XL1 CANON

That big lens helps the XL1 produce a stunning image, but makes the camera a bit front-heavy.

DV REVIEW

XL1

Canon, $4699

MiniDV Camcorder

Summary: The XL1 is a great camera. It produces a gorgeous picture with no dropouts, records fine audio, has well-laid-out controls, and is built around a rugged aluminum body. And it looks cool.

DV SCORE CARD	1 2 3 4 5 6 7 8 9 10
Features	●●●●●●●●●●
Performance	●●●●●●●●●●
Ease of Use	●●●●●●●●●●
Documentation	●●●●●●●●●●
Tech Support	●●●●●●●●●
Price/Perf.	●●●●●●●●●●
Overall	9.0 XL1

Reviewed by Vernon Kato and Jim Feeley

This is a camera we have already grown to admire. While the camera's not perfect, it's closer to ideal than any other camera in its price range. Much of this review discusses the limitations of the camera, but we can live with the limits exposed here.

Many of the camera's strengths, as well as weaknesses, hinge on it's 16X zoom lens. While the lens contributes greatly to the quality of the XL1's video, the lens isn't perfect.

The lens can zoom really quickly and can also creep well. But it takes a delicate and practiced touch to get the medium-speed zoom that we commonly use.

In certain conditions, the XL1's autofocus had a hard time locking down on an image. Even when shooting outside, the lens often searched for the right setting. The focus wasn't as quick or as useful as that on the $6400 Sony DSR-200 camcorder we reviewed in *DV*'s June '97 issue.

The camera's manual focus felt more like that of a Canon EOS still camera than that of a Canon professional video lens. There was a slight delay between turning the focus ring and the focus changing.

Eye in the sky?

We had difficulty manipulating the manual aperture, so we relied on auto mode. In auto, the XL1 had a tough time with sky shots and low-angle shots that incorporate sky backgrounds. The auto iris didn't perform up to the level of a broadcast camera, but then the XL1 is much less expensive.

More importantly, the lens wasn't wide enough for our tastes and needs, especially when shooting indoors. We found it hard to pull back far enough to frame shots in common interior settings. Luckily, Canon makes a 3X wide angle adapter.

With the $660 EF Adaptor XL, the XL1 camcorder can use Canon EOS 35mm lenses. Note that the effective focal length of your 35mm lens will be increased seven times—great for nature shooters, not so great for others.

The big lens on this camcorder makes it front-heavy. Since it isn't balanced to rest on your shoulder, you need to support the camera with your arm. Although the camera and lens together only weigh 6lbs., 5oz., we found hand-holding it to be rather fatiguing. We didn't test the camera with the optional XLR audio adaptor/shoulder mount,

so we don't know if that extra $250 attachment would better balance the camera.

Canon includes an internal neutral density filter and the built-in image stabilizer worked fine. The camera's adjustable color viewfinder displays information such as timecode and zoom location, and the information can be turned off if desired.

As with most color viewfinders, we found the XL1's made focusing harder than with a black-and-white viewfinder. While the camera does generate zebra patterns, the viewfinder also made getting the right exposure more difficult. With a black-and-white viewfinder, we can open up until just before the image burns, and then reduce the iris. That was harder to do with the XL1.

Behind door number one...

Almost every square inch of the camera is covered with controls, some behind little doors. But rather than resulting in a cluttered camera, we found everything well laid out and easily accessible. There's even a zoom control on the carrying handle, a brilliant idea that makes creative hand-held shooting (as opposed to shoulder-mounted shooting) much easier.

Unlike some other cameras that force you to use only their automatic adjustments and keep you from controlling your own signal, the XL1 provides both automatic and manual control. You have full control over shutter speed and iris levels with five gain presets ranging from -3 to +12. You can shift the exposure by up to two stops above the auto level, and can choose between manual white balance, indoor auto, and outdoor auto. This flexibility makes it easier to get sharp and creative images in tricky settings.

We found the XL1 resolved over 550 lines of video and performed well in low light. Canon says this is due to their CCD technology. Each pixel on the camera's three CCDs is 150 percent larger than the pixels on competing cameras. The company has also adjusted the location of the green CCD slightly. If you must know, they moved it a half pixel horizontally from the red and blue CCD and interpolated the green signal a half pixel vertically. They say these adjustments combine to give their 270,000-pixel CCDs performance rivaling 410,000-pixel CCDs. The end result is that we were very pleased with the picture recorded to DV tape.

Hear no evil

The XL1's strongest attributes don't stop at visuals. Canon also took care to ensure that the audio is top notch. The mic sounded very good to our jaded ears and its placement away from the body reduces extraneous operating noise. You can record 16-bit or up to four 12-bit tracks and output each track independently. LED audio meters are nicely placed below the handle, and Canon intelligently provides both automatic and manual audio gain control. The XL1 also provides a hi-res photo mode for recording stills and can record up to 30fps in a Frame Movie mode. The still images look sharp—another tribute to the lens. The battery gave us more than 30 minutes of life, and the bundled charger includes useful status indicators.

In addition to generating color bars, the XL1 provides composite, S-video, LANC, and IEEE 1394 FireWire ports. While some FireWire card manufacturers had a tough time getting their boards to work with the XL1, several have already reworked their drivers for compatibility and others expect to be compatible by the time you read this. All expect any necessary updates to be available free of charge.

The XL1 looks like a neo-retro version of an old 16mm film camera. The big lens helps give it a "pro" look, something worth considering when working with clients or interview subjects. For the price, the XL1's picture and performance are fantastic. It compares favorably to the Sony DSR-200 and Panasonic AJ-D200, both of which cost much more. That Canon lens appears to justify its bulk. The bottom line is that Vernon, who relies on his camera everyday, would be willing to use the XL1 for his daily work. For $4699, that's saying a lot.

***Vernon Kato**'s arms get tired shooting video for a call-letter TV station. **Jim Feeley**'s arms get tired editing at DV Magazine.*

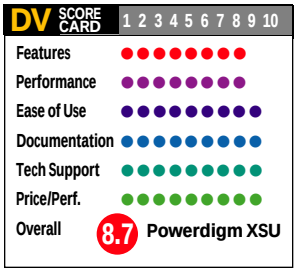
DV REVIEW PC

Powerdigm XSU

Micron, $5998

Dual-Pentium II Workstation

Summary: Following the tradition from a long line of fine Micron PCs, the Powerdigm XSU workstation delivers high performance at a reasonable price. While this system arrived too late for our December '97 Workstation Roundup, it's not too late for you to add this powerhouse to your shopping list.



Test Results

After Effects
12 minutes, 32 seconds

Elastic Reality
55.9 seconds

Infini-D
23 seconds

LightWave 3D
7 minutes, 35 seconds

Photoshop
re-size 15.6 seconds
save 15.5 seconds
filter 1 minute, 56 seconds

Premiere
4 minutes, 22 seconds

3D Studio MAX
2 minutes, 25 seconds

Reviewed by Dean Andrews

The Powerdigm XSU came to us in its standard configuration. Like the fastest ➢

The Micron Powerdigm XSU is no trendsetter in the fashion department, but it's as solid as a rock.

systems in our roundup, it sports two Pentium II 300MHz chips so that it can crunch away at rendering and video processing. Each of the processors carries a 512KB L2 cache. In our NT Pentium workstation tests, the fastest performers all had dual 300MHz Pentium IIs.

Some vendors might scrimp on the rest of the components, banking on the Pentium IIs to pull the extra load, but not Micron. The XSU features a speedy 4GB UltraSCSI-3 Seagate hard drive, a Diamond FireGL 1000 Pro 66MHz 8MB SGRAM video card, and a 12/20X variable-speed Plextor CD-ROM. And, for the first time in Micron's product line, the XSU comes with their new Samurai PCI chipset. Whether your work stresses storage or video, these components will likely stand the test.

Overall, the Powerdigm did very well on our performance tests. For comparison results with the other systems we tested in our recent Workstation Roundup, go to www.dv.com/magazine/issues.html in the December '97 Features section. Unfortunately, direct comparisons with the workstations from the roundup are difficult as the Micron Powerdigm came with only 64MB of ECC RAM rather than the 128MB we requested for systems in the December roundup. You can, however, order this workstation with 128MB by adding $305 to the base price. And as a plus, you can upgrade the XSU to a whopping 1GB of RAM using DIMMS.

Even with half the RAM, the XSU beat all challengers in the Elastic Reality morphing test and performed at or near the top in most of the other tests. In Photoshop, though, the lack of RAM seemed to slow things down. Resizing and saving our image was about three times slower than the fastest workstations last year. But, due to its top-notch work with modeling, morphing, and rendering, more RAM would very likely make the XSU a top performer.

Micron's extras are worth noting. In addition to the fast CD-ROM drive, you'll find 1GB of removable storage Jaz drive for storing data or backing up. You also hear SoundBlaster AWE 64 wavetable audio driving the decent-sounding Advent stereo speakers. For networking, Micron supplies a 3Com 10/100 Ethernet PCI NIC. And, the XSU arrives ready for the latest peripherals with its two USB ports on the backplane.

Like other Micron systems, this workstation is well-built and rugged. The XSU doesn't follow the latest fashion trends, but this beige utilitarian case is solid as a rock.

The side panel slides off easily, and, if you're an upgrader, the internals won't disappoint you either. The processors, RAM slots, and card slots are all arranged for easy access on a motherboard of Micron's own design. A cooling fan hangs on the side of the case, out of the way, so there's no need to remove it when installing devices. Likewise, the cabling comes organized and bound together. In fact, you won't need to remove any components other than the ones you're planning to upgrade.

Three open drive bays leave plenty of room for additional drives like DVD-RAM or CD-RW units. Unfortunately, though, this configuration has only one open shared PCI/ISA slot, so you may have difficulty if you frequently add new cards. The lack of open card slots is the single biggest drawback of this workstation.

If this particular configuration doesn't suit your needs, Micron offers a very wide range of options. Hard drives range from 2GB to 9GB. The included 19-inch Hitachi monitor can be swapped for a 17- or 21-inch version. You can ramp up the video with the Diamond FireGL 3000 and 4000 cards. Add a Sony DAT drive. Get a printer. Bundle in software applications.

The service and support that backs the XSU ranks with the best. Toll-free tech support is available 24/7. The processors and memory come with a five-year limited warranty. And, all the hardware has a three-year warranty. The first year of on-site service is included in the price, but you can extend it to a second year for an additional $99 and even a third year for an extra $139.

For $5998, the Powerdigm XSU is a bargain. If you can live with only one open card slot, this workstation will power through your work for several years.

***Dean Andrews** is a freelance writer based in Boston. He frequently reviews PC products and technologies for the computer press.*

DV REVIEW Mac PC

Bryce 3D

MetaCreations, $199

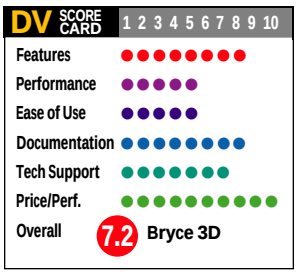
Fractal-based terrain generator

System requirements:

Mac: Power Mac with 16MB of RAM; 50MB of hard disk space; 2X CD-ROM; and System 7.5 or later.

PC: Pentium with 16MB of RAM; 50MB hard disk space; 2X CD-ROM; and Windows 95/NT.

Summary: Bryce 3D has what Bryce users have been waiting for since the program first shipped in November 1994. New features include the ability to animate your camera, lights, and atmospheric effects for creating realistic flybys of your scenery; also to import models that you've created in Poser, Painter, Detailer, and Ray Dream Studio. Bryce 3D is a good starter application for novice users who would like to dabble in 3D, but don't want the hassle of learning something as deep, complex, and expensive as 3D Studio MAX or ElectricImage. The interface is pleasing to the eye and fun to interact with, but quickly ends up becoming more annoying than useful.



Reviewed by Rick Popko

If you're one of the many Bryce users out there, this is the upgrade you've been waiting for. If you're new to Bryce and don't know what the fuss is about, allow me to explain. Bryce is a Fractal-based terrain generator for

Continued on page 64

Continued from page 28

modeling and texture mapping photorealistic landscapes that are derived from mathematically complex algorithms. Algorists—those who utilize Fractals for artistic purposes—will most likely appreciate Bryce's free-flowing user interface (see Figure 2). Control freaks, like me, will probably yearn for something a little more intuitive to use.

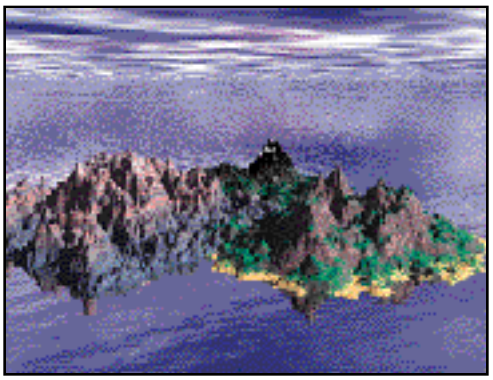


Figure 1—Bryce landscapes are often surreal and spectacular, but still a bit artificial.

Figure 2—Bryce's user interface is a double-edged sword; artistic types will appreciate it, but it's difficult to navigate if you have something specific in mind.

Bryce landscapes are often surreal and spectacular, but they still look artificial. I believe we still have a few more years before Fractals are able to perfectly mirror reality.

Fun with Fractals

What I like best about Bryce 3D is that I can create key frameable animated camera flybys of my terrain. These flybys, which can be saved as either a QuickTime or an AVI file, can be easily incorporated into Web sites, multimedia games, and video productions. You have animation control over materials, textures, sky, and fog, and now Bryce also imports DXF, 3DMF, and OBJ objects and supports Direct 3D and OpenGL. The flip side is that you can't export Bryce models, there's no built-in support to take advantage of multiple processors, and there's only one level of undo.

One of the hassles I encountered while testing Bryce was how incredibly long it took me to render a project. Using an H/P Pentium 166 with 32MB of RAM, I created a two-second flyby that consisted of an island surrounded by water, fog, and clouds. For the sake of expediency, I set my project to 120x80 (thinking, at that resolution, it wouldn't take but a couple of minutes to animate a two-second fly through). I kept the default setting at 15fps and clicked the render button. It took a little more than two hours to render 15 frames (my finished animation can be downloaded from *DV*'s Reader's Corner at www.dv.com). When tested on a Pentium 133 with 32MB of RAM, the preview window updated so slowly, I'm sure I went grey during the wait. Remember, the more environmental attributes you add to your project, the longer your render time will be. If you're thinking of using Bryce at 720x486 at 30fps, be prepared to be rendering for days. Also, PC users take note—there are no right mouse button short cuts. This probably had to do with the way the application was compiled, to allow for a simultaneous Mac and PC release. Bryce was originally a Mac application.

Redesign the interface

In addition to the slow render times, I was also bothered by Bryce's user interface. It's not as easy to use as programs like Photoshop, for example, where you can generally figure the application out in an hour by clicking though the menus. For example, the minute you enter the terrain editor, you know Kai Krause was involved. A Kai interface is a love-hate relationship. On one hand, they're beautiful to look at and fun to interact with; on the other, they're extremely difficult to navigate.

Still, as I talk about these minor annoyances, one thing is certain: Bryce 3D is affordable. In fact, I'd go as far as to say that this is one of the coolest creative applications you can purchase in the sub-$200 range (and is well worth the $99 upgrade price from version 2.0).

How does it compare to other terrain generators? Well, I called Virtual Reality Labs to get a copy of Vista Pro 4.0. VR Labs is gone. Their sales are now handled by RomTech, who declined to send a copy of the program for evaluation. The other contender is World Construction Set Volume 3 from Questar Productions, which has much deeper features, such as custom rendering, large scale rendering, and volumetric shrubbery for planting entire hillsides of trees in a few short clicks, as opposed to Bryce where you have to plant one tree at a time. Then again, World Construction Set costs $940.

If your livelihood depends on creating very specific artificial terrains for clients, you'll probably find World Construction Set a more useful application for getting work done. However, in another generation or two (especially since Ken Musgrave—fractal coder extraodinaire—recently came aboard as MetaCreations' Director of Advanced 3D Research), I have no doubt that MetaCreations will soon rule the terrain-creation market.

***Rick Popko** is DV's Technical editor.*

DV REVIEW Mac

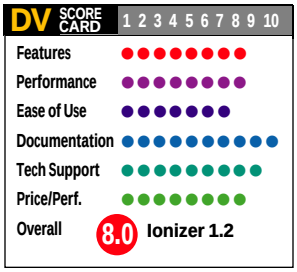
Ionizer 1.2

Arboretum Systems, Inc., $399

Noise reduction, Audio restoration, Mastering, and Sound design software

System requirements: Apple Power Macintosh (or Mac OS-compatible Power PC); System 7.6 or higher; Sound Manager 3.2.1 recommended; 16MB of RAM (minimum); Premiere-compatible host application (or stand-alone operation using HyperEngine).

Summary: Ionizer is a software tool for the dynamic reshaping of a sound's spectral content. Uses include noise reduction, band-dependent compression and expansion, and dynamic equalization.



Ray Gun 1.03

Arboretum Systems, Inc., $99

Noise reduction and removal software

System Requirements: Apple Power Macintosh (or Mac OS-compatible Power PC); MacOS 7.6 or higher; 4MB of RAM; Sound Manager 3.2.1; Premiere-compatible host application (or standalone operation using HyperEngine). Future support for Windows 95 , DirectX (ActiveMovie), and .wav files.

Summary: Ray Gun incorporates broadband noise reduction, pop/click removal, and hum and rumble filtering. An intelligent, easy-to-use "search and destroy" function finds and eliminates noise, leaving the original sound intact.

DV SCORE CARD	1 2 3 4 5 6 7 8 9 10
Features	●●●●●●●
Performance	●●●●●●●
Ease of Use	●●●●●●●●●
Documentation	●●●●●●●●●●
Tech Support	●●●●●●●●●
Price/Perf.	●●●●●●●●●
Overall	8.5 Ray Gun 1.03

Reviewed by Burke Trieschmann

Arboretum Systems has created two powerful software tools for cleaning up, reshaping, and restoring problematic audio files. Ionizer can be configured for a variety of audio restoration, mastering, and sound design processes while Ray Gun is an inexpensive tool that makes it easy to remove noise and other audio artifacts.

Both tools work as plug-ins in a number of popular audio editing and authoring programs and in standalone operations using Arboretum's HyperEngine (provided free with Ionizer and Ray Gun). Both programs support AIFF and SDII (Sound Designer II) audio files, and process 16-bit audio at all commonly used sample rates. Support for third-party sound cards includes Digidesign's Audiomedia II and Audiomedia III, and Korg's 1212 I/O cards.

Ionizer, the more powerful of the two programs, combines 512 bands of gated EQ, detailed spectral tracking, multi-band compression, expansion, and gain control. This allows precise control over delicate program material and provides a variey of options for manipulating your audio.

Using Ionizer is not for the faint of heart, however. This program has a formidable learning curve. Some background in sound design, use of EQ, and the concepts behind audio compression, limiting, and expansion are a plus.

Ionizer performs a detailed spectral analysis of the audio you have selected and creates a black "frequency profile" envelope on the Ionizer grid window. This acts as a guide for the Fit tool. The Fit tool places the red and blue curves (threshold and gate direction) to the contours of the frequency profile. This aids in the process of getting useful settings to begin manipulating the soundfile.

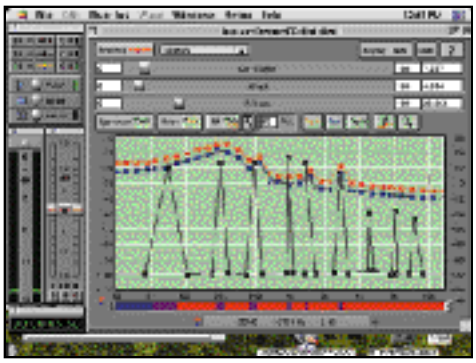
You can also create a frequency profile of the noise signature of your file making it easy to fit the red and blue curves to the contour of the noise. You can then use the black gain curve to reduce or eliminate the noise.

Most *DV* readers will use Ionizer for audio restoration of old recordings, noisy videotapes, cassettes or LPs, dialog with background noise, telephone interviews, field recordings, and repair of problematic source material for transfer to workstations, tape, or other digital media.

To test the program, I intentionally corrupted some audio files with line hum, 8-bit noise, hard drive noise, traffic rumble, tape hiss, old vinyl ambiance, and many other anomalies. In most cases I was able to eliminate the noise and leave the original file intact.

Ionizer also worked well as a mastering tool. After eliminating noise in the first pass on one of my test files (a mixed soundtrack), I set up a second Ionizer for EQ, enhancement, and compression. The results were impressive. I was able to tighten up the low frequencies, clarify the midrange, raise the overall level, and add a little high-end shimmer to my mixed soundfile. After making the appropriate adjustments, I processed the result as a new file and I was in business.

The software also ships with many preset files already configured for specific functions so you can get up and running fairly quickly. But even with the documentation and presets, it was a bit of a challenge getting used to the Ionizer interface and the rather steep learning curve. The rewards, however, are worth your perseverance.



Ionizer combines compression, expansion, and 512 bands of gated equalization in one package providing noise reduction, spectral shaping, and manipulation of audio files. The placement of the red (threshold), blue (gate direction), and black (gain) curves offer numerous possibilities for sound design and mastering.

Ready, aim, zap!

If Ionizer sounds like too much tool for you, consider Arboretum's low-cost alternative. Ray Gun is their point-and-shoot noise reduction solution. Under the hood, Ray Gun combines Ionizer's noise reduction technology, pop and click removal, hum and rumble filtering, and intelligent search functions in a compact, easily used software package. Compared to Ionizer's complexity, Ray Gun makes noise reduction easy and painless.

There's very little involved in using Ray Gun—select a portion of your audio or an entire soundfile, adjust Ray Gun's faders as you listen, and save the output of the effect.

Like Ionizer, Ray Gun is designed for audio restoration, and cleanup of dialog, vinyl, or video recordings before transferring them to digital media. Zap the noise and leave the original signal intact.

I performed several tests using appropriately mangled audio files as examples. In all cases the noise reduction feature did a great job of removing broadband noise from the offending soundfiles. The threshold and attenuation controls can be adjusted to take as much of the noise out as you wish. At extreme settings, Ray Gun added some artifacts to the soundfile, but in most cases I was able to find settings that reduced the noise, yet didn't corrupt the original file.

The pop/click removal feature also worked well in reducing clicks, pops, and scratches. I had better results on short soundfiles that had a single glitch (such as a guitar chord, or one shot sound effect that had a scratch). On longer files (such as a scratchy LP), Ray Gun reduced most of the background noise to a manageable level, ➢

Ray Gun offers noise reduction, pop/click removal, hum/rumble filtering, and intelligent "search and destroy" processing in a compact easy-to-use interface.

yet a few clicks and pops remained. These I cleaned up by adding a small amount of noise reduction.

The filtering features in Ray Gun were a mixed bag. The 50- and 60-cycle hum settings did help to remove line hum on my test files; however the rumble filter actually seemed to add a low frequency component to the audio signal. Arboretum is aware of these problems and plans to address them in a future revision, which should be out by the time you read this. Even without the filters, the noise reduction function reduced the 60-cycle hum to a much more manageable level.

Stand-alone or plug-in?

While both programs performed well as plug-ins, HyperEngine offered several benefits as a stand-alone operation. These include disk-based previews of soundfiles of unlimited length, play-thru mode for processing external signals in real-time, and the ability to run multiple Ionizer or Ray Gun windows together to create complex multi-effects. HyperEngine also allows you to capture audio in either Sound Designer II or AIFF formats.

I had a few problems with occasional crashes using Ray Gun in stand-alone mode with multiple files open, and intermittent loss of access to the Audiomedia III card. This was usually rectified by rebooting the computer and reestablishing communication. I was also unable to use Digidesign's editing program, Sound Designer II, at the same time as HyperEngine, but quitting HyperEngine allowed me to open files in SDII for additional editing.

In play-thru mode I was able to run both programs simultaneously and perform processing of long soundfiles. However, I found myself wishing for a way to play through and capture audio to hard disk at the same time. Play-thru will only pass the effected audio through to some other medium (DAT, another computer's hard drive, tape, workstation, etc.). Arboretum is aware of these issues and should be addressing them in future versions.

I found both programs to be useful for noise reduction, audio restoration, sound design, and mastering. At $99 Ray Gun is a bargain as a low-cost, powerful noise reduction solution. Ionizer, on the other hand, at $399 is positioned competitively in the increasingly crowded plug-in market. Its powerful noise reduction functions, and static and dynamic signal processing options make Ionizer a powerful tool for cleaning up problematic audio files and soundtracks.

Burke Trieschmann *is a composer, audio producer, and sound designer, providing soundtracks for video, film, CD-ROM titles, video games, and recording artists. He recently completed music and sound design for Crystal Dynamics'* Pandemonium 1 & 2, *and Broderbund's* Orly Draw's a Story. *He can be reached at burket@aol.com.*

DV REVIEW PC

MegaPEG

Digigami, $495

Software MPEG-2 Encoder

System Requirements: Pentium 486 or better; 12MB of RAM for Windows95, 16MB of RAM for Windows NT; 4MB of free disk space (much more for large movie files); a 256-color display or better.

Summary: Digigami previously released a workhorse MPEG-1 transcoder that has apparently been upgraded to output MPEG-2 clips as well. Input files can be AVI or QuickTime movies, including AVI streams encoded with DV compression from DV cameras such as the Sony VX1000. Such clips have native frame sizes of 720x480, which is generally the same as MPEG-2. Other input formats are also accepted, such as MPEG-1.

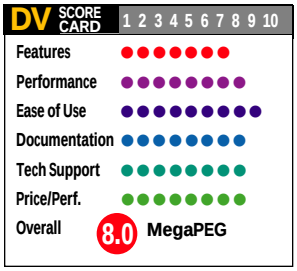
LSX-MPEG Encoder

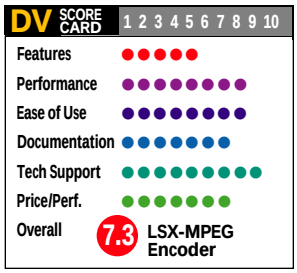
Ligos, $99.95

Software MPEG-2 Encoder

System Requirements: Pentium or DEC Alpha; 16MB of RAM; 4MB of free disk space (much more for large movie files); and 16- or 24-bit color display.

Summary: A solid, reasonably priced solution that produces high-quality MPEG-2 and MPEG-1 video if your input file is of very high quality. A major shortcoming is that input file audio tracks are not included in the output video file. Ligos recommends software products from Darim Technologies (www.darvision.com) to multiplex audio tracks with MPEG-2 video streams.





Reviewed by Nels Johnson

Right off the bat, any discussion of MPEG-2 video production on the desktop needs a context. What are you going to do with your MPEG-2 files? Put them in a retail DVD product, distribute them as is for stand-alone playback, or enjoy them for personal use? Answering these basic questions tends to raise even more issues. For independent producers, there are at least three major concerns.

First is the problem of encoding MPEG-2 clips at reasonable prices. Hardware encoding devices for MPEG-2 video clips currently run in the $10,000-$20,000 range (or higher). Consequently, affordable software transcoders—the subject of this review—that convert, say, uncompressed AVI or QuickTime files to MPEG-2, are valuable additions to any producer's toolbox.

The second issue is MPEG-2 file formats. Big-ticket DVDs play .VOB (Video Object) files, which contain MPEG-2 video and Dolby AC3 audio streams, multiplexed ➢

with other types of digital data streams. Files with the nominal extension .MPG or .MP2 can contain MPEG-2 video streams, but only multimedia quality audio (up to 44KHz/16-bit—the default for MPEG-1). The products covered in this review output these latter types of files. .VOB files are generally created with expensive hardware encoders.

Finally, a finished MPEG-2 file, converted in software, must look as good as (or almost as good as) the same file encoded in hardware. Some product vendors may disagree, but the whole point of MPEG-2 is broadcast—not multimedia—quality.

Both products in this review take at least raw (uncompressed) AVI files as input and convert them to MPEG-2 files. The big issue, however, is still visual (and audio) quality. If your input files are sharp enough, you may be able to output MPEG-2 video clips suitable for broadcast (or industrial) distribution.

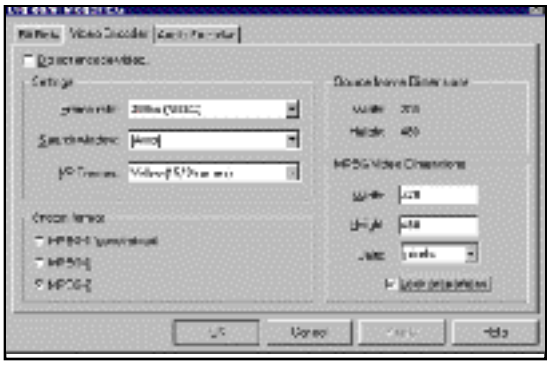
MegaPEG

For testing purposes in this review, AVI files with the following attributes were used as input media: 740x480, 30fps, RGB24 compression, and 44-16-mono audio. Playback of video in the MPEG-2 output files was handled with the Sigma REALMagic Hollywood-2 DVD card, using its bundled DVD Station application. Audio played back through a SoundBlaster 16 card. For the record, Windows 95 and NT do not support MPEG-2 video playback via MCI. Current plans call for support from Microsoft's DirectShow technology, although the issue is still evolving as of this writing.

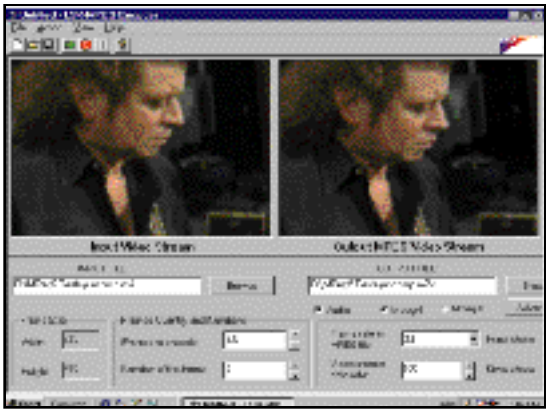
The Bit Rate UI provides various presets (such as Web ISDN, T1, Hard Drive, etc.), all of which affect visual quality of the converted video clip. Although you can manually set very high bit rates, the video quality of the output files did not improve proportionately when rates of 500, 1000, and even 2000 kilobytes per second were specified. As noted above, high-quality, uncompressed AVI files were used for input, but these were only as good as the capture card used to digitize them from videotape in the first place. Encoding time for a five-minute, 720x480 clip with fairly busy action on a P266 Pentium Windows NT machine was approximately six and a half hours.

Other noteworthy features of MegaPEG include various input file formats (AVI, QuickTime, MPEG-1, as well as BMP and Targa image file sequences); batch conversion support (of multiple input files); support for various audio sample rates such as 32kHz, 44.1kHz and 48kHz (the DVD/VOB standard), as well as various monaural and stereo modes.

MegaPEG successfully converted high-quality input files (i.e. uncompressed AVI and QuickTime) to MPEG-2 format with multimedia audio tracks (up to 44/16-stereo). These clips played back very well on a P200 with a Sigma Hollywood MPEG-2 card using the DVD Station application. Audio cards supporting 48kHz audio will render audio tracks in such movies if you specify that particular audio rate.



MegaPEG's Video Encoder parameters.



Only AVI files can be used as input in Digigami's LSX-MPEG Encoder.

LSX-MPEG Encoder

Like the Digigami product, the Ligos transcoder puts out both MPEG-1 and MPEG-2 clips. The same input media was used for testing the Ligos product as was used for the Digigami product. Unfortunately, only AVI files can be used as input in the LSX, although the range of advanced encoder settings offers more control over the output than the Digigami transcoder.

While there are no bit rate presets for increasing the video quality of the converted MPEG-2 file, you can manually calibrate the program to achieve quality essentially as good as that of the uncompressed source AVI file. For instance, a bit rate of 500 kilobytes per second produces minimum image quality of 83 percent, 1000KB/sec produces 90 percent, and 1500KB/sec gives 93 percent (as reported by the program in the test cases). Past a certain point (i.e. 2000KB/sec in the same test cases) the program won't accept higher rates.

On the negative side, this product cannot create MPEG-2 files with multimedia audio tracks (as opposed to multiplexed video and audio). Normal operation produces a separate audio stream which can be multiplexed with the video stream using a separate application. This is consistent with the MPEG (.MPG) / Video Object (.VOB) distinction noted above. Although no release date was given, Ligos says that the next version will have multiplexing. For the record, the MPEG-2 video stream in the resultant output file plays back fine through the Sigma Hollywood/DVD Station combination.

There are other noteworthy things about the Ligos transcoder: Only AVI files can be used as input media, it offers no batch conversion, but it does support various audio sample rates—32kHz, 48kHz, 64kHz and higher, as well as various monaural and stereo modes.

The LSX-MPEG Encoder successfully converted high-quality AVI files to MPEG-2 format, but without audio tracks playable by a SoundBlaster16-compatible audio card. These video-only clips played back very well on a P200 with a Sigma Hollywood/DVD Station combination (noted above). Remember, mediocre video in equals mediocre video out. DV

Nels Johnson *is president of Download Recordings (www.downrecs.com), a Bay Area consulting and production firm specializing in desktop video and multimedia software development. He is the author of* How to Digitize Video *(John Wiley, 1994),* Web Developer's Guide to Multimedia and Video *(Coriolis, 1996), and* Web Developer's Guide to Multicasting *(Coriolis, 1997).*