors to detect and counteract camera shake. It won't turn your camera into a Steadicam (see page 36) but it can make the difference between usable and unusable video when shooting handheld shots at the long end of the zoom. If your camera has optical image stabilisation, make sure it's switched on.

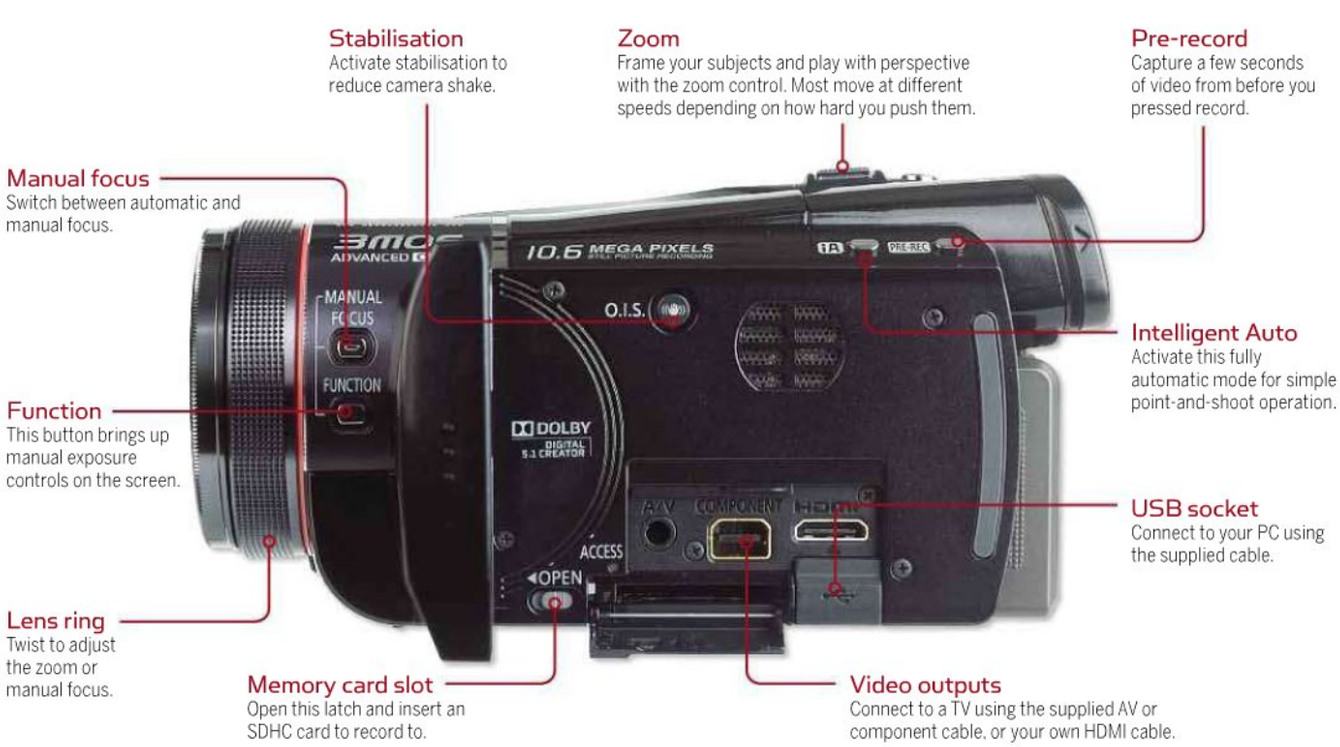
Cameras that lack this feature usually have electronic stabilisation, which uses digital processing to achieve the same effect. These tend not to be as successful as the optical kind, although they're still worth having. However, they may come at the cost of image sharpness, so experiment with the options and activate electronic stabilisation only when you need it.

ZOOM FOR MANOEUVRE

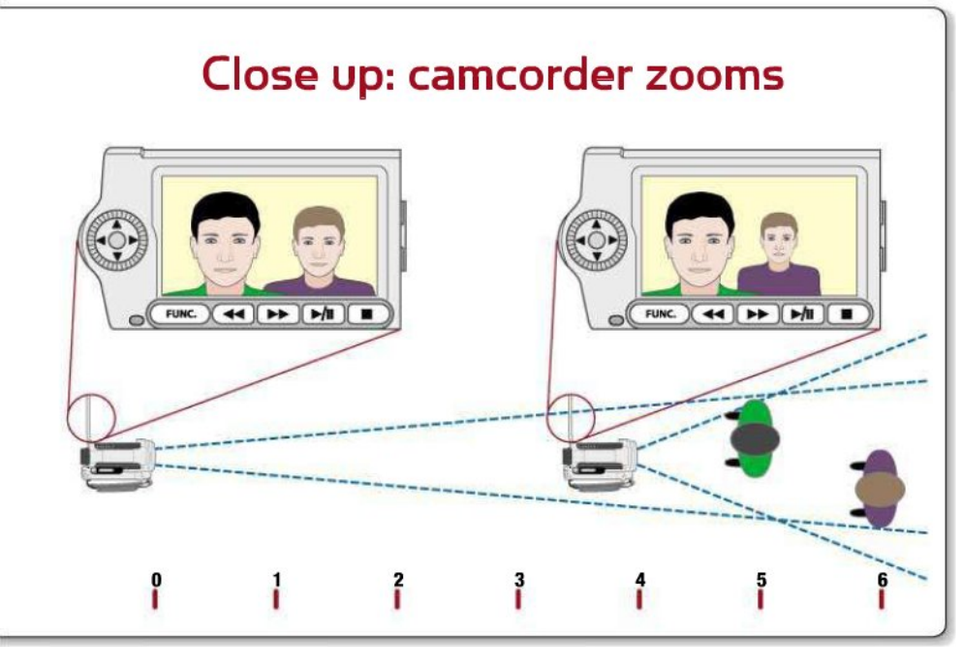
You're probably familiar with the zoom control: it allows you to get in close to a subject without actually moving any closer. Video cameras often have both optical and digital zooms, and it's only the optical one that's of any use. Whereas optical zoom uses the lens to magnify the image before it hits the sensor, digital zoom magnifies it after it has been captured, adding extra detail merely by guesswork. It's therefore best to disable the digital zoom in the camera's menu options and forget about it.

Zoom also has another use: it changes the sense of perspective and the relative sizes of objects. Imagine you've framed two people's faces. One is standing one metre away from you, while the other is two metres away. From

> "Digital zoom adds extra detail merely by guesswork, so it's best to disable it"



Close up: camcorder zooms



● **Use the zoom control to change the relative sizes of near and far subjects**

your camera position, the nearer person will look twice as big as the further one. Of course, your brain intrinsically understands about perspective and knows at a glance that one is nearer, rather than bigger. This will be less obvious when viewed through the lens, though.

Step back four metres and zoom in so you have roughly the same shot framed in the LCD screen. Now the two people will be five and six metres away, so the nearer one will be only 20 per cent bigger than the further one.

Zooming out and moving closer increases the difference in size between near and far objects, exaggerating the sense of perspective. Zooming in does the opposite, so the zoom control is a creative as well as a practical tool.

For a fun effect, try recording as you move the camera towards a subject and zoom out so that it stays the same size but the background shrinks. This technique, known as a contra-zoom, was famously used in Alfred Hitchcock's *Vertigo* and Steven Spielberg's *Jaws*, and gives a wonderfully warped sense of reality.

SCENE MODES AND DIGITAL EFFECTS

We'll be taking a look at exposure, focus, white balance and audio options over the next few pages, but most cameras include an intermediate level of control between fully automatic and fully manual settings. Scene modes such as Beach, Snow or Fireworks let the camera choose more intelligent automatic settings. For example, a snow scene is predominantly white, and this might confuse the camera into thinking that everything is over-exposed. Without a Snow scene mode, it would reduce the brightness so the snow would appear as a sludgy grey. Many cameras also include night shot modes, which we'll look at in more detail on page 48.

> "The zoom control is a creative as well as a practical tool"

Face detection is also beginning to appear in video cameras. This identifies people's faces and makes sure they're properly exposed and sharply focused, without being distracted by the rest of the frame. Cameras that don't offer face detection will probably have a backlight compensation option. Select this whenever a bright background such as a window is making your main subject appear too dark.

Your camera may also include creative effects such as black and white, sepia, pastel colours, soft skin tones and negative. These can be fun, but bear in mind that you can nearly always achieve better, more controlled results in video-editing software. Adding these effects in software also gives you the option to change your mind. If you record the footage in black and white, there's no way to restore colour later. The only significant exception is slow motion, which actually records more frames than the standard recording modes. As such, this is one effect that is worth applying in the camera, if yours supports it.

PLAYBACK ON YOUR TV

Before you get around to uploading your footage to your PC for editing, you might want to watch it on your TV. Pretty much all video cameras have an AV output and come with a cable that plugs into your TV's composite video and stereo audio inputs – the yellow, white and red phono sockets that resemble those on the back of hi-fis. If your TV doesn't have these sockets, you can get a SCART adaptor for a few pounds.

To watch HD video in all its glory, you'll need an HD-ready TV connected via either component or HDMI. Component requires three video and two audio connections, whereas HDMI carries everything down a single cable, with less chance of interference. You'll probably have to buy an HDMI cable, though, as few cameras come with one. Most domestic HD cameras have a Mini HDMI socket, in which case you'll need a Mini HDMI-to-HDMI cable.

The last thing to check is the resolution at which your camera is sending video out. Nearly all HD cameras record at 1080i (see page 12) and all HD-Ready TVs support this resolution, but you may have to select this in the camera's HDMI or component output options.

Exposure

Controlling how much light hits your camera's sensor will unleash an extra dimension of creativity for your video productions

Our eyes are incredibly versatile. We can see by the light of the stars, in the midday sun and in any lighting conditions in between. We can also see a wide range of brightness at the same time, such as when standing in a room looking through a window to the sunlit street.

Video cameras aren't nearly as adept at observing light. They struggle to measure it accurately when there's not much of it, and can take in only a narrow band of brightness at any one time. This band, known as the dynamic range, is the range between the darkest and brightest subject a camera's sensor can measure at any given exposure setting. Any parts of the image that are too bright get recorded as solid white, while the parts that are too dark are recorded as solid or noisy black.

This means video cameras have to adjust how much light they capture in order to produce a meaningful picture without big blocks of solid black or white. They have three means of doing this: aperture, shutter speed and gain.

Aperture

This is sometimes known as the iris because it works in the same way as an eye. The aperture of a lens is a hole that varies in size to let different amounts of light through. The bigger the hole, the more light reaches the sensor.

The effective size of the aperture depends not just on its diameter but also on the size of the lens, so apertures are quoted in a slightly mysterious-looking f/2 format. Smaller f-numbers mean a bigger aperture, so an f/2 aperture lets in lots of light and an f/16 aperture lets in very little.

The aperture also has an interesting side effect. When it's wide open, the lens has a narrow depth of field. This means that anything that's nearer or further away from the camera than the main subject will be blurred. A narrow aperture produces a wide depth of field, keeping the foreground and background more in focus. Both techniques can be useful in different circumstances. A wide aperture and narrow depth of field are great if you want to blur out the background to keep the viewer's attention on your subject. A small aperture and large depth of field is better when shooting large groups of people or objects, as this keeps everything more or less in focus.

A wide aperture (top) captures more light and gives a narrow depth of field, making the background and foreground more blurred

Shutter speed

The shutter speed is how long the camera takes to capture a frame of video. In the UK, video is recorded at 25 frames per second (fps), although interlacing means it's effectively 50fps (see page 12 for more details). Because the camera's sensor has to capture an image 50 times each second, the longest time it has to capture each one is 1/50 seconds. This gives us our slowest possible shutter speed. It can just

as easily use a faster shutter speed, though. Panasonic's video cameras go up to 1/8,000 seconds per frame. By doing so, they disregard over 99 per cent of the light entering the lens, but in very bright conditions, the remaining 0.6 per cent is all that's needed to capture a well-exposed image.

Slower shutter speeds produce motion blur, where any movement of the subject or camera turns into a blurred streak – the longer the shutter is open, the longer the streak. Fast shutter speeds, however, capture light for a fraction of a second, so moving subjects look sharper. This has its benefits, such as creating sharp freeze frames, but more often it has a negative effect. Video is just a sequence of static images played quickly enough to look like a moving image. Motion blur helps to merge each frame into the next. Instead of seeing a sharp object at discrete locations as it moves across the screen, instead we see a smudged object traversing the space without any gaps in its position from frame to frame.

Gain

In any video camera there is a limit to how wide the aperture and how long the shutter speed can be. In low light, they won't be enough to capture well-exposed colours, and the video will be too dark. This is where gain comes into play. Gain simply takes a gloomy image and amplifies the brightness. The effect is exactly the same as ISO speed in digital and film cameras. It also has the same side effect: noise.

Image noise is a wash of random errors at each pixel, and looks like a speckled graininess. It's more of a problem in low light because gain boosts noise as well as the captured image. Most digital video cameras include complex noise-reduction technology, which attempts to suppress noise. However, this also tends to suppress subtle textures. Therefore, footage shot in low light is usually noisy, and it often exhibits less fine details than brightly lit shots.

SPOT METERING

When your camera is set to automatic exposure, it measures the light entering the lens and adjusts the aperture, shutter speed and gain to produce a balanced image. However, the image isn't likely to be a

> "Spot metering works a treat: simply touch the part of the frame that you're interested in"

A fast shutter speed (above) makes moving subjects appear sharper. A slower shutter speed (right) encourages motion blur, which smudges details but makes motion look smoother

consistent brightness all the way across the frame – it would look pretty dull if it were. Therefore, the camera must take an average light measurement and adjust settings so this average brightness is recorded as a mid-grey. This often works well, but there are plenty of times when it's less than ideal. One example we have already discussed is snow scenes, where the white snow raises the average brightness significantly, so the camera over-compensates and makes everything too dark.

Spot metering lets you tell the camera to be more specific about what part of the image it should measure. Metering is the technical name for measuring the light in order to optimise the exposure settings, and spot metering does so for just a small part of the frame.

Spot metering is common on digital stills cameras but it has only started to become available on home video cameras since the introduction of touchscreens. With these screens' help, it works a treat. Activate spot metering in the menu, touch the part of the frame that you're interested in and the camera will adjust its exposure just for that area, ignoring the rest of the frame.

This feature is common on Sony's and Panasonic's cameras, but they implement it differently. On Sony's cameras, once you've touched the screen and the spot meter reading it taken, the exposure is locked until you touch it again. Panasonic's touchscreen cameras offer a tracking spot metering mode that follows an object around the frame as it or the camera moves. It's the same principle as face detection – which is itself a form of spot metering – but works for any distinctive object rather than just faces. However, if it loses track of the object it's tracking, it reverts back to automatic exposure.

MANUAL EXPOSURE

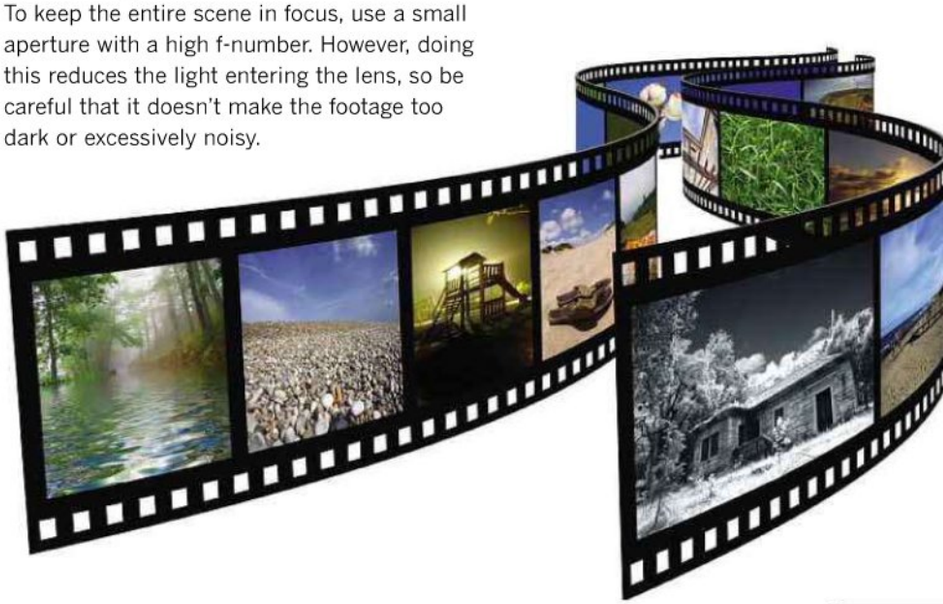
Many video cameras include an option to switch off metering altogether and set the exposure manually. There are a number of reasons why you might want to do this. Sometimes the automatic settings will be thrown by tricky lighting conditions, and backlight compensation, face detection or spot metering won't be enough to remedy the situation. Another use for manual exposure is when you deliberately want to under- or over-expose a shot for dramatic effect, perhaps to convey the harsh light of the midday sun or the gloominess of a dense forest.

● Spot metering lets you identify the most important part of the image so the camera makes sure it's properly exposed, regardless of what else is in shot

Possibly the most useful role for manual exposure is to achieve consistency throughout the length of a shot. On automatic settings, panning the camera around a room may cause the exposure to go up and down. That's useful if the light changes dramatically mid-shot but less so if the camera just points at a light-coloured wall and then a dark sofa, for instance. In these situations, it's worth switching to manual exposure to lock the exposure.

Manual exposure may also let you play with the motion-blur and depth-of-field effects described on pages 43 and 44. However, this depends on whether your camera provides direct control over the shutter speed and aperture. Panasonic's video cameras include these controls, whereas Sony's home video cameras just have a single control for adjusting the exposure.

To encourage natural-looking motion blur, set the shutter speed to 1/50s (or 1/25s for progressive scan). To blur out the background and focus the viewer's attention on your main subject, lock the aperture to its widest setting, remembering that lower f-numbers are wider. To keep the entire scene in focus, use a small aperture with a high f-number. However, doing this reduces the light entering the lens, so be careful that it doesn't make the footage too dark or excessively noisy.



In focus

Sharp focus is more important than ever with the rise of HD video, but it's not always easy. Here are some pointers

In a professional film crew, the focus puller's sole task is to measure the distance between the camera and the subject and adjust the focus. Fortunately, home video cameras have a virtual focus puller built in. These autofocus systems are pretty smart, but they're not infallible, and there are times when you might have to take matters into your own hands. Here we'll explain how to do just that.

Spot focus

Most autofocus modes assume that the most important part of the image – and therefore the part you want to be in focus – is in the centre of the frame. However, as we saw in the previous chapter, there are lots of times when you're likely to want to place your main subject off-centre.

If your camera supports it, spot focus mode can be extremely useful for specifying what the camera should focus on. It's common on video cameras with touchscreens, and simply requires you to touch the part of the image that you want to be in focus. Some spot focus modes can even follow the subject around the frame, so you're not limited to fixed camera positions and static subjects.

● Some cameras show an enlarged portion of the image to make manual focus adjustment easier

Manual focus

If you're using a static camera position and your subject isn't moving much, it's worth considering switching to manual focus. Not only does this let you specify what part of the frame is in focus, but it also eliminates any chance of focus hunting – that annoying habit of video cameras' autofocus systems to suddenly get confused and sweep through the entire focus range, trying to relocate the subject.

Sadly, few home video cameras make manual focus adjustment easy. One hurdle is that their LCD screens rarely have sufficient detail to see when the picture is in sharp focus. These screens typically have 200,000 pixels, which is half as many as standard-definition video and a tenth as many as Full HD.

Some cameras show an enlarged portion of the image to make manual focus easier, but even this can still feel like fumbling around in the dark. However, you can make life easier by zooming right in to focus and then zooming out again to shoot; most cameras retain consistent focus regardless of zoom position.

Another challenge is trying to adjust focus by prodding at buttons. It's easier to focus manually with a dial or lens ring, but only upmarket video cameras tend to include these features. The best way to achieve sharp manual focus is to use the spot focus option first and then switch to manual mode to lock it.

Manual focus for moving cameras and subjects is pretty much impossible on home video cameras, as the controls are too fiddly to adjust as you go along. Your best bet is to use a narrow aperture if your camera lets you set this manually. This widens the depth of field, keeping a greater range of distances in focus (see page 43 for more details).

White balance

Capturing natural colours in different lighting conditions can be tricky, but your camera's white balance controls can help

Different light sources emit varying shades of white. Midday sunlight produces a pure white, but overcast weather can give a slightly blue tint, light bulbs have a hint of yellow and fluorescent lights have a green hue. Our eyes are so used to seeing these colour tints that we barely notice them. However, a video camera is less forgiving. If these tints go unchecked, they can spoil the colours in your video footage.

Fortunately, modern digital video cameras are extremely adept at compensating for different light sources. Within a few seconds, they can often detect the colour tint – or temperature, as it's known – and counteract it by processing colours digitally. It's the equivalent of placing a colour filter in front of the lens, using a blue filter to eliminate a yellow tint, purple to eliminate green and so on.

It isn't always easy for the camera to detect the colour temperature of the light, though. It only has the light entering the lens to go on, and has no way of distinguishing between a yellow light source and lots of yellow objects under a pure white light.

Most of the time the automatic mode works fine, but if you find that your footage has a colour cast, experiment with your camera's white balance presets. When you select a preset, you're telling the camera what type of light you're shooting in so it can adjust its colour filter accordingly rather than making an educated guess. Some cameras have just a couple of presets, such as Indoor and Outdoor, but most have five or six including tungsten, fluorescent, daylight and cloudy. Tungsten light bulbs are the old-fashioned kind, while energy-saving bulbs are fluorescent.

● **If automatic settings produce unnatural colours (above), the manual white balance controls can help (right)**

Manual white balance

You'll get the best possible results by using the manual white balance setting. This usually appears among the list of white balance presets. It's sometimes referred to as Manual WB or One Push, but often it's represented by an icon of a block above two triangles. Manual white balance lets you calibrate the colour temperature by pointing the camera at a white or grey object and pressing a button to measure that colour. The camera will then adjust its digital filter to remove any colour cast. Doing so guarantees natural colours in pretty much any lighting condition.

The exception is when shooting in a mixture of light sources – perhaps light from the window combined with a light bulb. In these situations there's no way for the camera to compensate for both temperatures at the same time. If colours look skewed, you may have to close the curtains or switch off the light. There is another option, though. It may be quite pleasant to have a hint of warmth from the light bulb – it's certainly better than a hint of blue from the sky. So in this situation you could tune the white balance for daylight and live with the warmer-coloured light from the bulb.

Shooting in the dark

How do you record light when there isn't any? Your video camera may have a solution

On page 43 we looked at the different ways video cameras adjust their exposure for varying light conditions. However, there's a limit to how far the aperture, shutter speed and gain can go in normal shooting conditions.

Video cameras often boast about their ability to record in low light as a measurement quoted in lux. Lux is the scientific unit of luminance, with 500 lux being the brightness of an office, 50 lux a typical living room and ¼ lux a full moon. However, figures quoted in specifications are rarely achieved by normal means.

Slow shutter speed

The easiest strategy for a video camera is to lower its shutter speed. Video cameras normally capture 50 frames per second, so each frame can't be recorded for any longer than $^1/_{50}$ seconds because it has to get on with the next one. However, if you're willing to sacrifice motion smoothness, the camera can take more time capturing each frame. Capture just five frames per second, and each one has ten times more light to measure. However, this produces extremely jerky, blurred motion.

This technique is known by Panasonic as Colour Night View, by Sony as Color Slow Shutter, by Samsung as Super C.Nite and by Canon as Slow Shutter. It's OK for capturing a cityscape by night with a tripod, perhaps, but in general it's best avoided.

An infrared lamp lets you shoot in pitch darkness but can't record a full-colour image. Still, the surreal pictures it produces have their uses

Video lamps

A more pro-active solution is a lamp built into the camera. Recent advances in white LED technology mean these lamps are more powerful and consume much less power than they did previously.

These built-in lamps still have a range of only a couple of metres and the quality of light is hardly flattering, but they are fine for the occasional casual clip.

Infrared lamps

Infrared lamps use hardly any power at all and can illuminate a room for the camera to see while being invisible to the human eye. The resulting image is monochromatic, and most cameras record it as shades of green, reminiscent of CCTV footage.

However, you could convert this to black and white in your editing software. The picture is often grainy and tends to look quite surreal, but if you're shooting your own horror film it couldn't be better.

External lamps

If your camera's built-in lamp can't cut it, you might want to consider an external video lamp. You'll need an accessory shoe on your camera to attach it, so make sure the lamp fits your camera's shoe.

These camera-mounted lamps are brighter than built-in ones, but the light they produce is just as unflattering. Because of their position just above the lens, there's no variation of light and shade on subjects, so everything looks flat. You'll get more interesting results moving the lamp to the side, but in that case you may as well just use a torch.

Ultimately, unless you're aiming for a creepy effect, you'll always get better results by switching on the main lights.

Recording sound

Video isn't just about moving pictures. Make sure the soundtrack gets some tender loving care, too

It's easy to overlook sound when making videos, but it could be argued that it's even more important than the picture. Speech is an essential part of many video productions, and it's more interesting to hear someone speak than watch their mouth flapping up and down.

Fortunately, home video cameras don't expect you to worry too much about the sound. The volume is adjusted automatically to record at a reasonable level. Even so, there are various ways that you can optimise sound quality.

When you're holding your camera, your mouth is just a few centimetres from the microphone. Other people will probably be a few metres away. Sound gets four times weaker when you double the distance it travels, so your voice might be 50 times louder than anyone else's. Since you won't be visible in the shot, you'll sound as if you're booming down from the heavens. Our advice is to avoid speaking when holding the camera. If you want to add a narration, do it later when you come to edit.

Some video cameras lack any audio controls whatsoever, but yours may have a manual volume control. This deactivates the automatic level adjustment, which can be useful to avoid unwanted fluctuations. For example, if you're recording speech, setting the volume manually will prevent it increasing automatically in the gaps between people speaking, which would accentuate the general background hubbub.

A lapel microphone allows you to record voices up close and keep the camera a reasonable distance away

However, you'll need to set the volume carefully to prevent it distorting or becoming too quiet.

Other audio options may include a zoom microphone function, which focuses the microphone on sounds emanating from directly in front of it, and wind cut, which reduces the noise caused by wind blowing into the microphone. Both of these options are useful, but they usually come at the expense of overall sound quality, so experiment with them to see if they're worth using. This will be easy if your camera has a headphone socket. Otherwise, record short clips and play them back on your TV.

External microphones usually provide clearer audio and suppress wind noise better

External microphones

You'll often get the best results by using an external microphone. Not all cameras accept them, though: you'll need either an accessory shoe or a microphone socket. An accessory shoe is a clip on the top of the camera to connect a microphone or lamp. Some shoes are passive, in that they just hold accessories in place, in which case you'll also need a microphone socket. These resemble headphone sockets and can be used with handheld microphones as well as shoe-mounted ones.

A shoe-mounted microphone should offer better-quality sound than the camera's built-in microphone. However, for noisy environments or quiet subjects, your best bet is to get the microphone as close as possible to the subject. A handheld, lavalier (lapel) or wireless microphone will let you record voices up close while the camera stays a polite distance away, giving a clearer tone with less background noise. See page 23 for our recommendations.

If your camera has a microphone input, it hopefully has a headphone output, too. Use it to monitor your external microphone, making sure it's working properly and finding the best position for a healthy volume and clear tone.

KITTING OUT YOUR PC

Nothing tests a PC's mettle like a video-editing project, but with today's multi-gigahertz processors it no longer has to feel like wading through treacle. That pot of treacle is never far away, though. Getting the right PC setup is essential if you're going to enjoy making videos.

It's as much about choosing the right software as ensuring that your hardware is up to scratch. No low-cost editor does everything perfectly, but our round-up will help you find your best match.

IN THIS CHAPTER

Prepare your PC for video-editing

Manipulating video is hard work for a PC. Here we show you what each component does and where you might need to upgrade

Modern PCs are incredibly powerful. They can store the entire works of Shakespeare 100,000 times over and open a copy in about five seconds. Videos are much more demanding than words, though. The space it takes to store Shakespeare's works will hold only a single frame of uncompressed HD video. With 25 frames arriving every second, plus sound, special effects, animated titles and all sorts of other tricks, your PC has its work cut out.

If your computer is less than three years old it should have no problem handling standard-definition (SD) footage. Even the latest, fastest PCs can struggle with high-definition (HD), but there are workarounds (we'll look at these on page 58).

So let's take a look at which bits do what. Where relevant, we'll recommend the minimum you'll need for SD and HD, and the ideal specs you should aim for when upgrading or buying a new PC.

Internal components

Processor

It's essential that your editing software can show smooth previews in its playback window. If your processor is too slow, playback will stumble, making it hard to assess your work in progress. A really fast processor will let you apply lots of effects and overlay clips on top of each other and still provide smooth previews.
Minimum for SD: Pentium 4 or Athlon XP
Minimum for HD: Core 2 Duo or Athlon X2
Ideal: Core 2 Quad or Phenom II X4

Memory

Also known as RAM, this is the super-fast storage that's used by the software currently running on the PC. The operating system (such as Windows Vista) requires a big chunk, and video-editing software requires even more.
Minimum for SD: 1GB
Minimum for HD: 2GB
Ideal: 4GB

Hard disk

Video takes up lots of space on your hard disk. Depending on the camera, an hour of video uses up to 11GB. You'll need up to 5GB for your editing software, a further 4.5GB to create a DVD-Video and 25GB for a Blu-ray disc.
Minimum for SD: 50GB free space
Minimum for HD: 100GB free space
Ideal: 1TB (1,000GB) dedicated drive

Graphics card

Video-editing software rarely has special graphics card requirements, but for Blu-ray playback software you'll need a card with 256MB memory and support for HDCP, the copy protection used on Blu-ray discs. Search Google for 'CyberLink BD Advisor' and use this utility to check whether your card is compatible.
Minimum for editing: Any DirectX 9 or 10 card
Minimum for HD playback: 256MB HDCP-compatible graphics card

Operating system

All the software we'll be recommending runs on Windows XP or Windows Vista.

1) DVD or Blu-ray writer

A DVD writer is essential for burning DVD-Videos for playback in the living room and for backups. If you have an HD camera, consider a Blu-ray writer for burning your own Blu-ray discs. Make sure you get one that can write as well as read Blu-ray discs.

2) FireWire and USB ports

Most video cameras connect to the PC via USB, so you simply plug it in with the supplied cable. Tape-based digital video cameras connect using FireWire, sometimes known as IEEE 1394. If your PC doesn't have a FireWire socket, a FireWire PCI card (or ExpressCard for laptops) costs around £30 from computer retailers. You'll need a 6-pin-to-4-pin FireWire cable, too.

3) Monitor

Video-editing software consists of lots of panels, so a big, high-resolution screen gives you more room to work. Even better is to have two screens, with one dedicated to showing the video preview. Bear in mind that an HDTV can be used as a second monitor. For Blu-ray playback on your PC monitor, get one with a 1,920x1,080 or higher resolution and make sure it supports HDCP copy protection.
Minimum: 17in LCD
Ideal: Dual 24in LCDs

4) Video-editing software

Your video-editing software is where everything comes together. See page 56 to find out more about its role.

5) Speakers

Sound is as important as pictures in video production, so make sure you've got decent speakers or headphones; laptop and monitor-mounted speakers won't cut it.

6) Video-playback software

Windows Media Player can play most file types, but not all. To play DVDs, Blu-ray discs or footage from an AVCHD camera, consider CyberLink's PowerDVD Ultra or Corel's WinDVD Plus Blu-ray.

Installing a new hard disk

If you're short of disk space for your video collection, don't worry: fitting a new hard disk in your PC is simple

1) Fit hard disk into a bay

To fit a hard disk, you'll need an empty 3½in drive bay. Be careful not to use one of the external bays, which have a cutout on the front of the case, as these are designed for memory card readers and floppy disk drives.

If your case has drive rails or screwless fittings, you'll need to read the case's manual for instructions on how to fit the drives. For other cases, slide the hard disk into a spare bay until the screw holes in the side of the drive line up with the holes in the bay. The disk should be secured with four screws: two either side of the case. Suitable screws should have been provided with the hard disk or PC.

2) Plug SATA cables into hard disk

Locate the SATA power connector on the hard disk and on the power supply. Plug the correct connector from your power supply into the back of your hard disk. It goes in only one way and clicks when it's connected. SATA uses a simple and thin connector to carry data. Plug a SATA cable gently into the rear of the hard disk. It will plug in only one way and will click when it's properly connected.

3) Plug in SATA data cable

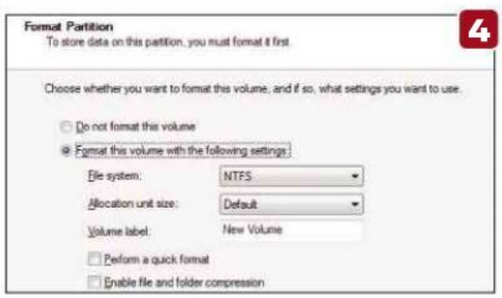
Next, you need to find a spare SATA port on your motherboard. These are usually located at the bottom-right of the board and are numbered. The lower the number, the higher up the boot chain your hard disk is. Therefore, make sure your new drive is plugged in to a higher-numbered port than your existing drive.

Check the motherboard's manual to ensure that all the ports do the same thing; some boards have ports reserved for RAID.

4) Format hard disk

When Windows starts, you need to prepare the disk for use. Right-click on Computer (My Computer in XP) from the Start menu and select Manage. Double-click on Storage and then Disk Management.

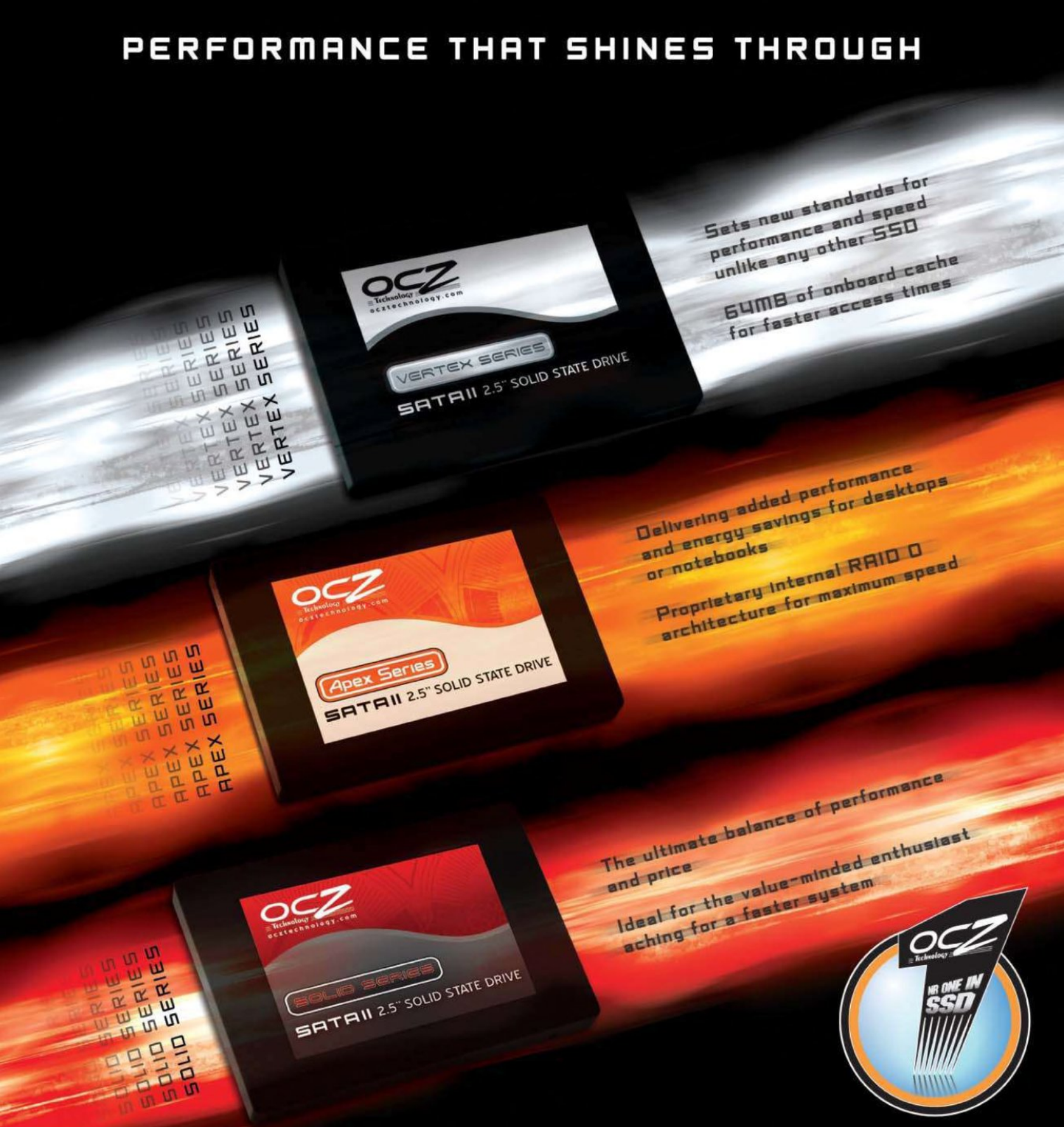
At the bottom of the screen you'll see a list of disks. Your new disk (probably Disk 1) will have 'Unallocated' written in a bar. Right-click on this bar and select New Simple Volume. Click Next until you get to the Format screen, type in a name for your disk and click Next, then Finish. Your disk will take a few minutes to format before you can use it in the normal way.



TIP

If your computer won't boot after you install you new hard disk, try switching the SATA cables of your hard disks.

PERFORMANCE THAT SHINES THROUGH



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Inside a video-editing software package

Your editing software needs lots of strings to its bow to do its job. Here are the key areas you can expect it to cover

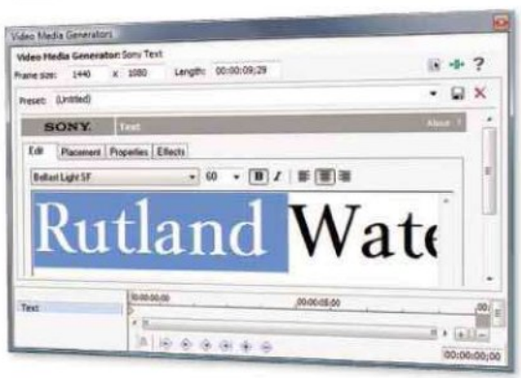
Editing software is the nerve centre of the video-production process. It's here that you choose, trim and order the best moments from your raw footage, combine them with photos and music, apply effects, transitions and text and export the results. With so many tasks, it's hardly surprising that no single editor that excels at everything. That's why it's so important to choose the package that matches your needs. Over the next four pages we'll take a look at the strengths and weaknesses of the leading software packages, but first we'll examine a typical editing package in depth.

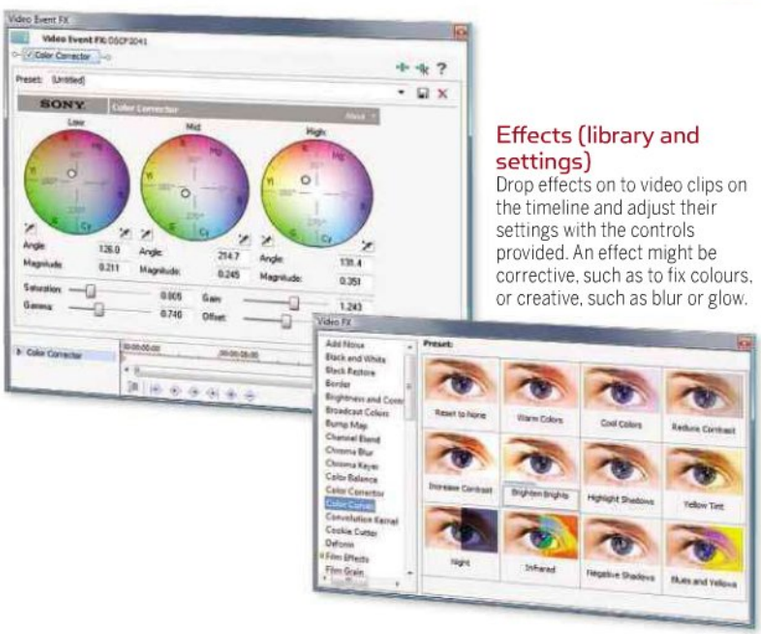
Capture

The first stage in any editing project is to transfer the footage from your camcorder to the PC's hard disk.

Titles

Here you add title sequences, captions, closing credits and more. Most software lets you animate these titles for a more dramatic effect.





Effects (library and settings)

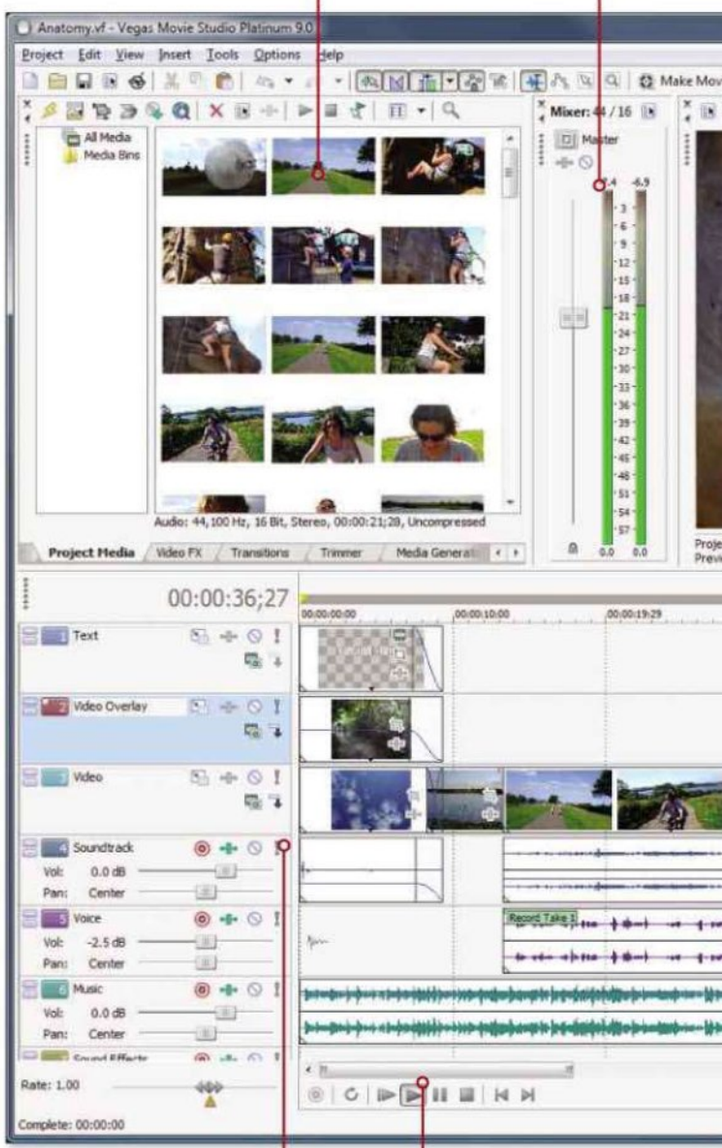
Drop effects on to video clips on the timeline and adjust their settings with the controls provided. An effect might be corrective, such as to fix colours, or creative, such as blur or glow.

Media bin

Captured video appears here, ready to drop on to the timeline. You can also import video, image and audio files from the hard disk to here.

Volume meters

Some editors include audio volume meters so you can make sure the output isn't distorting when mixing dialogue, music and sound effects together.



Timeline tracks

Multiple tracks let you use more than one video or audio clip at the same time. This is essential for adding music, sound effects or a narration, for layering videos in intro sequences and closing credits and for special effects such as green-screen effects.

Transport

These work just like the controls on a DVD player, letting you play, stop, rewind and fast forward. Some also let you loop sections or play footage at different speeds.

Transitions

Most of the time you'll just jump from one clip to another, but transitions let you merge them, perhaps with a slow dissolve, a wipe from left to right across the screen or even a flying 3D animation.

Preview

The video preview window shows you what your finished video will look like. It's put together on the fly from the various elements in your project – videos, photos, effects, titles and transitions.

Timeline

This is where most of the editing takes place: arranging the clips in order, trimming their start and end points, adding effects, transitions, titles and music. Time runs from left to right across the screen.

Cropping and object motion

Zoom in on a video clip to crop it, or zoom out to show it in a small window on the screen. Most editors let you vary the position over time for object motion effects.

DVD authoring

Create DVD-Videos with interactive menus. For HD projects, you'll want to be able to create Blu-ray and AVCHD discs. The latter records HD video to cheap DVD-R media that will play in most set-top Blu-ray players.

Export

When your project is complete, it's time to export it as a single video file and share it with others. Options include burning a DVD or Blu-ray, recording it back to videotape, saving it to hard disk and uploading to websites such as YouTube.

The video-editing production line

Understanding how editing software handles your video files will help you choose the best software for your camera, PC and creative desires

Video-editing and photo-editing programs have many common features: colour correction, special effects, text overlays and layers to combine multiple images. However, there's one crucial difference. In photo-editing software, an image is opened, altered and saved in its new state. Unless you choose Save As, the original file is lost. In video-editing software, no matter how much you edit your footage, the original files remain unaltered.

A video project may use many gigabytes of raw footage, so it's not practical to save the actual video clips inside the project file. Instead, the software stores a list of all the clips that are used, along with their locations on the hard disk. When you trim the start of a clip or apply an effect, you're not editing the original video file. Instead, you're giving the software instructions on how to play that file. This makes it easy to go back and amend edits later on.

When you apply an effect, the software only needs to show what the effect looks like for the current frame. However, when you hit play, it needs to apply the effect 25 times per second to provide a smooth motion preview. Layered video clips, multiple effects or complex transitions make it harder to calculate each frame fast enough to play them back at this speed. When it gets too complex, the software has to skip some frames in order to keep up. This means playback can be jerky, which is distracting when you're trying to fine-tune edits.

Things are even harder when editing HD video. This contains five times as much detail as SD video, which means a lot more work to create each frame. AVCHD is really demanding, and even playing AVCHD clips with no effects can be too much for some editing packages.

There are three techniques editing software uses to obtain smooth previews. One is pretty obvious: optimise the software to play video (and especially HD) files as efficiently as possible. Sony's and Adobe's editors excel here, although they will require a quad-core PC to edit AVCHD footage comfortably.

For particularly complex scenes, Sony's and Adobe's editors have a backup plan: while playback is stopped, they calculate what the preview will look like so that they're ready to play smoothly when you begin playback. However, these previews take time to generate and must be updated after each edit, so they're only suitable for occasional tricky scenes.

Corel's, CyberLink's and Serif's editors (page 61) take a different approach for demanding HD formats. They create lower-resolution copies of the original footage as soon as it's imported. These copies, known as proxies, also take time to generate, but they need to be created only once. From then on, previews are much smoother. Only when it's time to export does the software revert back to the original HD files. The downside is lower-quality previews, but that's a reasonable sacrifice for the advantage of smooth playback when editing HD footage, especially on slower PCs.

Different editing packages take different approaches to achieving smooth previews

Introducing...
Adobe Premiere Elements

Powerful effects make Premiere Elements ideal for ambitious video producers

Adobe Premiere Elements is a classy, highly capable editor that's suitable for both beginners and advanced users. Novices will appreciate the straightforward screen layout, responsive performance and attractive off-the-shelf text, video-montage, soundtrack and DVD menu templates. These templates are also available for Blu-ray discs, but Elements can't burn HD footage to DVD media. HD camera owners will need to buy a Blu-ray writer if they want to play edited videos in the living room.

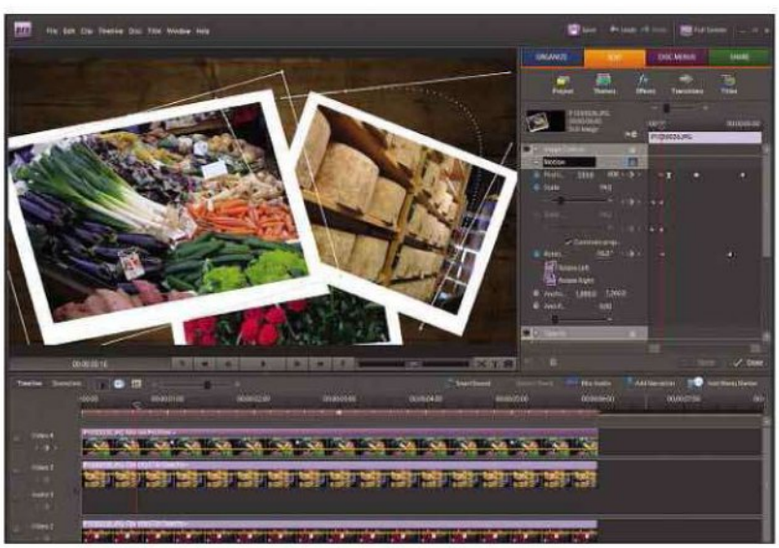
DETAILS

BEST FOR
Sophisticated effects and animations

NOT GOOD FOR
AVCHD editing on slower PCs

WEBSITE
www.adobe.com/uk

PRICE
£70 inc VAT



● **Adobe Premiere Elements includes a wide range of sophisticated effects**

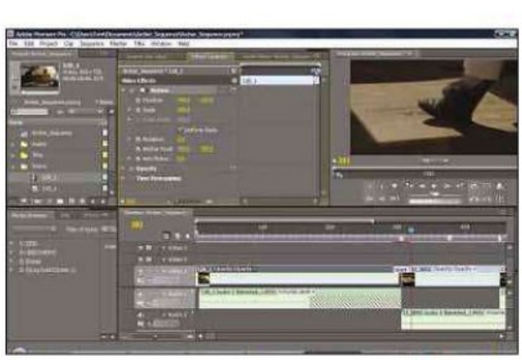
More ambitious users will appreciate Premiere Elements' unrivalled effects power and 99 tracks for layering clips and images together, so it's perfect for sophisticated intro sequences and custom menu backgrounds. The wide range of sophisticated effects includes automatic colour correction, but the best thing is how precisely the effects can be controlled and varied over time. Each parameter can be given multiple values for different points in time, and the software fills in the gaps with straight or curved paths. This is particularly powerful when animating video clips, images or text around the screen. All this sophistication can make the effects section a little daunting for beginners, though.

Premiere Elements' handling of standard-definition footage and HD footage from tape-based HDV cameras is excellent, with a smart system that shows a high-resolution preview image when playback is stopped, and reduces the resolution during playback to avoid dropping frames. However, it still struggles with AVCHD footage on anything but the fastest PCs; we recommend at least an Intel Core 2 Quad or AMD Phenom X4 for AVCHD editing. If you have an AVCHD camera and a slower PC, you'll be better off with an editor that uses proxy files (see opposite) to lessen the burden, such as Corel VideoStudio or Serif MoviePlus.

Adobe Premiere Pro

Premiere Elements started life as a cut-down version of Premiere Pro, Adobe's flagship video-editing software. The two applications have gone their separate ways since then but they still have a lot in common, so Elements users who want to upgrade will find it easy to get to grips with Pro. The Pro version has more comprehensive timeline tools, an extended effects library including advanced colour correction, blend modes for mixing the colours of layered videos, advanced DVD and Blu-ray authoring and surround-sound mixing.

It's not cheap, though, retailing at £690. Aspiring professionals should consider Adobe Creative Suite Production Premium, which costs £1,700 and also includes Photoshop, Flash, After Effects, Illustrator and more.



● **Premiere Pro is a true heavyweight of PC video editing**

Introducing...
Sony Vegas Movie Studio Platinum

Sony's streamlined editor makes light work of everyday editing tasks

Sony's Vegas Movie Studio Platinum looks businesslike and perhaps even a little uninviting, but in many ways it's the friendliest video-editing software available. It's certainly the quickest to use. No matter how complex a project becomes, the timeline is effortlessly quick to navigate. Various clever timesaving tricks mean that edits often take half the time in this package than they do elsewhere. Audio is particularly well catered for, with options and controls to rival some dedicated music-production packages.

DETAILS

BEST FOR
Precise, fast timeline editing

NOT GOOD FOR
Menu-based Blu-ray discs

WEBSITE
www.sonycreativesoftware.com

PRICE
£60 inc VAT

● **Vegas Movie Studio Platinum is capable of sophisticated results**

Its sophistication is undermined a little by a limitation to just four video and four audio tracks. This is enough for a main video clip, two overlays and text, but more complex montages aren't possible. It also lags behind Adobe Premiere Elements for object motion, where animations follow only linear rather than curved paths. Even so, Movie Studio Platinum's attention to detail and elegance make it an appealing prospect for ambitious users.

The preview window has extensive options to balance preview quality against smoothness. When editing standard-definition (SD) footage on a fast PC, you can keep the quality high, but on slower PCs, when adding lots of effects or editing HD footage, you can use a lower-quality setting achieve smooth playback. You'll still need a fast PC to edit AVCHD footage, though. Movie Studio Platinum is more efficient with this demanding format than Premiere Elements but not as good as Corel VideoStudio.

Another limitation is lack of the Blu-ray authoring options. A Blu-ray disc can be burnt directly from the timeline, but these discs don't include menus. On the upside, the same Blu-ray data can be written to blank DVDs, which will play in some set-top Blu-ray players, although they're not as widely compatible as the AVCHD discs made in VideoStudio. DVD authoring is excellent, with unrivalled control over menu design and disc navigation.

Sony Vegas Pro

If you want Vegas Movie Studio's slick interface without its limitations, consider Vegas Pro. At £450 including VAT it's a big investment for home users, but upgrading from Movie Studio currently costs £300.

Vegas Pro includes an injection of powerful features: unlimited video and audio tracks, more comprehensive colour correction, superior animated text, comprehensive surround-sound mixing and support for footage shot with multiple cameras. Blu-ray authoring includes sophisticated menu design and disc navigation. One criticism that remains unresolved is the inability to animate video clips and images along curved paths, although this is possible for text and in Blu-ray and DVD menus.

● **Vegas Pro is an excellent choice for ambitious users**

Introducing...
Corel VideoStudio Ultimate

It offers quantity more than quality, but VideoStudio is a good-value editor

VideoStudio Ultimate ticks all the right boxes. It has plenty of effects, transitions, text animations and DVD menu templates, and also includes some unusual extras such as an animated illustration maker, picture frames and a sound effects library. Its export options include DVD-Video, Blu-ray and AVCHD. This last option puts HD video on blank DVD discs, which are much cheaper to make than Blu-rays and will play in most set-top Blu-ray players. The package even includes a copy of WinDVD Plus Blu-ray, Corel's flagship video-playback software that normally costs £50. Best of all, VideoStudio has an extremely effective proxy system for smooth previews of HD footage on slower PCs (see page 58 for details).

DETAILS

BEST FOR
AVCHD editing on slower PCs

NOT GOOD FOR
Fast, precise editing

WEBSITE
www.corel.co.uk

PRICE
£65 inc VAT

There are more sophisticated editors, but VideoStudio includes all the key ingredients and has excellent HD support

Sadly, VideoStudio Ultimate also has some limitations. Its previews are smooth, but the interface can be slow to react to the keyboard and mouse. This can make fine-tuning edits fiddly. Its effects don't look as sophisticated as those in Adobe's or Sony's editors, and editing their settings can be awkward, too.

Despite the inclusion of seven video tracks, it's pretty much impossible to animate video clips so they move around the screen – basic slide in and out options are all you get. Still, it is possible to pan gently across photos, and the text animation templates look great.

VideoStudio will frustrate ambitious, technically minded users. However, its ability to edit HD video on slower PCs and burn the results to affordable AVCHD discs make it an excellent choice for anyone with an HD camera who isn't ready to splash out on a new PC.

...and the rest

Here we look at some of the other low-cost editors available

So Adobe Premiere Elements has the most sophisticated effects, Sony Vegas Movie Studio Platinum is the quickest to use and Corel VideoStudio handles HD footage best on slower PCs. If you're still undecided as to which one is best for you, here are a couple of other candidates to confuse you even further.

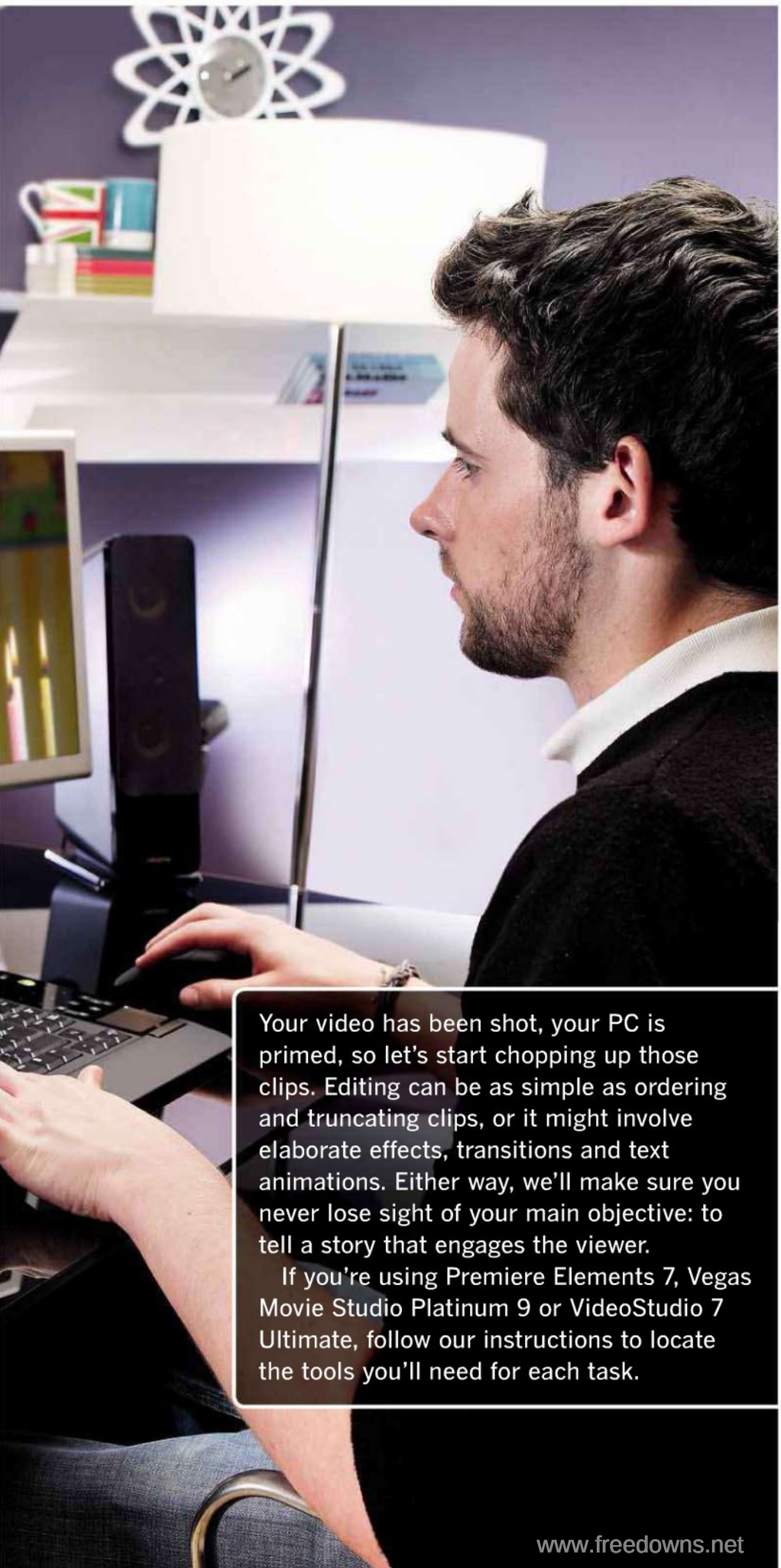
Serif MoviePlus (*www.serif.com*) has a lot in common with Sony Vegas, including a streamlined, responsive interface, and its unlimited tracks make it ideal for complex montages. Unlike Sony's editor, it uses proxy files to take the load off the processor when editing HD footage. However, its effects library is sparse and it can't export to Blu-ray or any other HD disc.

CyberLink PowerDirector (*www.cyberlink.com*) has plenty going for it, too, including proxy editing and comprehensive export options. These are strengths it shares with Corel VideoStudio, and its core editing features are clumsier than VideoStudio's, so there's little pointing in choosing it.

Pinnacle Studio is another editor we'd recommend ruling out. It includes some attractive beginner-friendly features, but ultimately it lags behind the competition for editing power, ease of use and preview smoothness.

If you want to edit AVCHD but aren't bothered about Blu-ray discs, Serif MoviePlus might be ideal

EDITING VIDEO



Your video has been shot, your PC is primed, so let's start chopping up those clips. Editing can be as simple as ordering and truncating clips, or it might involve elaborate effects, transitions and text animations. Either way, we'll make sure you never lose sight of your main objective: to tell a story that engages the viewer.

If you're using Premiere Elements 7, Vegas Movie Studio Platinum 9 or VideoStudio 7 Ultimate, follow our instructions to locate the tools you'll need for each task.

IN THIS CHAPTER

Exporting your video

Before you start editing, make sure the software on your PC is set up properly and import your video to your hard disk

Video editing involves huge amounts of data – a two-week holiday might produce 30GB of raw footage. It's not just the size of these files that's an issue, though; it's also the quantity. Each clip is usually saved as a separate file, and music and photos will add to the file count. It's not uncommon for a project to run to hundreds of files, so it's crucial that you keep them neatly organised on your PC. Storing all the files for a particular project in a dedicated folder will make it easier to find clips, and easier to back up and archive the project when it's finished. From now on, we'll refer to this folder as the project's working folder.

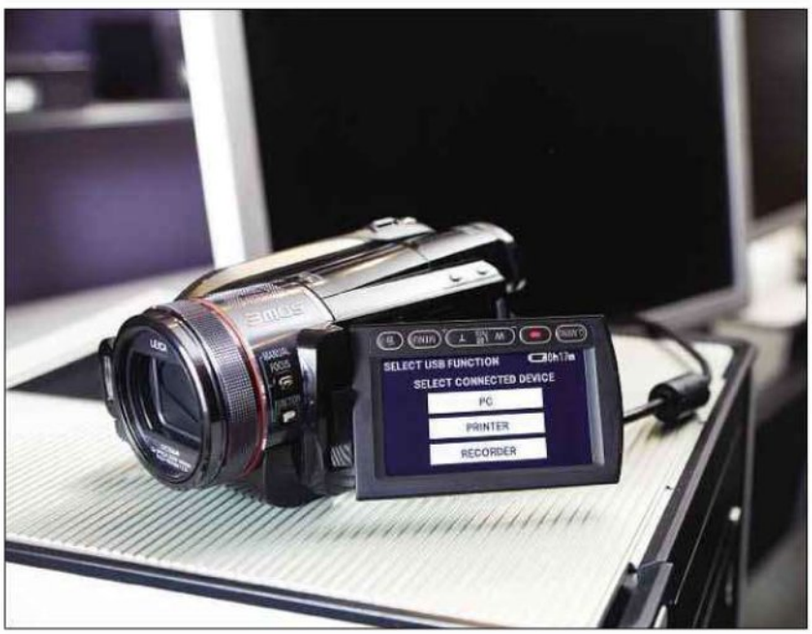
SETTING UP EDITING SOFTWARE

Most editing software requires you to save your project before you can start capturing and editing. This involves naming the project and saving it to a folder on your computer's hard disk, so this is a good opportunity to create the project's working folder.

When you create a new project, you'll need to tell the software about the video you'll be editing. Corel's VideoStudio simply needs to know whether you'll be working in widescreen or standard aspect ratio – tick the 16:9 box on the splash screen for widescreen editing. Adobe's Premiere Elements and Sony's Vegas Movie Studio Platinum (we'll just call it Vegas from now on) ask for more details about the type of footage you'll be editing.

In Premiere Elements, select New Project from the welcome screen. Name the project and create a new folder to save it in. Click Change Settings and choose the template that matches your video camera. PAL is the TV standard for the UK, so choose a template from this folder. MiniDV camera owners should choose DV Widescreen or DV Standard. For standard-definition cameras that record to hard disk or memory card, choose Hard Disk, Flash Memory Camcorder, Widescreen. For tape-based HDV cameras, choose HDV 1080i 25. Choose from the four AVCHD templates according to whether your AVCHD camera supports surround sound (it'll say something like 5.1 on the camera's microphone if it does), and whether it records 1,440x1,080 or 1,920x1,080 pixels per frame. If it records at the higher resolution, choose Full HD 1080i.

In Vegas, choose Europe and Asia (50Hz/PAL) and then DV for MiniDV cameras, DVD for other standard-definition formats or HDV Camera (1080i) for all HD formats. On the next screen, switch to 5.1 surround if your camera supports it and click Finish. You can change these settings at any time by selecting Project, Properties. For Full HD editing, select the bottom template, HD 1080-50i (1920x1080, 25.000 fps). If you've recorded progressive scan video, change the Field Order. Tick the 'Start all new projects with these settings' box.



● **Once you've shot your footage, it's time to transfer it to your PC**

The editing screens

Each of the three editors' screens is divided into three areas: the preview window, the timeline, where clips are arranged, and a tabbed properties panel. You can resize any of these areas by dragging the dividing lines. If you have two monitors, Premiere Elements and

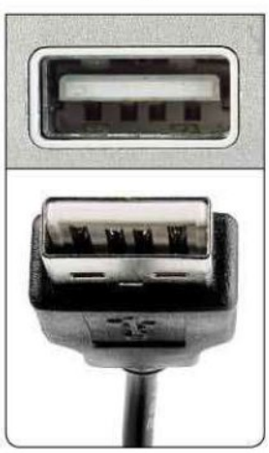
Linked up: FireWire and USB connections

FireWire

6-pin FireWire

4-pin FireWire

USB Type A



USB Mini-B

● **Tape-based camcorders connect via FireWire, while other types connect via USB**

Vegas let you use one exclusively as the preview window. You can also use an HDTV as a second monitor, which is ideal if you're editing on a laptop. You'll need to activate the TV first, though. Right-click on the Windows Vista desktop and select Personalise, Display settings (in Windows XP, select Properties). Two boxes marked 1 and 2 should be visible. Click on 2, tick the box marked Extend the desktop onto this monitor, drag the Resolution slider all the way to the right and click Apply.

To set up dual monitors in your editor, right-click the preview and select Playback Settings (Premiere Elements) or Preview Device Preferences (Vegas). In the dialog box that appears, select a monitor in the drop-down list.

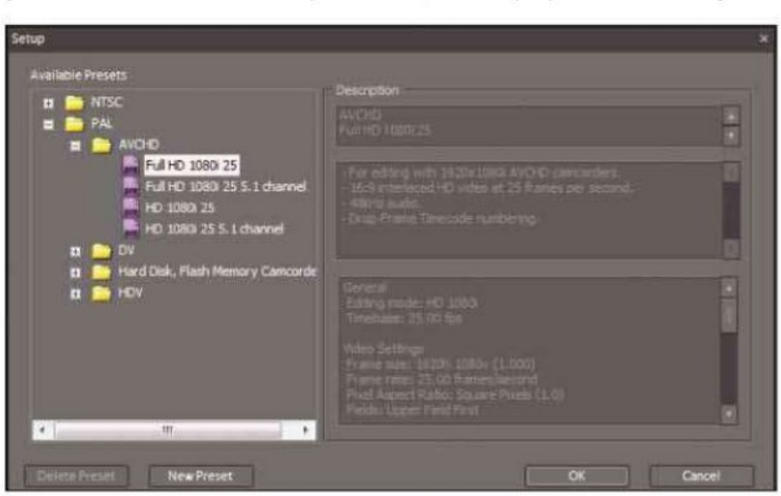
In Premiere Elements, this option is only available in high-definition projects, so if you're editing SD footage and want to use two monitors, create a new project and choose the HDV 1080i preset. In Vegas, switch the full-screen preview on and off using the TV icon just above the normal preview. Just to the right, you'll find a preview quality setting. Preview (Full) is a good starting point, but try lower settings if previews become jerky.

TAPE AND FIREWIRE CAPTURE

If your digital video camera records to tape, it will have a FireWire port. Tape-based camcorders may also have a USB socket, but this is only for transferring photos. For video transfers, you should use FireWire.

Camcorders use the smaller 4-pin FireWire socket type. It may be labelled FireWire, IEEE 1394, i.LINK or DV. Desktop PCs tend to have 6-pin sockets, while laptops are more likely to

● **Make sure your project settings match your camcorder format**



have a 4-pin socket. A FireWire cable is rarely included with the camera, but it shouldn't cost more than £10. Get a 4-pin-to-4-pin cable for laptops, or 4-pin-to-6-pin for desktops. If your computer doesn't have a FireWire port, an expansion card can be bought for around £25 and easily fitted.

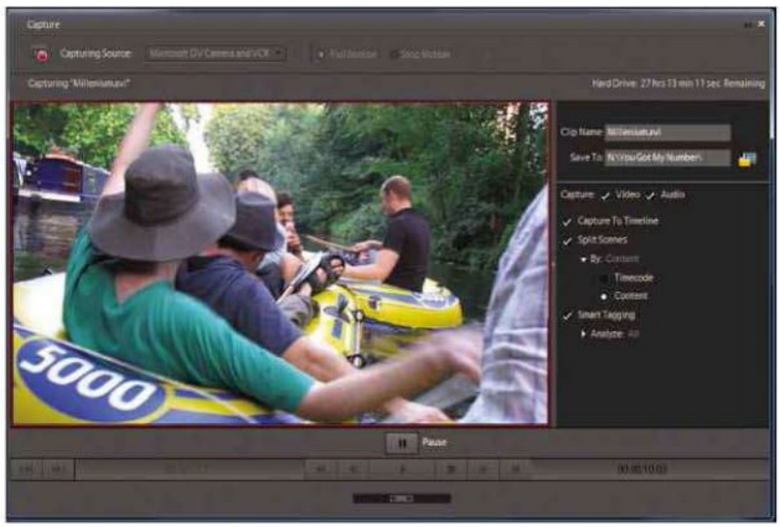
Switch on the camera and the PC should recognise it without needing any drivers. However, you'll need your editing software in order to record the incoming video to hard disk. In Premiere Elements, click the Organise tab, followed by Get Media and then DV Camcorder or HDV Camcorder. In Vegas, click the Project menu, Capture Video, select DV or HDV as necessary and click OK. In VideoStudio, click the Capture tab and the Capture Video button.

You'll be given the opportunity to name the captured video and choose where it's saved to. Choose the project's working folder. In Premiere Elements and VideoStudio, it's worth using the Split Scenes feature, which breaks up the captured footage into individual scenes for easier editing. Vegas does this automatically. VideoStudio also includes an option to convert MiniDV footage during capture, but it's best to leave it in DV format.

Because the video is stored on tape, it must be played into the computer at normal speed, in the same way as you would play it to watch on a television set. However, the FireWire connection makes a perfect digital copy of the footage, and also lets you control the camcorder's transport remotely from the software. Rewind to the beginning of the section you want to capture, hit the Record button and press Stop when you're done.

DVD VIDEO CAMERAS

Some video cameras record directly to DVD, either in DVD Video or AVCHD format. You can pop these discs straight into your PC drive to watch them, but the data is stored in a special format that some editing software can't work with directly. It's easy to convert it into a friendlier format, though. In Premiere Elements, select the Organise tab, Get Media, DVD (Camcorder or PC DVD Drive). You'll find similar facilities in Vegas via the Project menu's import options and under VideoStudio's Capture tab, Import Digital Media. If a disc isn't readable, you may have to reinsert it into the camcorder and use the Finalise function. Consult the camera's manual for more information.



● Use your editing software's capture utility to transfer video to your PC's hard disk

USB VIDEO CAMERAS

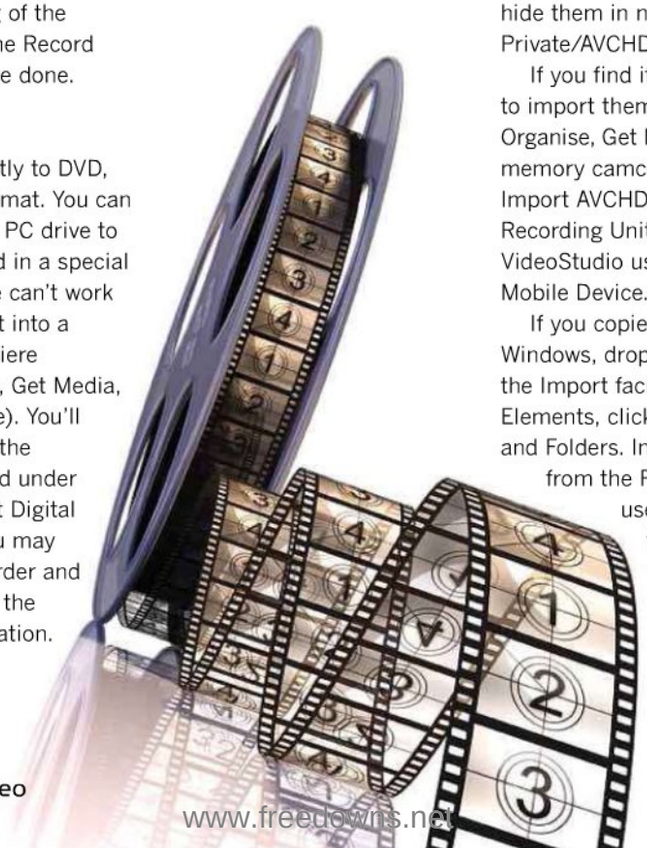
Most modern video cameras use memory cards or hard disks to store video. These connect to the PC using a USB cable, which is supplied with the camera. If you have an SDHC or Memory Stick reader in your PC, you might find it easier to whip the card out of the camera and stick it into the reader.

The footage recorded by hard disk- and memory card-based cameras is compatible with editing software without any capture or conversion, so you can just use Windows to drag and drop the files from the camera or memory card to your project's working folder on your hard disk. These files can be tricky to locate, though. Panasonic's AVCHD cameras hide them in nested folders at the location Private/AVCHD/BDMV/Stream, for example.

If you find it easier, use your editing software to import them. In Premiere Elements, click Organise, Get Media, AVCHD or other hard disk/memory camcorder. Vegas users should select Import AVCHD Camcorder or Import Memory Recording Unit from the Project menu, while VideoStudio users should use Import from Mobile Device.

If you copied the footage to your PC using Windows, drop them into your editor using the Import facility. To do this in Premiere Elements, click Organise, Get Media, PC Files and Folders. In Vegas, select Import Media from the Project menu, while VideoStudio users should click the Edit tab followed by the folder next to the drop-down list.

With that done, you're ready to start editing.



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The timeline

This is where your edited video takes shape, but there's more to choosing, trimming and ordering clips than meets the eye

The timeline is where the simplest and trickiest parts of the video-editing process take place. It's where you put the clips in order and trim their start and end points, and for some projects, that's about as complex as it needs to be. However, the success of your finished video hangs on how you go about this simple process. There are lots of things to think about in order to make the most of your raw footage and hold your audience's attention. Before we get into the artistic challenges, let's take a look at the controls we'll be using.

TIMELINE BASICS

Your captured and imported raw footage should currently be in the media pool. You can see this by clicking Premiere Elements' Edit tab and Project sub-tab, Vegas's Project Media tab or VideoStudio's Edit tab. Double-click on a clip to preview it (in Vegas, select it and click the Play button above). When you find a clip you want to use, drag it on to the timeline.

The timeline is a visual representation of your project, with a playback bar running from left to right. Multiple tracks let you combine clips for simultaneous playback – we'll explore this on page 76 – but for now you'll need one video track and its corresponding audio track.

Premiere Elements' Sceneline view provides a simple way to pick and order your video clips

The transport buttons let you play, pause and navigate around the timeline, but we rarely find them useful. Instead, use the spacebar to play and pause and the mouse to jump to a point on the timeline. In Premiere Elements and Vegas, the left and right cursor keys nudge the playback bar by one frame. In Vegas, use the mouse wheel to zoom in and out. In Premiere Elements and VideoStudio, the wheel shuttles along the timeline, so use the zoom slider above the timeline to view the whole project or get in close to fine-tune an edit.

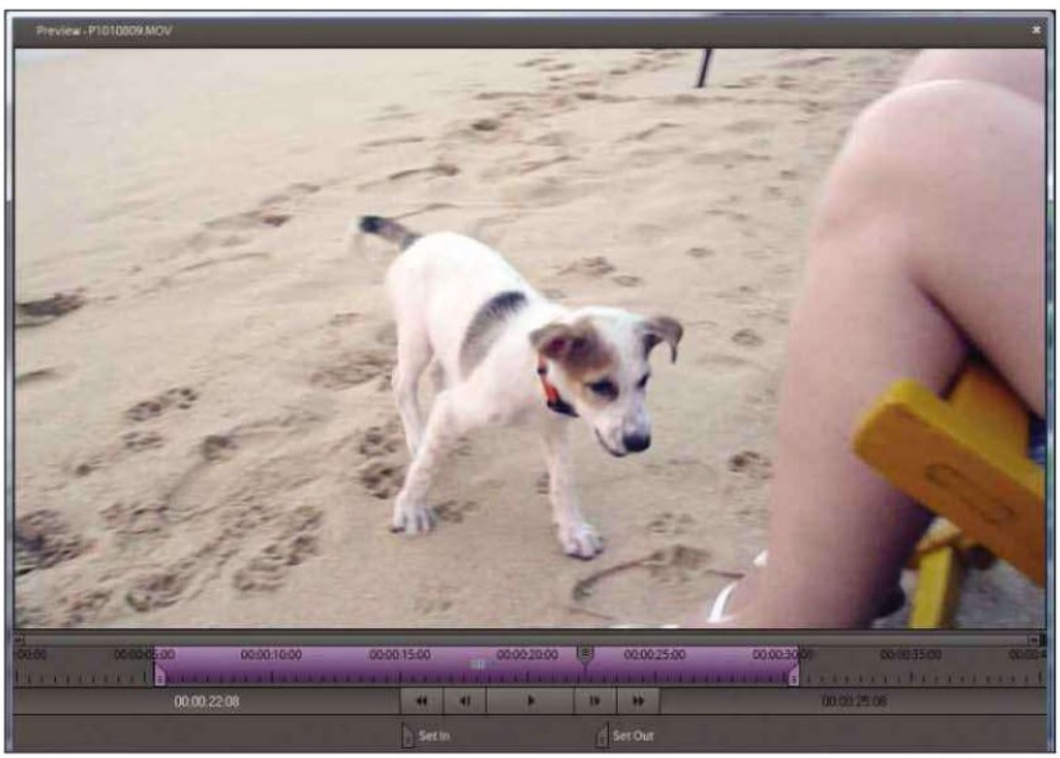
TRIMMING CLIPS

Most clips will be longer than you want them to be, with an unwanted portion at the start or end, and often, both. There are three ways to remove these unwanted bits. One is to click and drag the edges of the clip as it appears on the timeline. Alternatively, adjust the playback bar to the start or end frame, select the clip and click the scissors icon below the preview window (type S in Vegas). This splits the selected clip in two, so you can select the unwanted section and hit the Delete key to discard it.

Another option is to trim clips before you add them to the timeline. In Premiere Elements and VideoStudio, double-click a clip in the media pool and adjust the start and end points by dragging the markers at either end of the bar below the preview. Close this preview window, and when you drag the clip from the pool to the timeline, only the selected section will be used. In Vegas, right-click a clip and select Open in Trimmer, drag to select a section you want to use and drag it to the timeline.

RIPPLE EDITING

Feel free to use a mixture of these techniques to trim clips, perhaps making a rough cut before adding to the timeline and fine-tuning by dragging the start and end points later on. As you do so, the clips that appear later in the



Double-click a clip in the media pool to trim it to size before you add it to the timeline

project will shuffle along to make space or close the gap. This is known as ripple editing.

This is generally welcome, but there are times when ripple editing isn't desirable. If you're editing a video to music, such as for a pop video, you don't want subsequent clips to move around as this will make them lose sync with the music. To prevent this happening in Premiere Elements, use the scissors tool to truncate a clip and type Shift-Delete to delete the unwanted section without subsequent clips changing position.

In Vegas, you can enable and disable ripple editing as and when you need to by typing Ctrl-L or clicking the button at the top of the screen. This button also lets you decide whether ripple editing affects the selected track or all tracks. The latter usually works best as it keeps extra objects such as text and music in sync with the main video clips.

In VideoStudio, ripple editing is permanently active for the main video track, although you can choose whether or not other tracks are affected, too. Moving or trimming objects on other tracks doesn't invoke ripple editing, so use an overlay track as your main track if you don't want subsequent clips to move.

ORDERING CLIPS

Timeline editing isn't just about choosing and truncating clips; it's also about ordering them. Mostly you'll be adding clips in the order in which you want them to appear, but sometimes you may have a change of heart.

Reordering clips on the timeline is often a simple matter of drag and drop, but doing this can create unwanted gaps as the ripple-editing function confuses matters. Therefore, you'll probably find it easier to reorder clips using Premiere Elements' Sceneline or VideoStudio's Storyboard View (Vegas sadly lacks an equivalent mode). You switch views by clicking the button just above and to the left of the timeline. Whereas the timeline represents clips as bars, these editing modes use one thumbnail per clip. Reordering clips is then a simple matter of dragging them to the left or right.

We recommend sticking to the Timeline view most of the time, as it allows you to do lots of things that aren't possible in the Sceneline or Storyboard views. Once you've started layering videos or adding text and music, you'll have to stick to timeline editing. However, for reordering clips at the early stages, the Sceneline and Storyboard views are ideal.

TIP

As you move around the timeline, the software updates the thumbnails for each clip. If you find that this is slowing down your PC and resulting in jerky previews, you can deactivate it in Premiere Elements by clicking the buttons to the left of each track on the timeline. In Vegas, click the View menu and deselect Waveforms and Frames.

Creative timeline editing

Behind the simplest of editing tasks are some complex creative challenges. Here's how to make every shot speak volumes

So that's the technical side of timeline editing covered; now let's take a look at the creative challenges. The simplest videos, such as YouTube clips, consist of a single, uninterrupted shot. It's hardly surprising – after all, this is as close to human vision as a video can get. So why would you want to chop up your video into shorter clips?

The most obvious reason is to get rid of the dross. Home videos have a reputation for being painfully boring, and it's usually because no-one bothered to trim out the dull bits. If you shot half an hour of video on holiday, an edited version of the best two minutes will be far more interesting than the unexpurgated 30-minute version. Remember that videos aren't like photos, where viewers can flick through at their own pace. You don't want them to be reaching for the fast-forward or stop button, so keep it brief. If you can't bear to be that brutal with the editing scissors, do an additional 10-minute director's cut for your own pleasure.

Choosing the bits to use isn't just about jettisoning the junk, though. As we saw in Chapter 2, video production is all about telling a story. That story might be what you did on holiday, what your pet hamster had for dinner or what you think about climate change. Even if it isn't a story in the obvious sense, it's worth having a start, middle and end. Begin with an establishing shot that introduces the location, main characters or key subjects. Pick shots that get your point across by showing the interaction between people, close-ups that emphasise what someone is thinking and clips that help move the story along.

Revisit Chapter 2 to remind yourself of these techniques, and pick out the shots that serve a useful function. Don't feel obliged to use clips in the order that they were recorded if they flow

As you sort through clips, keep an eye out for ones that can work as a final shot, putting a full stop at the end of your video.

more naturally in a different order. Perhaps a shot taken early in the day would make a satisfying closing shot. Just make sure there's nothing in the shot that gives the game away. Also try to avoid repetition. If you have five great clips of a baby taking its first steps, your video will probably be more engaging if you just use the best one rather than show all five.

A SNIP IN TIME

When you think about it, a cut in a video is a strange thing. One minute you're asking your viewers to imagine that the two-dimensional image on their TV screen is a three-dimensional world. A second later, that three-dimensional world has been replaced by a completely different one, or the same one but seen from a different angle. Taken on these terms, it's amazing that a video cut isn't completely bewildering for the audience. It isn't, though – people are so used to seeing them that, most of the time, they don't notice them at all.

In fact, if there's one basic rule for a good cut, it's that the viewer shouldn't notice it. This stems from an idea known as the suspension of disbelief. This expression originally comes from literature, and it's all about making an audience buy into what they're experiencing. If you were reading a fantasy novel, you'd probably be quite happy to read about fire-breathing dragons or an invisibility cloak. However, if a passing elf whipped out his iPod, it would be pretty off-putting. This is because there are certain accepted rules for what does and doesn't happen in a fantasy novel. As soon as the author breaks them, you're reminded that you're reading a novel and it's all just made up – your suspension of disbelief is broken.

This is also true of video production, but it goes beyond making stylistic blunders such as elves with iPods. Even if you're just making a simple home video of a family holiday, you should aim to edit as unobtrusively as possible so the viewer can concentrate on (and, hopefully, care about) the subject matter. Elaborate editing tricks such as spinning 3D transitions or psychedelic effects have their uses, but most of the time they get in the way, drawing the attention to the editing process and away from the subject of your video. The chances are your audience is more interested in the people in your video than in the special effects rack in your editing software.

The same goes for the timing of cuts. If each clip flows elegantly from one to the next, it's easy for the audience to become involved in the story. However, clumsy or attention-grabbing edits constantly remind viewers that they're watching a screen, and will leave them cold.

CONTINUITY STYLE

There's no blanket rule for how best to cut from one clip to another. It all depends on whether there is continuity between two clips. Continuity editing simply means that two clips look as though they were shot straight after one another. When they're edited together, they have the feel of a live video stream. If you show a clip of Bob asking Bill a question and then cut to a clip of Bill answering, the audience will accept that these two shots were recorded one after the other, with no interruption in the passage of time. However, if you show the first clip and then cut to one of Bob and Bill on the beach eating ice creams, the viewer knows that some time must have passed between the first

Try to order and trim clips so it looks as if you're cutting between shots captured simultaneously with multiple cameras

> "Home videos can be boring if no-one bothers to cut out the dross"

It may not be the most riveting thing you captured, but shots such as this can provide a smooth link between scenes and help the viewer follow the story

and second clips. It doesn't matter that all three clips might have been recorded on different days; the first pair is an example of continuity editing, the second is not.

Professional films and videos make extensive use of continuity editing. However, if you're making home movies with a single video camera, it isn't so easy to edit in continuity style. You can't record from multiple angles simultaneously, and you don't have the luxury of asking people to repeat their actions so you can shoot it from another angle.

Therefore, you'll often have to accept that for each cut, viewers will realise that continuity has been interrupted. That's fine, but it does mean you need to proceed gently. Interrupting the continuity every few seconds can be wearying for viewers, as they constantly have to reorient themselves to what they're watching.

It's also important to leave some breathing space at the beginning of each shot when continuity is interrupted. Cut straight from someone talking to someone else talking in a different environment, and you won't give viewers time to take in the new surroundings. That's why it's really useful to leave the camera running for a few seconds at the beginning and end of each shot you capture.

Try to think ahead to the edit while shooting video and record clips that will lend themselves to continuity editing. Recording the same person or people from multiple angles lets you do this if their position and actions don't change significantly. It's a lot easier when recording larger groups of people, such as at a party, as you can cut from one area to another and give the impression that the events happened consecutively.

In some ways continuity editing is restrictive, as it binds you to various rules: don't cut between two shots of the same person viewed from the same angle, or the same person in two different places, or the same place with different people in it and so on. However, continuity editing is also extremely liberating. Because your viewers don't have to reorient themselves at the start of each clip, each one can be shorter and they can flow into each other far more quickly. Showing the same subject at different angles also lets you use just the best moments rather than show an event in its entirety from a fixed camera position.

By the way, it's fine to compress the passage of time and still expect the audience to buy into the continuity of your video. For example, if you show a clip of someone standing up to receive a degree, cut to the applauding students and then cut to the stage as he or she shakes the chancellor's hand, you don't have to show the applauding students for 30 seconds to allow suitable time for the walk from chair to stage; a couple of seconds is probably enough to get the point across. This compression of time is a widely used editing technique that viewers are happy to accept without spoiling their suspension of disbelief.

SET THE MOOD

The length of your clips will depend on how long the good bits of your raw footage are, and also whether the cut maintains or breaks continuity. But there's more to consider: the length of clips should also depend on the style, topic and mood of your video. A video of a pop concert or a chaotic children's party might warrant a cut every second or two, whereas one of a wedding ceremony or a bedtime story might suit a cut every 20 seconds.

The pace of your edits can even radically alter the mood of your video. You might edit a skiing video with lots of fast cuts for a frenetic atmosphere or with long clips from the skier's perspective for a more meditative mood.

Ultimately, your intuition will be your best reference point for finding the right clips to use and the perfect frame at which to cut. Once you've got your head around the objectives and the techniques for fulfilling them, simply trust your instincts.

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Transitions

Blending from one clip to another can look impressive and improve the flow of your video – just be careful not to overdo it

Transitions are often considered to be an important part of video editing, but we're only covering them briefly here. This is partly because using them is a simple matter of choosing a transition type and setting how long it goes on for. It's also because transitions are usually best avoided. Cut directly from one clip to another and your audience is unlikely to give it a second thought. However, join them with a transition where the first clip folds up into a paper aeroplane and flies off over the horizon, and viewers will be distracted from what's happening in the video. The chances are they don't care how many wacky transitions your editing software has to offer, so keep it simple.

Professionals occasionally use elaborate transitions. In sports coverage, for example, an attention-grabbing transition can be used to cut from live action to a replay, or for a break in continuity during match highlights. Here, the transitions' distracting nature is an advantage, helping viewers understand what they're watching. A similar device is sometimes used in dramas to indicate a dream sequence (see page 112 for more details on this technique).

Editing packages include lots of impressive-looking transitions, but the more elaborate ones tend to distract rather than entertain viewers

A couple of transitions can be useful on a regular basis. One is fade to black. As the name suggests, this fades the first clip out until the screen is black, and then fades the second one in. It works like a new chapter in a book, giving a clear break in the narrative. Some people consider it a bit of a cheat, though – a classier technique is to linger on the first clip a little longer than usual and then use an establishing shot to introduce a change in time or location.

The other transition that we recommend trying is the dissolve, also known as crossfade or cross dissolve. This fades from one clip into another, and is great for giving a sense of tranquillity to your edits. It's useful when a straight cut (with no transition applied) seems too abrupt. Don't lose confidence in the straight cut, though – for 99 per cent of edits it's the best way to move from one clip to another.

Vegas and VideoStudio add a dissolve transition whenever you overlap two clips on the timeline. You'll need to set this as VideoStudio's default behaviour, though. To do this, go to the File menu, Preferences, Edit and choose F/X – Crossfade from the drop-down list at the bottom. In both Vegas and VideoStudio, the more you overlap the clips, the longer the transition will be. One second is a good starting point, but use your intuition to find the best length in each case. To try other transition types, drag one from the Transitions library onto the overlapped section (in VideoStudio, click the Effect tab).

Premiere Elements handles transitions a little differently. Start by dragging a template from the Transition library on to the timeline between two clips. You can then adjust the length of the transition by dragging either end. However, if you haven't previously trimmed the end point of the first clip and the start point of the second, the transition won't work properly; you'll get a freeze-frame effect for part of the transition. To rectify this, drag the end of the first clip to the left and the start of the second clip to the right to trim a bit off, giving spare footage for the transition to do its thing.

Using still images

Whether it's a slideshow, a map or a logo for the corner of the screen, photos and graphics are great for spicing up your videos

There are all sorts of reasons why you might want to include still images in a video. A video of a holiday could start with your 10 best photos set to a soundtrack of local music. You might like to use a photo in a video blog, either full-screen or as a smaller picture positioned in the space beside your head (this is known as a picture-in-picture overlay). We'll look at how to position and move objects around the screen over the page, but here we'll look at preparing and importing images for your projects.

Most video-editing programs handle still images without much fuss. You import them in the same way as you would a video file and drop them on to the timeline. To adjust their duration, simply drag the left or right edge.

CUTOUT SHAPES

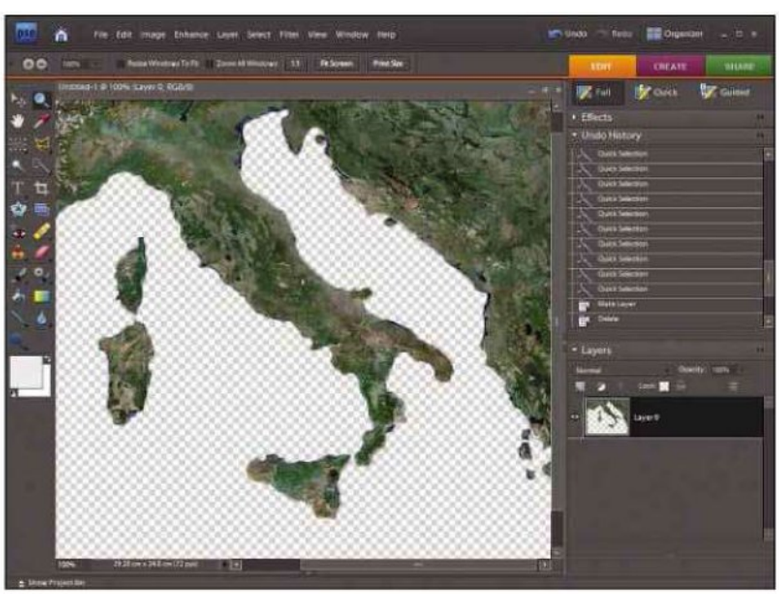
Photos are usually rectangular but some images look better if they're not stuck inside a rectangular border. Some image formats allow certain pixels to be invisible. The JPEG format doesn't support this, but GIF and TIFF formats do, as does Photoshop's native PSD format.

You'll need image-editing software such as Photoshop Elements to create images with a transparent background. In the Layers palette, right-click on Background, select Layer from Background and click OK. Use the Magic Wand, Quick Selection or Lasso tool to select the area you want to erase and hit delete. The selected area will turn into a grey and white chequered pattern, which denotes that it's invisible.

You can also delete parts of images with a large, soft-edged Eraser brush to give the edges a wispy, cloud-like appearance. This can work well as a text background, especially if you use simple images with colours that contrast with the text. Save the image as a Photoshop .PSD file in your project's working folder and import it into your video-editing software.

FREEZE FRAMES

Another common use for still images is for freeze frames, but this can be tricky to achieve.



Use photo-editing software to create images with transparent areas to overlay on top of your video clips

In Premiere Elements, stop playback at the frame you want and click File, Export, Frame to save it to hard disk as a BMP file. This is added to the media pool automatically, ready for you to add to the timeline. However, interlaced video can cause serious problems for freeze frames. If your video is interlaced (see page 12), open the image file in Photoshop Elements and select Filter, Video, De-Interlace, click OK for the default settings and save the image.

In Vegas, you can de-interlace in the editor, although it's fairly long-winded. Click the Project menu followed by Properties, note the current Field order setting and change it to None. Click OK, then adjust the preview quality to Best (Full) using the options just above the preview window. Click the floppy disk icon to save the current frame as a JPEG, ready to re-import. Finally, switch the Field Order back to its original setting in the Project Properties.

In VideoStudio, click the Tools menu and select Save Current Frame as Image. This is de-interlaced as it's saved, but it's worth finding the file on your hard disk (look in C:\Users\[*yourname*]\Documents\Corel VideoStudio\12.0) and dragging it to your project's working folder before importing.

Resizing, layering and moving

Breathe life into your still images and videos by resizing them and moving them around the screen

Premiere Elements makes it extremely easy to resize videos and photos. After adding one to the timeline, click on the preview window and handles will appear. Simply click and drag a handle to resize it. Drag the middle of the clip to move it to a new position, and click just beyond one of the corners to rotate it.

The process is very similar in VideoStudio, but first, you select the clip on the timeline, click the Attribute tab and then tick the box marked Distort clip.

Vegas handles resizing a little differently. Instead of moving clips around the frame, you move the frame around the clip. Think of it like holding a photo frame up in front of a photo. There are two buttons at the right end of each clip on the timeline – click the upper one to open the Pan/Crop editor and drag the handles to resize the clip. The dotted rectangle represents the frame, so enlarge it to make the clip appear smaller, and vice versa.

Place videos and photos on different tracks to layer them on top of each other

LAYERING WITH VIDEO TRACKS

Most of time you'll be using one clip at a time, except for the odd transition. However, video-editing software has multiple tracks for layering videos and photos. There's no need to go crazy and turn all your videos into multi-screen simulcasts, but let's look at what's possible.

Add a video clip to the start of the timeline. Now add a photo, but instead of putting it on the same track as the video clip, place it on the track above. (In VideoStudio, the tracks stack the other way, so place it below the video clip. It shows two video tracks by default, but you can activate more by right-clicking the timeline and selecting Track Manager.) Resize the photo so it takes up a small portion of the frame.

You're not limited to photos on top of videos. It's just as easy to layer videos on photos, photos on photos or videos on videos. You might use this technique to create a stack of virtual postcards, or perhaps for split-screen video over a photo background.

Try reducing the opacity of the upper object so that it's semi-transparent, and fading it in and out. In Premiere Elements, drag the yellow line inside the timeline object downwards. To fade the clip, select it and click the Properties button, marked with a grey box just above the timeline. Click the arrow next to Opacity to expand the controls. In Vegas's timeline, drag the top edge of the clip downwards. Drag the top corners inwards to fade in or out. In VideoStudio, click Attribute, then Mask & Chroma Key and adjust the Transparency slider at the top left of the window. Close this panel and fade in and out using the buttons that resemble mobile reception icons.

ANIMATED SLIDESHOWS

It's easy to create photo slideshows within video productions simply by adding a collection of photos to the timeline. However, it will look

much classier if you slowly zoom in on an interesting detail or zoom out or pan across the image to reveal other sections. This is sometimes known as the Ken Burns effect, named after its most celebrated proponent.

Place a photo on the main video track and resize it so it fills the frame without any black bars. Move the timeline marker to the beginning of the photo and create a keyframe for the photo's position. A keyframe is simply a marker that says, 'At this frame, use these settings'.

To access keyframes in Premiere Elements, select the photo on the timeline and click the Properties button. Expand the Motion controls and click the stopwatch at the top to reveal the keyframe tracks. Click the stopwatch next to the word Motion to create a keyframe. Move the playback marker to the end of the photo and enlarge the photo using the Scale slider. Another keyframe will be created automatically. Drag the clip around the preview window to change its position for the second keyframe.

The process is easier in Vegas, as the Pan/Crop editor's keyframe track is already visible at the bottom of the window. Click the right end of this track to go to the final frame and move the photo to create a second keyframe.

VideoStudio's animation tools work independently of its cropping tools. For photos, select it on the timeline, click Edit, tick Apply Pan & Zoom and click Customise. For videos, use the Video Pan effect (we'll cover effects in more detail on page 78). Go to the start of the timeline, press play, and the software will animate the photo's position between the two keyframes to create smooth motion.

Vegas and Premiere Elements let you create more than two keyframes for a photo or video clip's position. Create a third keyframe half way through the clip and make it go on a detour. Create as many keyframes as you like, drag them left or right to change their timing and right-click to delete them. Premiere Elements creates curved paths for objects to follow for smooth motion. It also uses separate keyframes for Scale, Position, Rotation and so on. Drag these keyframes to stagger the animation, so it starts panning before it starts zooming.

LAYERING AND ANIMATING

By combining the layering and animating techniques here, you can use your video-editing software like an animation studio. You already know how to create an animated slideshow that zooms into pictures, but why not have a go at creating a picture-in-picture video overlay that scrolls across the top of another video clip?

Keyframes are useful not just for animating objects, but also for varying effects settings over time. To exploit them to their full potential, see the advanced keyframe workshop starting on page 114.

> "These techniques will allow you to use your video-editing software like an animation studio"

Use keyframes to create unique positions at different points in time, and the software will fill in the gaps by animating the clip

Special effects

Like herbs and spices, effects can bring out the natural flavours of your footage or be sprinkled liberally to concoct a spectacular dish

Video effects change the appearance of a video clip. Sometimes it's to fix a problem, such as washed-out colours or wobbly movement. At other times, effects are used creatively, changing a clip's appearance in ways that you want the viewer to notice.

Effects can also be divided into various groups depending on how they process the video. Some alter the colours. Brightness/Contrast is an obvious example, but this group also includes black and white, negative, colour tints, spotlights and many others.

Some effects move pixels around the frame. Any kind of warp effect falls into this category, as does blur, mosaic (for big, blocky pixels), mirror and anti-shake processing. Some effects add things to the video, such as lens flares, borders and drop shadows. Others remove areas of a clip to reveal the one below, perhaps to frame the upper clip in an oval or star, or to remove a green background for weather presenter-style overlays. The final category changes the timing of the video. This includes fast- and slow-motion effects, reverse motion and various forms of video echo.

Some effects combine more than one technique. For example, a glow effect might colour-process and blur the highlights. Old film effects use sepia colour processing, add dust and scratches and perhaps shake the image slightly to mimic a rickety cine-film projector.

APPLYING EFFECTS

The three editing packages we've focused on each come with a staggering array of effects. Fortunately, nearly all of them are applied in exactly the same way: choose one from the library, drop it on to a video clip or photo on the timeline and adjust its settings using the controls. You can vary effects' settings over time using the same keyframe controls we looked at on the previous page. This makes it possible to create effects that creep in from nothing, or that react more sensitively to the source footage. Follow the instructions on page 76 to get up and running with keyframes or turn to page 114 for an in-depth tutorial.

In Premiere Elements, click the Edit tab, the Effects sub-tab and drop an effect on to a clip. Click the Edit Effects button at the bottom of the library or the Properties button just above the timeline. This reveals a list of effects for that clip. A basic colour-correction effect called Image Control is always available, plus Motion and Opacity settings (see page 76). The effect you just added should be below. Click the arrow next to the effect's name to view and adjust its settings. Clicking the eye icon to the left toggles the effect on and off.

All video-editing software includes a range of effects to spruce up your footage

Vegas's Color Corrector effect is extremely effective at sorting out colour problems

The process isn't much different in the other editors. In Vegas, click the Video FX tab and drop an effect on to a clip. Each one comes with a selection of template settings, and you can save your own. You adjust settings and create keyframes using the pop-up editor that appears. To reopen it later, click the green button to the right of the clip on the timeline.

VideoStudio's effects are a bit clumsy. You'll need to click the Effect tab, select the drop-down list that appears and choose Video Filter followed by All. Drop an effect on to a clip and, under the Attributes tab, click the arrow next to the small Rubik's Cube icon to select a template. Click Customize Filter to edit settings and create keyframes.

All three editors let you stack effects on top of each other and reorder the stack. Reordering can make a big difference. For example, glow followed by mosaic will look radically different to mosaic followed by glow. Effects are only permanently applied when you export, so you can tweak them as much as you want.

The downside is that combining multiple effects can cripple preview performance. However, you can get around this in Premiere Elements by hitting Enter on your keyboard. The software then calculates what each frame looks like in advance, ready to give a smooth preview. Adjust the bar at the top of the timeline to select which section is prepared.

Vegas has a similar feature; drag the mouse across the timeline to select a section and type Shift-M. For standard-definition projects, choose AVI, PAL DV Widescreen. For HD projects, choose MPEG-2, HDV 1080-50i.

CORRECTIVE EFFECTS

Modern video cameras are generally pretty good at capturing natural, flattering colours, but often there's room for improvement. Colour-correction effects vary from simple brightness and contrast sliders to complex curve- and wheel-based processes. There's often quite a lot of jargon bandied about, so let's take a look at what you're likely to encounter.

Contrast controls the range of brightness: a low contrast setting turns everything into mid-tones, while a high setting makes bright areas brighter and dark areas darker. This can give the picture more impact, but as with all colour correction, be careful not to turn up the contrast so much that you clip the shadows and highlights. Clipped shadows appear as solid black, and clipped highlights appear as solid white. This can be desirable as a creative effect but it means you're losing details in these areas, so in general it's best avoided.

Another useful control is gamma. This brightens or darkens mid-tones while leaving highlights and shadows unaffected, and is particularly useful for making the picture brighter without clipping highlights. It's available in Premiere Elements' Gamma Correction effect. Vegas calls it Contrast center, and includes it in the Brightness and Contrast effect. VideoStudio has a Gamma slider in the colour-correction controls that are permanently available for each clip; select a clip and click the Video tab followed by Colour Correction.

Colour correction might involve adjusting the hues as well as the brightness. Saturation adjusts colours from greyscales to violently lurid tones. Boosting the contrast also boosts saturation, so trimming back the saturation can help restore more natural colours.

The Hue control warps colours around the colour wheel, for example to make yellows appear orange, oranges appear red, reds

> "High contrast settings make bright areas brighter and can give the picture more impact"

appear purple and so on. However, if the colours in your footage look unnatural because it was shot under artificial light, you'll have more luck fixing them with the Color Balance effect, as it's known in both Premiere Elements and Vegas.

However, this takes a fair bit of trial and error, so Premiere Elements users may have more luck with the Auto Levels effect. VideoStudio's Color Correction toolbox includes a dedicated White balance tool for removing colour casts. Tick to activate it, and if the Auto settings don't work, select the colour picker and click on a white or grey part of the footage.

Premiere Elements includes some additional colour-correction effects that do the hard work for you – check out Auto Color, Auto Levels and Shadow/Highlight. Vegas goes the opposite route, providing sophisticated manual controls. Its Color Corrector effect packs a range of powerful tools, while its Color Curves and Saturation Adjust allow you to tune tones with surgical precision.

The remaining type of corrective effect is shake reduction. There isn't much to say about it, though. It can help to stabilise wobbly camerawork, but nearly all video cameras apply a similar process while recording. Still,

● VideoStudio is a bit clumsy in its handling of effects, but its Film Look and Film Pro effects are capable of excellent results

Premiere Elements and VideoStudio users can give this effect a go and see if it helps.

CREATIVE EFFECTS

Corrective processing is all well and good, but the creative effects are where the fun happens. Well, we say fun; often it's really just tacky self-indulgency. Creative effects suffer exactly the same problem as elaborate transitions: the more impressive they are, the more likely they are to distract your viewers, who probably want to watch what's happening in the video rather than be confronted with a spinning collide-a-scope of abstract shapes.

The best way to ensure that the effects don't get in the way of your footage is to restrict them to intro sequences. Effects that resemble art media can make a good backdrop for titles in an intro, but be careful to avoid your video resembling a daytime TV cheesefest. Distortion effects such as Camera View and Basic 3D can be useful for doing interesting things with picture-in-picture overlays (see the advanced tutorial on page 113).

Titles are particularly receptive to eye-catching effects. Rather than make the title for your homemade horror film appear abruptly onscreen, try the Guassian Blur and Wave Warp effects to make it shimmer into view. This is another area where VideoStudio users are sadly left out, as its effects can't be applied to text.

If you must use creative effects in the main footage, make sure they add something to the narrative. Suitable candidates include Premiere Elements' Ghosting effect, which creates a good approximation of a drunk's eye view of the world, or Earthquake, which shakes the picture around in a suitably violent manner. Highlights in Vegas's effects library include Radial Blur for exaggerating fast motion, and News Print and TV Simulator for making video resemble a newspaper or glitchy TV.

We also like effects that emulate the properties of film. The most obvious example is the Old Film effect, which makes video resemble a silent movie. However, there's a growing trend for subtler treatments – perhaps giving a green tint in the style of *The Matrix* or a sepia-like colour palette as used in the film *Delicatessen*.

VideoStudio does rather well here – check out its Film Look and Film Pro effects. Premiere Elements and Vegas don't include dedicated effects for this purpose, but you can build them

● **Slow motion will add a sense of gravitas and grace to any scene**

up from basic building blocks. In Premiere Elements, try the Tint effect followed by Auto Contrast. In Vegas, try Gradient Map, Color Corrector and Glow. The Glow effect is particularly satisfying, creating a diffused haze around highlights.

Another of our favourite effects is chroma key. This allows you to specify a colour to be made invisible, so if you shoot in front of a green or blue screen, you can layer subjects over other clips. This is tricky to get right, though, both in the filming and the editing stages. Check out the tutorial starting on page 118 for more information.

CHANGING TIME

One of the most useful creative effects is slow motion. Mute the original soundtrack, put a bit of soothing music on (see page 87) and even a busload of happy-slapping teenagers can be made to look endearing. Don't slow a clip to less than 50 per cent, though, or else the frame rate will drop too low and the video will look jerky. Fast motion can be just as evocative. Admittedly, people in fast-motion look a bit silly, but passing clouds, sunsets and views out of vehicle windows can be spectacular.

Because slow- and fast-motion effects change the rate of playback, and thus the length of a clip, you can't apply them from the effects library. Instead, you'll need to adjust the playback speed on the timeline. In Premiere Elements, select the Time Stretch Tool (with a clock icon, just above the timeline) and drag either end of a clip. Lengthening it slows it down and shortening it speeds it up. If you know what speed you want, right-click the clip, select Time Stretch and type in a new speed. From here you can also choose whether to maintain the original pitch of the audio. This prevents people sounding like chipmunks or monsters, although it only works well for small changes in speed. The other option here is to reverse the clip, which can be a bit of fun.

The controls in Vegas are pretty similar. Hold down the Ctrl key as you drag the end of a clip to adjust its speed, or right-click, select Properties and type in a new Playback rate. However, the latter loses sync with the audio and doesn't adjust the clip length accordingly, so the Ctrl-drag technique is usually best. If you specifically want chipmunk or monster voices, right-click the soundtrack, select Properties and tick the box marked Lock to stretch.

In VideoStudio, hold down Shift as you drag the end of a clip, or select the clip, click the Video tab and Playback Speed. The Reverse video button is just underneath.

TIP

Shoot a few seconds of dialogue, play it in reverse in your editor and learn to say the reverse version of the dialogue. Now record that version and play it in reverse in your editor. Memorising backwards speech is difficult, but the results can be hilariously creepy.

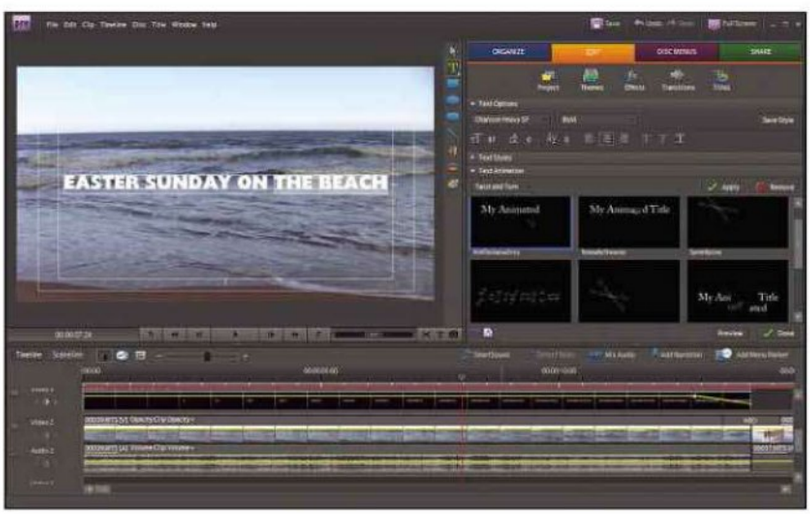
Adding titles

From opening and closing credits to captions and subtitles, there are lots of opportunities to get creative with text in your productions

Titles have lots of uses in video production. An opening title sequence might comprise the name of your dramatic production or simply the location and date of a holiday. Closing credits give you the chance to mention all your accomplices. Neither of these is mandatory, though. If you want to keep it casual, you can introduce the name of your video on the DVD or Blu-ray menu page or in the title of your YouTube clip.

You can also include titles during the video itself, to introduce a new location midway through the production, for example, or to add a date or day of the week to help the viewer understand how much time has passed since the last clip. When using titles to introduce a new scene, we'd recommend showing them over the top of an establishing shot (see page 28) rather than over a plain background, as this keeps the video moving at a satisfying pace.

Titles can also be used to introduce people by name. These are known as lower thirds as they occupy the lower third of the screen. You'll see them all the time on the news and other programmes where people are being interviewed. You don't need to introduce friends and family members by name, but it might be useful to do so for other people, especially if they're talking directly to the camera.



Premiere Elements' text-formatting options also include a number of impressive animation templates

DESIGNING YOUR TEXT

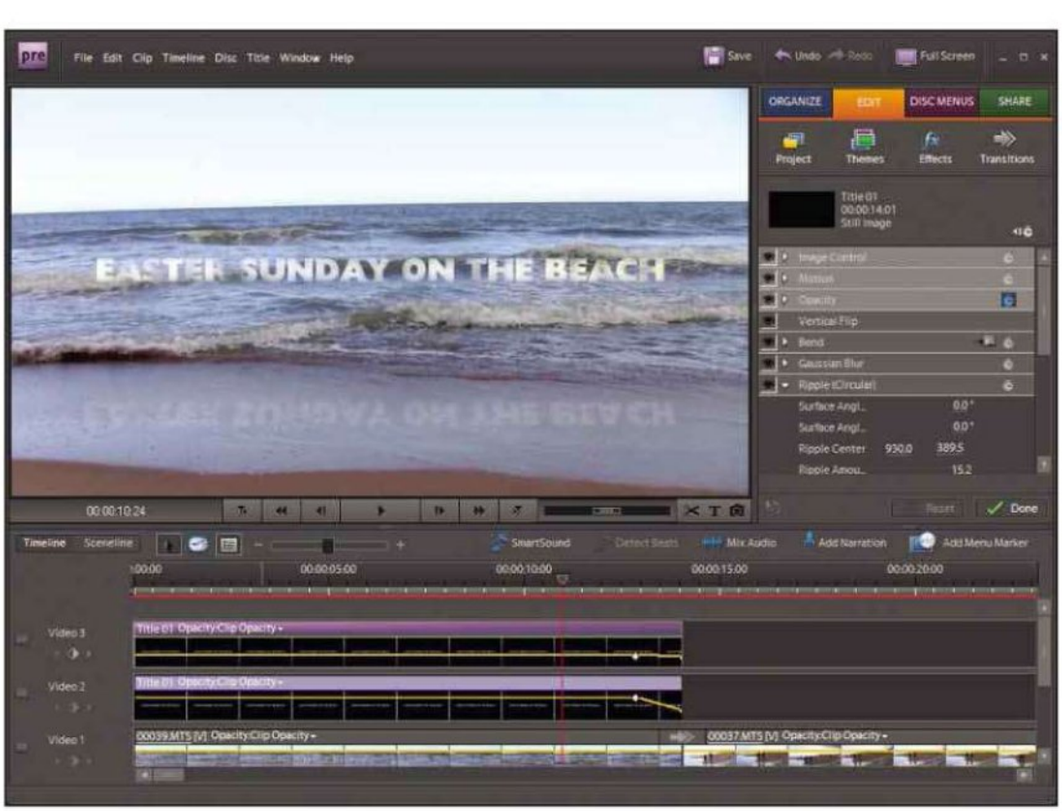
Most editing packages come with a wide range of template designs, ready for you to drop into your production, enter your own words and customise the design. These can be useful, but if you're confident about what you want – and particularly if you want something simple – it's usually easier to start from scratch.

There are a few general rules. One is to keep text away from the edges of the frame. TVs often enlarge and crop the picture, so the edges as you see them in your editing software may be cut off on the TV. When you're designing your text, the editor will show a box to keep the text inside; this is known as the safe area.

Another useful tip is to use large, chunky fonts. Computer monitors are great for showing lots of detail, but TV screens often aren't, not least because they're viewed from the other side of the room. Make sure that the colour of your text makes it easily legible against its background. This can be tricky when overlaying text on a full-colour moving image, which is why titles are often white with a dark drop-shadow. The shadow serves the same purpose as an outline, as often used on DVD subtitles, but a drop-shadow tends to look a bit smarter. Alternatively, place text over a solid-coloured bar or a graphic that you've designed especially in image-editing software (see page 75).

In Premiere Elements, move the timeline playback marker to the frame where you want your title to start and click the Title menu followed by New Title, Default Still. A title object will appear on the timeline, and you can begin editing it simply by typing your own text. To create more than one block of text, click elsewhere in the frame and repeat the process.

The Text Styles on the right provide a quick way to format text, but you can do it yourself with the formatting tools above and the Color Properties box, which you'll find by clicking the palette icon. You'll find drop-shadow and bevel options here, too. Premiere Elements' titles designer goes further than just handling text, with the ability to add boxes, ovals, ellipses,



Titles provide the perfect opportunity to indulge in some creative effects. We've used the Vertical Flip, Gaussian Blur, Ripple (Circular) and Bend effects and an Opacity of 15% to create a reflection of our title in the sand

lines and even photos. This is perfect for creating titles with a background to help with legibility. To exit the titles editor, click on an empty section of timeline. To access it again, double-click the clip on the timeline.

VideoStudio's titles editor is very similar, so after clicking the Title tab, you can pretty much follow the instructions above. The Text backdrop feature adds a box around text, and Border/Shadow/Transparency includes various other means to make titles stand out.

Vegas's text editor is much simpler. To access it, click the Media Generators tab, Text, and drag a preset to the timeline. A text object comprises a single block of text with colours, outlines and drop shadows applied globally. However, you can combine different styles by stacking multiple titles on different tracks.

ANIMATED TITLES

If you have lots of people to mention in your closing credits, it makes sense to scroll them up the screen. You can do this using one of Vegas's Credit Roll presets from the Media Generators tab. To change its speed, alter the Length at the top of the editor and then trim the clip on the timeline accordingly.

In Premiere Elements, click Title, New Title, Default Roll, enter and format the text in the normal way. Adjust the scroll speed by changing the clip's length on the timeline. In VideoStudio, click the Title tab and drag the first preset from the library on to the timeline, adjusting its length to set the scroll speed.

Premiere Elements also includes some elaborate animations for shorter titles. In the title editor, click on a template under the Text Animation heading and click the Apply button. It's not possible to animate a title as it appears and also as it disappears, but you can get around this by duplicating the title, positioning the two versions consecutively on the timeline and applying a different animation to each. To do this, click the Edit tab, Project sub-tab, find the title (usually called Title 01), right-click and select Duplicate. Add the copy to the timeline. To control how long the title is static, create three versions and don't apply an animation to the middle one.

VideoStudio's titles editor includes a similar set of animations, and you can apply a start and end animation to the same title. Vegas doesn't include elaborate animations such as these, but both Vegas and Premiere Elements can apply the same object animation and effects to titles as are available for video clips. Distortion effects aren't much use for video clips but they're great for titles, especially during intro sequences where you might just have a couple of words to play around with.

TIP

YouTube now lets you overlay captions on to videos after they've been uploaded. Turn to page 104 for more information and consider whether this is preferable to adding titles at the editing stage.

EDITING AUDIO

The soundtrack is probably the most neglected element of home videos, but giving it some care and attention isn't hard. In this chapter, we'll look at technical issues such as balancing levels and fixing problems such as boomy or harsh soundtracks. We'll also see how music and narrations can be used to shape your videos, and how subtle audio-editing techniques can help the flow from shot to shot. There's lots to do, so let's get stuck in.

IN THIS CHAPTER

Timeline audio editing

Editing the video footage independently of the soundtrack can help your production flow more smoothly. Here are two simple tricks you can try

Most of the time it makes sense to keep your video footage and its soundtrack in tight synchronisation, and this is what editing software does by default. However, there are times when you might want to edit them independently.

To do so, you'll need to break the link between a video clip and its soundtrack. In Premiere Elements, right-click a clip and select Unlink Audio and Video. In Vegas, right-click and select Group, Clear, or type Ctrl-U. In VideoStudio, right-click and select Split Audio.

This is useful when creating cutaway shots. As we saw on page 29, this is when the edited video goes from shot A to shot B and back to shot A, usually to mask a problem section in shot A. Someone may have wandered in front of the camera, or you might have moved positions and wobbled the camera. In these situations you'll have a few seconds of duff video, but there may be nothing wrong with the soundtrack. Sometimes it's crucial that the soundtrack isn't interrupted, such as during a speech or concert. The problem is solved pretty simply. Select shot B on the timeline, unlink and delete its soundtrack and place it on a separate track above shot A (below in VideoStudio). That way, you needn't cut shot A at all – shot B masks the problem video without interrupting shot A's soundtrack.

You can use the same technique to shorten the overall length of shot A without the viewer noticing. Perhaps a shot is dragging on too long but you want to keep the first and last bits, such as a toddler opening some tricky wrapping on a present. Follow the instructions above, and then use the section masked by shot B to perform a sneaky cut in shot A, discarding an unwanted middle section and putting the beginning and end together.

The L cut is an audio-editing technique that can help your shots to flow more smoothly. It involves staggering a cut so that the audio and video switch at slightly different times. It's often used to smooth over the join between two scenes. For example, if the first scene is set indoors and the second is on a busy street, you might cut to the sound of the street a second or two before the picture. This subliminally prepares the viewer for the jump. It may sound an odd idea, but it's often used by the professionals and is surprisingly subtle.

To perform an L cut, first unlink both videos from their soundtracks. Drag the end-point of the soundtrack A and the start-point of soundtrack B to the left. Be careful to adjust the start and end points and not drag the entire soundtrack, as this will upset lip sync.

When you're done, relink the video and audio so you can continue to edit them as one clip. Select both and use Premiere Elements' right-click menu, or type G in Vegas. Sadly, this isn't possible in VideoStudio, so you'll have to be meticulously careful to edit the video and audio together.

Create a cutaway shot by placing a short clip on its own track without interrupting the main clip's soundtrack

Layering sounds

If the original soundtrack on your footage feels a bit sparse, you can easily liven it up with some music, special effects and a narration

Music is a potent force, and adding it to your video production is a great way to rouse an emotional response in your viewers. The basic technique is easy. Use Windows Explorer to copy an audio file into the same folder on your hard disk as the raw video files for the editing project (we'll refer to this as your project's working folder). An MP3, WAV or M4A (AAC) file is fine, and you can convert a CD with music-player software such as iTunes or Windows Media Player.

Import the file into your editing software and drag it to the timeline in the same way as you would for a video file. Premiere Elements, Vegas and VideoStudio all have a dedicated timeline track for music, but you can place music on any audio track. The only caveat is that Premiere Elements can't put stereo audio clips on 5.1 tracks and vice versa, but it will automatically create a new track at the top of the timeline when you try to import a clip to the wrong type of track. If you're trying to add a clip and nothing seems to be happening, scroll up the timeline to see if it has appeared there.

The skill comes in choosing the best music for your production and using it in the right place. Opening and closing sequences are obvious locations, but any sections that lack dialogue are good candidates. If you've used slow- or fast-motion effects, the chances are that the original soundtrack will sound pretty weird, so it's best to replace it with music.

Scenes that include dialogue sometimes benefit from incidental music, but make sure that it doesn't mask the speech. Music written especially for video and film soundtracks tends to be sparse and understated while people are speaking. Music with vocals is extremely rare anywhere except the closing (and possibly opening) credits because it's too distracting. Unless you're making a musical where the people onscreen burst into song, it's best to stick to instrumental music.

When choosing a piece of music, make sure it enhances the mood of the particular scene. That might mean looking beyond your own CD or MP3 collection. Now that legal download services such as iTunes Store and Amazon use unprotected MP3 and AAC formats, it's easy to buy tracks for a few pence and import them straight into your project. Browse these stores' film soundtrack catalogues – in iTunes Store, click the Browse button and select Music, Soundtrack, Original Score and look up some film composers such as John Barry, Danny Elfman and Ennio Morricone. You might want to go for a recognisable classic, such as the theme from *The Good, The Bad and The Ugly* to accompany the kids' cowboy showdown, or pick a lesser-known piece that sets the mood without being too imposing. Alternatively, search for instrumental versions of pop songs, but steer clear of the hideous cover versions made for the karaoke and ringtone markets.

The next challenge is to trim the music to the required length. Feel free to start it at whatever point in your video you like, but it's best to keep it running until the end of the scene. When the video cuts to a new location or some other significant change happens, it feels natural for the music to end. However, ending it mid-scene can lead to an eerie silence.

Check out the iTunes Store's soundtracks department for music that will make a good accompaniment for your videos

Premiere Elements' Fade In and Fade Out buttons add keyframes to an audio clip's volume setting

It's more likely that your chosen music will be too long rather than too short for your scene. One way of reducing its length is to fade it out at the end, but you may find that it's more effective to fade in halfway through and use the natural ending of the music.

To fade a music clip in Premiere Elements, select it on the timeline, click the Properties button, expand the Volume controls at the top-right of the screen and click Fade In or Fade Out. Volume keyframes will be added, which will be visible both on the timeline and on the keyframe tracks (see page 76 for an introduction to keyframe editing). Simply move the keyframe positions to adjust the length of the fade.

In VideoStudio, select the clip on the timeline and, under the Music & Voice tab, click the fade buttons. Click the Audio View button below to view and edit the timing of the keyframes that are created. Fading is much easier in Vegas – simply drag the top corner of an object on the timeline.

> "Recording music yourself may sound ambitious, but it isn't hard and makes the perfect soundtrack"

KEEP IT LEGAL

We should point out that any form of copying or repurposing of commercial music is a breach of copyright. You're unlikely to be hounded by the police for using a track on a home video that you share with family and friends. However, it's more complicated if you intend to put it on public display, such as on YouTube. The use of commercial music in YouTube videos is very common but it breaks the site's terms and conditions, so your video might be removed.

One solution is to record some music yourself. That may sound ambitious, but it isn't hard to record someone playing the piano with your video camera's microphone. If you're shooting a wedding and there's a string quartet playing, leave the camera to record it for 10 minutes – it will make the perfect soundtrack to shots of people milling about. You won't want the accompanying video from these recordings, so unlink the video component and delete it (see page 86).

Another option is to use the library music that comes with your editor. This has three advantages: it won't have any copyright restrictions, it's composed specifically for use with video productions and it's automatically arranged to the exact length you require. The downside is that these libraries tend to be a bit cheesy, but they're worth trying.

In Premiere Elements, use the timeline ruler to decide how long your music needs to be. Click the SmartSound button just above the timeline. In the window that appears, click the words Click here to select music. Double-click a track title to audition it and, when you've found one you like, click Select. On the next screen, try out some of the variations available and enter the required length. Click OK, browse to your project's working folder, click Save and the music will appear on the timeline.

In Vegas, drag the mouse across an empty section of timeline to set the length of your music. Right-click an audio track and select Insert Generated Music. Choose a Theme and Variation, click Next and, on the next page, set the Folder to your project's working folder. Click Finish to add the music to the timeline.

In VideoStudio, click the Audio tab at the top and the Auto Music tab lower down. Choose from the Music and Variation options and click Add to Timeline when you find something suitable. VideoStudio doesn't require you to save the music there and then, and you can resize it to fit the video by dragging either end. When you do so, it will automatically be adapted so that it comes to a satisfying close.

Our three recommended editors all come with library music that's automatically edited to the right length

SOUND EFFECTS

Those spare audio tracks on the timeline aren't just for music. You might also want to add some sound effects. These have the potential to go horribly wrong – we don't want to encourage the comedy honks that some American TV producers seem to think are hilarious. However, it may surprise you to know that nearly every sound you hear in films other than dialogue is added later by sound-effect specialists. If your video is a dramatic production, try adding the sound of slamming doors, running footsteps, bubbling saucepans and so on. Even for simpler home videos, the sound of tweeting birds or babbling brooks can be quite evocative at setting the mood of your production.

Online sound effect libraries are great for livening up your soundtrack

You can record these by getting up close with your camcorder microphone and dropping the clips on to the timeline to bolster the original soundtrack. As before, you'll need to unlink the video and audio and delete the unwanted video element.

Alternatively, try sound effect libraries. A quick online search should reveal hundreds, some of which are free to use. There are lots at iTunes Store, too – search for 'sound effects' followed by the sound you want. Libraries are also available on audio CD, CD-ROM and DVD-ROM from Amazon and elsewhere.

DISEMBODIED VOICES

You can also add a narration to your video. In chapter 2, we advised against speaking while holding the camera, so this is your chance to put your personality into the production.

All three editors include a dedicated function for recording a narration as the video plays back, using a microphone plugged into the sound card. They're all easy to use, but the chances are that the best microphone you own is the one built into your camcorder. You could plug the camcorder's audio output into the PC, but it's unlikely you'll have the right cable.

It's therefore probably easier to record the narration to your camcorder as part of a video clip and import it in the normal way. Watch the video playing back as you record, but turn down your PC's speakers so you record just the narration and not the original soundtrack, too.

Balancing levels

When multiple audio elements are competing for the viewer's attention, adjust their volumes so they're all clearly audible

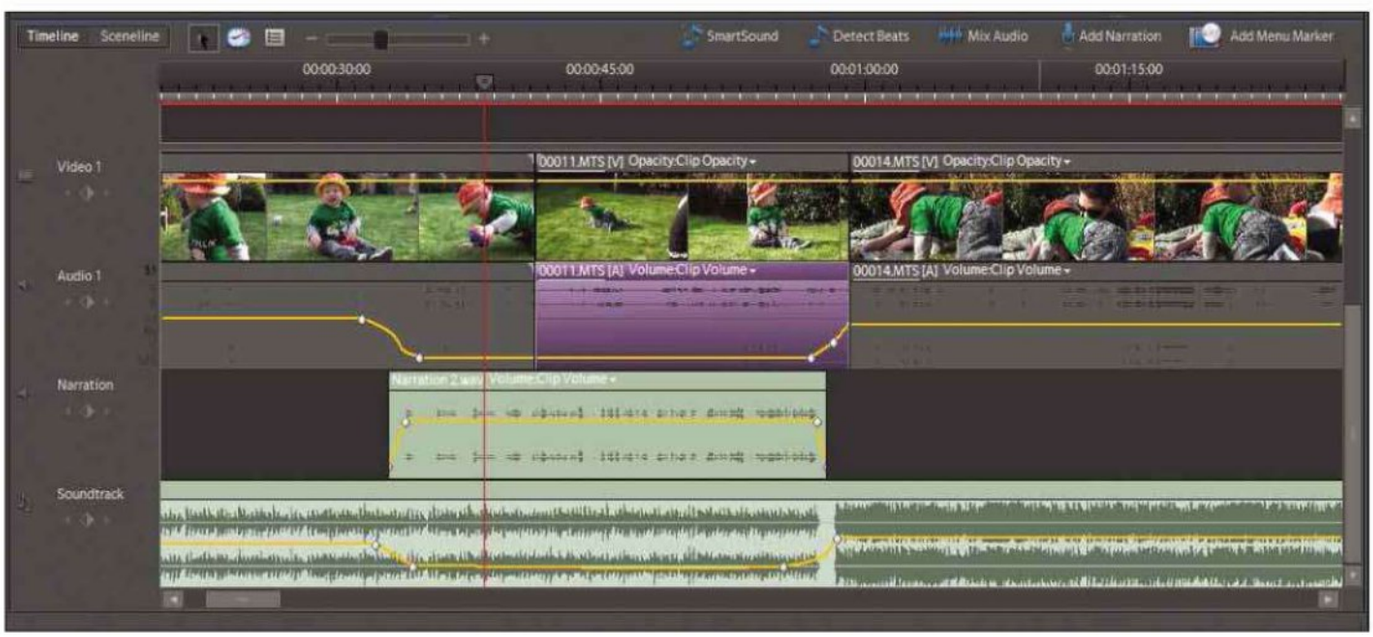
When you're combining multiple audio elements, you'll need to adjust their volumes. This is partly to balance their relative volumes so everything is clearly audible, but it's also to prevent distortion in your exported soundtrack. Video cameras automatically regulate their microphone sensitivity so that the soundtrack is recorded at a healthy volume but not so loud that it distorts. The same is true of music recordings and sound effects. However, using two or more simultaneous audio streams pushes the combined volume into distortion.

The first thing to do when balancing volumes is to take a look at the master level meter. This displays the combined output of all the audio tracks. It's vital that it never goes into the red, as this indicates that your soundtrack is distorted. To see it in Premiere Elements, select Audio Meters from the Window menu. While you're there, select Audio Mixer from the same place. Vegas's level meter and mixer controls are visible by default, but select Mixer from the View menu if you can't see them. In VideoStudio, click the Audio View button just above the timeline on the left.

In Premiere Elements, each audio clip (including video clips' soundtracks) has its own volume setting. View and adjust it by selecting the clip, clicking the Properties button and expanding the Volume control. The same volume setting appears on the Audio Mixer window, and it's also represented by the yellow line on the clip itself. There isn't much room on the screen to adjust this line, but you can give it more space by enlarging the track height. To do this, right-click the timeline header on the left and select a new Track Size.

The quickest way to set each clip's volume is by using these yellow lines. If you want to change the volume over the course of a clip, hold down Ctrl and click the line to create keyframes, then drag their positions to create volume curves. You can also change the volume by adjusting the slider in the Properties panel or Audio Mixer as the project plays back.

Sometimes it's useful to crossfade two audio clips to soften the transition. Click the Edit tab, Transitions, select Audio Transitions from the list and drop the Constant Power crossfade on to the timeline between the two clips.



You can use volume curves to create a careful balance of the various audio elements. Here, we've faded out the original soundtrack (the top track) and reduced the volume of the music (bottom track) so our narration is clearly audible

VideoStudio's Audio View works in a similar way, except that adjusting the volume either on the timeline or with the mixer control always generates a keyframe. This is handy if you want to create volume curves, but quite fiddly if you don't. It's usually easier to adjust a clip's volume with the numerical setting that appears in Timeline View, next to the fade in and out buttons. As with VideoStudio's video dissolves, audio clips are crossfaded automatically when you overlap them on the timeline.

Vegas crossfades overlapping audio clips, too, and it has four fully independent volume controls. This may sound like overkill, but it actually makes it much easier to balance levels. Each audio track has its own volume control, located to the left of the timeline. These are your first ports of call for balancing dialogue against music, narration and sound effects.

It's also possible to reduce the volume of each clip on the timeline by dragging the top edge downwards. To create volume curves, right-click an empty part of an audio channel and select Insert/Remove Envelope, Volume. Double-click the purple line that appears to create keyframes and drag them around to

Premiere Elements' Audio Mixer lets you adjust volumes, but contrary to appearances it works per audio clip rather than per timeline track

create volume curves. The final control is for the master volume, located beside the level meter. If the master output is distorting, you can fix it with a single control rather than having to adjust every track or clip in turn.

All three editors refer to volumes in decibels, or dB. 0dB isn't silent; it means the volume is unchanged compared to the original recording, so in most cases you can consider 0dB to be full volume. When combining two audio tracks, you'll usually have to reduce both to avoid distortion; take them to –6dB and then make one of them quieter still until you achieve the right balance between the two. Reducing rather than boosting will ensure that you don't distort the master output.

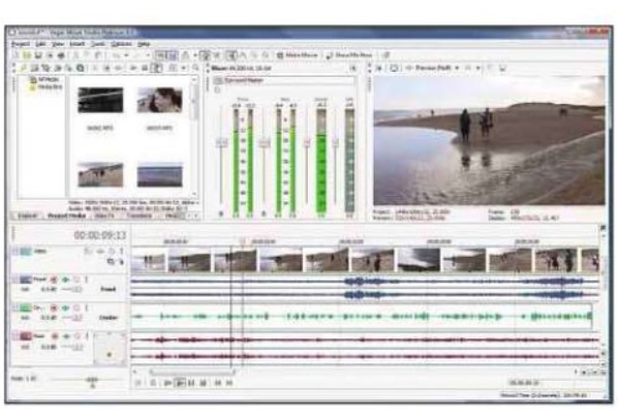
Surround sound

Surround sound envelopes your audience in sound, and can really add to the sense of drama in your production. All three editors support surround sound to an extent, but make sure your chosen export format supports it; DVD, Blu-ray and AVCHD usually do, but YouTube doesn't.

Premiere Elements is the most basic in this respect. Camcorder footage with 5.1 soundtracks is preserved during editing but stereo sources such as music and sound effects always appear from both the front and rear speakers. It's all quite theoretical anyway because it's practically impossible to export in surround sound from Premiere Elements (we'll cover this in the next chapter).

Vegas gives you the option to edit in stereo or 5.1 surround in its New Project wizard. It's important that you work in surround if that's your camera's format. Otherwise the centre channel will just appear from the right speaker, creating a lopsided stereo image. Even if your camera just records stereo sound, you can still have some fun with surround mixing. Each audio track is assigned to the front, rear, centre or subwoofer speakers, or positioned freely using a Surround Pan control. Right-click the speaker name or pan control to switch between these options.

VideoStudio includes the ability to move sounds around the surround soundstage. Click the 5.1 button just above



Use Vegas's surround mixing to place sounds in different speakers. Here, the video's original stereo soundtrack is in the front speakers, a narration is in the centre and music is placed towards the rear using the Surround Pan control

the timeline to enable surround mixing. Click the Audio View button, select an audio or video clip and drag the icon around the Surround Sound Mixer as the video plays back. However, be warned that while it's easy to create sweeping surround-sound movements, it's extremely tricky to adjust or remove them afterwards, other than by re-recording the movements.

Audio effects

If your soundtrack is too boomy, harsh or noisy, rescue it with audio effects. Here we tell you everything you need to know

Audio effects work in the same way as video effects. They're applied to clips to change their character, but in this case, it's the sonic rather than visual character that's altered.

Sadly, VideoStudio's audio effects are pretty much useless, so if you're using this software you may as well skip this section. If you're determined to give them a go, right-click an audio clip and select Audio Filter.

To access Premiere Elements's audio effects, click Edit, Effects and choose Audio Effects from the drop-down list. They're applied to each clip rather than per track, which is a pain if all your clips suffer from the same problem.

Another drawback is that effects can't be applied to 5.1 surround soundtracks. If your camcorder records surround sound and its soundtrack needs attention, your best bet is to edit your video and export it as a video file with stereo sound (we'll cover export in Chapter 7). You can then import this file and apply effects to its soundtrack. However, this means you can't add any other sounds until the video has been edited, exported and re-imported.

Premiere Elements' Dynamics effect is great for levelling out fluctuating volumes in an audio recording

Vegas applies audio effects to entire tracks, which tends to be much more useful for fixing problems with camcorder soundtracks. To apply an audio effect, click the green button on the left of the timeline. Three effects are enabled by default, and you can add more by clicking the green button in the top-right of the window.

Effects can also be applied to individual audio clips. Right-click a clip and select Apply Non-Real-Time event FX. This way of applying audio effects can't be undone, though, so you'll need to re-import the clip from scratch if you want to adjust or remove the effect.

PICKING THE RIGHT EFFECT

The three types of effect you're most likely to need are EQ, compression and noise reduction. At its simplest, EQ consists of treble and bass controls, just like the ones on a hi-fi. Boost the bass to fix weedy sounds or reduce it if it's too boomy. Dull sounds need more treble, while harsh sounds need less.

More advanced EQ effects offer multiple controls at varying frequencies, letting you pluck out problem areas in the frequency spectrum. Vegas' excellent Track EQ effect is pre-loaded on every channel. Premiere Elements users will have to grapple with individual Bass, Treble and Notch EQ effects, or use a VST plug-in (see below).

The compression effect has nothing to do with data compression such as MP3 or MPEG-2. It turns down the volume of the loudest parts of a recording without affecting the quiet parts, compressing the variation in volume. You can then turn the whole lot up without it distorting. This prevents the quieter sounds getting lost when played back at moderate volumes on a TV. Compression effects are built into video cameras, so it's often unnecessary to apply it again during editing. However, if quieter sounds are getting lost, it'll be more effective than just turning the clip up.

Compression effects often have a bewildering array of controls, but the two most important ones are the threshold and

ratio. Lowering the threshold and increasing the ratio results in heavier compression. A –20dB threshold and 3:1 ratio are good settings to start off with. Again, Vegas has a capable Track Compressor effect ready to roll. Premiere Elements users should use the Dynamics effect. Concentrate on the central Compressor section, and use the MakeUp control to boost the level.

Noise reduction is extremely useful in video production, where soundtracks are often blighted by noise from the camera's zoom and focus motors, creaky controls and tape mechanism. Even if the camera manages to keep quiet, ambient noise such as traffic provides yet another hurdle.

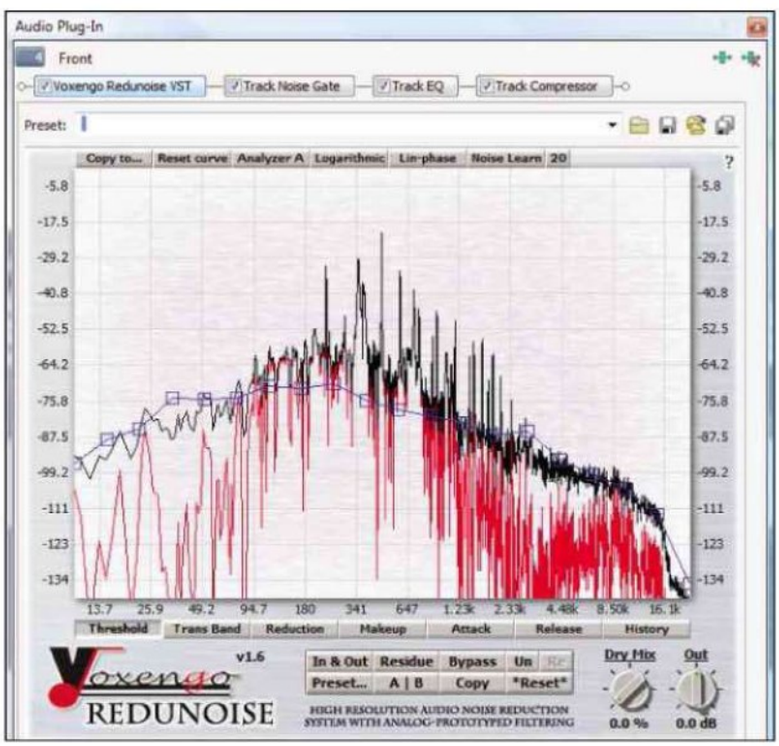
Sadly, no low-cost editors include high-quality noise reduction. Vegas's Track Noise Gate effect simply mutes sounds below a specified volume, which can cause more problems than it solves. Premiere Elements' DeNoiser tries to remove background noise while leaving other sounds unscathed, but it's pretty ineffective.

VST PLUG-INS

All is not lost, though. Both Premiere Elements and Vegas are compatible with VST plug-ins. This is an open standard that allows audio effects from other software developers to be used inside your editing package. Most VST plug-ins are made for music rather than video production, but many are suited to both tasks.

Some VST plug-ins are free, but we don't know of any effective noise-reduction freebies. However, if you're willing to stump up $100 (around £64), Voxengo Redunoise will do a fantastic job on noisy soundtracks. It can't remove bumps and thuds or very loud sounds such as wind noise, but for continuous noise such as whirr from the camera, it's fantastic. Visit *www.voxengo.com* to download the demo, which is fully functional but mutes the output every 25 seconds. While you're there, we recommend that you download EssEQ, too. It's free and much better than Premiere Elements' built-in EQ effects.

When installing a VST plug-in, a .dll file needs to be placed where the host software can find it. For Premiere Elements, you'll need to install it to C:\Program Files\Adobe\Adobe Premiere Elements 7.0\Plug-ins\en_US\VSTPlugins. Vegas is more flexible, so install it to C:\Program Files\Vstplugins\. In Vegas, click the Options menu, Preferences, the VST Effects tab and browse to this folder.



● It's not cheap, but Voxengo's Redunoise does a miraculous job of cleaning up hiss, whirrs and other forms of continuous noise

Once it's installed, you apply Redunoise to a clip or track in the normal way. This is a complex effect that looks pretty daunting, but it isn't hard to get great results.

The first task is to take an audio fingerprint of the noise you want to eliminate. You'll need to find a second or two of audio that has this noise and no other sounds. Along the top of Redunoise's interface, click the button on the right that says 5 and change it to 20. This sets how accurately the audio fingerprint is measured. Click the Noise Learn button, play the section of noise using the normal timeline controls and click Noise Learn again to stop measuring.

Click the Reduction button at the bottom and drag the blue bar upwards. The higher you raise it, the more the noise will be reduced, but be warned that extreme settings can sound a bit weird. Even so, Redunoise beats the built-in noise-reduction effects hands down, and is well worth the expense and effort if you want to get the most from your video soundtracks.

> "The compression effect turns down the loudest parts of a recording without affecting the quiet parts"

SAVING AND SHARING

Your video project is complete, and it's finally time to unleash it on friends, family and the general public. It's easy to rush this task in your eagerness to share the fruits of your labour – and to regain a social life after days or weeks of painstaking editing. Getting it right will ensure that your video looks as good as possible. You'll be able to use the same settings again when you export and share other projects in the future.

IN THIS CHAPTER

Understanding export settings

Exporting can be as simple as picking a template, but it's sometimes useful to know the underlying settings and be able to change them

In our guide to the ins and outs of camcorder formats in Chapter 1, we promised not to bring up this often confusing subject again until page 96. We hope we haven't let you down, but there's no point putting it off any longer – it's time for another look into the dark underbelly of video formats.

Video-editing software provides export templates for destinations such as DVDs, YouTube and iPods. Your exported video will need to be in exactly the right format to ensure compatibility with an iPod, so these export templates save a lot of hassle. However, other situations, such as when you're exporting to YouTube or to keep a file on your hard disk, are less clear cut. On these occasions it's useful to be able to tweak the settings and create your own export templates.

We won't pretend it's easy deciphering the complex array of export options, but let's throw caution to the wind and give it a go.

KEY SPECIFICATIONS

First, look back at page 12 to refresh your understanding of interlaced and progressive scan, common video resolutions and the benefits of various video codecs.

We also need to look a bit closer at aspect ratios. There's a bit of maths coming up, but don't worry – you won't have to do any sums yourself. The aspect ratio of a video is the proportion of its width to its height. Widescreen video is 16:9. Divide 16 by 9 and you get 1.778. The same goes for 1,280 divided by 720 and 1,920 divided by 1,080. Therefore, 1,280x720 and 1,920x1,080 – two common HD resolutions – both have a 16:9 aspect ratio.

HD video with a 1,440x1,080 resolution also has a 16:9 aspect ratio, even though the numbers suggest otherwise. That's because each pixel is stretched so it's 1.333 times wider than it is high. This figure is known as the pixel aspect ratio; it's like the screen's aspect ratio, but in miniature for each pixel. Standard-definition formats use non-square pixels, too. In the UK, widescreen standard-definition video uses 720x576 pixels with a pixel aspect ratio of 1.4568. Non-widescreen standard definition has a 4:3 aspect ratio, a 720x576 resolution and a pixel aspect ratio of 1.0926.

Keeping on top of pixel aspect ratios can be a headache, so we recommend keeping it simple. If you're using one of the resolutions above, stick to the export templates. If you want to use an unusual resolution, perhaps for a website, set the pixel aspect ratio to 1 and make sure the resolution width and height match the aspect ratio of your project. For widescreen HD, divide the width by 1.778 to get the height. For standard-definition widescreen, divide by 1.821, and for non-widescreen, divide by 1.366.

BUDGETING YOUR BIT RATE

The bit rate is how much data is used to describe each second of video; the higher it is, the better the quality. Quality also depends on the resolution, frame rate and codec, so let's see how these work together.

HD video from an AVCHD camera might run at 1,920x1,080 pixels and 25fps with a bit rate of 16Mbit/s. These are the specifications of the top frame opposite. Now let's imagine that we want to produce a 1Mbit/s copy of this video to post online.

We could simply export it at the same 1080p resolution and 25fps frame rate, but that's an awful lot of pixels to describe with a 16th of the original bit rate. The result is the middle frame opposite. Most of the detail is lost

When you're trying to get your head around video formats, it can help to think of a walnut

because the AVC codec has to make sweeping generalisations about the pixels in each frame. The bottom frame has a much lower resolution, with nine times fewer pixels per frame. As such, the AVC codec can describe each pixel pretty accurately. The result is more detail at 640x360 than at 1,920x1,080 at the same bit rate.

As you can see, for a given bit rate, there comes a point where increasing the resolution has an adverse effect on picture quality. Similarly, when the resolution is fixed, an insufficient bit rate will mean lost detail, particularly in fast-moving scenes.

Another way to cope with low bit rates is to reduce the frame rate. This isn't advisable, though, as you'd have to drop it by a huge amount to reap significant benefits. Meanwhile, smaller changes such as converting from 25fps to 20fps involves discarding every fifth frame, which can make motion look lumpy.

The final variable is the codec. Better codecs can provide more detail for the same bit rate or the same amount of detail at a lower bit rate. The AVC codec is about as good as it gets, though, so there's no point in switching to a different one in this case.

DISSECTING A VIDEO FILE

Before we start encoding videos, we need to take a look at how codecs are organised. A video file is a bit like a walnut. The shell represents something called a container. Common video container types are AVI, MP4, WMV and MOV. (These letters, known as file extensions, appear at the end of filenames but aren't visible in Windows by default. To see them, open a folder and click the View menu, Folder Options, View tab and untick Hide extensions for known file types.)

Inside the container there are two distinct elements, a video and a soundtrack, each with its own codec. For example, AVCHD clips have an MTS container, and inside they use the AVC video codec and Dolby Digital audio codec. Sometimes the container, video codec and audio codec are related. For example, a WMV container will always use a WMV video codec and WMA audio codec. Other containers let you mix and match codecs freely.

From here on in it gets horrendously complicated. Things that you might think are a recognised standard video format – such as MPEG4 – are often a sprawling tangle of standards. DivX uses the MPEG4 video codec, but it's a different sort of MPEG4 to the one used by AVC. There's also an MP4 container, but MPEG4 video is just as likely to use an MTS, M2TS or AVI container.

If you want to know more about this bubbling inferno of jargon, see the article at *www.expertreviews.co.uk/features/198663*. The thing to remember is this: when choosing a video format to export, you'll usually need to choose a container type first, and then you may also have to choose the specific codecs for the video and audio elements. We'll look at some examples on the next page.

The top image above is a frame taken from an AVCHD clip. The middle picture is a copy with the same high resolution, but its low bit rate isn't sufficient to describe all those pixels. The bottom image's lower resolution is more appropriate for the low bit rate, so it preserves more detail than the middle frame

Export and archiving

With the editing over, it's time to make a master copy of your video and tidy up your hard disk ready for the next project

Regardless of whether you'll be watching your finished video on an high-definition projector or an iPod, it's always worth making a master copy to keep on your PC that preserves the full quality of the original footage. This should be straightforward to do, but it isn't always. For example, Premiere Elements is pretty hopeless at exporting in surround sound, and Vegas is strangely lacking in standard-definition widescreen templates. So let's look at some typical settings for a range of camera types.

Start by locating your editor's export module. In Premiere Elements, click the Share tab, followed by Personal Computer. In Vegas, click Make Movie at the top of the screen, select Save it to my hard drive and click Next. In VideoStudio, click the Share tab and the Create Video File button.

MINIDV

The DV format used by these tape-based cameras produces massive files, but they're certainly high quality, especially for fast-moving scenes. Choose PAL rather than NTSC, and select widescreen if necessary. DV is easy to find in Premiere Elements and VideoStudio's export templates. In Vegas, start by selecting Video for Windows (*.avi).

There's not much to look at when choosing export settings – thank goodness for kittens!

OTHER STANDARD-DEFINITION CAMERAS

For other types of standard-definition camera or for those with MiniDV cameras but limited disk space, exporting in MPEG2 format makes more sense. MPEG2 files are reasonably small, and pretty much any software can play them. In Premiere Elements, select MPEG and then PAL DVD (either Standard or Widescreen, as necessary). In VideoStudio, click the Share tab, Create Video File and select DVD/VCD/SVCD/MPEG followed by PAL DVD (4:3 or 16:9).

Vegas users with non-widescreen footage can choose MainConcept MPEG2 followed by DVD PAL. However, there isn't a widescreen version of this template, and you can't customise MPEG2 templates. Our preferred solution is to export as a 720p HD file. Select MainConcept MPEG2 followed by HDV 720-25p. The file will be about twice the size as it needs to be, in terms of both pixels and disk capacity, but it will still take up less disk space than a DV file.

The only potential drawbacks are that some software can't play these files, and that this template is progressive scan, so motion might seem less smooth. However, progressive scan is often deemed to have a desirable film-like quality, so it's not a huge disaster. If this export format doesn't work for you, use the DV format, as described above.

HD CAMERAS

Pretty much all HD video cameras record at 1,920x1,080 pixels. The AVC format (also known as H.264) is a popular choice for HD footage and suitable templates exist in all three editors. In Premiere Elements, choose MPEG followed by H.264 1920x1080i 25. In Vegas, choose Sony AVC followed by AVCHD 1920x1080 PAL. In VideoStudio, choose AVCHD followed by PAL HD - 1920.

1080P HD CAMERAS

Exporting progressive-scan projects is trickier because the AVCHD format doesn't explicitly support progressive scan (even though some AVCHD cameras can record it; such are the paradoxes of video encoding). It's often easiest to use the HD export templates above, as most playback software and devices will recognise progressive scan even when it's labelled as interlaced, and display it appropriately.

Alternatively, you can export in WMV format, which is always progressive scan. You should have no problem finding a suitable template (Premiere Elements' one is erroneously labelled HD 1080i 25, but it is actually 1080p).

SURROUND SOUND

The easiest way to export in surround sound is to make a DVD, Blu-ray or AVCHD disc, but it's handy to be able to keep a video file with surround sound on your hard disk, too. Sadly, support for surround sound in export templates is patchy, but there are a few options. We'll assume that if your camera records surround sound, it's also widescreen.

If you're using Premiere Elements your only option is to use the MiniDV export template above. There's no way to export HD video with surround sound in a single file, and even its DVD and Blu-ray export lacks surround support.

In Vegas, the only standard-definition export format (other than DVD disc) is WMV – choose the template called 5 Mbps HD 720-25p Video, 5.1 Surround. For HD surround sound projects, choose Sony AVC followed by AVCHD 1920x1080 PAL 5.1 Surround.

In VideoStudio, choose PAL DVD (16:9, Dolby Digital 5.1). For HD surround projects, you'll have to export as a Blu-ray or AVCHD disc.

ARCHIVING YOUR PROJECT

It's a good idea to make a copy of all the files you used for a project, either as a backup or to free up space on your hard disk. Remember that if your archived copy is the only copy, it's not a backup; consider making two archived copies and store them in different places.

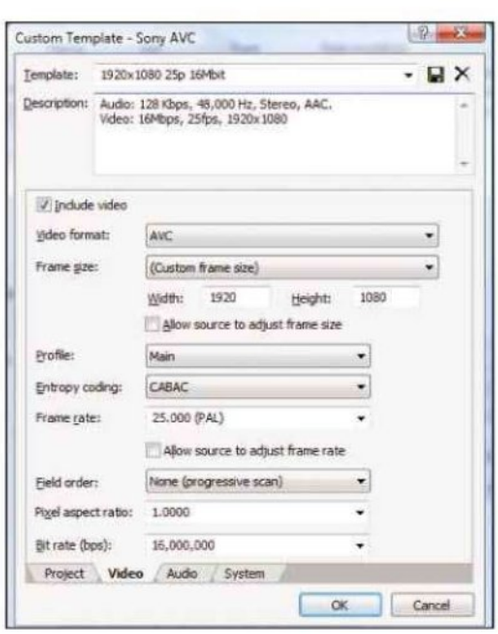
Now comes the payback for your diligent efforts to keep all the files used in your project in a single folder – the project's working folder, as we called it. Simply burn a copy of this folder as a data DVD or Blu-ray disc using Nero or whichever disc-burning software you have. Don't forget to include the final exported video file, too. You may have to span the project across multiple discs, but it isn't hard to do so manually – just fit as much as you can on the first disc, make a quick note of what's on it, do the same for the next disc, and so on.

> "It's always worth making a master copy to keep on your PC that preserves the quality of the original footage"

As a final precaution, it's worth making extra copies of your finished video. Many tape-based camcorders are able to record video coming back up the FireWire cable, allowing you to export your finished project to tape. Your editor will help you to do this. In Premiere Elements, click the Share tab and the Tape button. In Vegas, click Make Movie and Save it to my camera or portable device. In VideoStudio, click Share followed by DV or HDV Recording.

Another useful backup medium is DVD Video or Blu-ray. If you're not planning to produce discs complete with interactive menus, it's still worth making a copy to keep in your DVD collection, just in case it comes in handy. It can have standard menus, or no menus at all.

Premiere Elements and VideoStudio users needn't follow the tutorial on DVD authoring over the page to do this – just use the Create Disc function under the Share tab. In Vegas, create a Blu-ray disc by clicking the Tools menu, Burn Disc, Blu-ray disc. To make a DVD, you'll need to import the master copy of your video into Vegas's sister application, DVD Architect Studio.



● To create your own 1080p AVC template in Vegas, click the Project menu, Render As, select Sony AVC, Default Template and click Custom. After you've entered the settings shown here, save the template using the floppy disc icon

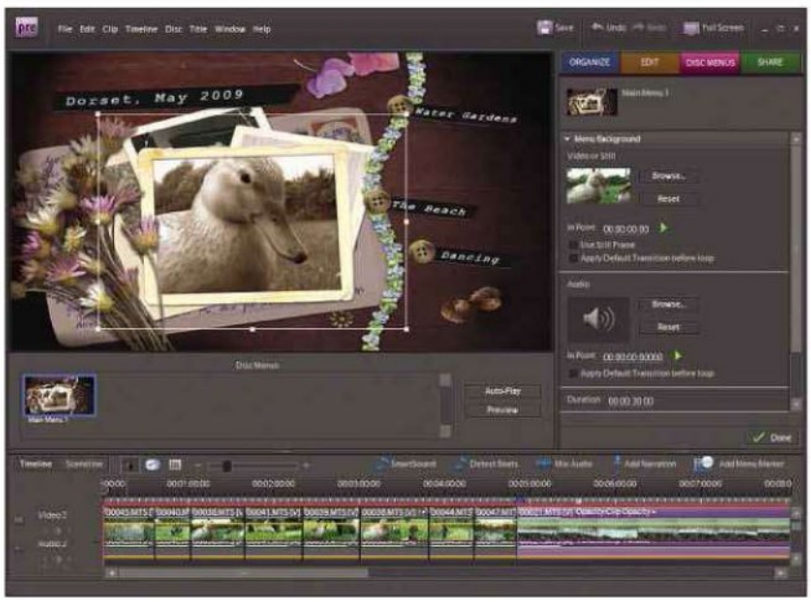
DVD and Blu-ray authoring

DVD and Blu-ray are excellent formats for archiving and sharing, and making the discs provides another opportunity for a bit of creativity

The DVD Video format is massively popular. The vast majority of UK living rooms have a DVD player tucked under the TV, and most PCs these days have a DVD drive. Quality is excellent, the discs are easy to make using pretty much any video-editing software and blank media cost a few pence.

One thing DVDs can't do, however, is high definition. This is where Blu-ray comes in. Blu-ray is essentially DVD Video in HD, with resolutions up to 1,920x1,080 pixels per frame. Professional discs also offer superior sound quality and more sophisticated menus. These facilities aren't available in low-cost software, but Blu-ray's main advantage – HD video – is readily available.

All three of our editing packages can create DVDs with interactive menus, and Premiere Elements and VideoStudio can make menu-based Blu-ray discs, too. All three also come with a stack of template menu designs. These are handy for getting started, but it's worth customising menus with your own background video and music. This is the ideal opportunity to use any clips that are visually appealing but somewhat lacking in activity. You'll also be able adjust the layout of buttons and text, but be careful not to make them too small or place them too close to the edge of the frame.



● **Premiere Elements' menu templates let you incorporate your own video clips within the stock designs**

Your discs are likely to consist of a main menu page with a link to one or more videos, and possibly a scene-selection page. Let's see how you would go about putting such a disc together in each application.

PREMIERE ELEMENTS

Open an editing project that you want to make into a DVD Video or Blu-ray disc. To combine multiple projects on a disc, import master copies of the finished videos (see page 98) on to the timeline in the order in which you want them to appear. Click the Disc Menus tab, choose a menu template category from the drop-down list and browse the presets.

If you're making a Blu-ray disc, choose a preset with an HD icon. You can use these for DVD projects, too, so you'll only need to design the menus once for both types of disc.

Some templates consist of a full-screen photograph or video background with text overlays; pick one of these and you can replace the background with your own full-screen clip. A few are designed with frames specifically for your own clips, as in the template shown on the left.

As you drag a template on to the preview window, you'll be asked if you want to create Menu Markers. Don't choose this option, because it's best to do this manually in a moment. To preview animated menus and see how the buttons will work, click the Preview button just below the preview window.

Select a text object to change the font, size and colour. Rearrange the various components by dragging them and double-click to enter your own text. Click the Browse buttons on

the right to add your own video, photograph or musical backgrounds. If you want to try a different template, click Done and drag another one on to the preview.

A disc with no markers will have a menu page with a single button to your video. Scene Markers create chapter points and a scene-selection menu page. To add these markers, position the red playback marker on the timeline, right-click on the ruler at the top and select Set Menu Marker. Scene Marker creates chapter points, but if you want a link on the main menu rather than a scene-selection menu, choose Main Menu Marker.

The third option is to create a Stop Marker. This brings the viewer back to the menu page when they get to this part of the disc. That's useful if you have two unrelated videos on the same disc, where it doesn't make sense to play one straight after the other.

When you're happy with your disc, click the Share tab and then the Disc button, select DVD or Blu-ray and choose an appropriate Preset. For DVD, this means PAL Dolby DVD or PAL Widescreen Dolby DVD. For Blu-ray, go for H.264 1,920x1,080i PAL Dolby.

VIDEOSTUDIO

Access VideoStudio's disc-authoring module by clicking the Share tab followed by Create Disc and then either Blu-ray, DVD or AVCHD (see page 103 for more information on AVCHD disc authoring). The current project is automatically added to the disc. Add further videos, either as video files, VideoStudio projects or even DVD or camcorder footage using the buttons at the top. To add chapter points to a video, select it and click Add/Edit Chapter.

At this point it's a good idea to set the disc properties. If you're using dual-layer media, tell VideoStudio using the button at the bottom-left. To switch from stereo to surround sound, click the button marked with a cog and then click Change MPEG Settings, Customise and the Compression tab. Change the Audio format to Dolby Digital and Audio type to 3/2.

Click Next to proceed to the menu designer, choose a menu template and click the remote control to preview it in action. The drop-down list arranges them by category: Text and Thumbnail refer to how buttons will look.

SmartScene menus show a large motion preview of the highlighted button. They can look smart, but the underlying structure is quite complex and the menus can also be slow to navigate.

● VideoStudio's SmartScene menu templates are sophisticated, but you may find that they're slow to navigate in your DVD player

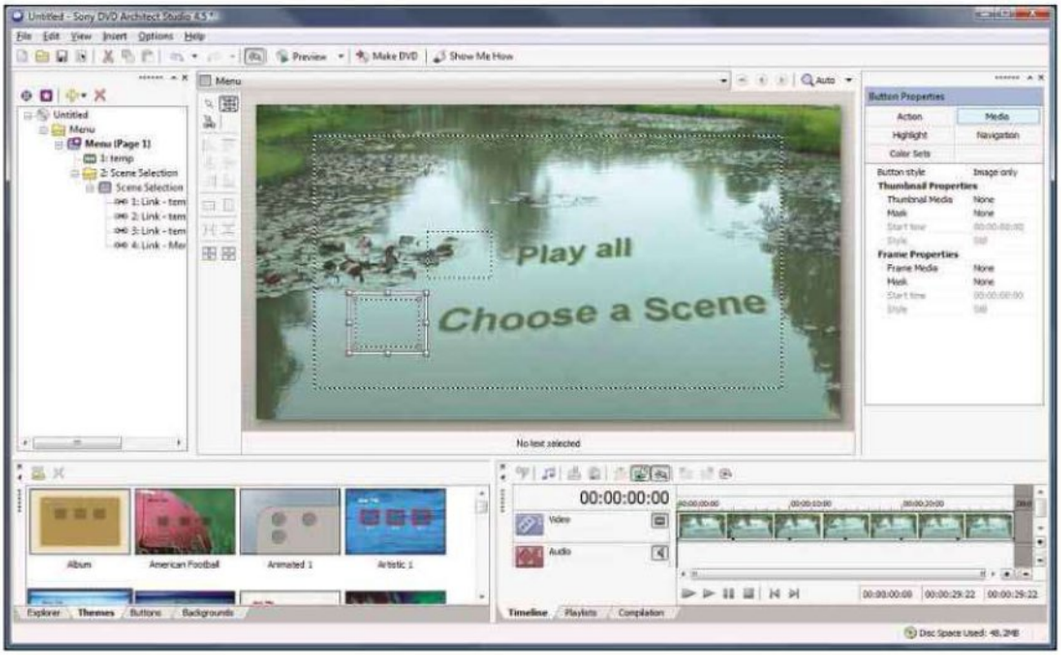
Click the Edit tab and you'll find options to use your own image, video and audio backgrounds. The Menu In and Menu Out options are transitions between menus and videos and other menus. They're not that impressive, though, and once again they make menus slow to navigate. We recommend selecting the top option, No Transition.

By default, videos that have chapter markers will have a scene selection menu instead of a direct link on the main menu. This means that in order to play a video from the beginning, viewers will have to use the scene selection menu. The alternative is to disable scene selection menus completely. Viewers will still be able to jump to chapters using the forward and back remote controls buttons. To do this, click the Edit tab, Advanced Settings and deselect Create Chapter Menu.

VEGAS AND DVD ARCHITECT STUDIO

Vegas's Blu-ray discs don't include menus, so there's not much to think about here. Arrange your videos in order on the timeline and create chapter points by positioning the timeline marker and typing M. Then click the Tools menu followed by Burn Disc, Blu-ray. Select Sony AVC as the video format and Blu-ray 1920x1080-50i, 16Mbps as the template.

Vegas's DVD Video authoring is handled by a separate application, DVD Architect Studio. You can import the master copy of your finished video (see page 98) into this software, but you'll get the best results by exporting especially for DVD Architect from Vegas's



DVD Architect Studio, which comes with Vegas, is much more flexible than the other packages in terms of both menu design and disc structure

timeline. Click the Make Movie button and select Burn it to a DVD, ticking the widescreen option if necessary. This will produce an MPEG2 video file and a separate Dolby Digital audio file. When it's finished, click Send to DVD Architect Studio.

DVD Architect Studio will open with the correct widescreen and soundtrack settings, but then it will try to open the last DVD project. If it asks to save changes, click Cancel. Open the Project Properties from the File menu and adjust the Target media size to 4.70 for single-layer or 8.50 for dual-layer discs.

To add other videos to your disc, drag them from the Explorer tab to the preview window. Click the Themes tab and double-click a template to apply it. DVD Architect Studio's menu templates are fairly simple, but there's much greater scope to customise menus.

By default, each button comprises a static thumbnail and text, but you can delete one for thumbnail-only or text-only buttons. Type F2 to edit the selected text object. To animate a video thumbnail, click the Media tab and change the style to Animated. It's also possible to swap the thumbnail for a custom graphic designed in an image editor – click Thumbnail Media, select Replace and browse to a file.

For really smart-looking menus, you can create a graphic that appears only when the button is highlighted. Create a simple graphic with a transparent background in image-editing software (see page 75) and save it as a PSD file. Back in DVD Architect Studio, select a thumbnail button, click the Media tab, and for Thumbnail Media, select Remove to make the button invisible (remove any Masks, too). Click the Highlight tab, change the Style to Custom and, under Mask, browse to the PSD file.

The limitations of the DVD format means that this graphic will just be a block colour, but you can make it translucent via the Color Sets tab and line it up with a text object to show what it links to. You could even delete the text and use Vegas to design some effects-laden animated titles and export it as a video clip to use as the background for your menu.

There are various ways to create additional menu pages in DVD Architect Studio. To make a scene-selection menu, first add some chapters. Double-click a link on the menu to open a video. Use the timeline to locate the frame for a chapter point and type M. Hit the Backspace key to return to the main menu, right-click the video and select Insert Scene Selection Menu. To generate additional menu pages, right-click a menu and select Insert Submenu.

There's a lot more to DVD Architect Studio than we have room for here. To discover its full potential, check out the feature at *www.expertreviews.co.uk/features/104428*.

> "For really smart-looking menus, you can create a graphic that appears only when the button is highlighted"

Blu-ray on the cheap

You don't have to splash out on an expensive Blu-ray writer to make HD discs that you can watch in the living room

HD camcorders are affordable and their quality can be fantastic, but you may need some additional hardware to watch your edited HD projects in the living room. HD-Ready TVs and Blu-ray players are widely available, but they'll set you back at least £500 for the pair. Of course, you can use them for more than just home videos, and having an HD home cinema is quite a pleasing by-product.

To make your own Blu-ray discs, you'll also need a Blu-ray writer for your PC. These drives currently cost around £140 (LG's GGW-H20L is a good choice), while blank discs cost around £3 to £5 each. That's fine for the occasional project every few months, but if you're planning on making lots of shorter videos, those blank media costs can soon mount up.

Another option is to save HD video to DVD media. You'll still need an HD-Ready TV and a Blu-ray player, but if you're using VideoStudio or Vegas, you may not need a Blu-ray writer and expensive media.

We need to make a distinction here between DVD and DVD Video. DVD is the disc itself; it might hold a movie, PlayStation game or a backup of your documents. DVD Video is a video format comprising MPEG2 footage that complies with strict specifications and is stored on a DVD disc in a VIDEO_TS folder.

A DVD Video can't be high definition, but it is possible to burn HD video to DVD media. If you burn them in the right format, these discs may play in a set-top Blu-ray player. We say 'may' because, in our experience, support for these discs is patchy. But if it works in your Blu-ray player, that's good enough.

One option is to create an AVCHD disc. The first generation of AVCHD camcorders included a few models that recorded directly to 8cm DVDs, and AVCHD on DVD media is a recognised format. VideoStudio includes AVCHD Disc among its export options, which stores 80 minutes of Blu-ray-quality video on dual-layer DVD media. The downside is limited compatibility. In our experience, Sony and Pioneer Blu-ray players can play these discs, but Samsung and Sharp models can't. Panasonic players seem to be OK with the discs but only if they don't include menus. Untick the option on the first page of the disc-authoring module to make a menu-less disc.

Nero Vision, which is part of the Nero suite, can also create AVCHD discs. We've found that some Samsung players that don't like VideoStudio's AVCHD discs can play Nero's discs. In short, AVCHD disc support is variable, so you may have to experiment to see what works with your player.

Another option is to write Blu-ray data to DVD media. This option is included in Vegas, via the Tools, Burn Disc, Blu-ray Disc menu. These discs won't have menus (the Blu-ray format supports menus but Vegas lacks the tools to design them), but they can include chapter markers. We've found that these discs play in Pioneer, Sharp and Sony but not Panasonic and Samsung Blu-ray players.

Premiere Elements sadly lacks the ability to write HD video to DVD media, so you'll have to splash out on a Blu-ray writer and media – or alternative software – if you want to play HD videos in the living room.

The ability to fit over an hour of Blu-ray-quality video on to cheap DVD media is great, as long as your Blu-ray player can read the discs

Video-sharing sites

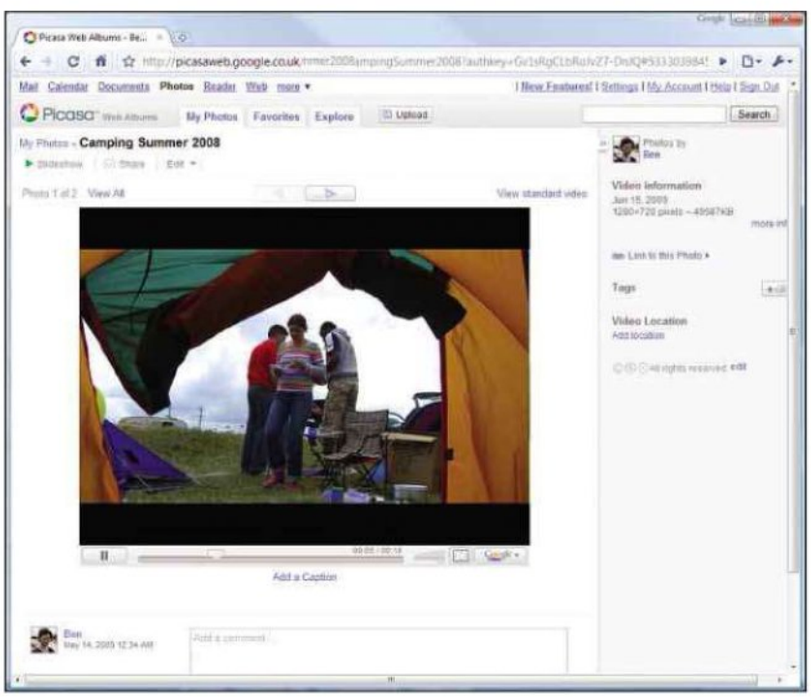
The best part of making home videos is sharing them with others, and there's no better way to do it than via a site such as YouTube

Until recently, sharing videos meant a choice between the high quality of DVD and Blu-ray and the convenience of websites such as YouTube. Now that choice is a little easier. YouTube is certainly easy to use – an uploaded file and a group email is much quicker and cheaper than creating and posting lots of DVDs. Meanwhile, YouTube has recently undergone a huge improvement in quality, and its HD mode is arguably better than DVD Video.

YouTube isn't the only free service, though. Its competitors include Vimeo, Metacafe and Yahoo! Video, and MySpace and Facebook can host videos as part of user profiles. Picasa, Flickr and Photobucket are better known for sharing photos, but they all support video, too.

Even so, it's easy to see why YouTube is the most popular service. None of the others currently matches its combination of a generous 10-minute running time, unlimited videos per account and excellent video quality.

Picasa (*http://picasa.google.co.uk*) has a few special talents that make it worth considering, though. One is that videos can be of any length as long as they're under 1GB. Another is that it's possible to incorporate photos and videos in the same online album, which is ideal for holidays and family events.



Picasa is a bit clumsy at handling video files, but it has some useful home-oriented features that YouTube lacks

Picasa's three-tier privacy control is another strength. The Public setting lets anyone watch your video. The Sign-in option only lets other Picasa users you invite see it. That's useful, but it's a bit of a pain for friends and family who don't have a Picasa account. The Unlisted option is a good compromise. Anyone can watch an Unlisted video but it won't appear in searches, so they'll need to know the link. That keeps it fairly private without the inconvenience.

Sadly, Picasa is a bit clumsy in the way it manages video files. They appear on the website as a 320x240-pixel clip, with an HQ button upping the resolution to 640x480 pixels. However, the video files are stored in their original format on Picasa's servers, and with just 1GB of total storage available per account, you'll need to use a low bit rate to avoid running out of online storage space. We recommend WMV or AVC format with a 640x480 resolution (640x360 for widescreen) at 1Mbit/s. This will give you around two hours' total running time for your 1GB online storage.

For most occasions, YouTube has the best combination of features. It offers excellent quality and unlimited storage space, and it's unbeatable for reaching as wide an audience as possible. Its massive popularity and the way it suggests related videos mean that home videos can snowball into international sensations, making its creators into overnight stars.

EXPORTING FOR YOUTUBE

Premiere Elements, Vegas and VideoStudio all have built-in upload features for exporting directly to YouTube without leaving the editing software. This is all well and good, but it isn't hard to log into the YouTube website and upload videos that way. In fact, you're much better off taking this route – as of May 2009, none of these editors' export functions takes

advantage of YouTube's switch to widescreen and High Definition video.

The High Quality and High Definition modes deliver a massive boost in quality compared to YouTube's previous one-size-fits-all quality setting. (If you're interested in the numbers, older clips are encoded at a 320x240 resolution and a bit rate of 200Kbit/s. HQ mode runs at 480x360 and 512Kbit/s, with HD mode at 1,280x720 and 2Mbit/s.)

The basic quality is always available to viewers; when you email them a link, this is what they'll get. However, just below the player they'll see a button marked HQ or HD. If you upload standard-definition video, an HQ button appears. If you upload in high definition, it'll be an HD button. Clicking these buttons switches to the higher-quality video stream.

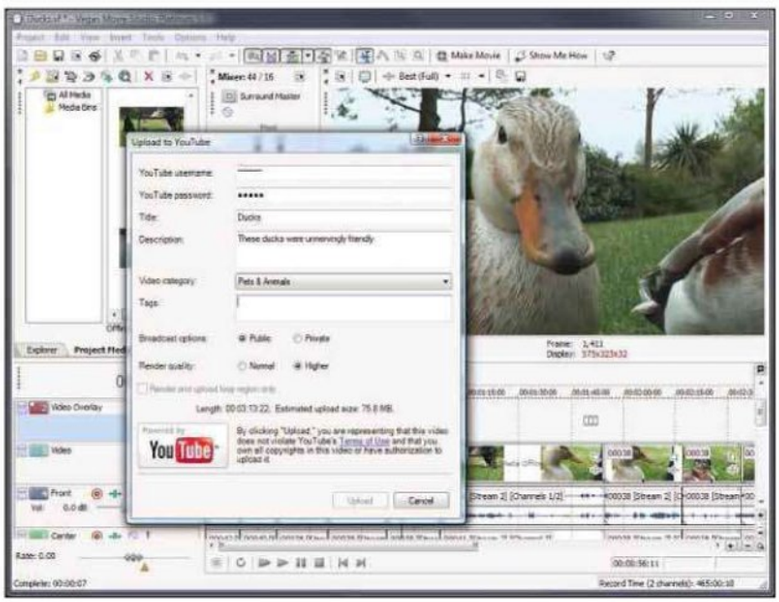
YouTube's guidelines suggest that you upload videos in their original format rather than convert them beforehand. There's some sensible thinking behind this. Each time you convert a video, you lose some of its quality. YouTube's servers need to convert videos after they're uploaded. It does an excellent job, preserving the original frame rate and applying de-interlacing where necessary. As such, it makes sense to send YouTube the best-quality version at your disposal, as long as it's not too big to upload.

YouTube has a 10-minute maximum running time and a 1GB maximum file size per video. This means that the DV format used by MiniDV cameras is impractical; a 10-minute DV file consumes 1.8GB disk space. For standard-definition projects, MPEG2 is a decent choice. Quality will be much better than YouTube's HQ mode, and the file will be no bigger than 700MB. The resulting file may take a couple of hours to upload, but we reckon that's a bearable amount of time. Refer to the instructions on page 98 for making standard-definition MPEG2 files.

Vegas sadly lacks a widescreen standard-definition MPEG2 template. Instead, select Render As from the Project menu and choose Sony AVC, YouTube Higher Quality 25p. Click Custom followed by the Video tab, and change the width to 640 and the height to 360.

EXPORTING HD PROJECTS

YouTube's HD mode looks great, but its 2Mbit/s bit rate is seriously demanding for internet connections; not everyone's broadband service is that fast. Even when the connection doesn't cause a bottleneck, we've found that playback sometimes stutters, and it's often necessary to let the entire clip download before starting to watch it. PCs that are a few years old may not be powerful enough to play these HD videos smoothly at all.



Until Adobe, Sony and Corel update their editors' YouTube export for widescreen and HD compatibility, you're best off exporting and uploading manually

Some people therefore won't be able to view YouTube's HD mode. If you upload a clip as HD video, the intermediary HQ mode won't be available so viewers with slower connections will have to settle for the basic-quality version. As such, you'll need to make a decision as to whether to provide the best possible quality for some viewers or intermediary quality for everyone. If you choose the latter, you should export your project as standard-definition MPEG2 or AVC format, as explained above.

If you want to go for HD, you could just upload your top-quality HD file using the settings described on page 98. However, the chances are that this file will be bigger than YouTube's 1GB limit. It will also contain more pixels than YouTube needs – most HD cameras shoot at 1,920x1,080, but YouTube's HD mode runs at 1,280x720. As such, you can afford to reduce the resolution and create a more manageable file.

MPEG2, AVC or WMV are all sensible formats for this. The relative merits of each are irrelevant as long as you keep the bit rate way above the 2Mbit/s used by YouTube. We'll choose WMV because all three editors include a suitable WMV template. In Premiere Elements, select Windows Media and HD 720p 25. In Vegas, go for Windows Media Video V11 and 5 Mbps HD 720-25p Video. In VideoStudio, it's WMV, WMV HD 720 25p.

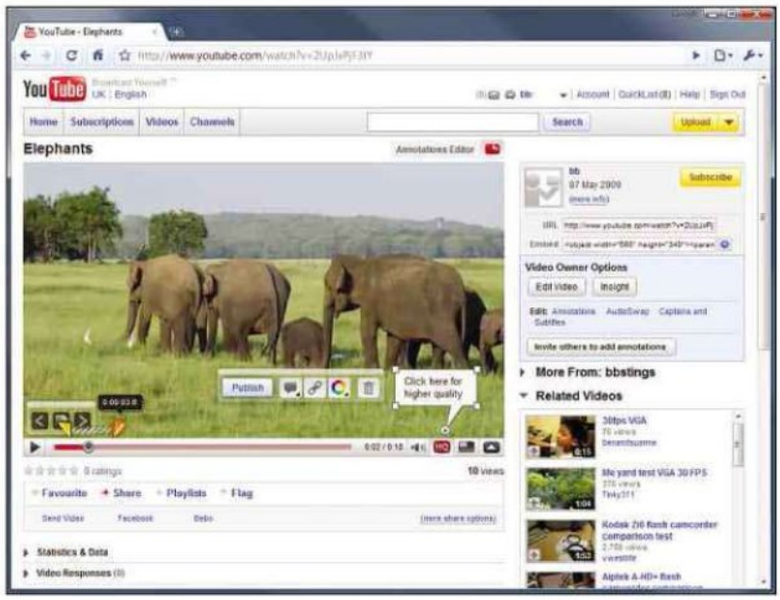
UPLOADING AND TAGGING

You'll be glad to hear that YouTube gets a lot easier from now on. If you haven't got an account yet, visit *www.youtube.com*, click Sign Up and following the instructions. Make sure you choose your username carefully because you can't change this later.

Click Upload followed by Upload Video and browse to the file on your hard disk. Uploading can take some time, but while that's happening you can tag your video to make it easier for others to find. The Title will appear above the video clip and its Description appears on a panel to the right.

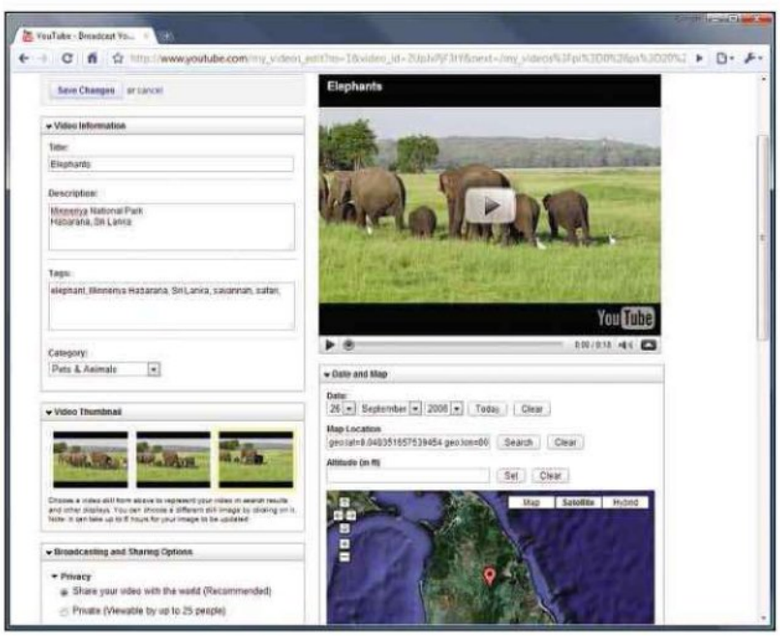
Tags aren't normally visible but they help YouTube's search engine. If you want people to find your video, add any vaguely relevant words. Pick a category from the drop-down list and choose a privacy setting: either shared with everyone or only viewable by up to 25 invited YouTube users.

When the file is uploaded, click Go To My Videos. It takes a few minutes to convert the video to the correct format, and the HQ and HD versions can take a little longer to appear. In the meantime, click the Edit button to add a date and map location, change the thumbnail and choose whether to allow comments and ratings. Comments are a key part of YouTube's community spirit, but they're often used for illiterate insults, so it's no great loss to bar them from your videos.



● The Annotations feature provides a novel way to add text and links to other YouTube videos

● The more numerous and accurate your tags, the more likely it is that other people will find your videos



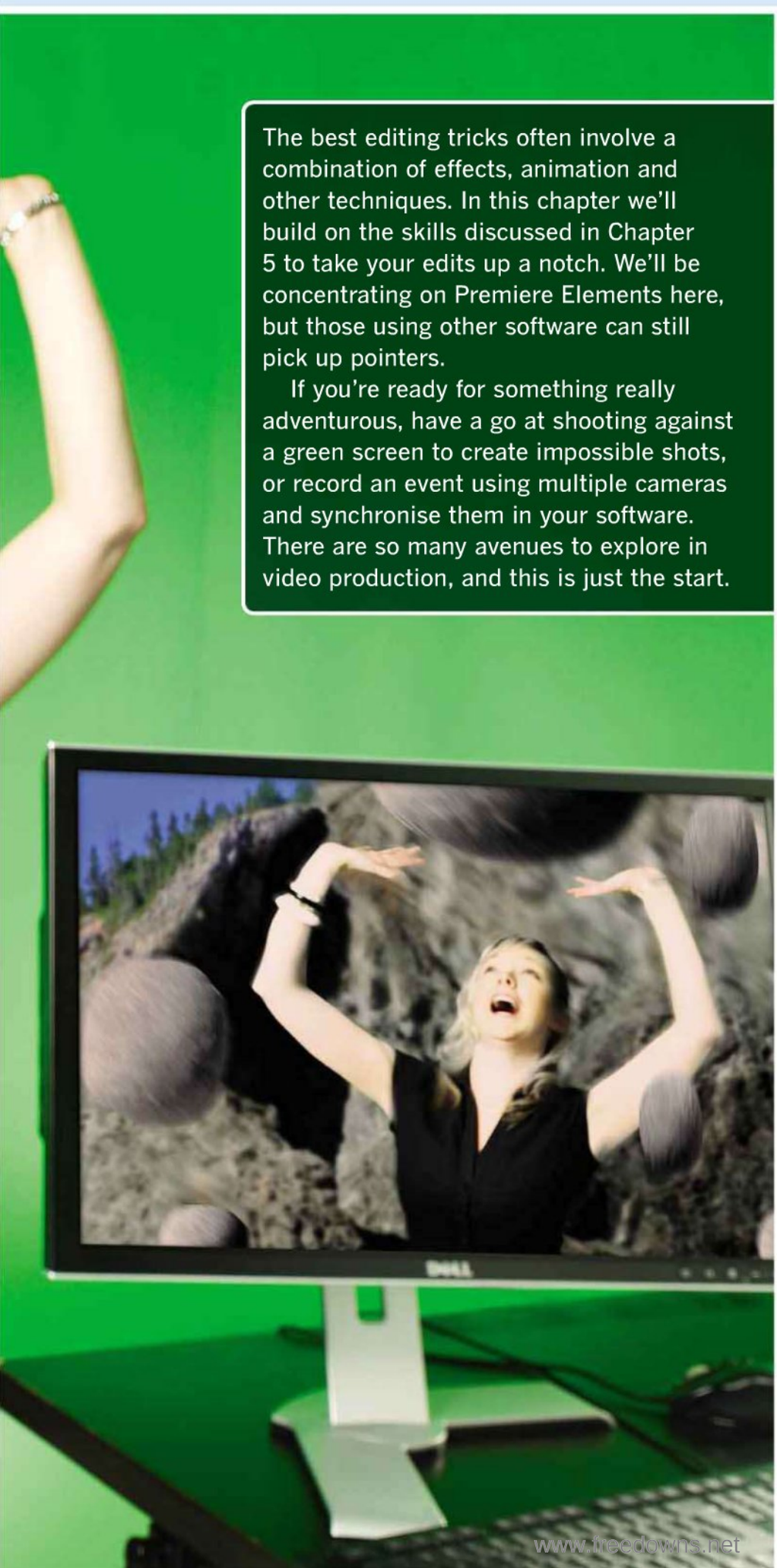
ANNOTATIONS

There are lots of other features in YouTube, with new ones appearing on a monthly basis. One recent addition is Annotations, which lets you add text over the top of video clips. Because they're saved as text, they're much sharper and more legible at a small size than text in the video itself. Typical uses include a speech bubble to advise viewers to click the HQ or HD button, or perhaps a caption to introduce someone.

Adding Annotations is remarkably easy. Simply view one of your uploaded videos, enable the Annotations Editor button above the video window and click anywhere in the frame as the video plays back. You'll get a choice of three object types: a speech bubble, a text box and a highlight box. Try them out to see how they behave. Move annotations around the frame and resize them simply by dragging, and adjust their duration with the bar that appears above the main playback bar.

Annotations can also link to other YouTube pages. Click the link icon while designing an annotation and paste in a link to another YouTube page. They can even link to a particular point in a video, which could be used to build a scene-selection menu into the start of a video. Alternatively, click the link icon, select Channel and type in your YouTube username to create a link to your YouTube Channel, the home page for all the videos you've uploaded.

ADVANCED TECHNIQUES



The best editing tricks often involve a combination of effects, animation and other techniques. In this chapter we'll build on the skills discussed in Chapter 5 to take your edits up a notch. We'll be concentrating on Premiere Elements here, but those using other software can still pick up pointers.

If you're ready for something really adventurous, have a go at shooting against a green screen to create impossible shots, or record an event using multiple cameras and synchronise them in your software. There are so many avenues to explore in video production, and this is just the start.

IN THIS CHAPTER

Animate name straps

Introducing a person or place with a strip of text can set a scene, and creating professional-looking animated name straps is simple

A strip of text to introduce a person or place is a common sight in news and documentary programmes. The standard format is to place it at the bottom of the frame, running across from the left. These strips are known as 'lower thirds' because this is the area they occupy on the screen.

Premiere Elements includes various lower-thirds templates, but they're busier than anything used by professionals. What we want is a simple, smart design that does its job without being too distracting.

1) Select the clip over which you want to add text by clicking on the timeline. From the Title menu, choose New Title and Default Still. Select the style of text that appears using the mouse and type in your own. Click the Selection Tool to the right of the preview window and move the text down into position. Keep it inside the white rectangles towards the edge of the frame, though, because TVs often crop the picture slightly and text outside this box may be truncated.

2) Choose a font that's not too fussy and has chunky characters to maximise legibility. You can then afford to reduce the size by grabbing one of the corner handles. Hold down Shift as you resize the text to maintain its width-to-height ratio. Alternatively, use the font size control under Text Options. This allows for two sizes in the same text object, which is ideal for a title and subtitle.

3) White text often works best but can be hard to read against a light-coloured background. You can get around this by opening Color Properties (click the artist's palette icon) and ticking Drop Shadow.

You could also try adding a block colour behind the text. The Rounded Rectangle Tool is particularly good for this. Right-click it and select Arrange and then click 'Send to back' to make it appear behind the text. Use Color Properties to change its colour. You might even like to add a simple graphic prepared in an image editor. Do so by clicking the Add Image button.

4) Premiere Elements' text animation presets are a little fussy. We want a simple animation so that the entire graphic comes into view from the left. Click a blank part of the timeline to exit the Titles editor, click the Title object on the timeline and then the Properties button to the left of the timeline zoom slider to reveal the Motion controls. Drag the playback marker about one second into the title's duration and create a Position keyframe (see pages 76 and 114 for more on keyframes).

5) Drag the playback marker to the start of the clip and adjust the Position value until the title is fully off-screen. Right-click the second keyframe and select Temporal Interpolation and then Ease In so that it comes to rest gently.

6) Rather than make the title fly away again at the end, fade it out gently by clicking Fade Out, which is under Opacity at the bottom of the Properties list. Adjust the length of the fade by dragging the left keyframe left or right.

Create textured text

Static text can look dull, but by adding a texture you can liven it up and create amazing titles that will draw your viewers in

Static, block-coloured text can look bland, but somersaulting text animations are often gaudy. A good middle ground is to give titles a textured fill with subtle internal motion, so the text's outline remains static, but the colours inside move around.

1) Drag the playback marker (a vertical red line on the timeline) to the point where you want the text to appear. Use the handle at the top of the marker to move it. Click the Title menu and choose New Title, Default Still. Drag the mouse across the default text to select it and type your own text.

Format it using the Text Options on the right of the preview, click the Selection Tool (the one with an arrow icon) and move the text into position. On the timeline, drag the title object from the track labelled Video 2 to the Video 3 track.

2) Drop a video clip with a subtle, slow-moving texture on to the Video 2 track. This will provide the coloured texture for your text. You won't want the clip's soundtrack, so right-click it and select Unlink Audio and Video. Click a blank part of the timeline to deselect, click once on the soundtrack and hit the Delete key. Adjust the clip's length so it matches the text by dragging its right edge.

Click the orange Edit tab, choose the Effects sub-tab and drag the Track Matte Key effect on to the video clip. Click Edit Effects below the effects list and, under the Track Matte Key settings, select Video 3 for the Matte value. This instructs Premiere Elements to use the text on track three as a cut-out shape (known as a mask) for the video on track two.

3) You should see the text created in Step 1 filled with the colours of the video added in Step 2. However, you may want to adjust the colour to increase legibility. To do this, select the clip on Video 2, click Properties and adjust the values under Image Control. Soften colours in the texture with the Gaussian Blur effect or apply the Wave Warp effect to increase the internal motion of the texture. Click Edit Effects and drag these effects above the Track Matte Key effect so the texture, but not the text's outline, is affected.

Nostalgia trips

A wavy transition immediately tells your audience that they're about to travel back in time with you. Here's how to create the effect

Elaborate transitions are justified if they help the flow of narrative. For example, a wavy transition is instantly recognisable as a flashback. It's not the most sophisticated of visual effects, but in the right situation it can add some light-hearted fun to the proceedings.

1) The Wave effect is not available in older versions of Premiere Elements, but the latest version of the software has a transition specifically for this task. Click the Edit tab, choose the Transitions sub-tab then scroll down to the NewBlue Motion Blends Elements section. Drag the Wave transition on to the timeline between two clips. The default transition length is just over a second, but it's worth experimenting with slightly longer times by dragging either end of the transition as it appears on the timeline.

2) For better-quality results, start with the Cross Dissolve transition. Click the Effects sub-tab, drop the Ripple effect on to the first clip and click Edit Effects. Adjust the effect's settings so the first four parameters are set to zero, Vertical Rate is at 100 and Vertical Width is 51.

Move the playback marker to the start of the transition and click the Stopwatch icon to the right of the word 'Ripple' to enable keyframes. Drag the playback marker to the middle of the transition and increase Vertical Intensity to 20. Move to the end of the transition and reduce the value to 0.

3) Right-click the bar at the top of the Ripple effect's settings (on the word 'Ripple') and select Copy. Select the second clip on the timeline. Right-click the Parameters panel and select Paste to add the Ripple effect with the same settings as the first clip.

Repeat the procedure to animate the Vertical Intensity value from 0 to 20 and back to 0 across the length of the transition.

4) The Ripple effect is spoiled by a white border that appears on either side of the picture. To prevent this, select the first clip, enable keyframes for its Motion controls and increase the Scale value from 100 at the beginning of the transition to 140 mid-way though the transition. Repeat this for the second clip, animating the Scale parameter from 140 to 100.

5) Apply the Gaussian Blur effect to the first clip and use keyframes to animate the Blurriness parameter from 0 to 30 across the length of the transition. Then do the same for the second clip, animating the setting from 30 to 0.

6) For a cheeky finishing touch, add a rippling harp sound effect to accompany the transition. You'll find one at *http://tinyurl.com/harpsample*.

You may also want to try giving the flashback footage a distinctive appearance to differentiate it from the other sections, perhaps by using the Old Film effect or another colour-processing technique.

Virtual TV

If you're filming a computer or TV screen, you'll need to drop in the image using software. This is easy to do in Premiere Elements

Whenever you see a TV or computer screen on a TV programme, the chances are that the image it displays has been dropped in digitally rather than recorded live by the camera. This is because it's hard to match the brightness of the image with the surrounding scene so that both are exposed properly. It's much easier to drop a video clip on to the screen using software, as long as there are no obstacles in the way and the camera is static.

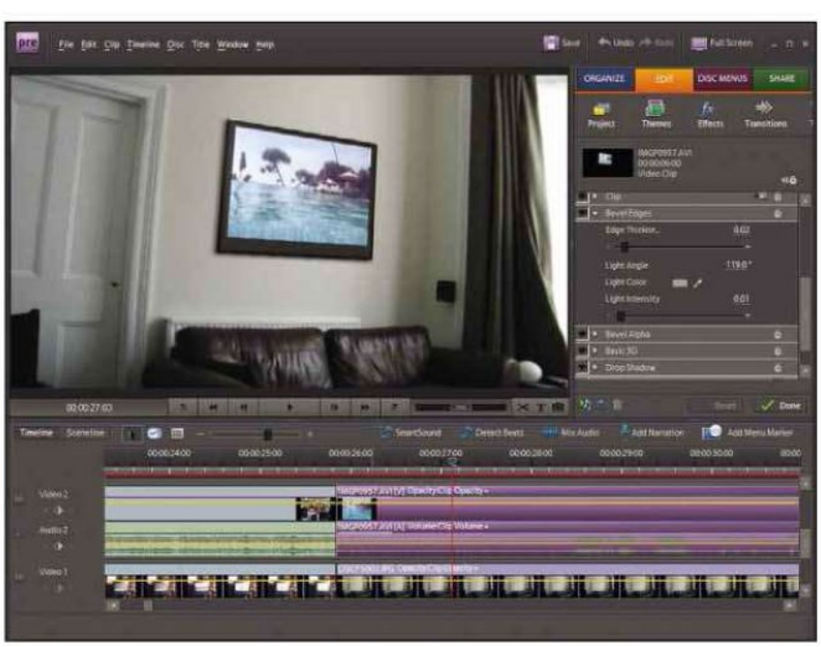
The Camera View or Basic 3D effect can be used to skew a video clip so it hangs in 3D space in a convincing manner. To apply an effect, click Edit and then the Effects sub-tab, drag the effect on to the clip and click Edit Effects to see its properties. If you're using the Camera View effect, switch off the background fill by clicking Setup to the right of the effect's name and untick the Fill Alpha Channel option. This pop-up editor isn't so useful for other settings, as changes aren't previewed instantly in the main window, so click OK and use Premiere Elements' standard controls.

The Basic 3D effect is a little more approachable than Camera View, but you'll need to use it in conjunction with the clip's Position, Scale and Rotation controls (under the Motion heading) to line up the clip precisely. Whichever effect you choose, you'll need to use trial and error to get an exact fit, so don't expect perfect results to come quickly.

If you're dropping a picture on to an old-fashioned CRT TV with a slightly bulbous screen, use the Spherize effect with a large Radius value to mimic this shape. You may find it easier to apply this to the clip before the Camera View or Basic 3D effect, so drag it to the top of the list so that it is applied first.

Another trick is to build a border around the video so that it looks as if it's appearing on a virtual flat-panel TV. The example (below right) was created using the Clip effect to add a dark grey border around the video, Bevel Edges and Bevel Alpha to give it a raised appearance, Drop Shadow to cast a shadow on to the wall and Basic 3D to position it on the wall.

● **Here we've used the Camera View effect to drop a picture on to the TV set and used Spherize to give it a slightly bulbous appearance**



● **This TV was created from scratch using a video clip with various effects applied to it**

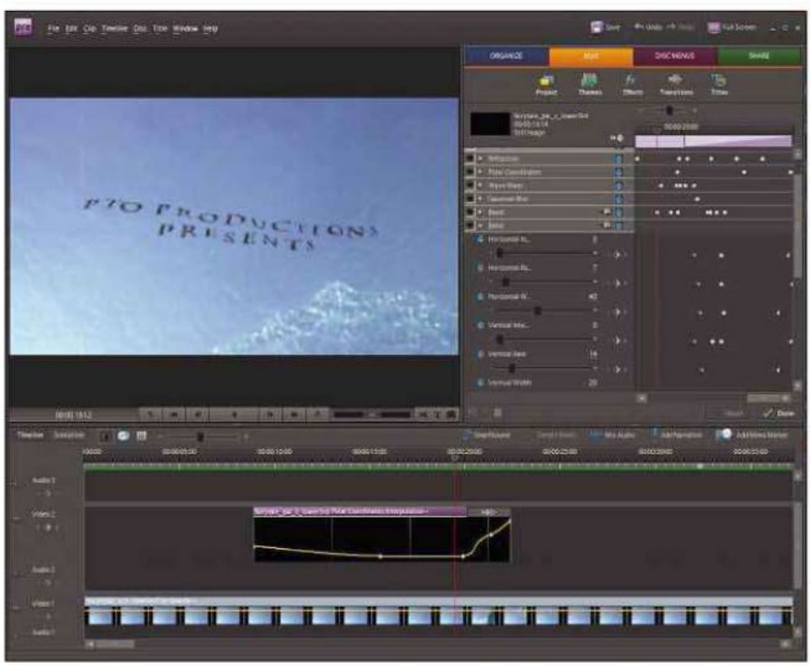
Master keyframes

Whether you want to jazz up your titles and credits or create subtle video effects, the power of keyframes can help

Keyframes are an integral part of video editing, allowing settings to be varied over time. They're used to animate objects, be it simple scrolling credits or full-blown cartoon animations. They also play a crucial role when manipulating effects, with subtly or even dramatically changing parameters that help the effect interact with the source footage.

While the basic concept is simple enough, keyframe editing can be highly complex. Editing multiple tracks of bezier curve keyframes in both temporal and spatial planes can produce amazing results, but to the uninitiated it can be as daunting as it sounds. Here we'll explore the nuts and bolts of keyframe editing, take a closer look at the advanced options available in Adobe Premiere Elements and reveal how to get the most from them.

Low-cost video-editing software such as Adobe Premiere Elements caters mainly for casual users, but dig a little deeper and you'll find a wealth of powerful keyframe editing tools. Keyframes take a little getting used to, but they're incredibly useful. Today, they're part of almost every video-editing application. They also crop up in other creative software such as Adobe Flash, 3D-modelling applications and music-production software – essentially, anything with a timeline.



● Premiere Elements has various distortion effects that are quite effective in isolation, but layering four of them on top of each other and using staggered keyframes to randomise their behaviour has produced extremely natural-looking motion for our titles sequence

Keyframes are easiest to understand in the context of animation, so we'll use that as an example. Let's say we want a scrolling credit, with a single line of text appearing at the bottom of the screen and disappearing at the top four seconds later. Rather than define the position of the text for each individual frame, keyframes let you define the start and end positions, leaving the software to fill the gap with smooth motion. To speed up the motion, you simply bring the two keyframes nearer to each other on the timeline. If you want to reverse the direction or make the text travel from left to right, you move the text's position at each keyframe.

Keys to the door

The best way to get to grips with keyframes is to try them out yourself. We'll be using Premiere Elements because its keyframes implementation goes way beyond that of the competition, though the first stages of this tutorial also apply to most other editors.

Insert a graphical object on to the timeline; a small image works best as it won't tax the processor and make the software unresponsive. Click it in the preview window, reduce its size (you'll see why in a minute) using a corner handle, and drag it to the bottom of the preview. Select the Edit tab at the top-right, the Effects sub-tab and click Edit Effects, below the thumbnails. We haven't added any effects at this stage, but Premiere Elements' Motion controls reside in the same place. Just below and to the right is a stopwatch with an arrow next to it; click it to reveal the keyframe editor.

Keyframes are switched on and off for each effect by clicking the stopwatch icon to the right of each effect. Doing so creates a keyframe at the current point in the timeline, so before you click this button, drag the playback bar to the

beginning of the clip using the handle at the top of the red vertical line. Click the stopwatch icon next to Motion to enable keyframe editing and create a keyframe. Next, drag the playback marker to the end of the clip, and then drag the clip itself up to the top of the preview screen. When keyframes are enabled, adjusting a parameter will generate a new keyframe automatically. Return to the beginning and hit the spacebar to see the animation.

There's no limit to the number of keyframes allowed. To add more, move the playback bar to another frame and adjust the image's position again. Keyframes will appear on the keyframe timeline. To adjust the timing of these keyframes, click the arrow next to the word Motion. This reveals six lanes of keyframes, one for each parameter. You should find that only the Position parameter has multiple keyframes. The rest should only have one, which means that their settings are currently static.

On the right track

This multitrack approach to keyframes is unusual, as most other editors use a single lane of keyframes per effect. Although they can look daunting, multitrack keyframes are actually much simpler to edit. They mean that keyframes for one parameter don't get muddled with those of another. To experiment with this, create a Scale keyframe at the end of the timeline by moving the playback bar to the end and adjusting the Scale value. Offset this keyframe's timing by dragging it to the left. You'll notice that the Position keyframe is unaffected; this is extremely tricky to achieve in most other editing software.

Generating a keyframe is so easy that new ones are sometimes created accidentally. To adjust the value of an existing keyframe, the playback marker must be at exactly the right frame. The easiest way to do this is with the controls to the right of each parameter slider. The diamond-shaped button creates a new keyframe at the current frame, but the ones to either side jump to the previous and next keyframe. Jump to a keyframe and adjust the parameter and you won't risk unintentionally generating extra keyframes.

Another common problem is when you want to apply keyframes to some parameters but not others. For example, a Rotation keyframe was created when you first activated keyframes for the Motion effect. Therefore, adjusting Rotation will create another keyframe and animate between the two values. If you simply want to adjust Rotation to a new, fixed value, click the Stopwatch icon to the left of the parameter name. This disables keyframe editing for that particular parameter.

● Keyframes let you choose how to animate a graphic, adjust the contrast and brightness over time and more

Beautiful curves

You will probably have noticed that a dotted line appeared when you created a second keyframe by dragging the object across the preview screen. If this isn't visible, click on the object as it appears in the preview. You may also have noticed that introducing three or more Position keyframes results in a curved line. This line shows the path taken for object animation, and Premiere Elements' default use of curved paths produces more natural-looking motion than the linear paths of other programs.

Premiere Elements goes much further, with sophisticated controls to define the path between keyframes. It can create linear motion if that's what is required, while its curved paths can be tailored using bezier curve tools. Bezier curves are common in illustration software such as CorelDraw, and use handles about a fixed point (in this case, a keyframe) to adjust the trajectory of the curve. The exact behaviour of these handles is more easily witnessed than described, so grab the end of a handle and give it a whirl to see what happens.

A choice of four types of curve are included with Premiere Elements. Auto Bezier is the default for motion paths, and produces a gentle curve around the keyframe. Adjusting its

handles switches it to Continuous Bezier. Here, the two handles can be of different lengths, but they always face in opposite directions, maintaining a smooth curve about the keyframe. See Keyframe 2 on the annotated screenshot on the right for an example of this.

To place a sharp corner in a curved path, hold down the Ctrl key while adjusting a handle. This allows the two handles to face in different directions, as demonstrated by Keyframe 3. To create a straight line between two keyframes, switch to Linear by holding down the Ctrl key and clicking the keyframe itself. Ctrl-click again to return to Auto Bezier.

Need for speed

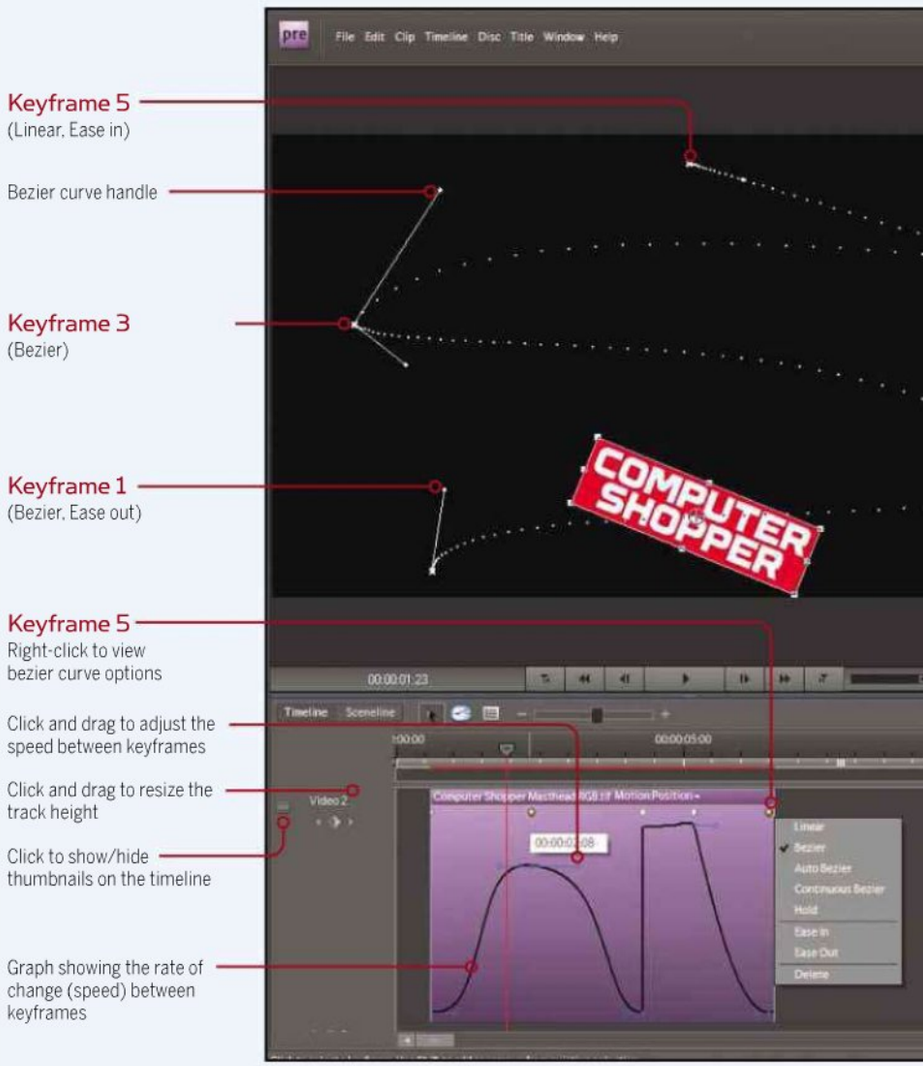
Bezier curves are easy to visualise when applied to motion paths, but they're also available for all other types of keyframes in Premiere Elements. Here, the curves dictate the rate of change, or speed, rather than the direction. For example, when adjusting the Scale from 20 to 100 and back to 20 again using three keyframes, the object will grow at a constant rate from 20 to 100, and then shrink at a constant rate back to 20. However, switching the middle keyframe from Linear to Auto Bezier will make the rate of growth slow down as it approaches 100, before slowly beginning to shrink again. This often gives much more natural-looking results, not just to object animation, but to keyframe editing of virtually any effect parameter.

Only Position keyframe paths appear on the preview window, so bezier curves for other types of keyframes must be adjusted on the keyframe timeline or main timeline. Right-click a keyframe on the keyframe timeline to see a drop-down list of bezier options. This is useful for quickly switching from Linear to Auto Bezier, or to select the Ease In and Ease Out options, which slow down the rate of change just before and after the keyframe.

For precise control over these velocity curves, you can view them as a graph on the timeline. The default height of the timeline tracks makes these graphs difficult to see clearly, though. To increase the height of a track, hover the mouse just above the track

Using keyframes

This screenshot shows some typical settings used to animate an image using keyframes in Premiere Elements. There are five Position keyframes, which define the location of the Computer Shopper logo at different moments in time. These keyframes are represented by five points along the path shown in the preview window, and also by the five hourglass-shaped icons on the keyframe timeline on the right and the five grey dots



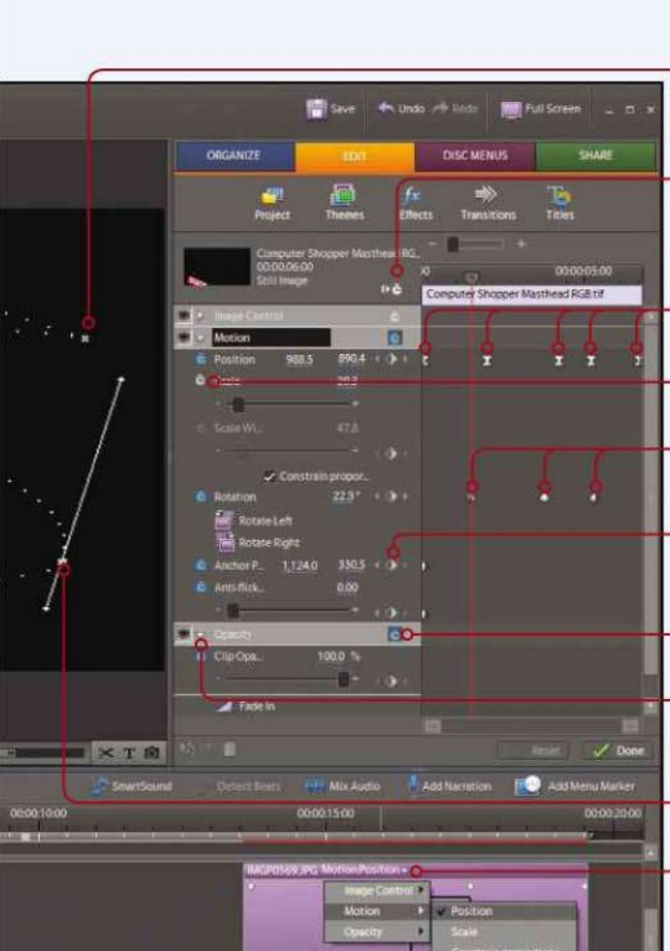
> "Curved paths and smooth acceleration give objects a sense of mass and momentum"

name (typically Video 1 or Video 2) until the cursor icon changes and drag upwards.

On the timeline, locate the object that you animated earlier, click on the words Opacity: Clip Opacity, and select Motion, Position to see a graph showing the speed of movement

in Premiere Elements

along the top of the object on the main timeline. The dotted line joining the keyframes in the preview window shows the path taken for the animation, with each dot representing a frame – larger spaces between dots means faster motion. The speed of motion is also represented by the curved line in the purple block at the bottom, and it's here that the speed can be edited using the blue horizontal handles.



of this object. By default, the velocity between any two keyframes is constant, so this graph should consist of horizontal blocks between each keyframe. Right-click on one of the keyframes at the top of the graph and select Continuous Bezier. Now, rather than travelling in blocks of constant velocity, it will accelerate and decelerate. Once again, this gives a much more natural sense of motion.

You can also fine-tune the curves on the graph using the blue horizontal handles. Adjusting these can be quite fiddly, as position, velocity and acceleration are all interdependent, but with practice it's possible to produce highly controlled animations. If a curve won't bend to the desired shape, try adjusting the timing of the keyframe by dragging it to the left or right.

Do try this at home

Armed with this knowledge, you should now be able to animate objects with tight precision. Curved paths and smooth acceleration give objects a sense of mass and momentum, breaking away from the rigid, synthetic movement of linear keyframe animation. This is great news for anyone attempting to produce character animations, but it's also useful for breathing life into simpler animations such as intro sequences, credits and animated logos.

Keyframes are just as useful when applied to other types of effects. Distortion effects benefit greatly from precise keyframe animations, and there's no reason why other creative effects and colour-correction shouldn't be given the same treatment. Subtle flourishes using keyframes will make effects look more sophisticated and appear to interact with the source footage much more than static settings.

Keyframes can also make effects creep in from nowhere. Rather than start an effect abruptly, start it at zero strength and fade it in gently over a second or two. This is great for making titles dissolve in and out using the Gaussian Blur effect rather than the standard fade in and out. You could also try combining it with a distortion effect such as Bend to give a sense of natural internal motion.

Motion in real life is often extremely complex, so combining multiple distortion effects often gives more convincing results than using just one. You might even find that multiple instances of the same effect work well, as this will allow you to apply different keyframe-animated settings to each. When doing so, use bezier curves and stagger the keyframes of the various parameters to avoid noticeable lumps and jolts in the animation.

The list of potential uses for keyframes is endless, and it's rare that a project won't benefit from them. Why not go through some of your existing projects and see how keyframes can boost the quality of the results?

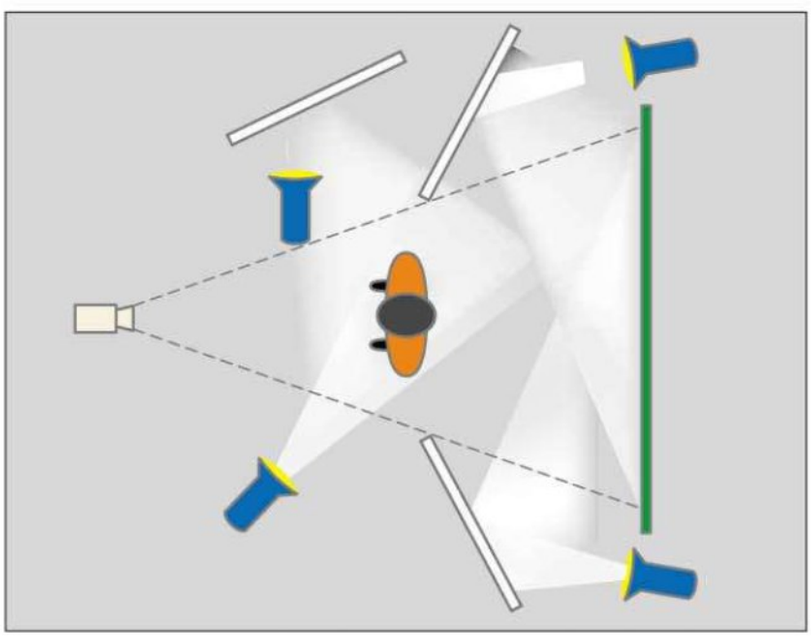
Create green-screen effects

Want to soar above the clouds without a plane? We explain how to do the impossible with a green-screen effect

If you want to fly like Superman, come face to face with yourself or shrink down to the size of an ant, you can do it with chroma keying. This technique, sometimes described as the green-screen or blue-screen effect, lets you isolate moving images from one video clip and superimpose them over another.

Most home-oriented video-editing software includes chroma keying, but the process is as much in the filming as the editing. The right preparation can make the difference between convincing superimposed shots and a grubby, dysfunctional mess. In this tutorial, we'll show you how to achieve excellent results on a shoestring budget.

Chroma keying is a video-editing technique whereby a particular colour is specified to be made invisible, allowing the remaining areas of the footage to be superimposed on top of other footage or images. Its best-known use is in TV weather forecasts, where the presenter stands in front of a green screen; to the viewer, they appear to be standing in front of a map. There are lots of other applications for chroma keying in TV and film production. It's commonly used to superimpose various elements of a special effect together, such as adding sparks and flying debris to an action scene.



This diagram shows how you might light a shot for chroma keying using four lamps and three white cards to diffuse the light. Note the even illumination of the screen

Choosing a scenario

You'll tend to use chroma keying because a scene demands it rather than for the sake of it. However, chroma keying can be tricky to get right, so it's worth having a practice run.

First, decide on a scene that requires chroma keying. Ideally, you should start with a newsreader-style headshot. This means your monochrome screen can be fairly small, which makes it easier to set up. This type of shot is ideal for interviews, video blogs and pop videos.

If you're feeling more ambitious, try a full-length shot. This requires a bigger screen to film against and makes lighting trickier. We'd still recommend cropping the subject at the knees; creating a monochrome set that covers the wall and floor is particularly challenging. This type of shot is perfect for producing weather reports, virtual on-location reports, magic tricks, guitar solos... you get the idea.

If you fancy a serious challenge, you could try building a monochrome set with walls, floor and props to sit and climb on that match the geometry of your virtual set. The camera and lighting angles of the two shots will need to match precisely if the subject is to look like he or she is rooted to the floor. This is for highly skilled, brave or foolhardy people only. For now we'll stick to something simpler.

Key ingredients

The goal when shooting a scene for chroma keying is to capture your subject against a backdrop of a consistent colour that doesn't appear in the subject itself. Afterwards, when you tell the software to remove everything that's

green, for example, it knows exactly which areas to remove and which to keep. Green and blue backdrops are commonly used because they're far removed from human skin tones. If you're filming your pet frog, you might be better off using a red backdrop. The more vivid the colour, the easier it will be for the software to identify and remove.

Chroma screens are available commercially from around £30; you'll find examples at *www.jackthehat.co.uk*. However, there are lots of other options. A brightly coloured sheet or other large piece of fabric can work well. Make sure it's aggressively garish, as relaxing sky blue or meadow green won't work as well.

The screen needs to be much bigger than you might initially envisage. If the subject is positioned right up against the screen then he or she will cast shadows across it, which will create problems. If you move the subject forward, you'll need a bigger screen to fill the view around him or her. Typically, a head-and-shoulders shot will require a 6ft² screen and full-length shots will require a 12ft² screen.

Just as important as the screen itself is the means to light it. Lighting should be as even as possible across the entire screen, so you'll need at least two light sources, one at either side. You'll also need to illuminate your subject, and you'll find it much easier if you use separate lights for the screen and subject. The brighter these lights the better, as video cameras produce cleaner, more vibrant colours when there's a lot of light.

If you can get the scene really bright, you'll be able to use a fast shutter speed to minimise motion blur. This is useful for chroma keying as it creates a sharper border between your subject and the background. If necessay, stock up on low-cost lamps and high-power bulbs to put in them.

Setting up to shoot

Set your screen up on the shorter wall of the biggest room at your disposal, making sure there are no creases. Position your video camera at the opposite end of the room and point it at the screen. You'll probably need to zoom in a little so the screen fills the shot. When doing so, bear in mind that most video cameras' LCD screens crop the image (in the same way that TVs do), so you'll be recording a slightly wider shot than you can see on the display. You'll only know for sure when you get the footage on to the PC, so it's best to err on the side of caution.

● Premiere Elements' Videomerge effect performs chroma keying with little need for user input, but its Garbage Matte effects are useful for removing objects from the edges of the frame

Position your subject about two metres away from the screen. If you find that this crops the subject too heavily, even when the camera is pushed up against the back wall, you need a bigger screen or a bigger room (moving the camera back and zooming in will make the screen appear bigger relative to the subject). If you don't want to build another screen, you can cheat by using a mirror to extend the effective length of the room. You'll need a large, smooth mirror to avoid distortions. Later, consider using a mirror effect in your editing software to flip the subject back the right way around.

Illuminate the screen with at least two light sources. These should be positioned at either side of the screen, far enough away to produce an even illumination but close enough to bathe it in plenty of light. Keep checking the video camera's display to see how even it looks; what may seem evenly lit to the eye might be patchy to the camera. If your lights are too directional, try diffusing them by bouncing the light off some large white card.

Light parade

Next, it's time to illuminate the subject. Ideally, you should use another two lights for this, placed on either side. Diffuse the light with reflective card to eliminate harsh shadows. The objective is to create flattering lighting for the subject, but just as crucial is preventing shadows appearing on the screen.

It's also important that the screen and subject are lit by approximately the same amount. If the subject is too bright, the screen will appear muted and less vibrant. If the

The tools in FX Home CompositeLab Pro – which specialises in chroma keying – can help you produce a smooth, sharp border to your subject

subject is too dark, the screen will be overexposed, making it appear white.

Make sure your subject is suitably attired. This may sound obvious, but double-check that he or she isn't wearing anything that's the same colour as the screen. Chroma keying effects struggle with outlines such as fluffy hair so, if possible, tidy up any loose strands.

Finally, make sure the camera is set to the highest quality setting, as compression artefacts cause problems for chroma keying. As the subject is the only discernible object in the scene, focus shouldn't be a problem, but you may as well switch to manual focus to avoid focus hunting during a shot. Exposure and white balance may need a little more attention. If your camera allows it, adjust them both so that the subject looks at his or her best.

When you're ready, do a test shot or two, then upload the footage to the PC and try it out in your editing software. It's crucial that you do this straight away and leave everything set up, as it's unlikely you'll get perfect results first time.

The editing process

If everything has gone well during shooting, the editing stage should be easy. Import the footage into your software, apply the chroma key effect (Premiere Elements calls it Videomerge) and place a background clip on the video layer below. Most editors have an eye-dropper tool that allows the keyed colour to be specified by clicking on the preview image. If your screen's colour is uneven, pick a colour that matches the area immediately around the subject.

Most chroma key effects have various options to set which range of colours will be removed. Your screen's colour won't be perfectly even so you'll need to allow some tolerance for colours that are a near match. These controls vary from package to package and their behaviour varies widely depending on the shot. As such, the best way to get to grips with them is to experiment.

The two main challenges you're likely to face are removing the screen across the entire frame and achieving a smooth boundary around your subject. The first problem is easy to overcome if your software can mask areas of a clip. In Premiere Elements, the Garbage Matte effects allow areas of a clip to be discarded manually, by drawing a shape around the area you want to keep. This is ideal if lights or the edges of your screen are visible in your shot, or if the far corners of the screen aren't being picked out by the chroma key effect.

Sony Vegas Movie Studio doesn't have an equivalent effect to Garbage Matte, but it is possible to achieve a similar result with the Pan/Crop tool; just hold down the Ctrl key while dragging the edges of the window inwards. If your editor can't remove areas of the frame manually, consider using a second chroma key effect layered on top of the first to remove stubborn areas.

Jagged edges and bleeding of screen colour on to your subject are harder to overcome. These problems are partly down to the fact that pixels that fall on the boundary are likely to be a midtone between the screen and subject colour. Some software has controls to help produce smoother outlines, such as Premiere Elements' Smoothing option and Vegas's Blur amount control. The best chroma keying effects, such as those in Adobe After Effects and FX Home CompositeLab Pro, allow the cut-out area to be slimmed down to remove any hint of the screen colour and smoothed to eliminate interference from noise.

These options are invaluable when you're wrestling with less-than-ideal footage, but if you got things right at the filming stage there's no reason why more affordable editing software cannot live up to the highest expectations.

> "Make sure your camera is set to the highest quality setting, as compression artefacts cause problems"

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Shoot with multiple camcorders

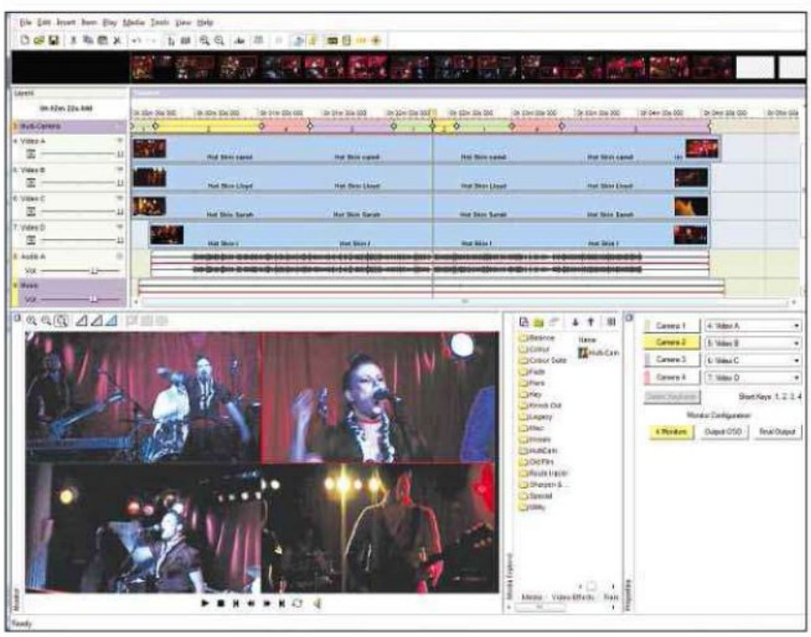
You'll get more from your video footage by using multiple cameras and syncing them together. We show you how to get the best angles

If you're shooting a video of a wedding ceremony, business presentation or concert, an uninterrupted shot from a single camera will make for dull viewing. With multiple cameras recording the event, you'll be able to liven up your production.

Tooling up

The biggest hurdle is sourcing the cameras. For the best results, you should use identical cameras so that the footage matches up in resolution and quality. Hiring equipment makes sense for a one-off event such as a wedding. Hireacamera.com stocks a wide variety of video cameras with prices from £50 a camera per day plus courier costs.

Another important consideration is sound. When editing, you'll be able to pick from the soundtracks captured by each camera or even combine them. However, the best spot for a mic may be on the subject's lapel or somewhere else where it's not practical to put a camera.



● Creating temporary standard-definition copies of HD footage will let you preview four cameras simultaneously without your PC grinding to a halt

Your final consideration is editing software. Multi-camera productions can be edited with any software that supports multiple tracks, but it's far easier in those that specifically support multi-camera editing, such as Sony Vegas Pro 8 and Adobe Premiere Pro CS4. However, these programs are expensive at £400 and £650 respectively. Mediachance EditStudio 6, which we've used here, is much cheaper at £67. Trial versions of all three are available for download.

Shooting gallery

When setting up for a shoot, it's worth spending time getting the footage from each camera to match as closely as possible. If the cameras have a manual white balance option, use it (see page 47 for details). Doing this should help to match the colours from each camera, even if they're not the same model or brand.

If you are using identical cameras, it's often worth setting them to the same manual exposure settings, too. However, this may cause under- and over-exposure problems when shooting in variable light such as outdoors or on stage, in which case automatic exposure is safer. If you're shooting a static subject from a fixed position, then set the focus manually to avoid focus hunting.

For tripod-mounted cameras without an operator, allow plenty of time to find the best positions for them. Think about how much the subject will move around and whether anyone is likely to get in the way. The most useful angle is often directly facing a speaker or performer, so you may want to operate this camera and zoom in for a head-and-shoulders shot. You may also need a wide shot (perhaps a three-quarter angle), a view of the audience and even a floor- or ceiling-level angle.

Bear in mind the 30° rule, whereby two cameras shooting the same subject must be at least 30° apart for there to be a clear distinction between the two. Cutting between

two very similar views – known as a jump cut – can be distracting for the viewer.

Up close and personal

If you have multiple camera operators, consider how much you want to brief them. It may be worth giving each person a specific close-up and asking them to follow the action. Shaky, wonky or constantly zooming footage is largely useless, so ask them to find a camera position and stick with it for at least 60 seconds before moving to another.

Once you've started recording, create a cue to help synchronise the cameras in your software. A handclap is easier to line up than most other noises or a visual cue. Once you've started recording, don't stop and restart any of the cameras until the end, as this will create more work when syncing up in the software.

Try to capture some footage that doesn't include the main people in your production. These shots could be of the audience, a close-up of a flower arrangement or some other object, perhaps recorded while setting up. These clips, known as cutaways, can be lifesavers to fill out moments where you haven't got any usable footage (see page 86 for more).

Cut above the rest

Mediachance EditStudio 6 supports multi-camera editing in a straightforward and accessible manner, although the basic principles are the same in other editors. EditStudio's multi-camera facilities come in the form of an effect. The procedure is simple: stack up to four video clips on individual tracks, or layers as they're known here, and use the Multi-Cam effect to view them simultaneously and switch between them.

Click File, Project Settings and choose the settings that match the specifications of your footage. Right-click the Layers panel to the left of the timeline and insert a video and audio layer for each camera. Capture or import your footage via the File menu and drag the clips from the Media Explorer's Media tab to the timeline, stacking them on top of each other.

EditStudio doesn't draw audio waveforms by default, so select the clips and click View, Show Audio Waveform. You should be able to line up cue point so the clips are in sync with each other. Use the audio layers' mute buttons and volume faders to balance the soundtrack.

Click the Video Effects tab in the Media Explorer, select the Multi-Cam folder and drag the Multi-Cam effect on to the timeline above the video clips. Click on the Multi-Cam object on the timeline to view its properties. These consist of four buttons to switch between the cameras, drop-down lists to reassign the buttons to different layers and three monitor options. The '4 monitors' option gives a split-screen view, with the selected layer highlighted with a red outline. Output OSD shows just the selected layer along with its name, while Final Output shows the selected layer with no overlay.

To cut between cameras, just click the four buttons or keys 1 to 4 on the keyboard during playback. It's best to edit in '4 monitors' mode and preview the results in Output OSD mode. Edits appear as keyframes on the Multi-Cam object. These can be dragged left and right to adjust their position, swapped for a different layer by clicking a keyframe and selecting another camera, or deleted by right-clicking.

The process is simple; the challenge is in the craft of editing. Your intuition is your best guide as to how to use the various cameras. Common practice varies greatly according to the subject matter, so watch some professionally produced videos if you're not sure how to proceed.

More than four

If you have more than four cameras to edit or you want to drop in other cutaway clips to mask problems, create another video layer above the Multi-Cam one and edit in the conventional way, muting this layer to see the Multi-Cam footage.

Filler clips can also be useful if you need to trim out dead space. Just discarding five seconds may cause a sudden change in the posture of the subject, but cutting to a shot in which they don't appear will mask it.

To remove a section of footage, position the playback marker, select each object (including the Multi-Cam effect) and press the 'i' key to split it at the current frame. Drag the end of clips to truncate them, using the snap function to line them up, and drag the clips on the right to fill the gap.

The Multi-Cam effect cuts between cameras, but it's possible to use other types of transition. Drag a transition from the Media Explorer to the layer just above the Multi-Camera object. You'll have to assign the layers it moves from and to in the transition's properties; for a cut from camera 1 to 3, for example, the transition will go from layer A to C. When you've finished, make sure the Multi-Cam effect is set to Final Output and render it using Export Movie from the File menu.

● The Joby Gorillapod SLR is ideal for placing cameras discreetly around the room

Glossary

Bamboozled by bit rates and mystified by MPEG? Don't worry – here we spell out the acronyms and explain all the jargon in plain English

#

1080i An abbreviated name for video with a resolution of either 1,440x1,080 or 1,920x,1080 pixels, in interlaced mode.

1080p The same as 1080i, but in progressive scan rather than interlaced mode.

16:9 The technical term for widescreen, based on the ratio of the screen's width to its height. This ratio is known as the aspect ratio.

25p Short for 25 frames per second video in progressive scan mode.

30-degree rule When shooting a subject from two different camera positions, this rule states that the two positions should be at least 30 degrees apart so as to look significantly different when edited together.

4:3 The technical term for non-widescreen, based on the ratio of the screen's width to its height. This ratio is known as the aspect ratio.

50i Short for 50 fields per second video in interlaced mode.

5.1 Surround sound system. The numbers represent the five satellite speakers (two front, two rear and one centre) plus the subwoofer.

720p An abbreviated name for video with a resolution of 1,280x720 pixels in progressive scan mode.

A

AC-3 Another name for Dolby Digital.

Accessory shoe A metal clip on top of some cameras for attaching microphones, lamps and other accessories. A cold or passive shoe is just a simple clip, while a hot or active shoe incorporates power and audio connections.

Alpha channel In an image file, an alpha channel allows some pixels to be transparent or translucent (semi-transparent) so that the image isn't limited to being box-shaped.

Aspect ratio The ratio of a video frame's width to its height. The two most common ones are 4:3 and 16:9.

Aperture The size of the iris-like hole in a camera's lens. A lower aperture value, quoted in the style of f/2, means a bigger hole, which lets in more light and shortens the depth of field.

Autofocus (AF) A camera's ability to judge a scene and automatically adjust the lens to make the subject in focus.

Automatic exposure (AE) A camera's ability to judge a scene and automatically adjust the aperture, shutter speed and gain to produce pleasing colours.

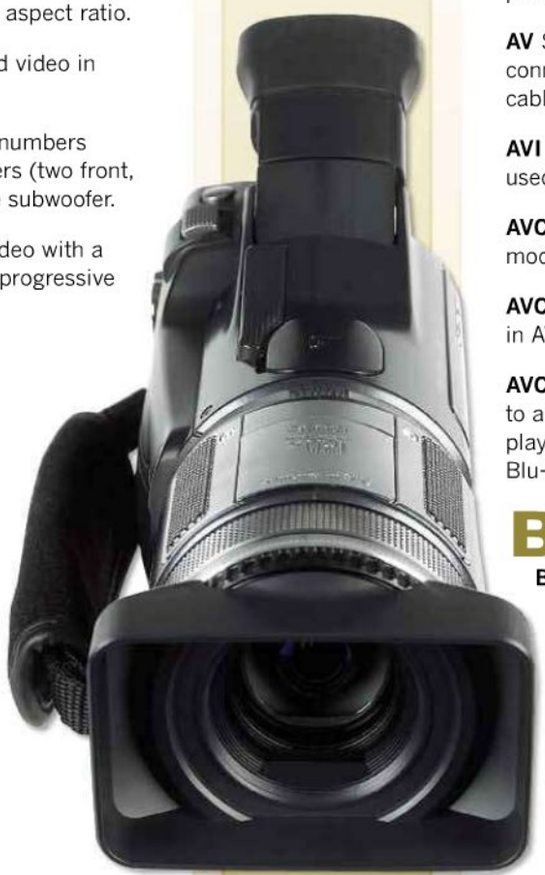
AV Short for audio-video, a type of video connection comprising a composite video cable and stereo audio cables.

AVI A container type for a video file commonly used for DV and DivX footage.

AVC A video codec that's widely used in modern video cameras and on the web.

AVCHD A camera format that records HD video in AVC format to hard disk or memory cards.

AVCHD disc AVCHD-format video recorded on to a DVD disc. These discs play in some Blu-ray players and are cheaper to produce than true Blu-ray discs.



B

Blu-ray The heir apparent to DVD Video, with support for HD resolutions, progressive scan, better-quality sound and more sophisticated menus.

Bit rate The amount of data used to describe each second of video, audio or both. Usually measured in Mbit/s.

C

CCD Short for charge-coupled device, a type of sensor similar to CMOS but designed in a slightly different way.

Chroma key Also known as the green-screen or blue-screen effect, an editing technique whereby a particular colour in a video clip is specified to be made invisible, partially revealing another clip behind it. Its most common use is for placing weather presenters over maps.

Clipping When the true colour is brighter than the brightest colour possible in a video clip, or darker than the darkest colour. The result is solid areas of white or black, and it's a common problem in high-contrast scenes.

CMOS Short for complementary metal-oxide-semiconductor, a type of sensor used by some video cameras to convert light into an electronic signal.

Codec Short for compression-decompression, a codec takes a large volume of data and finds a way to express it more efficiently using less data. This usually results in a slight loss of quality in the video, audio or other type of file.

Colour correction Video effects that can manipulate the colours of clips to make them look more lifelike.

Component A type of video connection that uses three cables, usually identifiable by three phono plugs coloured red, green and blue. Unlike other analogue cable connections such as composite and S-Video, component supports high definition (HD) and progressive scan.

Composite A type of video connection that uses a single cable, usually with a yellow phono plug. It supports only standard-definition, interlaced video.

Compression (1) A way of turning a large amount of data, such as the raw video captured by a camera's sensor, into a small amount of data that will fit on a memory card. Compression is handled by the codec.

Compression (2) An audio effect that evens out the variations in volume so that there isn't such a big difference between the loudest and quietest sounds.

Compression artefacts When a video codec doesn't have a high enough bit rate to compress the video data, compression artefacts are the inaccuracies that creep into the frames.

Container The part of a video file that binds the video and audio elements together and flags up what kind of file it is.

Continuity editing An editing technique whereby each clip flows from one shot to the next with no apparent breaks or jumps in the passage of time.

Cut The moment when playback switches from one shot to another in an edited video.

Cutaway shot An editing technique whereby playback cuts from shot A to shot B and back to shot A, often to mask an unwanted section in shot A.

D

Depth of field When a lens is focused on a subject, this is the amount by which the foreground and background are also in focus. A narrow aperture such as f/16 gives a long depth of field with everything in focus, while a wide aperture such as f/2 gives a short depth of field with a blurred background and sharp foreground.

Dissolve A type of video transition whereby one shot fades gently into the next.

DivX A popular video format comprising an MPEG4-based video codec and MP3 audio, wrapped in an AVI container.

Dolby Digital An audio codec commonly used on DVD Video and Blu-ray discs. Quality is

broadly similar to MP3, but Dolby Digital supports 5.1 surround as well as stereo.

DV A camera format that records standard-definition video to MiniDV tapes, or the name for the video files that these cameras generate.

DVD Short for Digital Versatile Disc, an optical disc that resembles a CD but stores more data – 4.38GB for a single-layer and 7.95GB for a dual-layer disc.

DVD-Video A video-distribution format that stores standard-definition MPEG2 video on a DVD disc.

E

Effect A process that's applied to a video clip in editing software to change its appearance, or to audio to change its sonic character.

Establishing shot The first shot in a scene, which helps the viewer understand where they are, who is there and what the time is.

Exposure The brightness of a scene as it's captured by a camera, governed by the available light and the camera's aperture, shutter speed and gain.

F

Field In interlaced video, each frame is split into two sub-frames, known as fields.

Flash Video (FLV) A video format commonly used by video-sharing sites such as YouTube (although YouTube is in the process of switching to AVC). Some editing software can generate FLV files, but you'll need other software to incorporate them into websites.

Focal length The technical name for the zoom position of a lens.

Frame Video is made up of a fast succession of still images. Each one is called a frame.

Frames per second (fps) The number of frames used in each second of video.

G

Gain If there isn't enough light for a video camera's lens to produce a well-exposed picture, the gain amplifies the brightness of the image electronically.

Gigabyte (GB) A quantity of data (1,024MB).

H

High definition (HD) Any video with a resolution higher than standard-definition formats. Typical HD formats are 720p, 1080i and 1080p.

HDD Short for hard disk drive, this term is often applied to video cameras with a built-in hard disk for recording video.

HDMI Short for High-Definition Multimedia Interface, a video connection that carries video and audio along a single cable. Quality is excellent, with data transferred digitally to minimise the risk of interference and support for HD video and surround-sound audio.

HDV A video camera format that records high-definition MPEG2 video to MiniDV tapes.

Hotshoe See Accessory shoe.

Interlaced A technique for doubling the frame rate without increasing the total number of pixels per second. Each frame is split into two sub-frames, called fields. See page 12 for a full explanation.

I

Iris See Aperture.

J

JPEG A digital image format commonly used by digital cameras and websites.

K

Keyframe A feature found in editing software that specifies settings for a particular frame. When two or more keyframes are applied to a clip, the software will gradually morph the settings from one keyframe to the next.

L

LCD Short for liquid crystal display, the type of screen used on video cameras as well as most computer monitors and TVs.

Luma key Similar to chroma key, except that all pixels of a certain brightness rather than a specific colour are made transparent.

M

Mbit/s The bit rate of a video clip, measured in millions of bits – or megabits – per second. There are 8 bits in a byte, or 8Mbit in 1MB, so a bit rate of 8Mbit/s will consume 1MB of disk space each second.

Megabyte (MB) A quantity of data, equivalent to 1,048,576 bytes.

Metering The technique used by cameras to measure the brightness of a scene. Multi-metering modes measure the light across the entire frame, while spot metering measures a pre-defined small area.

MiniDV A digital video tape format used to record either DV or HDV video.

Mini HDMI A miniature socket type used by many HD video cameras to output an HDMI signal.

M-JPEG Short for Motion JPEG, a video codec used by some digital stills cameras' video modes.

Motion blur Blur caused by a moving subject or camera (rather than by an out-of-focus lens). The longer the shutter speed, the more motion blur will occur. It may sound undesirable, but it can help give a smoother sense of motion.

MPEG2 The video codec used on DVD Videos, many standard-definition cameras and all HDV cameras.

MPEG4 A suite of video standards made up of 23 parts. One of these parts is the AVC codec.

N

Noise Random speckles of interference caused by slight inaccuracies in a camera's sensor, and exaggerated when a high gain setting is used.

NTSC The alternative to PAL, as used in North America, Japan and elsewhere.

O

Optical image stabilisation (OIS) The combination of gyroscopic sensors used to detect camera shake and moving lens elements that counteract this movement.

P

PAL The standard-definition video specifications used in the Europe and elsewhere. PAL comprises 720x576 pixels per frame at 25 interlaced frames per second (or 50 fields per second).

PCM Short for pulse-code modulation, an audio format that doesn't use any compression and is used on CDs, DV cameras and occasionally on DVD Video and Blu-ray discs.

Phono A type of plug and socket commonly used on the backs of hi-fis, and also on video equipment for composite, component and audio connections.

Picture-in-picture An editing technique whereby one video clip or photo is reduced in size and overlaid on top of another video or photo.

Pixel A single dot in a video frame or photo.

Pixel aspect ratio Sometimes video pixels aren't square; when they're not, the pixel aspect ratio tells you what each pixel's width should be compared to its height.

Progressive scan The alternative to interlaced video, whereby each frame consists of a single, complete image.

PSD An image file format used by Adobe Photoshop and most other image editors, which supports an alpha channel.

Q

QuickTime A video file container used by Apple's QuickTime player and by some video and stills cameras.

S

Scene In an edited video, a set of clips that occur at a particular location.

SD See standard definition. SD can also refer to a type of memory card; see SDHC.

SDHC Secure Digital High-Capacity, a type of memory card commonly used in camcorders.

Sensor The chip inside a video camera that captures light and turns it into an electronic signal. It will either be a CCD or a CMOS.

Shoe See Accessory shoe.

Shutter speed The length of time the camera spends measuring each frame or field of video. This is limited by the frame rate, so the longest shutter speed for 25fps progressive scan video is 1/25 seconds (or 1/50 seconds for 25fps interlaced). Faster shutter speeds can be used in bright conditions to lower the exposure.

Spot focus Cameras' autofocus modes usually measure focus wherever they deem is most appropriate, but a spot focus mode lets the user specify a particular part of the frame on which to focus.

Spot metering See Metering.

Standard definition This name has been retroactively given to video formats that pre-date high definition. In the UK, standard-definition video usually adheres to the PAL specifications.

Super SteadyShot Sony's brand name for optical image stabilisation.

S-Video A type of video connection that uses a single cable, usually with a round multi-pin plug. It only supports standard-definition interlaced video.

T

Terabyte (TB) A quantity of data, equivalent to 1,024GB or 1,048,576MB.

Titles The technical name for text when it's used in video productions.

Transition In editing software, a momentary effect that takes the viewer from one clip to another. The dissolve is the most common type, but dozens of others, such as Venetian blind effects and 3D animations, are available.

W

White Balance (WB) A feature offered by nearly all video cameras and some editing software to remove colour casts caused by tinted lighting, including light from a lightbulb or fluorescent tube.

WMV Short for Windows Media Video, the name for both a video container and the video codec it employs.

Z

Zoom Optical zoom is a lens's ability to magnify the image before it reaches the sensor. Digital zoom magnifies it after it reaches the sensor, so unless the sensor has a very high resolution, it doesn't capture any more detail.

THE COMPLETE GUIDE TO HOME VIDEO

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