VIDEOGRAPHY

HANDS ON

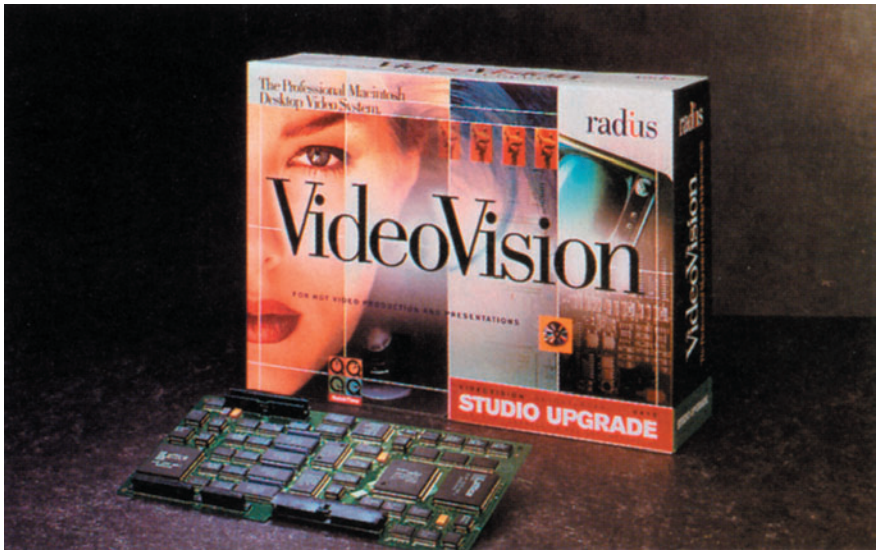
PRODUCT:
RADIUS VIDEOVISION STUDIO

MANUFACTURER:
RADIUS, INC.
1710 Fortune Drive, San Jose CA 95131, (408) 434-1010

SUMMARY:
Mac-based desktop video editing and production system.

PRICE:
$4,499 (list), including video interface card, connector panel, software controls, JPEG video compression accelerator, Adobe Premiere 2.0, and VideoFusion.

INFORMATION:
Circle number 46 on the Free Literature Card in this issue.



A FULL-MOTION VIDEO ENGINE

BY CHRIS ALLAIN

The VideoVision Studio is a video display solution for Macintosh computers. It provides video switching, basic audio mixing, capture of still and motion video images with audio, and accelerated JPEG compression and decompression of video frames. Along with solid digital video and frame buffer performance, the system offers an impressive array of features, such as hardware interpolation during zooming, standards conversion, and convolution.Videography readers will probably find uses for this system in two areas: video production and multimedia presentations. The system contributes powerful tools to both endeavors. This look at the VideoVision Studio begins with a description of the system, both hardware and software, and follows with a comprehensive evaluation of performance in various applications.

The hardware

The hardware components of the VideoVision Studio System include the VideoVision interface card, which provides the Mac with video input and output. The external connector panel supplies the connectors for interfacing the system with video and audio sources. The VideoVision Studio daughter card, a JPEG compression accelerator attached to the VideoVision card, compresses digitized video for recording to disk in real-time.The systems NuBus board has two multipin connectors accessible from the back of the computer; one interfaces to a standard Macintosh display and the other to the external connector panel. Through

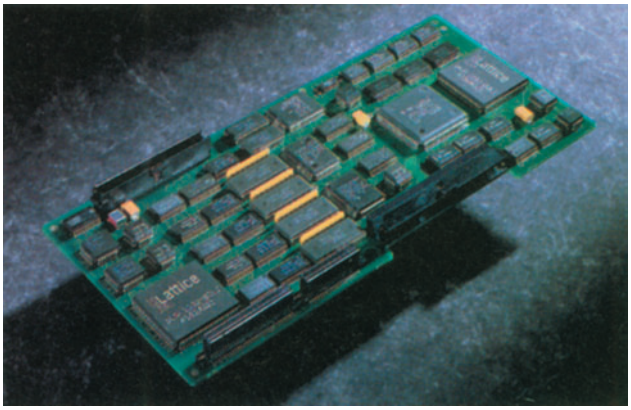
the standard Mac 15-pin video connector, the VideoVision can drive nearly any monitor that a user might have. An ideal arrangement might be to feed this direct RGB output into a multiscan monitor that scans down to 15.7 kHz. This would allow the monitor to receive a signal even when the external connector panel is displaying an NTSC picture. The external connector panel allows interfacing with audio and video devices such as tape machines and NTSC monitors.

The External Connector Panel The external connector panel provides two input groups, a stereo audio mix in, and an output group that can be software selected from within applications using a standard QuickTime dialogue box. Each input group provides two stereo audio inputs, an S-Video, and a composite video input. Composite video and audio inputs and outputs use RCA-style connectors. S-Video connectors allow interfacing with devices that support Y/C signals. An additional circular-eight connector, the EXT jack, provides an interface for genlocking and other serial communications such as machine control. Currently only the genlock feature is implemented in software.

The VideoVision System can feed a composite, an S-VHS, and an RGB monitor simultaneously, without additional video distribution equipment. Multiple inputs and outputs make the system versatile for integration into a facility environment.

The VideoVision Card The VideoVision card digitizes 8-bit audio at 11kHz and 22kHz rates. A multimedia producer can mix an additional stereo audio source attached to the mix in connectors, with the digital audio for output. The audio out provided on the external connector panel delivers the mixed signal. This audio quality level might be appropriate for a multimedia presentation or kiosk, or for offline applications, but a pro would not use it for finished audio.The card can scale video brought in through the composite and Y/C connectors of the external panel for video-in-a-window-style display or can route it to the Studio daughter card for compression and recording. The VideoVision card provides a high speed connector called the H-bus to interconnect to other cards such as the Studio daughter card for com-

pression and recording. The VideoVision card provides a high-speed connector, called the "H-bus," to interconnect to other cards such as the Studio daughter card. The RGB component signal outputted through the standard Mac 15-pin connector, when it's not driving a multisync monitor, can feed an encoder or transcoder. An external encoder or transcoder can provide a higher quality interface to other video devices.



The VideoVision performs standards conversion, one of several impressive features. The VideoViewer application selects incoming video from NTSC, PAL, and SECAM standards; the board can output in PAL and NTSC.

Another useful feature, convolution, eliminates flicker on NTSC displays caused by interlacing. Convolution is useful when recording a standard Mac display on video tape or viewing it on an NTSC monitor. Although it is easier to look at a convoluted picture on an NTSC monitor, it does reduce sharpness.

The Studio Daughter Card The VideoVision Studio card is a high-performance real-time compression and decompression board for recording and playback of QuickTime movies. This powerful compressor-decompressor—or "codec"—uses the LSI Logic chip set. This is the chip set used in the Data Translation Media 100 and in the RasterOps Movie Pak 2 products, and appears to be the leading performer among today's compression engines. This JPEG engine delivers good image quality and seems to perform very reliably.

The VideoVision Studio daughter card installs piggy-back style onto the H-bus connectors of the VideoVision interface card. Together, the VideoVision interface and Studio boards use only one NuBus slot.

Studio delivers compression of full-screen, 24-bit video at ratios as high as about three to one. These ratios are approaching lossless quality. The problem with providing production-caliber video at this point is getting data into and out of the board at high enough rates. The performance evaluation following provides a more detailed discussion of the issues of data rates and image quality.

The Studio codec supports "adaptive compression," which allows the dynamic adjustment of compression levels to get the highest-quality image possible for each frame and reduces the likelihood of dropping frames. Adaptive compression attempts to increase the compression slightly to allow continued recording at a certain data rate.

The Software

Radius Utility Software Several pieces of utility software ship with the VideoVision Studio. The RadiusWare control panel provides for management of pivot displays, but also provides a pop-up bit depth changer, a screen saver, and capture utilities. The VideoVision Monitors Extension serves as the primary control for the VideoVision display. The OPTIONS button in the monitor's control panel brings up the window. From this window a user controls the display's resolution, scan rate, sync, and genlock options. After changing the scan rate setting and closing the window, the monitor fades to black and fades back up using the new scan rate.

The VideoVision VDIG extension file operates in conjunction with the Apple QuickTime system extension to allow control of the digitizing capabilities of the VideoVision board. The VideoVision Studio extension activates the video compression and decompression functions of the Studio board. It also operates in conjunction with the Apple QuickTime extension. The VideoVision Recorder extension is a sound driver for recording sound through the Apple Sound Manager in QuickTime applications.

The VideoViewer application selects from the input choices and displays live video input in a scalable window. It also allows selection from the various standards conversion options. Another stand-alone

application, Studio Player, simply plays back VideoVision Studio compressed movies at optimum performance. The VideoVision Grabber and Print-to-VideoVision Studio are plug-in files for Adobe Photoshop and Premier. VideoFusion includes a Studio export module with its software. The Director XObj allows control of the VideoVision system using Director's Lingo programming language.

Bundled Commercial Software Radius bundles three commercial applications with the VideoVision system: Premier, VideoFusion, and DiskExpress II.

Evaluation

Performance for Animation The VideoVision Studio provides solid performance for animation applications. Most animators creating 3-D animations work on fairly short projects because of the time-consuming nature of 3-D design and rendering. Using a large RAM disk, an animator can burst short scenes out to videotape, and for longer segments edit the pieces together. This technique has proved more efficient than laying projects to tape frame-by-frame, and significantly reduces wear and tear on VTRs. A 32MB RAM disk yields about six to eight seconds of great video. Hopefully the animation controller companies will tap this feature to provide frame accurate assembly of video bursts on to a master tape, eliminating the need to edit short segments together.

To proof a segment, an animator can render it at half-screen and then apply a moderate amount of compression to it. This will allow for 30 fps playback from disk, and the preview of segments of virtually unlimited length. The hardware interpolated zoom turns this into decent full-screen video. This system offers a lot to animators.

Performance for Video Production Professionals will find the display quality of the frame buffer to be usable in a production environment when encoding the signal externally. The RGB signal, when fed through a transcoder to a component VTR, looked particularly good. Measurements with a waveform monitor and vectorscope showed that the composite output of the VideoVision, when encoded with the same external encoder, is more accurate than a NuVista board and offers slightly

better color saturation. In fact, on the test instruments it performed nearly as well as the Intelligent Resources Video Explorer. When viewed on a video monitor, however, the Explorer reproduced noticeably better saturation. Video captured through the VideoVision's decoder also looked good, with excellent color saturation. It performed much better than the decoder on the NuVista+.

Playback and recording of video through the Studio codec will provide more mixed results, at least until higher-performance disk drives are available. Animations played back from a single high-speed hard disk would only be acceptable if the animated material lent itself well to compression. For example, an animation of text or simple objects moving against a solid color background would probably play back from a single disk without excessive compression artifacts.

Motion Video playing back from a single drive would probably be usable only for some type of special effect. The video quality of the system begins to look more like 3/4 in. SP or standard Betacam when linked to a carefully tuned high-speed array. Using a huge RAM disk allows the system to record and playback short bursts of video that easily rival Betacam SP quality. Tests using a large RAM disk with a Mac Quadra 840AV yielded a sustained 4.9 MB per second data transfer rate. That transfer rate is astounding for a QuickTime-based system since QuickTime and operating system overhead zap much of the performance.

The 840AV seems to have played a big part in this performance, since the highest data rate achieved on an accelerated Quadra 900 was much less. Although spending $7,000 on RAM might seem a bit extreme, with that much memory one could approach 30 seconds of record and play time, about the same as some video-specific digital disk recorders. Obviously this system is not a substitute for an Abekas. It does not record uncompressed 4:2:2 digital video. It doesn't even offer serial machine control as a source VTR…today. It does, however, make pictures that are comparable or better than the analog laserdisk players that cost between $15,000 and $40,000. And it integrates perfectly into the Mac environment.

Many drive vendors believe that hard disk arrays will soon provide data-transfer rates comparable to the RAM disk described above. Hard drive technology has been improving at a mind-numbing rate. It is surprising to reflect back to as recently as the end of 1989, when a 600MB drive cost $3,400. Today 2GB-drives are plummeting to well below the $2,000 mark and their performance is improving dramatically as well. Don't be surprised if vendors provide a drive array system within months, that can pump 5MB of data per second into a VideoVision.

VideoVision Studio provides a valuable feature set to animators and brings a frame buffer with motion video to the edit suite.

Performance for Multimedia The system offers impressive performance in several types of compression applications, even with limited drive capacity. Horizontal interpolation averages every pair of pixels along a horizontal line into a single value, reducing the number of values stored from 640 to 320. This reduces the data rate and storage requirements by half. Several competing systems capture 30 fields per second to cut the data rate or because they are unable to capture at the 60-field rate. This significant feature allows a user to record 60 fields per second, yielding the smooth motion of the higher frame rate while still cutting the data requirements in half. Upon playback, the system extrapolates pixels back out, to deliver a full-screen image with remarkable quality.

Another data-rate reduction technique entails recording at one-half the vertical and horizontal resolution—320 by 240 pixels—and doubling or zooming the image by a factor of two upon playback. This technique works well because in playback the system provides not just pixel replication, but hardware interpolation, both vertically and horizontally. Again, the image quality is striking, considering that it is grabbing one-fourth the number of pixels that captured in full-screen mode. This technique requires recording at 30 fields per second rather than 60, but the resulting image quality is interesting. It shows very little loss of resolution and looks somewhat like 30-frame-per-second film. This quality level would fit well in a multimedia kiosk or other application where you needed to hold data rates down.

Docmentation Radius provides good documentation for the system, but covers several components only in on-disk read-me files. The manual fails even to mention a few of the utilities such as the Studio Player and the Director XObj. An addendum discussing these applications and other topics covered in read-me files and assorted documents would be welcome. Also, Radius could develop more in-depth documentation in some areas such as using the VideoVision with Director for interactive applications.

Support Radius obviously tries to offer great support for their products and succeeds on most counts. In response to a hardware problem experienced in the first week, they overnighted a replacement board without waiting for the defective board to be returned. Throughout several contacts with Radius, the employees consistently exhibited good attitudes and it generally proved a pleasure dealing with them. One minor quibble is that the technical support people did fall a bit short on more esoteric topics, such as subcarrier phase issues and the finer points of compression ratios and data rates. On balance, Radius deserves its reputation of a quality company with quality support and products.

Complaints Clearly, the VideoVision Studio fairs well in this review, but the system does provoke a few complaints. Radius uses the same method to set monitor resolution and scan rate as Apple does. Three sense pins are terminated in various configurations to set display signal parameters upon startup. Apple's attempt to drive nearly every monitor available is admirable, but the "buy the appropriate cable or adapter" approach is maddening to those working with multisync monitors who regularly change configuration. To make matters worse, Apple has changed the rules a few times.

Minor variations in capability and pin configurations between different CPU models, and developments such as the removal of sync on green on the new AV models, have wearied the most diligent systems integrators. A simple comprehensive document readily available from Apple or Radius could ease the grief of a number of users.

Another related auto-sensing issue involves the external connector panel. The VideoVision system will not let you change the display to NTSC rates unless there is a monitor connected to one of the video-out ports. This feature makes troubleshooting inconvenient, and it is difficult to imagine what the benefit to this could be.

The system did exhibit a couple of problems. Once, the card stopped working, and restoring it to operation required moving it to another slot. Software or firmware could have caused this problem. It only occurred once, but between this, the auto sensing confusion, and mastering the control panel options, running this board through its paces took some effort. Eventually the operation becomes more familiar and predictable. It should be noted, though, that getting this system integrated and performing to its fullest is challenging. It is not that Radius has failed in some way, it's just that digital video and audio are complicated areas.

The standard QuickTime slider used to set compression levels can also cause grief. Apple—not Radius—bears the responsibility for this. The slider, accessed through a QuickTime Application such as Premier, provides a coarse adjustment. It also has the annoying habit of snapping to another point near the one selected. To fix the problem, Apple could provide a numerical field where a user could enter a simple value.

Perhaps the only serious criticism of the system regards its ability to genlock. The board locks to a signal input through the EXT jack on the external connector panel. Radius supplies an optional adapter cable that plugs into the eight-pin jack and provides a BNC connector for connection to a sync source. The system allows horizontal phase adjustment, but not subcarrier phase adjustment. The subcarrier phase remains unlocked and feeding it into a switcher causes it to spin out of control, generating a rainbow of color rapidly floating through image. Most external encoders will allow subcarrier phase adjustment if you feed the board.s RGB into them. It would be unfortunate, though, to have to spend the extra money and waste the VideoVision's respectable quality encoder. Producers looking for the highest quality would also welcome an RGB input into the VideoVision. Fortunately, the on-board decoder offers respectable quality.

Conclusion

Radius could respond to the system,s primary shortcomings by developing a professional interface unit with pro connectors. It should address the subcarrier issue and provide full genlock. Radius should also upgrade the audio to professional 16-bit sound and eliminate the autosensing connectors. With these improvements, Radius would significantly advance an already fine product. The VideoVision Studio is unequaled for multimedia applications. It provides a valuable feature set to animators and brings a frame buffer with motion video to the edit suite, and at $4,499 retail, it's a bargain. □