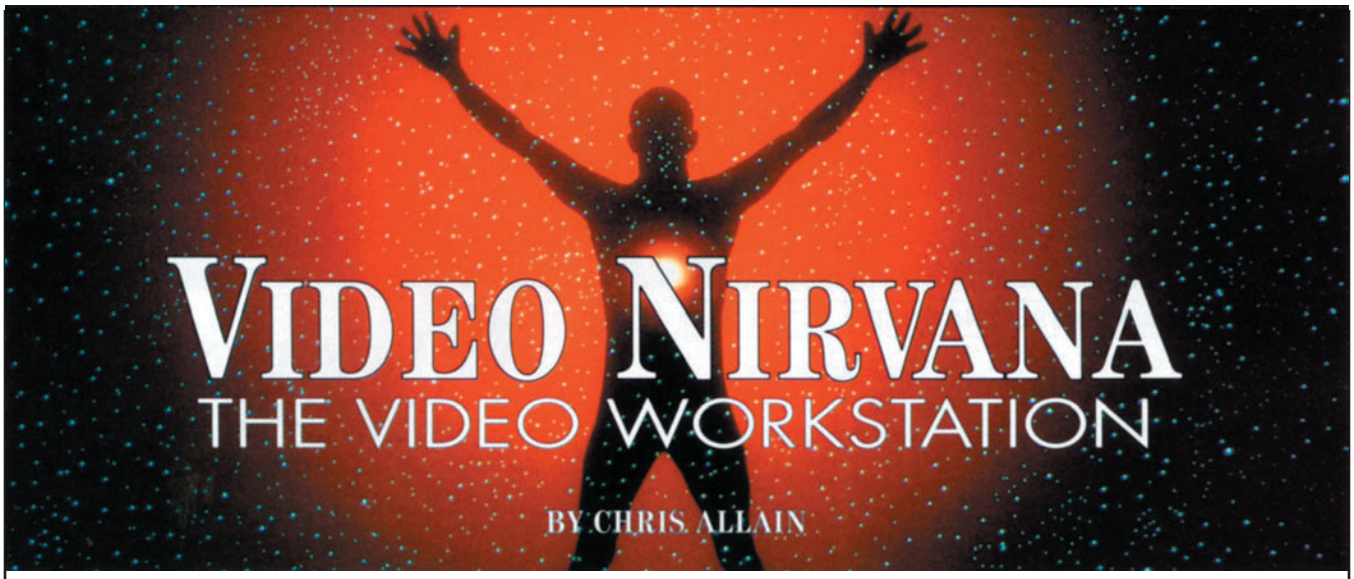

VIDEO NIRVANA

THE VIDEO WORKSTATION

BY CHRIS ALLAIN

Years ago, as I packed my bags for college, I thought I knew what nirvana would be: a 1964 VW bug, my own wheels. I guess satisfaction is like a horizon, the faster you approach it the faster it recedes. Today the "VW" of my dreams is not a car at all, this time it's a video workstation and the ultimate VW hasn't been developed yet.

An online video workstation for the rank-and-file video producer grows closer to a reality each day. The scene of an editor laboriously pouring over video footage using tedious, mechanical VTRs will soon be an amusing bit of nostalgia. Remember when editing video tape involved a razor blade? Setting up a single edit will no longer be a procedure that takes several minutes. Random access is replacing shuttling tape, and previewing an edit is becoming an instantaneous process.

The system of the future will sell for a fraction of the cost of a Quantel Henry and offer a much more comprehensive feature set. Initially the system may perform some functions more slowly than traditional equipment, but it will rapidly pick up speed. The system's record time, a factor of hard disk capacity and compression, is somewhat restrictive now. With the rate of development in these areas, however, storage media will soon accommodate longer programs economically.

Some might say that this system is available today. I disagree, but feel it's probably being developed somewhere right now. Remember, we are talking about a complete replacement for an online suite. Sure, Avid builds a great editing system and Quantel's Henry is amazing. The ImMix Video Cube is a capable system, as is Data Translation's Media 100, which has great image quality. None of these systems, in my opinion, has made all traditional online suites obsolete.

Components of A 199X Model VW

Video workstation require several components to replace an online suite. Some vendors opt for a proprietary system but the ideal VW—what I'll call the 199X Model VW—will probably be an open system, drawing from the strengths of many vendors. The components required to build the ultimate video workstation include:

- a primary CPU;
- video and audio storage (media);
- input/output (I/O) processors and interfaces;
- digital effects, switching, and titling processors;
- machine control;
- software.

The storage requirements for this application are tremendous. Today's hard disk drives are barely adequate. The cost-versus-capacity ratio of storage solutions must improve many times, and it will. The system requires input and output processors to convert digital data to and from analog form, and it must provide connections to interface with the analog world. The I/O section may also include compression processing technology. Multipurpose effects processors must handle all traditional switcher effects, the moving picture manipulation we now call digital video effects, and the motion effects now provided by character generators.

Machine control in the traditional sense of RS-422 will become increasingly unimportant, but systems will continue to control at least one machine for some time. To get a picture of the future, visualize tape machines as "bit buckets" with little more than an eject button on the front panel. If we edit video in a nonlinear system, why do we need incredible tape drives with insert editing and special-tracking heads? Instead of video-in and -out connectors, future tape drives will have a single data interface. The same tape drive a production company will use to make a

distribution copy of a commercial will be used to back up their network server. The Exobyte 8mm format, a tape drive for computer backup, has become something of a standard for the exchange of video animation. Add third or fourth-generation compression technology to the mix and we may see a Hi-8 tape with HDTV broadcast image quality. What is surprising about this is how quickly it could happen.

One might view the CPU in today's high-end personal computer as video-workstation ready or as far from being ready, depending on the system's design. In one design, the workstation will use special chips for various functions, such as the effects processors. With this approach, a designer could build a system that performed acceptably using dedicated processors and current CPUs, such as a Macintosh Quadra. That designer could not build a system that performed acceptably relying on the primary CPU for all processing. You can not provide real-time effects using current technology. Real-time multichannel layering, 3-D rendering, and other effects require staggering amounts of computational power. To create real-time effects on their own, the speed of primary processors must increase by orders of magnitude. As RISC chips mature they might become fast enough for the job, but primary CPUs alone probably won't have the horsepower to provide these functions for years to come. Don't despair though, viable multi-processor-based systems will be here long before that.

Grand Unification Software (GUS)

To imagine how all this power comes together, it helps to develop a grand unification software theory, or GUS. GUS will be mature and refined like the Avid Media Composer. It will reflect the innovation of Premier and VideoShop and build on the effects capabilities of CoSA After Effects and VideoFusion. It will offer titling like Bola 32 or Comet and MacroMedia Director-style animation. It might come from a single vendor or be assembled from a diverse group of plug-in style modules or extensions customized by each user. It will probably offer many other functions not traditionally associated with an online suite such as storyboard creation and printing and video-tape logging.

GUS will offer a general-purpose editing interface that allows rearranging of video and audio segments, but it will also summon the functionality of other components found in a traditional online suite. A switcher-like module will create fades, dissolves, wipes, and keys. The digital video effects (DVE) module will offer the manipulation and layering of motion video. Soon the distinction between DVE and switcher modules will fade, and we'll simply have a transitions module. A titling module will do the work of a character generator, creating video typography that moves. A mix module will mix and sweeten the audio as capably as a multitrack studio.

Eventually GUS could be available as an affordable off -the shelf solution or set of solutions. An operator or systems integrator will most likely assemble the system. Just as today's Macintosh power users configure the Mac OS, picking from the plethora of available utilities, the video workstation user will customize GUS with the modules or functions required.

Existing Products Will Play a Role

Many existing technologies warrant a place in a top-of-the-line, multiprocessor-based VW. The Video Explorer, from Intelligent Resources, is among those on the hardware side that should endure. It stands as an example of a VW component that is ready now. It offers the highest-quality video available from a personal computer and provides CCIR 601 and component analog I/O. The Explorer can connect to other boards and processors through a high speed bus called the VideoBahn. VideoBahn has the bandwidth for multiple simultaneous digital video signals. Other devices connecting to it that are now under development include an Ultimatte and a DVE board that allow keying and digital video manipulation respectively.

Another key VideoBahn-compatible product is scheduled to ship very soon, the Digital Magic board from Advanced Digital Imaging (ADI). The board brings two key components to our workstation, SCSI acceleration and real-time compression and decompression. The Digital Magic board, if it delivers as promised, will offer a seven-to-one compression that is considered similar Betacam SP quality. ADI also claims it will provide something like D-1 video quality through lossless compression when using a pair of 2GB drives in an array configuration. Both drive configurations should store about the same amount of video, approximately seven minutes. Our VW must include a fast hard drive interface and a compression chip set. The Digital Magic board provides both. This board makes sense because it combines these features and since the drives connect directly to the ADI board, the main system bus avoids the flood of processing several megabytes per second. The Digital Magic board then pumps video bandwidth data across the VideoBahn bus, again avoiding the main system bus.

Digital Magic will allow animators to avoid the expensive and time-consuming processes of laying frames to, and capturing frames from, videotape. The Ultimatte and DVE boards lay the foundation for a Video Explorer-based replacement for a conventional suite. This system would provide multiple inputs and outputs in a mix of desired formats. It would do what an online system does and, for the most part, do it in real time. The Ultimatte, the DVE, the Digital Magic, and the base Explorer boards represent dedicated

processors. A system can combine the Explorer, with its real-time switching, keying, and effects with these other boards to supply the kind of mixing and transition power needed in professional production.

The AT&T Digital Signal Processor, or DSP, another dedicated device, processes digital audio. DigiDesign's products, meanwhile, lead the field in units sold for professional applications in digital audio. The new Quadra 840AV also offers CD quality audio through its onboard DSP. The AT&T DSP-based audio capability of the new Quadra may not provide a solution as flexible as the DigiDesign products but it will bring economical, digital audio to a large number of users. By the way, a system can also use this DSP for processing Photoshop filters and other video applications when it's not doing audio.

Impact on the Industry and Producers

The future will bring a revolution in video production, making the industry unrecognizable. Or will it? Will this technology breakdown the barriers to producing quality programing? Will the masses finally have access?

I frequently hear the analogy of desktop video changing an industry the way desktop publishing (DTP) did. DTP essentially overwhelmed the typesetting and prepress industries. Of course this technology will shake up the video production business and make the tools accessible to more users, but there is a primary difference. Before DTP one person could theoretically write the copy, create the design, and set the type for a major national print ad. In fact, with today's advanced DTP tools this scenario would not be at all odd.

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Major TV and film projects, however, are impossible to complete without the combined talents of numerous professionals. Lets assume that one person had the time and the skills to operate a camera, set lights, set the audio, do makeup and direct the talent, not to mention hauling a couple of truckloads of equipment back and forth. Could this superproducer do all these things at the same time. If so, he or she would still have to deal with the talent in front of the camera. I've described only field production here, preproduction and postproduction also involve the talents of many people. For instance how do you replace an audio engineer who has spent his or her life learning to hear things that the rest of us can't?

Editing is the part of a producer's job affected by future VWs. Although the percentage may vary, a typical commercial producer might spend about 10-20 percent of his or her time editing. If a new system makes this process twice or three times as efficient, it will only slightly improve a producer's ability to create finished programs.

So will my Model 199X VW usher in a revolution? Perhaps! I'm looking forward to kicking the tires and taking a test drive with GUS. But will it truly be Video Nirvana? Perhaps! □