Technofile

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Digital video

From camcorders to video-capable still cameras, videophones to webcams, digital video is becoming an everyday part of our connected lives and it no longer costs the earth to create your own masterpiece. Laurence Grayson lets you know what you're letting yourself in for

Given that some smart web browsing can uncover an entry-level digital camcorder for £250 or an analogue model for even less, it's fair to say that the days when you needed to be as rich as Croesus to create your own video productions are long gone. Nor do you have to lug around a camera the size of a small tenement, suffering the accompanying backache and the derision of your friends and family. Today's video cameras are small, light and highly desirable.

Once you've shot the material you need, all video or film productions can be broken down into three key stages: capture, edit and output. So all you need to create your own project is a camcorder, an editing system and the output media of your choice. It really is that simple. You'll also be pleased to hear that you probably already have half of what you need under your desk, while the remainder will set you back a lot less than you think.

The analogue option

Once you've shot plenty of footage, the next step is to get it on to your PC for editing. This process is often described as digitising, which is largely inaccurate for digital camcorders as their footage is already stored in digital form. Your options are dictated by the type of camcorder you've chosen – digital or analogue.

Ironically, cheaper analogue camcorders such as VHS-C or Hi8 require more expensive capture hardware than their digital counterparts. These can be external devices or add-in boards such as the Pinnacle Studio MovieBox USB or the Matrox RT.X10 Xtra. They provide your PC with the necessary composite or S-Video inputs for connecting your camcorder, along with specialist signal processors that convert the analogue video signal into digital data.

Analogue video captures aren't ideal, though, and come with their own drawbacks. Signal interpretation and conversion can cause jittering and noise on your footage. And this gets progressively worse if you recapture previously archived analogue material – generally described as 'generation loss'.

There's no remote camera control either, so you'll need to manually stop and start playback of the clips you want or just leave the camera running and capture one long video file. If you opt for the latter, many capture tools can separate your footage into sub-clips by analysing the frame content and looking for sudden changes in material. It's not infallible but it's more convenient than the manual option.

Digital advantage

In contrast, digital camcorders require only a FireWire port on your PC and a six- to four-pin DV cable for the job. They've already stored the image digitally, so all you need to do is transfer it to your hard drive where it'll be stored as an AVI or MOV file.

If your PC doesn't have an onboard FireWire port you can pick up a bog-standard FireWire PCI add-in board for as little as £10. Alternatively, you can buy a DV-based editing package such as the Hercules DV Action Pro or a high-end analogue/digital editing solution such as Pinnacle's Edition Pro.

As well as better picture quality, the benefits of digital camcorders over analogue are never more apparent than during capture. FireWire is a bi-directional connection that allows your software to access the camera's tape transport controls (fast forward, rewind, play and so on), so it can cue the tape to the right place directly from the PC.

There's also a timecode running through digital recordings that allows you to select in and out points for the clips you want to capture – known as 'logging' – and data flags that tell your software where you started and stopped recording. Thanks to this you can capture the entire tape automatically, separating the clips in your footage into individual video files or sub-clips from a single master clip.

Alternatively, you can manually log just the bits you want to capture and let your software do the rest – batch capture – which is a good idea if you're short on disk space.

Create a masterpiece

Once your footage has been stored on your hard disk, it's time to get creative. This involves a piece of software called an NLE (non-linear

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editor) which you've probably been using for capture already. Non-linear editing allows you to play with your footage, inserting and moving clips around and tweaking their appearance to get the look you want.

The simplest way to get started is to use the storyboard, a basic clip assembly tool that lets you drag and drop thumbnails of your footage into a series of placeholders. By creating a basic running order for your project, you can make a useful overview before you get down to fine-tuning. When you're happy with this you can switch to the timeline view. This shows your project in more detail, including the length of the clips.

Cost and control

The most obvious differential between entry-level and high-end NLEs is the number of tracks you get on the timeline. Expensive products, such as Adobe Premiere Pro and Pinnacle Edition 5.0, let you add as many as you like. More consumer-focused NLEs, such as Ulead VideoStudio 7.0 or Pinnacle Studio 8.0, stick with the basics – a video track, a title track, a music track and maybe a voiceover track. You may even get a second video track for video overlay effects but this is less common on the entry-level titles.

The amount you should spend on your NLE depends on how much

Digital video formats

There are three main video standards used by digital camcorders – DV25, MicroMV and DVD-VR. DV25 is the most common and is used by all consumer MiniDV camcorders. It uses a 5:1 compression technique that records video at a constant data rate of 25Mbps (megabits per second). It requires a significant amount of storage space (around 13GB for an hour) and is tape-based, so it can take a while to find the footage you're after. But it's still the best for editing because the frames in a DV25 clip can all be read individually.

Tape-based MicroMV uses a similar form of compression to that found on DVD movies, namely Mpeg-2, although it records at a better quality (12Mbps). Tapes are smaller than MiniDV cassettes, allowing for compact camcorders such as the pocket-sized DCR-IP7. Scenes are captured individually complete with thumbnails, but they still require cueing and reviewing to get to the required point on the tape.

MicroMV's high level of compression results in small files, but the format isn't widely supported by NLEs and is much harder to edit. The data needed to build a single frame of video may be spread across a series of subsequent or preceding frames in the clip. As a result, creating a simple fade or effect requires cross-calculation, together with protracted render times and slower editing.

This is also true of DVD-VR, another Mpeg-2 standard used by DVD-based camcorders. The limited storage on an 8cm DVD gives DVD-VR a low bit rate (typically 6Mbps), although it is compatible with many new DVD players.

Top: Pinnacle Studio 8.0
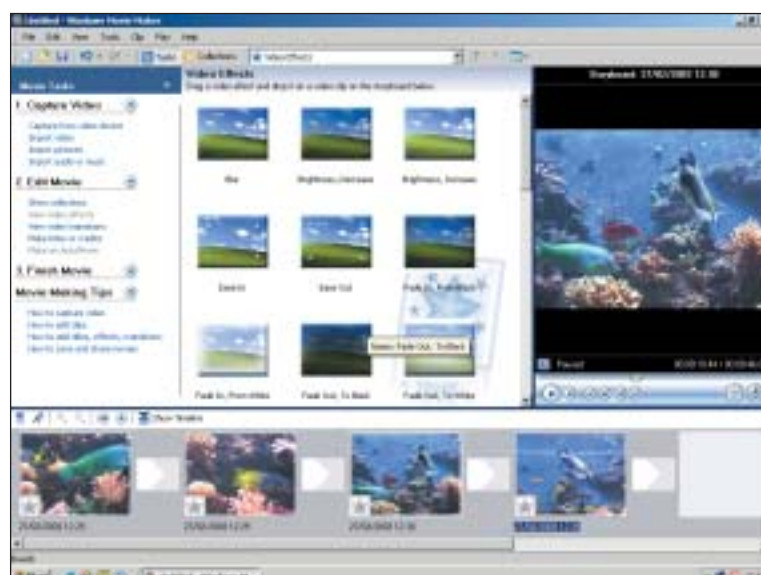
Bottom: Windows Movie Maker 2.0

control you require over your timeline. Premiere and Edition may be more expensive but they provide advanced tools such as slip, slide and ripple edits, which are methods of adjusting the in and out points of clips while they're on the timeline.

They also offer keyframes that let you customise effects by adding individual points that correspond to the changes being made. You also get full control over transparency, image masks and colour correction, plus advanced features such as chroma- and luma-keying for composite images like the blue-screen techniques used in news and weather reports.

For most of us, though, a basic NLE provides all the tools we need, including some handy features such as audio track ripping from CD and narrative recording with preview. Some even provide rate control, which allows you to speed up or slow down the playback of your footage for those Guy Ritchie-style sequences.

Don't get too carried away with your effects, though. It's the footage that people want to see, not a series of 3D transitions and overworked picture-in-pictures or colourisation filters. Be choosy – your audience will thank you for it.

Export the goods
Finalising your project depends a great deal on your equipment as well as the presentation medium that suits

Non-linear editor features	Adobe Premiere Pro	Windows MovieMaker 2.0	Pinnacle Edition 5.0	Pinnacle Studio 8.0	Ulead VideoStudio 7.0
Price (inc VAT)	£525	free with Windows XP	£499	£60	£60
Website	www.adobe.co.uk	www.microsoft.com	www.pinnaclesys.com	www.pinnaclesys.com	www.ulead.co.uk
Capture format	DV/Mpeg	DV	DV/Mpeg	DV/Mpeg	DV/Mpeg
Digital/analogue scene detection	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
Manual batch capture	yes	no	yes	yes	yes
Import video formats	AVI, Mpeg-1, Mpeg-2, QuickTime, Windows Media	AVI, Mpeg-1, Mpeg-2, Windows Media, Real Media,	AVI, Mpeg-1, Mpeg-2, QuickTime, Windows Media	AVI, Mpeg-1, Mpeg-2, MMV	AVI, Mpeg-1, Mpeg-2, QuickTime, Windows Media Real Media MMV
Import audio formats	WAV, MPA, MP3, WMA	WAV, MP2, MP3, WMA	WAV, MPA, MP3, WMA	WAV, MPA, MP3	WAV, MP2, MP3, WMA, ASF
Scalable workspace layout	yes	yes	yes	no	yes
Max video/audio tracks	unlimited	1/2	unlimited	1/3	2/2
Real-time preview	yes	yes	yes	yes	yes
Crop/clip/resize	yes	no	yes	no	yes
Keyframe effects	yes	no	yes	no	yes
Colour/contrast/brightness adjustment	yes	no	yes	yes	yes
Full rate control	yes	no	yes	yes	yes
Transparency	yes	no	yes	no	yes
Export file formats	AVI, Mpeg-1, Mpeg-2, QuickTime, Windows Media, Real Media	DV AVI, WMV	AVI, Mpeg-1, Mpeg-2, QuickTime, Windows Media, VOB	AVI, Mpeg-1, Mpeg-2, MMV, Real Media, Windows Media	AVI, Mpeg-1, Mpeg-2, QuickTime, Real Media Windows Media
DVD/VCD authoring	yes	no	yes	yes	yes

Hardware features	Dazzle Hollywood DV Bridge	Hercules DV-Action Pro	Matrox RT.X10 Xtra	Pinnacle Edition 5.0 Pro	Pinnacle Studio MovieBox USB
Price (inc VAT)	£210	£135	£469	£629	£149
Website	www.dazzle-europe.com	www.hercules-uk.com	www.matrox.com	www.pinnaclesys.com	www.pinnaclesys.com
Type	external box	PCI card	PCI card	AGP card	external box
Analogue capture	yes	no	yes	yes	yes
Digital capture	yes	yes	yes	yes	no
Inputs	composite, S-Video, FireWire	FireWire	composite, S-Video, FireWire	composite, S-Video, FireWire	composite, S-Video
Outputs	composite, S-Video, FireWire	FireWire	composite, S-Video, FireWire	composite, S-Video, FireWire	composite, S-Video
Signal conversion without PC	yes	no	no	no	no
Breakout box	n/a	no	yes	yes	n/a
Shuttle control	no	yes	no	no	no
Capture to DV	yes	yes	yes	yes	no
Capture to MPEG	yes	no	no	no	yes
Supplied software	Dazzle MovieStar, DVD Complete, OnDVD	Ulead MediaStudio Pro 6.5 VE	Adobe Premiere 6.5, Sonic DVDit LE, Matrox Xtools	Pinnacle Edition 5.0, HollywoodFX 5.0	Pinnacle Studio 8.0, HollywoodFX 4.6

your audience. Now that DVD writers have dropped below the £200 mark it's surprisingly easy to create a professional-looking title that will play back on the majority of DVD players. Indeed, most current NLEs come with a built-in DVD authoring tool.

Don't worry if you only have a CD burner. Plenty of DVD players also support VCD (VideoCD) or SVCD (Super VideoCD) discs, although these Mpeg-1-based discs won't come close to the quality or capacity of an Mpeg-2 DVD. The simplest option is to create a single Mpeg-2 stream that plays back the moment you pop the disc into your player. But if you're feeling creative, or want to put more than one video on to the same disc, you'll need to create a disc navigation menu.

Some apps let you start from scratch but it's easier to choose one of the preset menu templates. These automatically create scene thumbnails and menu navigation buttons.

Choose your own menu

If the preset menu doesn't quite match your required style, basic adjustments can be made such as choosing a different background image or music track. More advanced programs will let you drop a looping video clip behind the buttons, known as a motion menu. You can change the colour or shape of your menu buttons and reposition or resize them.

Advanced users might prefer to create a layered graphic in Adobe Photoshop and then import it to create their own style. However this feature tends to be found only in the more expensive authoring tools such as Adobe Encore or Pinnacle's Edition.

But DVD creation isn't your only option here. If your digital camcorder supports DV-in (entry-level models tend to be DV-out only), you can record your project on to tape using the same FireWire connection as your captures. If you have an analogue

capture card you may be able to do the same via composite or S-Video to either your camcorder or a standard VHS tape deck – still a more common format than DVD.

Alternatively, you can save it to a file on your hard drive. Here you can choose from a wide range of file types, from the standard DV AVI file format (the best solution for archiving) to a more compressed file type such as DivX or Mpeg-4. Bear in mind, though, that this depends on the compression schemes installed on your PC and supported by your NLE.

If you're looking to share your work on the web you'll need to make the file size as small as possible, using either the Windows or Real Media encoder plug-ins that come with most systems. While these are effective at compressing your video, don't expect miracles. Reducing the size of your video file will require a reduction in resolution, quality and frame rate. ⊠

Using your camcorder as a webcam

One option you will increasingly find lurking in the feature list of many new digital camcorders is the webcam tool. This feature lets you stream live video across a USB or FireWire connection. While perching an £800 camcorder on top of your monitor might seem rather ridiculous, it's not without its advantages.

The first of these is image quality. The optics and image sensors found in even the most basic camcorder are considerably better than those in a webcam, not only providing sharper images but also allowing you to use features such as zoom, focus and white balance.

Taking this a step further, the DV Messenger software supplied with Canon's new products allows you to control a camcorder remotely, zooming in, focusing and accessing tape playback from anywhere. DV Messenger includes a file transfer mode for sharing data on the camcorder's media card, such as MJpeg clips or still Jpeg images.

But it doesn't stop at video-conferencing. Download a copy of Windows Media Encoder 9.0 and you can set up a live broadcast from your very own PC. Just plug in your camcorder, select the broadcast type and let your audience know which IP address and port number you're using. The audience's own copies of Windows Media Player will initiate the stream, making it a 'pull' rather than a 'push' broadcast, and you can restrict viewers by blocking IP addresses or subnets.

To add that extra bit of professional appeal to your production, WME 9.0 will also insert intro, intermission and exit clips into your stream. A series of data profiles lets you choose the data rate and quality of your output and you can also save your broadcast to an archive file. The only thing that's not covered is the actual content – that's where you come in.
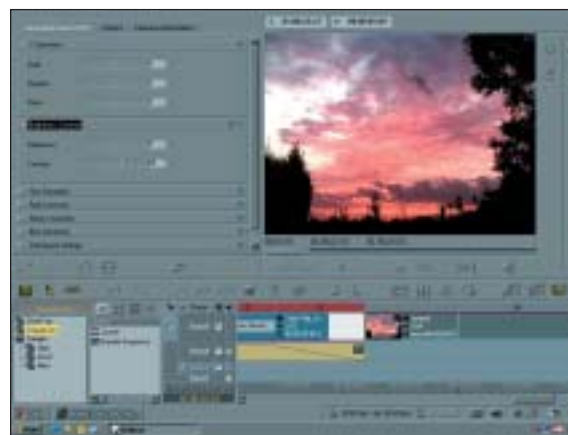
Top: Pinnacle Edition 5.0
Bottom: Ulead VideoStudio 7.0