With a range of quality suites available, Ken McMahon steps into the digital editing room to show you the basics of making your own movies.

Take one

It's an anorak sort of thing to admit to, but digital video editing is a very sexy proposition. Making your own movies on your computer screen with the ability to cut, insert, add transitions and special effects almost instantaneously is, well, a big turn on.

OK, if you're not convinced, just think of the analog option – you have to set up a tangled mess of cables between your VCR and camcorder, then spend interminable minutes waiting for a cassette to 'fast' forward from beginning to end, before you can even begin to think of the torture involved in frantically prodding rewind and fast forward buttons to get to the right bit. It wears you out just thinking about it.

Of course, digital video is nothing new, analog capture cards have been around for a while and Macs have been equipped with analog video in and out since 1995.

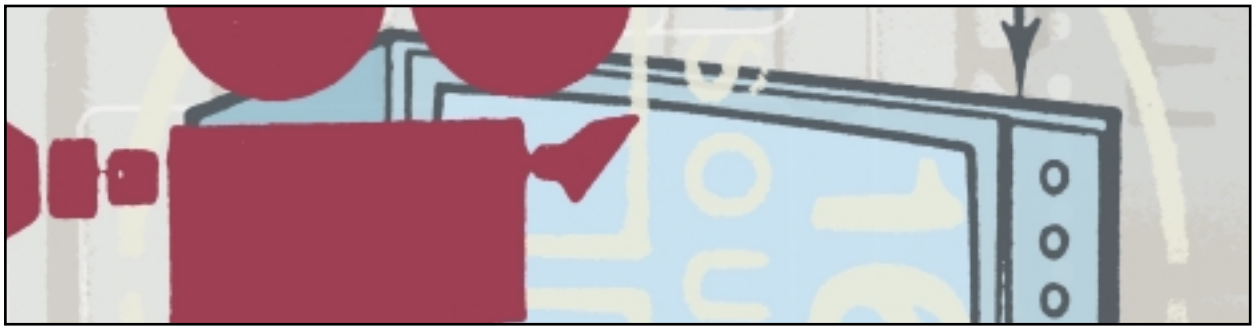
The problem with digitising analog video is that desktop systems have never been up to capturing it at sufficiently high resolution and frame rates. It's never really been much more than a blurred, jerky novelty – oh look it's dad and the kids on the beach, oh no, that's the closing sequence from *Lawrence of Arabia*.

But digital video (DV) camcorders have changed all that. The fact that the data is recorded in a digital format to begin with makes getting it into a PC (and out again) easier. More and more DV camcorders launch every month and the cost of the cards to 'capture' DV and software to edit it is tumbling. Apple's Steve Jobs sees DV as the next big consumer market. He's staked the future of Apple's iMac on it, and he's been right about these things in the past.

There's a little more to it, however, than hooking up your DV camcorder to the right port and pressing play. DV files tend to be quite large – 1GB of disk space will accommodate about four and a half minutes of digital video. What's more, your camcorder plays it down the wire at a rate of 3.6Mbytes/sec and your communications interface and hard drive need to be fast enough to keep up.

As far as drives are concerned, most modern EIDE and SCSI drives should have little problem with this, though you're likely to have difficulties with older IDE drives. If you're worried about drive performance you can improve things considerably by defragmenting and partitioning. If that's not enough, you may have to consider an external drive.

Editing out of the box



'It's the finest product we've ever created' is Steve Jobs' verdict on the iMac DV. Just over a year on from the launch of the original iMac, the machine that saw Apple's share price rise from less than £6 to over £60 now boasts an impressive hardware specification and a killer app in the form of digital video editing.

With a 400MHz G3 processor, 64MB of RAM, a 10GB internal hard drive, two FireWire ports and an 8MB AGP 2X Rage 128 VR video card, the iMac DV has what it takes to handle the demanding requirements of basic home video editing. But if you're looking for more, the Special Edition offers 128MB of RAM and a 13GB hard drive – and you can have any colour you like, as long as it's graphite.

Jobs sees DV as the Next Big Thing, and in typical Apple style has set out to make it so simple that anyone can do it. Alongside the iMac DV's Plug and Play hardware digital video support, Apple has bundled iMovie, a simplified version of its well received and highly respected Final Cut Pro editing suite.

To get started you simply plug in the camcorder, switch it on, start up iMovie, use the screen buttons to fast forward to your clip, press play and hit the capture button to start and stop capturing. Clips are stored in a palette from which you can drag them to a timeline, add transitions, music and titles. When the movie has rendered there are options for output back to your DV camera or to alternative codecs for use in email and on websites. It's quick, simple and fun and if you outgrow its limitations you could move up to Final Cut Pro or Adobe's Premiere on the same machine.

PC users looking for an out-of-the-box, desktop PC DV-editing suite are not exactly spoilt for choice. A hunt in Dixons or PC World may reveal a now discontinued Compaq Presario 5831 – a 500MHz Athlon machine, equipped with one conveniently front-mounted FireWire port.

Alternatively there's Sony's Vaio range of notebooks, well known for their FireWire capability. The PCG-X9 (*PCW* Feb 2000, p79) with 500MHz Pentium III, 128MB of RAM and massive 18.1GB hard drive makes a powerful portable editing studio.

Gateway's Solo 9300, awarded *Editor's Choice* in our April *Notebooks* grouptest, could also form the basis of a capable mobile editing suite and is less expensive than the Sony mobile DV-editing platform.

The IEEE 1394 interface specification is becoming the standard for digital imaging peripherals with high bandwidth requirements. Developed by Apple which dubbed it 'FireWire', it was adopted by Sony as 'i.LINK'.

You'll find FireWire ports on virtually every DV camcorder, as well as on Apple's blue and white G3 Powermacs, Sony's Vaio notebooks, and a growing number of peripherals including hard drives and PCI bus digital video 'capture' cards.

These cards are usually bundled with video-editing software that provides everything you need to capture, edit and record DV movies back to tape. We tested four budget priced cards, the ADS Pyro 1394DV, Pinnacle Systems' Studio DV, Digital Origin's Intro DV and the new Datavision DV-Capture.

All these cards are Plug and Play and we had little difficulty installing them. To evaluate their suitability for use on a typical desktop system rather than a state-of-the-art, video-editing workstation, we used a Dell Dimensions PII 350MHz machine with 64MB of RAM and a 6GB internal EIDE hard drive.

We also took advantage of one of the newer external drives that connect to a PC via FireWire. VST's ultra-slim 14GB external drive (£480.57 inc VAT), worked faultlessly throughout the test. VST drives come formatted for Macs, so we first had to configure the drive using Windows 2000's Disk Manager. Although no instructions were provided (the PDF installation instructions are for the DOS fdisk command which has been replaced by Disk Manager) it was fairly straightforward and we had the drive up and running in a few minutes.

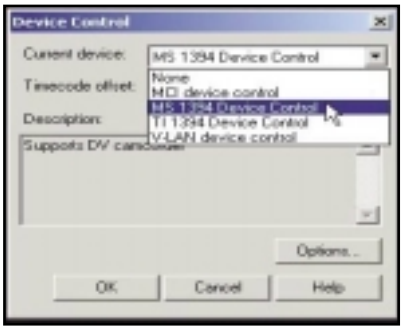
Both capture and playback from the drive was uneventful – it just sat there and did exactly what was required. Because the FireWire drive takes its power from the port, only one cable is required and it's much thinner and less obtrusive (as well as longer if required) than a SCSI cable.

There seems to be some confusion over hot-plugability of FireWire drives – the FireWire spec says devices can be plugged and unplugged at will, but the drive documentation advises against this. Nevertheless, we had no problems disconnecting and reconnecting the drive when using the unplug hardware wizard and indeed simply pulling the plug, even during live playback of a file in media player, caused nothing more than an error message. The video didn't continue playing when we plugged the drive back in, but we were able to exit the application and relaunch it without further trouble.

Prior to installing the FireWire cards it was

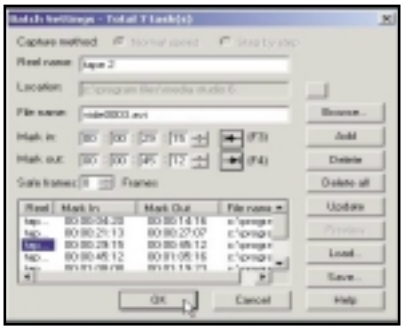
Capturing video using Media Studio Pro 6.0

It's tempting to get stuck straight in, capture video clips, drop them on the timeline and apply a few effects and transitions. But with a little planning you can achieve a lot more. First, storyboard your movie – a short list of clips, approximate duration and order. If you don't have reliable SMPTE timecode, set your camcorder's counter to zero and play your tape(s) through, fast forwarding long sequences to speed things up, making a note of shots and their position and duration.

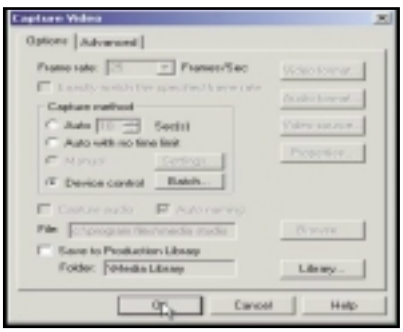


1 Connect the camcorder to the FireWire card, switch it on and make sure you're in VTR mode. Launch Video Capture 6.0. You should be in Preview mode looking at the image on the camcorder viewfinder.

Device Control can make editing easier. Use the VCR buttons at the bottom of the preview window to play, fast forward, etc. If they are greyed-out, select Device Control from the Setup menu and select the required driver. You can now use the Batch Capture facility.



2 Rewind the tape to the point where you want to start capturing clips and press Play. Use the Mark-In and Mark-Out buttons (or F3 and F4) to mark the beginning and end of clips. You can use fast forward and rewind to locate all the clips you need quickly. Then select Capture/Batch settings and you should have a list that looks something like the screenshot above. The Batch list shows all the clips selected for capture with their in and out timecodes.



3 Now just select Capture Video and click the Device Control radio button in the Capture Video dialog. Capture Video will rewind the tape to the beginning, fast forward to the first 'in' point, play and capture to the first 'out' point and repeat the process for each subsequent clip, saving them to the specified folder with sequentially numbered file names.

4 Device Control and Batch Capture will only work successfully if your tape is stamped with accurate SMPTE timecode. If it's not, for example, if you have introduced blank segments on the tape between recordings, the results will be unpredictable. In this case it's best to capture manually using the camcorder controls to locate and play the clip and the Record button to capture to file.

5 In the Capture Video dialog, set Capture Method to Auto with no time limit, enable Auto-Naming and in the Advanced tab turn off Display Message Before Capturing and Play Video File After Capturing. Then in the Preferences dialog uncheck Display Capture Options Before Capturing. You can now capture at will by pressing the REC button (or F5) to start and the Escape key to stop. As before all clips will be saved with sequentially numbered filenames.

necessary to upgrade the OS. Windows 98 doesn't include IEEE 1394 support, so you'll need to upgrade to Windows 98SE or 2000. We chose the second option. For our tests, we also used a Panasonic NV-DA1 DV camcorder.

First up was the **DataVision DV Capture**. This costs £116.32 inc VAT and has no fewer than three external and one internal FireWire ports, providing plenty of expansion potential. A DV cable to connect your camcorder to the port is also supplied, as is the case with all the other cards on test here. The short but sweet installation instructions tell you to plug the card in and follow the add new hardware wizard when it is autodetected by the OS. However, the Windows 2000 Professional installation had already loaded the appropriate IEEE 1394 driver.

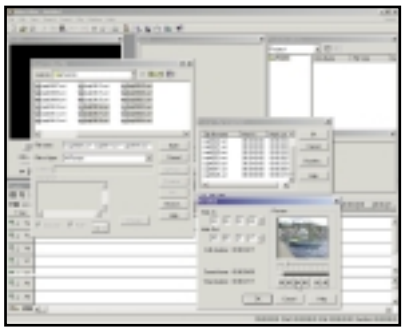
The DV Capture ships with Ulead's Video Studio 4.0 SE basic (upgrading to Media Studio V6 Pro costs £199 inc VAT), which provides an excellent introduction to editing as it's easy to use and packs in some powerful editing tools.

QUICK TIP

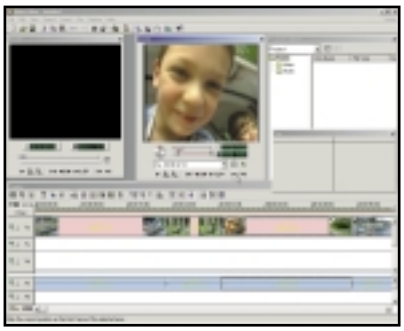
Even if the editing application has a 'story-board palette' write a list of all the shots on your tape with a description and approx duration. You'll probably decide not to use half of them – saving you over 6GB of disk space!

Arranging clips on the timeline and adding transitions

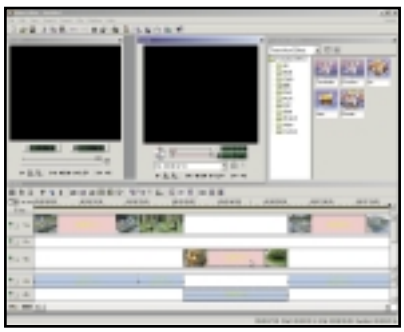
Having captured your clips the next task is to arrange them in Media Studio's timeline. Don't worry too much about the order at this stage as it's easy to move clips around. Once they are correctly positioned we'll add transition effects between the clips.



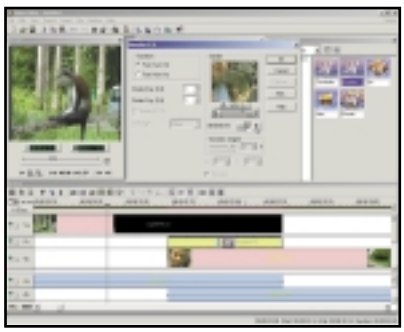
1 Click the Insert Video File button on the timeline toolbar. You can preview clips to check you've got the right ones. Hold down shift and click to select all the clips you want to import and sort them into the correct order in the Change Clip Sequence list. (You can even trim clips before importing them using the Duration dialog box). Click at the very start of the timeline in the Va track to position the clips sequentially along the line.



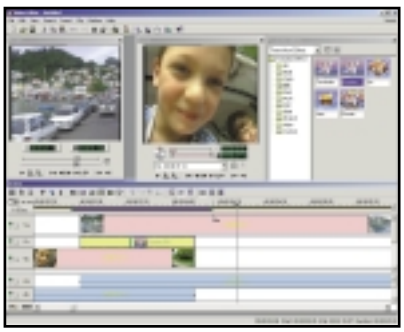
2 Unless you've been very accurate with your capturing, you'll most likely have some surplus material at either end of your clips. You can quickly trim this off either in the Source window, or by dragging the end of the clip on the timeline. On the timeline toolbar click the Clip Selection and drag the clip you want to trim onto the Source window. Drag the trim bars to mark the in and out points and click the Apply button.



6 For the transition to work, the two clips must overlap. We are going to overlap them by one second – the duration of our transition. By positioning the pointer over the first clip the Status bar tells us it ends at 32:14, so position clip two in the Vb track to start at 31:14 either by dragging or using the arrow keys to nudge it.



7 Using the Zoom tool or the Ruler unit pop-up, change the time scale to a fifth of a second. In the Production Library window select Transition Effect from the pulldown menu and from the F/X folder drag the dissolve thumbnail onto the Fx track. Release it anywhere in the overlap between the two tracks and it will position to fit. You can get a quick preview in the Dissolve F/X dialog that automatically launches.



8 For the next transition we have overlapped the Va track by one second – if either of the Ripple buttons is selected, then all the following tracks will move with it and you'll have no gaps. Notice the green arrow on the Dissolve thumbnail indicating that this time the transition runs from the Vb to Va track.

QUICK TIP

To ensure there are no timecode gaps in your tape, record an entire blank tape with the lens cap on. This will ensure you can use Device Control, Batch Editing and 'Preview Quality' editing successfully.

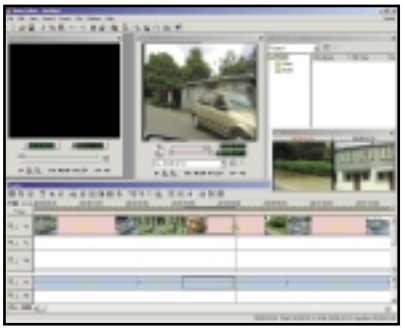
All editing takes place on a mock walnut-veneered edit console and the process is structured so that you begin by capturing clips, then trim and arrange them in a storyboard window before adding transition effects, titling, audio and music. Switching from storyboard to timeline mode displays an Adobe Premiere-style timeline window and there's a library window to the right of the viewing screen from which you can drag and drop video, music clips, still images, effects and title sequences.

The only problem is that you need to take care that projects (automatically saved to a temp folder) don't eat up your disk space.

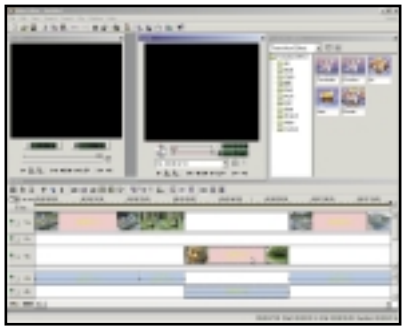
Video Studio also includes a very good video wizard which takes the express route from capture to creation in five quick steps.

The **ADS Pyro Digital Video 1394** card costs £100.16 inc VAT and delivery and has one internal and two external FireWire ports. You can daisychain up to 63 devices on one port, so this is probably adequate, although not all

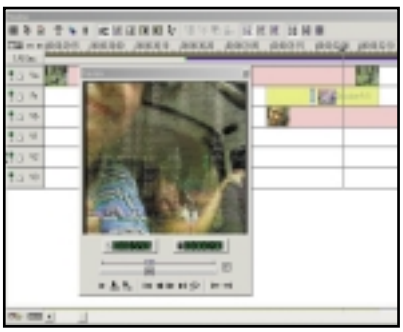
3 Another way to trim is by dragging the endpoints of clips in the timeline. First, call up the Trim window on the Window menu. This shows the last and adjacent frames of the clip so you can judge the endpoint more accurately than by looking at the timeline thumbnail.



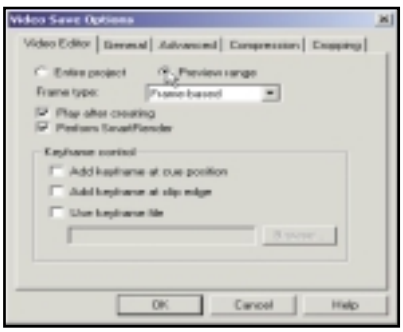
4 Using the Clip Selection tool select the clip you want to trim and drag the left or right edge (depending on whether you're trimming the beginning or end of the clip) along the timeline. If you have the Multiple or Single-Track Ripple buttons depressed adjacent clips will nudge up to fill the gap left by the trim.



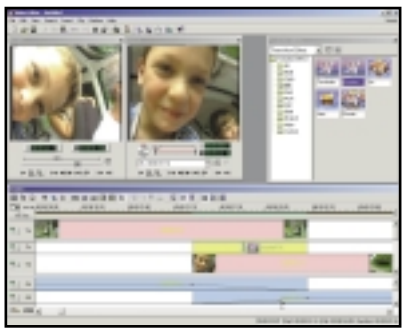
5 Click the Play button in the Preview window to see how things look so far. Next we're going to add some transition effects. All our clips are currently in the Va track (with corresponding audio in the Aa track). To make use of transitions we need to move some of them to the Vb track. To do this, with the Clip Selection tool drag the second clip to the Vb track directly below its original slot in the Va track.



9 To preview the transition, position the pointer in the strip just above the Va track – a filmstrip cursor will appear. Drag from left to right and a blue bar will appear indicating the preview selection. Now press the second button in the Preview window to play the preview range.



10 If the preview is slow and jerky, don't worry, it will be fine in the final rendered version. If you want to know exactly what it's going to look like you can export the preview range as an AVI file and view it in Windows Media Player. Select File/Create/Video File and check the Preview Range radio button.



11 If you tried step 8 you might have noticed that while the image transition is smooth, it all sounds a bit messy. Use the Cross-Fade button on the timeline toolbar to make one audio track fade in as the other fades out. If you leave this until all your transitions are in place you can shift-click on both audio tracks to cross-fade all overlapping clips.

devices – camcorders for example – have two ports through which to daisychain.

The Pyro comes with Video Studio 4.0 and Media Studio 6.0 Pro, making it a good choice for beginners with ambition. You can start with Video Studio 4.0 and graduate to Media Studio 6.0's more advanced features.

Moving up the price ladder, the **Pinnacle Systems Studio DV**, at £199 inc VAT, is another hardware and software bundle. Pinnacle is well known in DV circles and its latest DV card has one internal and two external IEEE 1394 ports. In the pack are two CDs – one with driver software and the other with the StudioDV application.

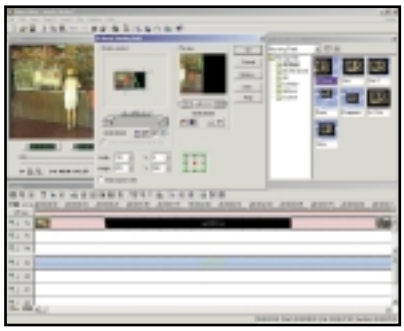
Like Ulead's Video Studio 4.0, Studio DV is aimed at the novice who wants to get good results with the minimum of fuss. Editing is split into capture, edit and make movie phases with the timeline window doubling up as a storyboard editor onto which you can drag and order clips and quickly add transitions, sound effects and backing music, before exporting to

QUICK TIP

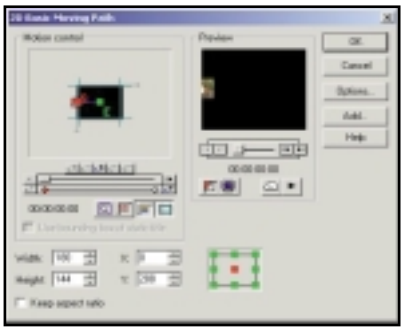
If you have to use your internal hard drive for DV capture, defragment it using disk defragmenter or a third-party utility. For successful DV capture and playback your drive needs a sustained transfer rate of 3.6Mbytes/sec.

Creating title sequences and captions

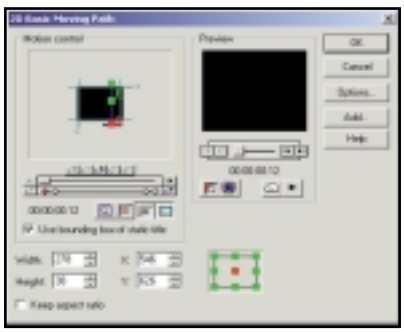
Media Studio 6.0 provides excellent titling tools with sophisticated overlay and rolling options. With the minimum of fuss you can produce professional looking opening and closing title sequences as well as captions or subtitles. With a little extra effort it's possible to produce something really special.



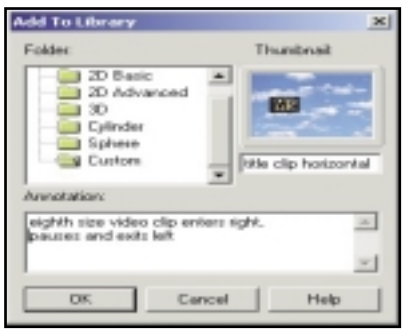
1 We're going to make extensive use of Moving Paths to combine inset video clips with captions. A video window will fly in from the right of the screen, followed by the caption coming up from the bottom, both will then exit – the video on the left and the caption off the top. First insert your video file into Va, then select Moving Path from the Production Library and drag the 2D Basic thumbnail onto your clip.



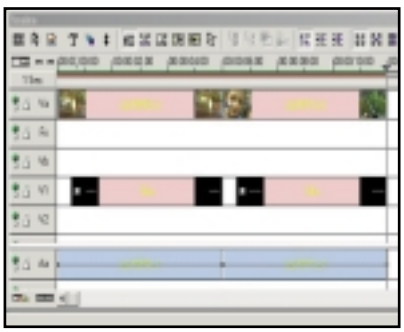
2 The Motion Control window shows what will happen to your clip. The start and end keyframes are marked S and E and displayed as diamonds on the keyframe controller scrollbar below. The first thing we want to do is reduce the clip to an eighth of the screen size. Check the Keep Aspect Ratio box and enter 180 in the width box. You will need to select the E marker and do the same thing or the clip will grow to full size as it moves along the path from beginning to end.



6 Drag the 2D Basic Moving Path onto the title clip. In the Motion Control dialog check Use Bounding box of static title and set the start and end keyframes off the top and bottom of the right-hand side of the screen (X546 Y626 and X546 Y-40). As before, add two more keyframes at the same co-ordinates (X546 Y253) the first at 01:00 the second at 5:12.



7 You can save the amended 2D Basic Moving Path. Select the Va clip then right click and select Moving Path from the pop-up menu. In the dialog box click the Add button and type a name and short description and save in the Custom folder. Do the same for the title clip and then import the next clip in the sequence, butting it up to the first one in Va.



8 Create a new title clip – your text settings will have been retained from last time – and position it in the V1 overlay track, not forgetting to extend it to the width of the track, leaving a 12-frame gap at the beginning. Now all you have to do is drag the new custom Moving Path effects onto the two tracks and click OK.

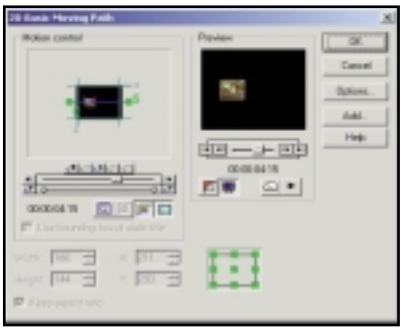
QUICK TIP

To conserve disk space try to capture only the clips you need with as little as possible excess on either end. If you are trimming a lot using Video Studio 6.0, use Smart Trim to reduce the size of your clips.

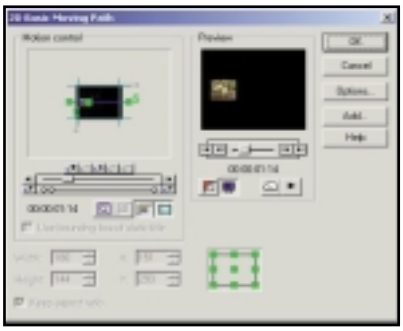
DV tape, AVI, or MPEG file. DV Studio also offers a 'preview quality' mode in which you capture and edit using low-quality preview clips.

When you've completed your project the clips are captured from your tapes at full resolution, edits are applied and the project is saved. This is quicker and uses less disk space for editing, but requires unbroken SMPTE (Society of Motion Pictures & Television Engineers) timecode to work reliably. SMPTE timecode is a standard that enables frame-accurate syncing between audio and video and is used as a time reference for some automatic editing features.

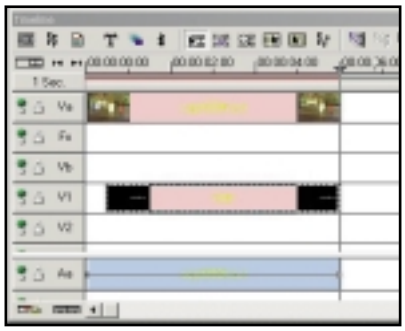
The **Digital Origin Intro DV** comes from a company with a solid catalogue of DV-editing products for both Windows and MacOS. Priced at £199 inc VAT, the hardware is limited by having only one IEEE 1394 port with the same four-pin socket as you'll find on your camcorder – so it's no good for FireWire hard drives or other peripherals. The manual is thorough and drivers are supplied for Windows 95 OSR2 and



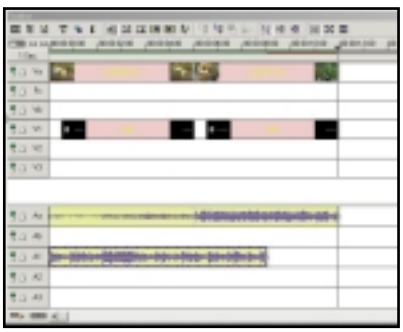
3 Now drag the Start Keyframe marker (the one marked 'S') off the right-hand edge of the screen (X820 Y293) and the end marker off the left (X-100 Y293). If you preview the effect now you should see the one-eighth size clip appear on the left, travel the full width of the screen and disappear off the right. Next we need to make it stop in the middle for a short time while the caption appears, and to do this we need to insert two further keyframes.



4 The total length of our clip is six seconds. We want the Video window to travel into position on the right of the screen in half a second, pause for five seconds and exit left in half a second. Using the Nudge buttons position the scroll bar at 00:12 (12 frames = half a second) and click on the Add Keyframe button. Position the new keyframe marker in the right half of the screen, horizontally aligned with the other markers (X200 Y293).

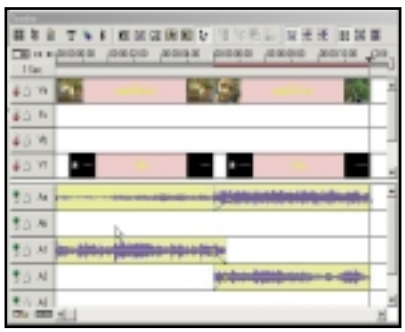


5 Reposition the scroll bar at 05:12 and add another keyframe, type in exactly the same X and Y co-ordinates as for the last one. Now for the caption. Click the Insert Title Clip tool and type your caption in the dialog selecting an appropriate font size, ranged right with black background and white fill. Don't click the Enable Rolling checkbox. Place the clip in the V1 overlay track and stretch it to occupy the same slot, starting half a second (12 frames) after the Va track.



9 No title sequence would be complete without sound. We're going to add a different track for each of the two credit sequences. Click the Insert Audio File button on the timeline toolbar, find your audio file and insert it in the A1 track (our soundtrack is mono, if you've recorded stereo sound it will appear in both Aa and Ab). As you can see, it's a little long, but we can clip it in the same way as the video files to make it fit.

10 We've imported another audio clip into A2. This one is also a bit long, but only by six frames. We don't want to cut it because it finishes neatly, so we'll adjust the speed of the track marginally so that it fits precisely. Right-click on the selected audio clip and choose Speed from the pop-up. Don't use the New Clip Duration window to set the length as we couldn't seem to get this feature to work properly. By increasing the speed to 104 per cent we can get the clip to fit exactly.



11 To tidy up, apply the Cross-Fade button to the two new sound clips (notice how the first overlaps the second by 12 frames). We have also faded in the beginning of the second clip in Aa and reduced the overall level. To hear just the sound without having to wait for the video to preview, lock out all but the audio tracks by clicking the green Lock buttons and press Space.

98. These drivers must be used in preference to those already included with Windows.

The bundled Intro DV application is aimed at those with little or no editing experience. Like Studio DV it splits the process into several stages: capture, edit story, titles, transitions and print, or export. A cutting-room palette displays clip and preview windows, and there's a conventional timeline and a library palette.

Intro DV has a playback to camera option that lets you display playback on your camcorder viewfinder or LCD panel rather than on screen. If you connect your camcorder to the TV you can preview at full-screen display quality.

If you're serious about video editing, a DV camera and one of these cards is the only option. The hardware's ease of use is astounding, and the results you can achieve with modern video-editing software really are jaw dropping. Whether it'll stop your friends from groaning when you offer to treat them to a special showing of your home-made movies is another matter, though.

QUICK TIP

For faster rendering preview only the tracks you are working on and disable any others. Use the preview range bar to limit the preview to the part of the timeline you are interested in.