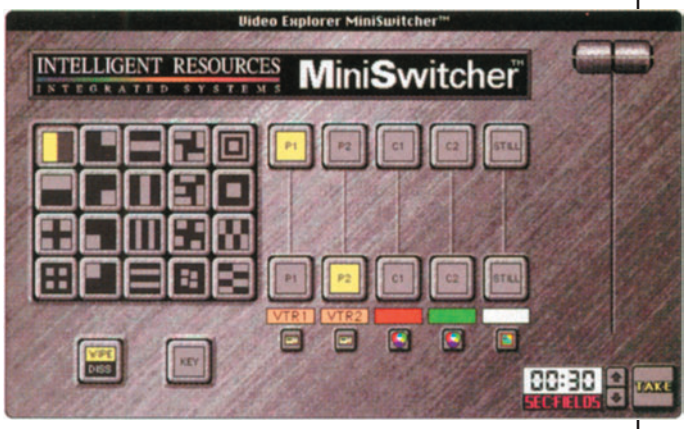
FEATURE

THE VIDEO EXPLORER:
A BRIDGING TECHNOLOGY



BY CHRIS ALLAIN

As I read and write about the future of video production there is one issue that recurs. This issue divides the perspectives of practitioners and prognosticators.

People involved day to day with program production care about near-term advances while those less directly involved in production are interested in more distant technologies.

Neither group is better informed, necessarily, but spirited discourse occurs. The prognosticator heralds the future, as though big changes were arriving tomorrow, and the practitioner believes that things change gradually. The prognosticator focuses on milestones and the practitioner on details. One boasts a broad perspective and the other an in-depth knowledge. Both views are valuable and each has its place. The two are divided by their perception of time, as much as anything else. Milestones just seem closer together from a hilltop than they do from behind a plow.

Hopefully all this serves to illustrate a difference between two classes of technology, one that will effect producers very soon and another that will affect us later. Occasionally a technology has the potential to impact the industry in the short and the long term.

Today's production environments consist largely of separate dedicated devices. A future production environment will consist of a video workstation into which we will "pour" video and audio. This material will be processed and edited—digitally of course—and poured back out as a distribution master. The video workstation will be similar in function to the high-end offerings of Quantel and others but much more complete and affordable.

I must be standing behind a plow, because this video workstation seems a long way off. Why is it taking so long? Ask the crack engineers at various companies who are a year late on delivery of their "near broadcast" compression-based disk recorders. These guys are behind the plow, too, although it must seem to them that they are pulling it.

In the near term, however, we must concern ourselves with consolidating the functions of the devices used in the modern edit suite. A host of devices will serve as "bridging technologies," allowing the industry to make the transition to the future's video workstation.

It is in the context, of a bridging technology, that the Intelligent Resources Video Explorer seems to be significant. I've tried to comment on the Video Explorer as objectively as possible, but it should be noted that my company has a relationship with Intelligent Resources. A division of Vidox Image & Data consults with clients in the area of Macintosh applications in video production, and as a part of that effort sells a handful of related products. The list of hardware and software solutions sold by Vidox includes the Explorer line. We tested it and built confidence in the Explorer before deciding to become dealers for it.

Significant Technology

The Video Explorer represents a significant technology because of its image quality, its powerful video processor, and its use of an open standard high speed bus called the VideoBahn. The Explorer brings a new standard of image quality for personal computer-based video. High quality D/A and A/D converters and full digital (4:4:4:4) internal processing are not found elsewhere on personal computers. The Explorer can be configured with "D-1" input and output modules that are in compliance with CCIR 601 and 656 digital specifications.

Intelligent Resources claims that its chip set is the largest and most powerful ever produced for civilian use. The capabilities of the chip are, as yet, barely tapped. In fact the board's designers are not quite sure what applications might be possible with the technology. Company VP Brett Bilbrey uses the analogy of the first home video game; although Pong was a very simple game by today's standards, the same technology eventually supported much more sophisticated games. Similarly, the Explorer is a young technology that will support more sophisticated video applications as it matures.

The VideoBahn is a powerful and versatile video bus standard developed by Intelligent Resources. It allows a series of cards to work together as a sophisticated video system. The VideoBahn is significant because it allows the interconnection of a wide range of high-speed peripherals in addition to multiple Explorer boards. The Video Explorer acts as a bridging technology in two ways. Most of the functions of this device will be required in the video workstation of the future, so it should endure. Also, it interfaces all sorts of peripherals to one another, from analog to digital, and from processing to storage.

Intelligent Resources is now shipping RGB and D-1 input and output modules, and will soon be shipping Y, R-Y, B-Y (YUV) modules as well. With that module, the Explorer will input and output Y, R-Y, B-Y components for interfacing to analog component machines such as Betacam SP and M-II analog component VTRs. A composite video module should follow sometime thereafter. This system should prove itself as a versatile solution

for interfacing the mixture of analog and digital video signals common in facilities today.

Modular Architecture

The architecture of the Explorer is different from any other PC video board strategy to come before it. The VideoBahn provides Explorer users a proprietary high-speed bus with the capacity to pass multiple simultaneous digital video signals.

The VideoBahn is the most powerful and elegant open architecture environment for the interconnection of digital video devices. It samples at a rate of 4:4:4:4, beyond the 4:2:2 rate usually associated with CCIR 601 serial digital video. The VideoBahn's 64 bit data path allows a transmission rate of up to 320MB (megabytes) per second.

Intelligent Resources designed the Explorer as a modular system. The Video Explorer base NuBus card includes the frame buffer, video processors, and the VideoBahn bus connector. The base card is configured with an input and output module in the desired flavor: RGB, D-1, or the soon to be released YUV module. The system expands using additional Explorer cards or I/O docking cards equipped only with input/output modules. A user can install up to six NuBus cards in a Macintosh. VideoBahn connectors link the boards to the high speed video bus and to one another. The Explorer also supports 16:9 HDTV computer graphics and is compatible with SMPTE 240M specifications.

A configuration used in an A/B Roll edit system might include one Explorer card with a frame buffer and YUV input and output, and a docking card with YUV input and D-1 output linked via the VideoBahn. This system could use two Betacam SP sources and a D-1 mastering VTR. The Explorer would provide transitions, such as dissolves and wipes, between the two source decks and alpha channel keys from the frame buffer over these signals. This system would provide very high signal quality at a cost much lower than anything else with direct component analog and digital in and out. Most other systems, in addition to costing more, would require expensive external transcoders or A-to-D and D-to-A converters. Once the YUV module begins shipping, a user will interface equipment to the Explorer system simply by specifying the input and output options required.

The Software Picture

Most applications currently supporting the Video Explorer use only the basic features such as capture and display. A few applications take advantage of some of the board's other capabilities. AT&T's Comet character generation software accelerates the scrolling of text using the board's video processing power. The Digital Suite, from Digital Media (London, England) has developed a production environment around the Explorer that offers switching, keying, still store with transitions between stills, and character generation.

Advanced Digital Imaging (Irvine CA), the developer of MacVac animation software, showed a prototype of a digital disk recorder, AD-1, at the SIGGRAPH convention in July. Interestingly, the AD-1 provides its own NuBus slots, and can use an Explorer without being connected to a Macintosh.

Other applications supporting the board include: MacVac, DiaQuest's DQ-Animaq, Electric Image, and AT&T's MacTopas. A Photoshop plug-in ships with the board as well a set of utilities and miscellaneous applications. Accompanying software includes Set-Up Utilities, ImageTools for capturing images, VideoRouter for routing signals to various destinations along the VideoBahn, Director X-Objects, Hypercard XCMDs, and MiniSwitcher. MiniSwitcher is a basic switcher application controlling wipes, dissolves, fades, and keys, using accurate transitions speeds measured in frames.

FX-Ternals are also available for use with the Video F/X from Digital F/X. A QuickTime digitizer, or VDIG, to ship with the next software revision, will let the Explorer capture QuickTime video with programs such as Adobe Premier 2.0 and Diva VideoShop. The VideoBahn provides an ideal platform for adding a JPEG or similar compression board, but compression is not built in to the Explorer. When the VDIG is released, however, it will, provide high-quality real time dithering when recording to 16- or 8-bit color levels.

The Explorer system currently has a serious shortcoming for some users: it cannot be properly timed into an existing system. The hardware genlocks to external sync, but H-phase cannot

be adjusted. This prevents intercutting with other sources when it is referenced to house sync. There are ways to get around the problem, and for those users who don't need to integrate it into a house system, it's not an issue. But, Intelligent Resources should have addressed this problem by now. Fortunately, revision 3.0 of the software, due in the first quarter of 1993, is scheduled to include this capability. Until then, Intelligent Resources should probably get this feature into some sort of beta release for those who need it now. Some users consider this feature to be critical to their application.

For many applications this missing feature doesn't present a problem. If the Explorer feeds a signal to a tape machine onto which graphics are laid to tape, or if the Explorer performs transitions and effects in a simple edit system where the board provides the master sync signal, there will not be a problem. To integrate it into a house system, however, the user must work around this limitation by feeding the output into either a TBC or some sort of scan converter that corrects the timing of an incoming signal. This could be an expensive proposition.

Some consider the Explorer system to be rather expensive. Intelligent Resources charges $7,995 for the RGB professional package, which consists of the Explorer with two RGB inputs and one RGB output. It's hard to say what a high-end video solution such as this is worth since there is nothing quite like it out there. If price restricts growth of the user base, it will also restrict software development.

Future Explorer Applications

Developers will build digital video switchers and routers out of Explorer systems equipped with multiple input and output modules. Buyers will probably be offered several products similar to The Digital Suite. Explorer architecture lets a user direct different sources to the available output modules. Sources include installed frame buffers, on-board video processors, and any signal connected to an input module. Using the right software, an editor could fade up from black, dissolve between two source VTRs—analog or digital component—and bring in linear keys. An operator could program these effects to take place in a single event and fire them with a GPI trigger from an edit controller. Broadcast television producers create at least 90 percent of all programing using these core production effects. In addition to a Macintosh, this system would require only an Explorer package with one output and two input modules. Most current video systems require a host of peripherals, but the Explorer portion of this system would provide a frame store, titling hardware, and a video switcher with linear keying as well as the video output for a powerful graphics workstation.

Using the model of a traditional piece of equipment, imagine the kind of still store that could be built around an Explorer. Install three or four frame buffers into a Quadra 950 with a couple of gigabytes of hard disk space. Capture images from virtually any format using the proper input module. Composite these images together within the Explorer or over other video using an external keyer. This system would store and display images with key channels, and—using lossless compression—could maintain several thousand images on line. Conceivably, an operator could place 5,000 to 10,000 images into a single list and display an automated slide show with preset timing and transitions.

Intelligent Resources is now developing a light pen application. The package will provide the kind of functions seen in broadcast football play illustration. The company is also planning a linear chroma keyer add on module for next year.

Other vendors have announced and some are shipping systems that provide similar functions, but what is unique about the Explorer is its uncompromising 4:4:4:4 processing and its potential to be interfaced to the machines in existing editing suites. As YUV modules become available to directly interface Betacam SP and M-II component signals, the Explorer might earn its keep as a transcoder alone. The VideoBahn data bus promises to be as relevant in tomorrow's video workstation as it is today. □

For more information on the companies mentioned in this article see the Buyer's Guide to Mac Desktop Video Products in this issue.