

DIGITAL VIDEO>>

# group test





# Straight to video

**Videoconferencing, digital camcorders: digital video promises much, but you need to know **just what it can deliver**, and when. We round up the facts and press play.**

**Y**ou've heard the hype and seen the ads, but there is much, much more to the digital-video revolution than Sky Digital and BBC Choice. Digital camcorders, DVD, video capture and video conferencing are all opening up a world of possibilities undreamt of a few years ago. The advantage of digital video over analogue is immediately apparent to anyone who has tried to work with either. Digital offers crisper, cleaner images, and, of course, for the PC user it is much more exciting. Video recording and editing has been opened up to anyone with a reasonably up-to-date PC and is no longer the preserve of the professional. For anyone who has tried to edit home movies using their VCR, the latest digital camcorders and video capture cards come as a welcome relief. In this group test we line up and review the products that would be a boon to any amateur film maker. You will doubtless have been tempted by a DVD drive. Before you hand over your credit card, do your bank balance a favour: read our expert guide to all the issues involved, and check out our tests on the best drives available. And whether it's for business or just to stay in touch with friends and family over Christmas, videoconferencing is the solution. We look at systems aimed at power users and at the home market — there is even one which does not need a PC.

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# DVD

DVD is the **future of software delivery** and a neat way to watch your favourite movie. Here's how...

Wherever you go, someone's talking about playing DVD movies on your PC. Well, the marketing people are anyway. But what if you want to watch the movies on your TV? Can you get around regional coding and confidently import US titles? What sort of hardware and software will you need? As usual, many questions; as you'd expect, we have all the answers.

First a quick word on the DVD format itself. DVD discs look just like CDs, but thanks to finer tracks and pits, they can squeeze on at least seven times as much information. DVD's standard capacity may be an ample 4.7Gb, but this can be immediately doubled to 9.4Gb by using both sides of the disc. Yet more cunning is the ability for the laser to refocus onto a second layer of information, increasing the capacity of a single-sided disc to 8.5Gb, or a double-sided disc to a whopping 17Gb. The possibilities offered by this sort of capacity have resulted in DVD being nicknamed the Digital Versatile Disc.

**The best known** application for DVD is for watching movies at home. Even using a single-sided, single-layer disc, it's possible to store a full two-hour movie at a quality much higher than VHS or, better still, Laserdisc. With all that space on a disc, it's also possible to store an album of uncompressed music at 24-bit/96kHz, which hi-fi enthusiasts claim sounds much better than conventional 16-bit/44.1kHz CDs. With between seven and 24 times the capacity of a CD-ROM, imagine the possibilities for encyclopaedias and games: even the

CorelDraw suite could once again be sold on a single disc!

So what do you need to play DVD discs? In the home, most people will opt for a domestic player, which looks just like a CD player and costs around £500. This will play movie DVDs on your TV, audio CDs through your hi-fi, and most can support the forthcoming super-fidelity audio discs.

On your PC, you'll need a DVD-ROM drive. These look just like conventional CD-ROM drives, can read both DVD and CD discs, and cost around £100. Like CD-ROM drives they also come in ATAPI and SCSI versions, although the latter are much less common.

Already, some DVD-ROM drives are being described as double-speed or even faster still. Like CD-ROM drives before them, the faster you spin the disc, the quicker you can get the information off it. This is of particular benefit when running computer applications off a DVD disc or installing software, although some manufacturers have recently claimed that for smooth DVD movie playback on your PC, you should be using at least a double-speed DVD-ROM drive.

Most recent drives are capable of this or faster — Pioneer's latest model boasts six-speed for DVD and 32-speed for CD. It's certainly worth considering a brand-new model of DVD-ROM drive, since these are also more compatible with the variety of rewritable DVD formats available now or under development.

## Video

DVD movies compress their video using the MPEG-2 system and hence require some kind of MPEG-2 decompression or decoding before they can be viewed. This decoding is traditionally done by hardware fitted in DVD players or on an optional PC expansion card bundled with most DVD-ROM upgrade kits. Don't, however, assume that all PCs

▲ **VIDEOLOGIC'S DVD PLAYER OFFERS HARDWARE DECODING OF MOVIES: NOTE THE VGA PASS-THROUGH PLUG**

fitted with DVD-ROM drives will come with hardware decoders as standard. Normally, your existing graphics

card is connected to the decoder card which is then connected to your monitor, so that both the standard Windows desktop, along with the decoded video, can be viewed on the same screen. Most decoder cards employ external analogue VGA pass-through cables to your graphics card, but whatever the manufacturers tell you, there is a very slight drop in image quality of your standard Windows desktop when passed through another card.

**Most MPEG** decoder cards also feature standard composite and sometimes superior S-Video plugs to connect directly to a TV set. You won't see the Windows desktop, but you will see full-screen decoded video. If you only ever want to play DVD movies on your TV, then you could reason that the VGA pass-through cable is unnecessary and leave your monitor directly connected to your graphics card. While this works with Creative Labs' DVD Encore bundle, VideoLogic claims it won't with its recent DVD Player, which relies on your graphics card for sync signals [see "Reviews", p99].

## Audio

The vast majority of DVD movies feature a Dolby Digital soundtrack. While Dolby Digital (also known as AC-3, after its compression algorithm) can supply plain-old stereo, it is most exciting when delivering digital surround sound. It does so using six separate channels: three for



the front, two on the rear, and one for a dedicated sub-woofer. Since this is in effect five full-range channels and one narrow-range for sub-bass only, it is known as a 5.1 system. Decoder cards can take this 5.1

▲ **DTS BOASTS BETTER SOUND QUALITY THAN DOLBY DIGITAL, BUT THE FIRST DTS DVD TITLES HAVE BEEN DELAYED UNTIL EARLY 1999**





soundtrack and down-mix it into two-channel analogue stereo which can be passed through your sound card, on its way to your PC speakers or hi-fi. Most decoder cards can also supply the raw Dolby Digital information through a phono socket to an external home cinema processor to access the full 5.1 channels, although you will of course need the required speakers and amplification to hear it.

**Dolby Digital** isn't the only 5.1 surround format. The same people who developed MPEG-2 for video encoding have a 5.1 audio system which was originally going to be standard on all European movies until Dolby got its foot in the door. There's also DTS from Digital Theatre Systems, which uses less compression to provide superior sound quality but therefore also requires around four times the space as Dolby Digital. Both MPEG 5.1 and DTS are optional extras for DVD movies and, like Dolby Digital, you'll need an external processor to decode their full 5.1 channels. There are a handful of European titles from Polygram with MPEG 5.1 audio, but sadly the initial US roll-out of DTS DVDs continues to be delayed.

## Software

All PC decoder cards come with software utilities for playing the movies, which allow you to navigate the disc and its options such as choosing the desired subtitles or soundtrack. However, given a powerful enough processor, it is in fact possible to decode the video and audio through software alone. Zoran was first on the scene with its SoftDVD player which could perform full-screen full-motion decoding using a fast Pentium II processor — anything over 350MHz should do. More recently, some graphics cards have featured motion compensation in hardware to help the software decoding along. ATi was the first to implement this with its Rage Pro AGP products in conjunction with Zoran, and claims a 20 to 30% performance increase over using just software decoding alone. Software decoding is great for viewing movies on your PC monitor, but what if you want to connect your TV? Without the suitable plugs you'd have found on a hardware decoder card, you're stuck. Your graphics

► CAN'T FIND ANY DVD TITLES IN YOUR LOCAL STORE? THEN HOW ABOUT BUYING REGION 1 US MOVIES OVER THE WEB



◀ **ZORAN'S SOFTWARE DVD PLAYER FOR ATi AGP GRAPHICS CARDS: NOTE THE DISPLAY OPTIONS**

card may feature composite or S-Video outputs you could use, and you'll be able to hear down-mixed stereo from your sound card, but the chances of having a socket through which the 5.1 audio can be routed, is fairly unlikely.

## Regional coding

To prevent pesky importers messing up Hollywood's global distribution schedule, almost every DVD movie has regional coding. The world is divided up into six regions (North America is Region 1, while we're in Region 2 with the rest of Europe and also Japan). Domestic DVD players are forced to play titles from their

native region only, unless sneakily modified by a third party. When playing DVD movies on your PC, the regional coding is checked out

by your software player, which normally asks you what region you're in during installation. Most players allow you to change the region up to five times, which means you could install your desired regions on separate Windows hardware profiles and effectively choose your region when starting your PC.

## Picture quality

Anyone who's watched video playback on a PC monitor knows it looks quite different to the TV, due to different types of resolutions, phosphors and shadow masks. It tends to look sharper and with more contrast — not necessarily wrong, but different, unfamiliar, and usually, as a consequence, less preferable. Most decoders also offer some kind of interpolation to scale the picture to fill your screen regardless of your resolution. This too can look strange, with many people preferring to set up a hardware profile running at 640x480 pixels just for playing movies. The good news is that when plugged in to your TV, the picture can be pretty much as good as a domestic DVD player. Where possible, always use the S-Video connection, then sit back and enjoy a picture far superior to VHS.

## Conclusion

While undeniably neat, you have to ask yourself why you'd want to play DVD movies on your PC. Starting up your computer is not quite as convenient as switching on a domestic player, and they do tend to whirr annoyingly in the background. For the best picture and sound you'll want to connect your DVD player to your TV and hi-fi, but how many people have their PC in the same room? And once you've settled down to watch the film, what happens when the phone rings? Very few PCs come with remote controls. So saying, DVD is the future of software delivery and will become as ubiquitous as the CD-ROM drive is today. When buying a new PC, it's worth specifying a DVD-ROM drive; and those living with CD-ROM drives today should consider upgrading in the near future.

GORDON LAING



## Sony DDU220E

**Sony has entered** the DVD fray with a third-generation 5X drive that can also read CD, CD-R and CD-RW. The DDU220E is the first DVD to employ CAV (constant angular velocity) technology, first used in 32X CD-ROMs, which reduces the amount of heat at the spindle motor.

**Sony is claiming** transfer rates of between 2.7 and 6.9Mb/sec, an impressive increase over the 2X drives. Like the drives currently on the market from Hitachi and Philips, the Sony unit is bundled with the RealMagic



Hollywood Plus MPEG-2 decoder card — unlike the Creative Labs DVD fully integrated solution which uses the company's own decoder, the DXR-2. The RealMagic card was easy to install and functioned perfectly once the driver diskettes were loaded up. An impressive decoder aimed at the home user who wants to convert their PC into a DVD player, the Hollywood Plus has S/PDIF output for Dolby Surround Sound, with its six channels available through a suitable amplifier. The Sony drive was recognised immediately, and we were viewing a DVD movie within seconds of rebooting the PC. To begin with we were running the movies on a powerful PII350 PC, so it wasn't surprising that the images were clean and ran flawlessly. When we disabled the MPEG-2 card in the hardware profile and ran the film using the popular Zoran software supplied, the processor couldn't quite cope with the extra

workload of decoding the MPEG files through software, and the film began to drop frames and lose fluidity. Bearing in mind that the processor was a PII350, the poor soft-DVD performance makes the point quite succinctly that a 5X DVD drive won't make much impact on performance. The bottleneck in the system occurs with the CPU being unable to perform the processing task without hiccups.

### PCW DETAILS

★★★★★

**Price** £249 (£212 ex VAT)

**Contact** Sony 01932 816660

[www.sony.co.uk](http://www.sony.co.uk)

**Good Points** Excellent picture quality and sound.

**Bad Points** Sony hasn't come up with its own decoder yet.

**Conclusion** An impressive way to turn your PC into a DVD player.

## Panasonic SR8582 DVD-ROM

**Keeping up with** new technology needn't cost the earth and can sometimes even make sense. With the DVD revolution seemingly around the next corner, it would be a short-sighted individual who replaced an ageing or ailing CD-ROM drive with a new model that lacked the ability to play this next-generation media. Panasonic's drive-only option is a cost-effective way of preparing for the DVD revolution. Straight out of the box it's a simple upgrade, slotting neatly into the 5.25in gap left by a retiring IDE CD-ROM drive:

hide the DVD logo, and it would be hard to tell



what kind of discs it accepted. In terms of CD-ROM performance, tests placed it in an equivalent position to mid-range drives, peaking out at 25X performance. Added to this, of course, is the ability to run DVD-based software at double the standard speed when it becomes more readily available.

**One area** that is lacking is MPEG-2 capability, which would allow the playback of movies on DVD Video. As our tests on the Sony drive [above] show, you should not depend on your CPU alone to play

back DVD movies satisfactorily through software. However, many modern graphics cards come with this capability built in, so movie buffs should check their PC before writing off this drive on that count. Movies will probably be a key consideration when purchasing the drive,

though, since the majority of currently available DVD software is still restricted to video.

**Third-generation** models from other manufacturers are waiting in the wings, although these are likely to be priced at a real premium while the early adopters take first pickings. For those of us willing to accept less for a more reasonable price, this second-generation drive balances a significantly lower price with a creditable performance.

### PCW DETAILS

★★★★★

**Price** £147 (£125 ex VAT)

**Contact** Panasonic 0800 444220

[www.panasonic.com](http://www.panasonic.com)

**Good Points** Good balance between price and performance.

**Bad Points** No MPEG-2 capability for running available DVD software.

**Conclusion** A convenient path into DVD without premium pricing.

# Digital Camcorders

Your modest attempts at filming family and friends could **benefit greatly** from a switch to digital.

**W**ith the advent of digital TV, film and TV programme makers are switching to digital as the ideal way of recording. But it is not just the professionals who get to use the best equipment. Since the first digital camcorders appeared back in 1997, they have become increasingly popular for two fundamental reasons: they produce better-quality video and audio, and the images they capture can be copied without degradation in quality.

**Digital camcorders** work in much the same way as digital cameras in that the image is captured using a CCD (charged coupled device), then the signal produced is converted into a digital format and saved onto a storage medium. Unlike photographic film, however, video is relatively low resolution: PAL displays images at 768x576 at just 25 frames (or 50 fields, i.e. interlaced frames) per second.

Digital video offers definite advantages over analogue, giving crisper edges and finer details, and as there is no signal interference you won't get those

annoying white lines across the picture. In addition, the audio track is recorded in 16-bit, which gives CD-quality sound.

But the most compelling reason to opt for digital over analogue is that the quality is not reduced when you copy it. Each time you copy an analogue signal, "generational loss" occurs, meaning that the image quality is degraded. The more times you copy, the more degradation that occurs, which can cause problems when you need to edit film more than once. Digital images, on the other hand, can be copied as many times as you like without fear of degradation, which again has a knock-on effect with degradation-free editing.

On the downside, digital video requires a fair amount of room on whatever storage medium to record just a few seconds of video. For each pixel of a single frame of PAL video, three bytes of data are required to store its red, green and blue colour components. So, one frame needs 768x576 x 3 bytes, making 1.266Mb before compression. Multiply this by the 25 frames needed each second for the eye to see continuous movement,

and you have a massive 31.64Gb requirement for just one second of video. And this is not even using the high resolutions and refresh rates of HDTV. The obvious answer is to compress the data, and there are numerous ways of doing this, notably DV and MPEG.

## Digital Video (DV)

The most common format used by digital camcorders is DV (digital video). Panasonic and Sony were the first to use this standard on their camcorders, although Panasonic did not use the DV output facilities included as part of the DV standard. Both companies have announced their own extensions to the standard — Panasonic with PWCPRO in '95, and Sony with DVCAM in '96, although for their consumer digital camcorders both manufacturers have stuck to a more basic form of DV, in common with just about every other maker of digital camcorders.

DV uses a three-stage process to compress data. The first stage uses discrete cosine transform (DCT)

### Canon DM-MV1

**You could be** forgiven for thinking that the DM-MV1 is actually a stills camera. It has been designed specifically to look like an SLR, which has its good and bad sides. It has easy-to-use buttons, all placed where you can easily feel for them as you operate the camera. It has a viewfinder, but only a very small LCD screen that tilts backwards, making it hard to use in sunlight. However, while the design suits an SLR where you need to hold the camera still, it works less well for video where you want to move the camcorder around. Added to this, the DM-MV1 is quite heavy at 930g (just over 2lbs) and while there is optical image stabilisation built in, this reviewer found it all too easy

to get wobbly shots. The quality of the video was high, however, helped by the progressive scanning technique of the CCD, which takes a full frame 50 times a second, instead of 25 frames a second from 50 interlaced fields.

**Price** £1,500 (£1,277 ex VAT)  
**Contact** 0121 680 8062

[www.canon.co.uk](http://www.canon.co.uk)



### Panasonic NV-DS77

**Cute, very, very cute,** is the only way you can describe this adorable camera. At just 590g (1.3lbs) it is light, you can easily hold it in one hand, and there is a stabilising function to reduce camera shake. Your fingers are automatically positioned over the relevant buttons, such as the wide and telephoto control. Again this control is smooth, and gives you 10X optical zoom. The flip-out screen is a huge 3.8in across. This makes a big difference when trying to line up your shots, but it will eat your Lithium Ion batteries for breakfast. To compensate, Panasonic has included a good viewfinder and

a battery recharger which can hold two batteries at a time. The 680,000 pixel CCD gives an excellent picture.

**Price** £1,600 (£1,362 ex VAT)  
**Contact** [www.panasonic.co.uk](http://www.panasonic.co.uk)





**Sharp VL-PD1**

**The most noteworthy feature** on this camcorder is the 4in flip-back, touch-screen LCD. The screen folds flat back against the body of the unit so you can play back your recorded video with the screen at a comfortable angle. It will also turn around so you can film yourself, although as you will more than likely be looking to one side at the screen, rather than at the lens, this can be less successful than it seems. The functionality is controlled by touching the on-screen menus, but this quickly covers the screen in sticky fingerprints. The viewfinder is fixed in place so you cannot choose the most comfortable viewing angle. The focusing is sluggish in poor light, and the telephoto (40X digital

but no optical zoom) has a horrible habit of sliding back to the default setting. Still, at 635g (1.4lbs) it is light and it does have a larger than normal Li-Ion battery to give a claimed two hour battery life.

**Price** £1,200  
(£1,021 ex VAT)

**Contact**  
0800 262958  
[www.sharp.co.uk](http://www.sharp.co.uk)

**Hitachi MP-EG1A**

**While not new**, this camcorder does stand out from the crowd. It is the only one we saw which does not use MiniDV cassettes, instead recording in MPEG-1 straight on to a PC Card hard disk, and so feels like a camcorder intended for use with a PC. There is no viewfinder, just an LCD screen, and no optical zoom although it does have 6X digital zoom. The head swivels round 180 degrees to capture video at any angle, and all the buttons for operation are on the back panel. The unit is extremely

easy to get to grips with, as everything is self-explanatory. Through MPEG-1 video is recorded at a very low resolution, just 352x240, but still images can be captured at 704x480. The hard disk supplied is 260Mb, which should store 20 minutes of video.

**Price** £1,000 (£851 ex VAT)  
**Contact** 0181 849 2000

[www.hitachi.co.uk](http://www.hitachi.co.uk)



compression, which strips away information that cannot be seen by the human eye. It separates the information from each pixel into brightness and colour and then samples this, favouring colour over brightness, which gives a highly accurate colour representation but cuts down the data by a third. It is compressed further by bunching colour information in adjacent pixels, and finally, hardware compression and an algorithm similar to that used by M-JPEG scrunches the information down even further.

**The DV standard** also supports PCM (pulse code modulation) stereo, a marking you might find stamped on the speakers of your digital camcorder. PCM refers to a system for digitising analogue sound. Using it, you can either record 16-bit audio — i.e. CD-quality audio — or in 12-bit mode you can record two pairs of audio tracks, one for stereo sound recorded at the time of the video and one for music or narration added later. Probably of most relevance for PC users is that it supports IEEE 1394 as a means of transferring the digital video from the camcorder to a PC. We'll look at 1394 a little further on [p223].

DV is recorded onto MiniDV cassettes. These are tiny things, but can hold a whole hour of video. They also have the advantage of having very low drop-out rates, unlike Hi8 which readily loses information, no matter how new the tape.

Not all manufacturers have adopted DV. Two years ago Hitachi released a digital camcorder based around the MPEG standard. Although this camera is relatively old, it is still one of the better cameras for PC users.

**MPEG**

MPEG comes in three flavours:

- the original MPEG-1 used as an alternative to QuickTime and the like;
- the widely supported MPEG-2; and
- the up-and-coming MPEG-4, intended for use in interactive set-top boxes.

The MPEG-2 standard is becoming ubiquitous since it has been adopted as the compression standard for DVD. It achieves a high compression rate by using the JPEG algorithm, a "lossy" compression standard, meaning that data is stripped away to reduce file sizes although the reduction cannot usually be seen by the human eye. It then stores only the changes between one frame and the next, so any data which stays the same for each frame is automatically dumped. This results in variable compression rates.

MPEG-2 allows for various resolutions and frame rates, supporting everything from PAL and NTSC through to HDTV and CD-quality audio.

However, on all but the most powerful systems, decoding MPEG-2 for playback will require dedicated hardware. Coding MPEG-2 requires considerable processing power and it is probably this stumbling block that has prevented the standard from being more widely adopted on camcorders.

**As MPEG-2** is the default standard used by DVD, all digital TVs will be able to display MPEG in the future. It should be pointed out, however, that DV and MPEG are not compatible: if you want to input an MPEG file into a DV camcorder,

***MPEG-2 supports everything from PAL and NTSC to HDTV and CD-quality audio***

you will have to first convert it to analogue and then reconvert it into DV format. Of the cameras we looked at for this group test, only the Hitachi MP-EG1A used MPEG-1 as its compression format. As a result, it was the only one to record its data not onto DV tape, but onto a PC Card hard disk. For the PC user this is perhaps more convenient than having video held on DV tapes, as the data on the PC Card disk can be quickly downloaded directly onto a notebook, so overcoming the problems associated with the other connections offered on digital

## Sony DCR-PC1

**Sony was the first** manufacturer to produce a digital camcorder and, like in so many areas, its products are considered some of the best around. We first looked at the DCR-PC10 (*pictured*); this has now been replaced by the DCR-PC1. The PC1 looks very similar and has similar features to the PC10, but is 25 percent smaller, making it around the size of a conventional compact film camera. Its small size, light weight and well-placed buttons make it very easy to use. Both camcorders have optical and digital zoom, 12X and 150X respectively on the PC10 and 10X and 120X on the PC1. Both have good-quality lenses, LCD screens and viewfinders, and Super SteadyShot image stabilisation. However, the small size of the PC1 makes it the most desirable of the two, while its excellent lens makes it one of the best small digital camcorders.



**Price (PC1)**  
£1,400 (£1,191 ex VAT)  
**Contact** Sony 0990 424424  
[www.sony.co.uk](http://www.sony.co.uk)

camcorders. However, using MPEG-1 the Hitachi camera captures images at 352x240 pixels only.

## Connections

The ability to capture clear, sharp images is nothing if you cannot download those images to another source for editing and playback. For PC users, the best thing about digital video is that it is in the right format for them to download direct to

shame, as this would give good-quality playback on a TV. S-Video and composite are standard on camcorders, TVs and video capture cards. S-Video gives a far superior picture to composite, as it separates colour information from brightness and transmits them in two separate channels over the cable. It favours brightness over colour, just as TV signals do, because the human eye detects brightness better than colour. Composite just takes everything and

the PC without analogue-to-digital conversion. With the exception of the Hitachi, all the cameras we looked at had three connections: composite, S-Video and DV-out. Some also provided a SCART socket for connection to a VCR, although the ones we saw only took a composite feed, not RGB. In fact, none of the cameras provided a direct RGB connection, which was a

squidges it all down one video channel. However, both these connections are analogue and will convert the digital signal to analogue before squirting it down the cable, so your crisp, clear digital video will be marred at this point.

For high speed and the best quality, you need to look for DV-out, or iLink as some of the camcorder manufacturers call it, or 1394 as everyone else knows it. It is the perfect bus for digital editing because it can transfer data at 100, 200 or 400Mbps — much faster than USB and, at the higher speeds, faster than 100BaseT Ethernet networks.

## IEEE 1394

You can set up peer-to-peer networks using any IEEE 1394 devices. This means you don't have to use a PC at all, but can simply connect one 1394 device directly to another. However, 1394 is expensive to deploy as it needs two chips per device — one to handle the physical layer and one to handle the link layer in the connection protocol. Therefore, it is over-specified to handle the low bit rates needed for devices such as scanners and keyboards, but is perfect for devices needing high bandwidth.

At present, few PCs come with 1394 as standard, although it could easily be put on to motherboards in the future, together with USB, and many hard-disk manufacturers are considering adopting it in the future rather than SCSI. Adaptec has had a SCSI/1394 combo card, the AHA-8945, for over a year although it still costs £376 (£320 ex VAT). The much cheaper Adaptec AHA-8940 card only copes with still images over 1394.

## Taking stills on your camcorder

If you have a digital camcorder which lets you take still shots, why would you need a separate digital camera? Canon even tries to convince you of the convergence of these two mediums by making the DM-MV1 look and feel like an SLR camera. But mixing the two does not always make sense. Firstly, the resolution of video is low, and so the CCD used in most of these camcorders is correspondingly low. Typically, the stills images will be just 640x480 pixels, which is low compared to most of the latest crop of digital cameras. Printing an image of this size will give you a photo 2.1in by 1.6in at 300dpi or 4.3in by 3.2in at 150dpi. If you simply want images

to put on a web site, this should be fine, but if you want to make high-quality prints, invest in a separate digital camera. Pulling images off the camera isn't easy, either. Canon provides a serial link to a PC and the Hitachi's images can be pulled off using the PC Card, but otherwise it's a fiddly job. Searching for the right image on a DV tape which can hold 500 still images is time-consuming and difficult unless you use special software.

Digital camcorders do not come with some of the extras which are needed on a stills camera: there is no flash as standard on any of the cameras we saw, and only the Canon has an optional flash attachment.

**Most digital camcorders** come with a 1394/DV connection, not so they can be connected to PCs, but so that they are ready for the new wave of digital VCRs which are now appearing. Looking through the manuals that accompany these digital camcorders, you could be forgiven for thinking that no camcorder was ever meant to be connected to a PC. The only manual that even made mention of a PC was for the Canon, and then it was only to mention that still digital images could be downloaded over the serial port. However, most camcorder manufacturers do provide cables for 1394, so if you have the right connections on your PC or video, pat yourself on the back for having made some excellent purchasing decisions.

ADELE DYER



# Video Capture

Everything you need to know about **capturing and saving** full-motion video.

**T**V tuner cards and video capture cards are not exactly new kids on the block, but they have been dropping sharply in price and even appearing on multi-purpose graphics cards. Saving moving video like this is resource-intensive. A 320x240 image, which is far from full-screen size, will occupy, on average, 2 bytes per frame. At 25 frames a second, and with a 3:1 compression ratio, you'll find yourself eating up your hard disk at a rate of 1.2Mb per second. A 30-minute clip of this size would therefore occupy a staggering 2.1Gb. But there is light at the end of the tunnel in the form of Digital VCR 2.0 from ATi. By reducing the quality and almost halving the size to 176x144, it squeezes 5.5 hours onto a 2Gb drive.

**If you still want** to capture full-motion video, disk space should not be your only consideration. Translating the analogue

signal into digital form and writing it to disk makes heavy demands on your processor. If you're running a 90MHz Pentium, you are unlikely to be able to capture anything more impressive than around 15fps, even at less than 320x240 resolution. Some cards, specifically the Matrox Marvel G200 [p226], include utilities to tailor video capture rates to your hard drive. Older drives are slower and unable to keep up with the high data transfer rates necessary. With over 3Mb of information being sent to it each second, anything more than a couple of years old is likely to start dropping frames and produce in a jerky result when you try to record full-screen PAL input.

Because of the difference in the way a computer monitor and a television are constructed, further distortion can occur. This is particularly evident when

the camera or a subject in the frame makes a swift movement. Because video images are interlaced, with every odd line being drawn before the even lines are even considered, the picture can have changed between line one (the first odd line) and line two (the first even line) being drawn. This sometimes results in

***If you want to capture full-motion video, disk space should not be your only consideration***

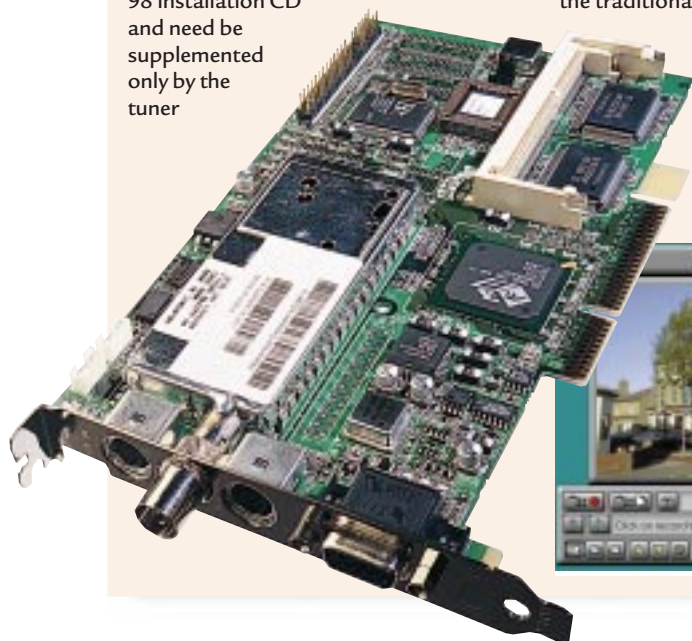
horizontal black lines across the image. This is less evident on a TV because the screen is coated with "slow phosphor". This takes longer to cool than the coating on a computer monitor and so the image on the odd lines is still visible while the even lines are being drawn.

## ATi All-In-Wonder Pro

**The All-In-Wonder Pro** has made a few appearances in high-end home PCs submitted for PCW group tests, and it's easy to see why. Available in both PCI and AGP versions, this graphics card incorporates TV and Teletext support and is supremely easy to install. All the necessary drivers can be found on the Windows 98 installation CD and need be supplemented only by the tuner

software on the bundled CD. The Teletext decoder incorporates TV Online, which gives a web-like slant to the rather primitive Teletext. The only channel we could find broadcasting to a UK audience and using this technology was German station ZDF, on the Astra satellite. When set to "multimedia mode", the traditional Teletext layout is lost and instead the pages are presented in Windows Terminal typeface. Users can click on red page numbers to be taken to the page without having

to type in the number. For traditional users, it offers the option of retaining Teletext's original look and feel. Images can be captured as either full-motion video, a series of stills or a one-off snapshot from the same interface that is used for viewing TV or video input, while the bundling of MGI VideoWave allows users to refine their captured clips and construct attractive presentations or home videos.



## PCW DETAILS

★★★★★

**Price** £129 (£109.79 ex VAT)

**Contact** ATi Technologies  
01628 533115

[www.atitech.com](http://www.atitech.com)

**Good Points** A well established, easy setup.

**Bad Points** None to speak of.

**Conclusion** A good all-rounder for the home power user.

Computer monitors, being built for accuracy rather than brightness, cannot enjoy this luxury.

Manufacturers attempt to combat this in one of two ways. The most obvious method is to de-interlace by keeping the odd lines on the screen while drawing the even lines between them. An alternative is what is known as vertical interpolation. Here, the even lines are ignored and only the odd lines are drawn. The card leaves enough space between each line to allow it to compare

one odd line of pixels with the next (5 with 7 or 29 with 31) and use a row of "average" pixels to fill up the gap.

Specific TV commands, in the form of Intel's Intersect, are incorporated into Windows 98. This allows broadcasters to combine their programmes with HTML elements that provide interactive programming and online TV guides. Although Intersect was

used extensively during the 1996 Olympics in Atlanta, it is now in short supply.

On these pages we look at a small selection of cards

catering for those interested in the merging of TV and PC technologies. Not all suit every need. The Studio 400 from



◀ **WHEN YOUR MOVIE IS COMPLETE, IT'S TIME TO RECORD IT TO VIDEO**



◀ **THE MINIMUM OF BUTTONS MAKE MIROVIDEO'S VIDEO CAPTURE PACKAGE SIMPLE TO USE**

Pinnacle excels at video editing but cannot tune into a TV broadcast.

The Hauppauge WinTV, which can, supplements your graphics card, while the Marvel G200 from Matrox replaces it and touches most other bases at the same time.

In short, it is up to the individual to select the most appropriate product to meet their needs.

NIK RAWLINSON

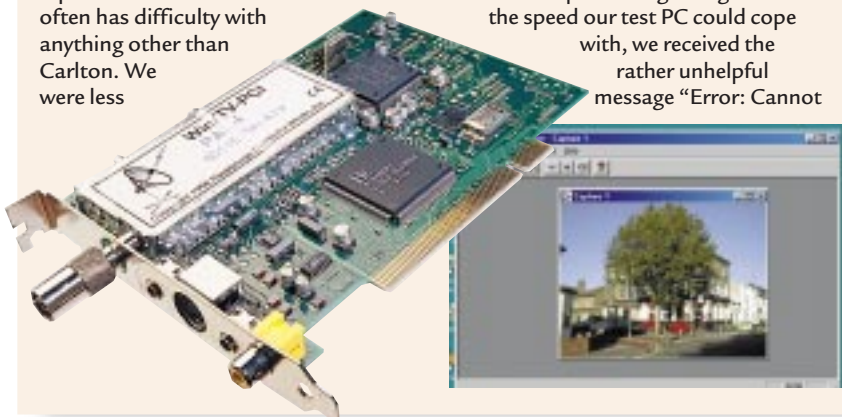
## Hauppauge WinTV

Installation of this card was simplicity itself. After it was popped into a spare PCI slot, Windows detected the new hardware and installed the relevant drivers from CD. We told it in which country we would be using it to watch television and it then performed a scan of all available channels within its frequency range. Using a standard roof-mounted aerial it managed to tune in to far more channels than any standard TV using the same connection. Picture quality was exceptional, even when resized to 800x600, with both Carlton and Anglia flavours of ITV (from London and Norwich respectively) flawlessly reproduced in an area that often has difficulty with anything other than Carlton. We were less

impressed after increasing our screen resolution to 1024x768, when vertical interference started to appear. Downloading Teletext pages was easy, although we were unable to display both Teletext and television on the same screen — it caused a lot of interference and made both indecipherable. A supplied lead allowed us to connect the line-out channel to the line-in channel of our sound card. This tuner does not replace the graphics card.

The video capture facility is very basic with "About" being the only option on the Help menu. When we tried to capture images larger than the speed our test PC could cope with, we received the rather unhelpful message "Error: Cannot

open the video input device" and had to work out how to solve this ourselves — even the manual didn't help. When we finally managed to capture video it performed well with small frame sizes, but it got so carried away that the icon turned into a permanent hourglass and the only way we could stop recording was to hit Ctrl-Alt-Del. This is in spite of the fact that the software limits captured frame sizes to 320x240.



## PCW DETAILS



**Price** £79 (£67 ex VAT)

**Contact** Hauppauge 0171 378 1997  
[www.hauppauge.co.uk](http://www.hauppauge.co.uk)

**Good Points** Great TV picture at 800x600 resolution. Strong reception. Easy to install.

**Bad Points** Cryptic errors. Interference in some conditions. Could not display TV and Teletext together. Difficulty with video capture.

**Conclusion** Cheap and cheerful, and would suit most needs.

## Matrox Marvel G200

The **Marvel** is a shapely blue box that sits on top of your PC case and connects your external video and other equipment to the card that sits inside your PC. This AGP card replaces the standard graphics card, leaving you with no less free PCI slots than you had before installation. Setting it up was simplicity itself and we needed to change only one default setting to tell it the country in which we would be watching TV. An analysis of the hard drives in our machine followed to determine

which had the best data transfer rate to support live video capture. When the tests had completed, we were able to capture full screen PAL (704x576) video at 25fps. The optional TV tuner has an impressive word-search function to scan subtitles and activate the recording function when it comes across a particular keyword, making it suitable for recording specific news stories.

**Recording,** it can take advantage of the MJPEG format, a Windows AVI (Audio/Video Interleave) format with extra compression used only by Matrox cards. A wide selection of complementary software ranges from games

and conferencing to image- and video-editing applications. The only minor difficulty we experienced was in having to remove previously resident video drivers from our test machine before installing the Marvel, although this is unlikely to affect home users who will not be regularly swapping a number of graphics cards in a single machine.

### PCW DETAILS

★★★★★

**Price** £199 (£169 ex VAT), TV tuner upgrade £75 (£64 ex VAT), DVD Video £58 (£49 ex VAT)

**Contact** Matrox 01753 665544  
[www.matrox.com/mga](http://www.matrox.com/mga)

**Good Points** 16-bit colour TV reception at 1024x768. Graphics-card replacement. Subtitle word search. Ease of configuration.

**Bad Points** None to speak of.

**Conclusion** Those who want to spend this much money won't find better than a Marvel G200.



## Pinnacle miroVideo PCTV

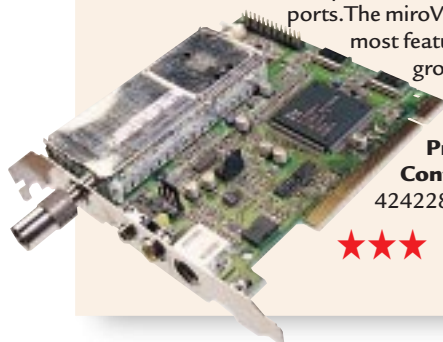
We were disappointed that we were unable to install this card under Windows 98 and so were forced to revert to using either Windows 95 or Windows NT. Once working, it was simple to use. The picture wasn't nearly as good as that produced by the Hauppauge WinTV [p226] but we were able to view Teletext and broadcasts at the same time, making subtitles a practicality even if they were in a separate window. Full-screen 768x576 resolution avoids scaling the image and maintains a 1:1 ratio to the original broadcast. An interface on the open end of the card allows a radio tuner card to be bolted on to increase the product's range of features. The bundled VidCon32 software catered for video capture. Users have the choice of capturing a series of stills to make up their AVI files or can simply hit the Record button for full-motion video. Kai's Power Goo SE allows users to manipulate captured images. Quick data transfer is ensured through the implementation of PCI bus mastering technology, while virtually any domestic video source can be connected with the incorporation of VHS and S-VHS ports. The miroVideo may not be the

most feature-packed card in this grouping, but at this price you can't complain.

**Price** £59 (£50 ex VAT)  
**Contact** Pinnacle 01895

424228 [www.pinnaclesys.com](http://www.pinnaclesys.com)

★★★★



## Pinnacle Studio 400

The Studio 400 is slightly different to the other products reviewed here in that it is not a TV tuner or a graphics card but a dedicated video editor. The smart, purple box connects your PC to a video and camcorder, while the software makes it easy to import your video clips as a series of scenes that are displayed on the pages of a virtual on-screen book. These scenes can then be dragged and dropped on to the film strip at the bottom of the interface in the appropriate order. You don't need to preview your tapes to mark where the scenes begin and end. By playing them through the hardware, the purple centrepiece will recognise and mark where scenes begin, representing each new scene with a further thumbnail in the virtual book. On-screen titles and special effects are applied by dragging them on to the film strip. To save on rapid hard-drive consumption, the Studio 400 leaves the original footage exactly where it is. The only thing written to disk is a low-quality, highly compressed copy of the scenes that are not used in the completed production. When you have finished assembling your previews, the Studio 400's infra-red attachment lets you control your video and reassemble the film directly from the recorded originals.

**Price** £199  
(£169 ex VAT)

**Contact** Pinnacle  
01895 424228  
[www.pinnaclesys.com](http://www.pinnaclesys.com)

★★★★★





# Videoconferencing

The last time *PCW* took a look at videoconferencing, it was clear that the big players like PictureTel and VideoLogic dominated, and the technology hadn't wholly migrated down to the lower end of the market. That has now changed. Of the five products we have reviewed this time around, there are two high-end packages but three desktop video solutions, including one that doesn't require a PC.

There is now a gamut of products under £100 that have made budget videoconferencing a reality using a variety of media, from the internet through normal telephone lines, to LANs and on to high-speed ISDN lines. This is not to say, however, that videoconferencing is about to be possible from wristwatches. One day, maybe...

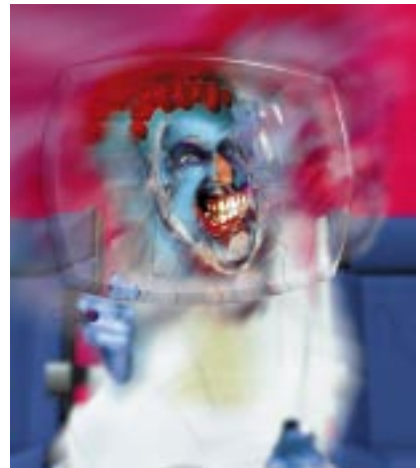
Grainy, murky images are still quite common when working with low-end cameras. Frame rates of between 5-15fps are common over a telephone link,

which appears jerky to the human eye used to a typical video rate of 30fps. But as our experience with the Kodak DVC 323 shows [*opposite*], it is possible to get a good-quality picture that isn't at the expense of frame rate. More of the work of compressing and decompressing the images to get them through narrow bandwidths can be handled through software by increasingly powerful processors.

Low-end cameras usually fall into one or two camps: those that use expansion cards, and those that connect straight into the parallel or USB ports.

## The professional view

In the professional solutions that hook up over LANs/WANs and/or ISDN lines, the quality of video camera is usually streets ahead of that available from the poorer cousins, and the picture benefits from the higher bandwidth available. Corporate videoconferencing is still the



Next Big Thing rather than a current phenomenon, but with Microsoft and Intel renewing and pushing their high-end videoconferencing with NetMeeting and Team Server respectively, and IBM/Lotus acquiring two specialist companies, DataBeam and Ubique, this can only be good news for high-end users.

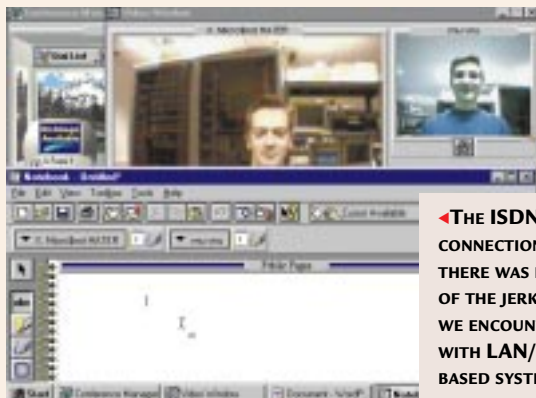
## Intel ProShare Conferencing

Intel's ProShare system is a well established product, aimed at the corporate market for whom data transfer is as important as visual communication. The 200 was about to be superseded by the 500 at the time of going to press, a cheaper, superior option that uses the PII processor for decoding, rather than the ISA cards in the 200. The ProShare can be set up to work with a modem or LAN, although using a modem means you work on data only, not audio and video.

However, the system is really aimed at ISDN users. Other users will need the same connection of course, and the ProShare uses the H.120 data conferencing and H.320 video conferencing standards.

**We set up** the system to run over an ISDN line in the labs and it went relatively smoothly apart from installing the drivers. The hardware wizard couldn't detect the drivers from the CD automatically, as it said in the manual, so we had to browse

through the disk to find them ourselves. Once we had done this, the rest of the setup was easy, and then we moved on to calibrating the camera. Connecting to another PC is relatively easy: type in the number of the person you want to call, and they are informed by a pop-up graphic.



◀ **THE ISDN CONNECTION MEANT THERE WAS LITTLE OF THE JERKINESS WE ENCOUNTERED WITH LAN/MODEM BASED SYSTEMS**

The ProShare system also allows multipoint conferencing between three or more users, application sharing, and the option to work on shared data during the call. Using the Notebook function, the file is copied by the ProShare application, allowing users to work on the one file simultaneously.

## PCW DETAILS



**Price** £1,327 (£1,129 ex VAT). ProShare 500 will be available for £586 (£499 ex VAT). A 500 upgrade kit is available for £370 (£315 ex VAT).

**Contact** Intel 01793 403000  
[www.intel.com](http://www.intel.com)

**Good Points** Does everything you could want.

**Bad Points** A little troublesome setting up. Uses up two ISA slots.

**Conclusion** A classy videoconferencing solution.

## Kodak DVC 323

The grumbles around the office have been going on for over a year now; when, oh when, were manufacturers going to take up the USB (Universal Serial Bus) cause? With the market's acceptance of USB-friendly Windows 98, we are only now starting to see a notable number of products on the market.

The DVC 323 is Kodak's update to the DVC 300, one of the very first USB



devices, and is an impressive piece of kit. Providing you have USB on your PC, and that it works, the installation is trouble-free. We wrestled with the camera for two hours on the first PC we tried, but to no avail. The drivers had to be updated from the Kodak web site, we were told. The PC finally recognised the hardware, but the new driver didn't fix the problem.

As if to thoroughly confuse us, the camera and software installed like a dream on the next PC we tried, and we were pleasantly surprised by what we saw. Kodak is using its own lens in the camera, and a 640x480 pixel CCD capable of taking video or stills, in up to 24-bit colour resolutions. It can manage 28fps in Wide Angle mode, and 30fps in Normal and Telephoto modes. The picture was sharper than most of the other cameras in this budget

range, and even recording at 640x480 the frame rate remains high. The basic software was PictureWorks Live, which was a joy to use: instantly comprehensible, with lots of well thought out drag-and-drop. There is also fun to be had with Kai's Power Goo, included in the pack along with Microsoft's NetMeeting and CU-SeeMe.

### PCW DETAILS



**Price** £160 (£136 ex VAT)

**Contact** Kodak 0800 281487

[www.kodak.co.uk](http://www.kodak.co.uk)

**Good Points** User-friendly software and excellent-quality video, and it looks like a Star Trek phaser.

**Bad Points** USB can be a little temperamental.

**Conclusion** A great toy that's a joy to use.

## Pace Colour Video Camera PCI

Unlike some of the other low-end videoconferencing cameras around just now, the Pace Colour Video Camera PCI works, as the quicker-witted among you will have picked up from its title, in tandem with the PCI video capture card that comes with the camera.

The digital CMOS camera is one of the more unusual-looking cameras on the market, with its rubber-cased lens looking like an eyeball trapped inside the small, cylindrical design. It can sit on top of the monitor or be screwed into a camera tripod for more stability. The installation of the camera and card is simplicity itself, first fixing the card in a spare

PCI slot and then attaching the camera to the port on the card. When we rebooted the PC, it recognised the card and camera and we loaded the drivers in from the CD. We were pleased to see additional ports on the PCI card for Composite and S-VHS inputs, enabling film from camcorders and VCRs to be captured on the PC, as well as a tuner card for watching TV.

**This is a budget camera**, a fact reflected by the picture; at best murky, at worst poor. With a maximum resolution of 320x240, the Colour Video Camera isn't

about to produce film-quality video.

Although this camera seems to be aimed at the home user who likes the idea of emailing videos of him/herself and doesn't care too much

about perfect pictures, there was a wide range of accompanying software. The camera comes with two "video mail" packages, a full version of VideoLink, and a cut-down version of VDOPhone. With business in mind there are several software solutions for live videoconferencing, and there is the option to install software that makes the camera motion-sensitive, turning it into a surveillance device.



### PCW DETAILS



**Price** £89 (£76 ex VAT). USB version also available at same price.

**Contact** Pace 0990 561001

[www.pacecom.co.uk](http://www.pacecom.co.uk)

**Good Points** Cheap. Easy to set up.

**Bad Points** You are made to suffer in terms of picture quality.

**Conclusion** You get what you pay for.

## ViaTV Phone

The idea behind the ViaTV is simplicity itself; to take the PC out of videoconferencing. The ViaTV Phone sits on top of the television, and sends the pictures directly down the phone line through its own internal modem to another videophone. As well as being able to hook up to other ViaTV Phones, the camera can also make videocalls to any other videophones that use the H.324 standard for modem-to-modem connections over a PSTN (Public Switched Telephone Network).



The ViaTV Phone was a breeze to set up. The camera doesn't have to be placed on top of the TV, but this is really the most practical place to put it due to the length of the leads between camera and TV. The camera connects to the TV via the SCART socket on the back of the TV, and to the existing phone line via a two-way socket into which you plug the line from your telephone.

It took us about five minutes to set up ready for our first attempt at PC-less videoconferencing, and most of that time was spent dragging the TV close enough to the phone socket: a longer line would have been much appreciated. Once you have rung the recipient of your call, you can then initiate the video-connection. It took around 20 seconds for the link

to establish, with a connection speed of around 31Kb/sec. Using the buttons on the phone, you can bring up menus that can alter picture quality as well as frame rate. The picture at its "fine" setting was impressively sharp, but its frame rate dropped dramatically and any sense of continuous movement was lost. At the "fast" setting, the frame rate was very impressive although the picture was pretty awful.

### PCW DETAILS



**Price** £399 (£340 ex VAT)

**Contact** ViaTv 0800 980 8889

[www.viatv.com](http://www.viatv.com)

**Good Points** Simplicity itself to set up.

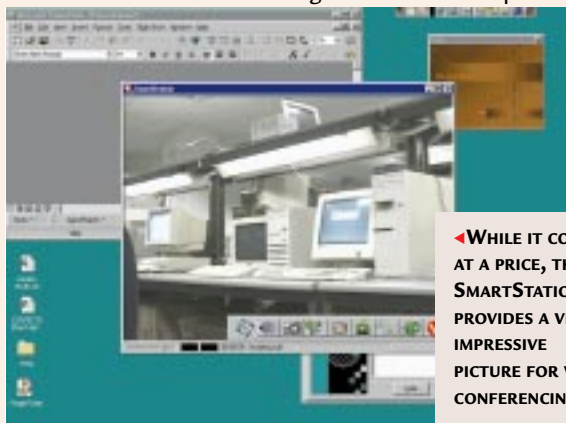
**Bad Points** You must sacrifice frame rate for picture quality.

**Conclusion** A neat idea that might catch on with a faster modem.

## Vtel SmartStation

Vtel is one of the key players in what is known in videoconferencing circles as "room" conferencing, where clients pay anything up to £20,000 for a set-up that allows whole boardrooms to communicate with each other. Rather than selling over the counter, its key market is corporates to whom money isn't a problem. Unlikely though it is that a small-business user is going to shell out the requisite readies, we thought it would nonetheless be interesting to

see how the other half lives. We reviewed Vtel's Executive package that includes the same excellent 12X zoom camera the company bundles with its £20,000 set-ups. Not for the faint-hearted, the SmartStation comes with two hulking codec cards, one PCI, one ISA. It is relatively easy to set up, but you will need at least a P133 processor as part of a robust system. The video is excellent quality, but in spite of the two codec cards it still makes certain demands on the processor. Once it was up



◀ **WHILE IT COMES AT A PRICE, THE SMARTSTATION PROVIDES A VERY IMPRESSIVE PICTURE FOR VIDEO-CONFERENCING**

and running, we were knocked out by the quality of the video — until we realised it was a local image and hadn't been compressed for transit. Even when we were hooked up to another user, the picture was

still impressive over an ISDN line, although it can be configured to run over LANs and modems. The package includes Microsoft's NetMeeting software that allows multiple users to share applications.

**The SmartStation** has a particularly intuitive user interface, an icon-driven menu that sits on the edge of the SmartStation window and can be customised depending on your needs.

### PCW DETAILS



**Price** The SmartStation is sold in varying configurations from £1,600 - £20,000.

**Contact** Vtel 0118 955 3208

[www.vtel.com](http://www.vtel.com)

**Good Points** Excellent camera and software.

**Bad Points** Class kit comes at a price.

**Conclusion** The business.