Broadcasting&Cable's
Digital Television™
Technology For The Digital Age

FEBRUARY 1998

1998: DTV'S YEAR

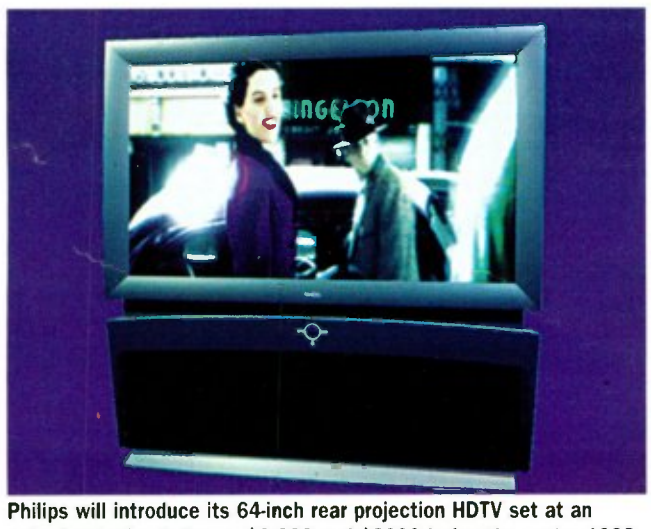
After two decades and hundreds of millions in development, digital TV is finally a go

By the Editors of Digital Television

The television delivery system of the 21st century has arrived. Two years early.

No one yet knows what shape digital television will ultimately take, but there's no longer doubt that it's here. The last piece of the puzzle was put in place at the Consumer Electronics Show in Las Vegas Jan. 8-12, when the leading edge of the setmaking industry—Sony, Zenith, Thomson, Panasonic and Philips—demonstrated prototype digital display devices. No matter that they were pricey: typically, $7,000 for a 50-inches-and-up projection model. More importantly, they represented the high-water mark in introducing the new TV lines; prices can only go down from there.

At the same time, the broadcasting industry is essentially on target in fielding its first 26 digital stations before Christmas 1998. Those advents are timed to the Christmas buying season, the consumer industry's largest. That will be the moment of truth in terms of the public's reaction to digital—and specifically to high-definition, the high end of the line in digital transmission.



Philips will introduce its 64-inch rear projection HDTV set at an entry-level price between $6,000 and $8000 in fourth quarter 1998.

A number of broadcasters are resisting those HDTV transmissions, specifically those in the 1080-line interlaced (1080I) format that soaks up all of the 6 mhz allotted to each new digital station. They have their eyes on multiplexing, or multicasting, with perhaps five independent transmissions in the 480-line progressive scan (480P) format. It's anticipated that the ABC and Fox networks will both announce a commitment to multiplexing, while CBS and NBC are more committed to high definition. Tom Rogers, president of NBC Cable and executive vice president of NBC, declared at the NATPE conference in New Orleans that HDTV will be the people's choice.

The odd-medium-out at the moment is cable, which has shown no enthusiasm for passing through broadcasters' HDTV transmissions. Indeed, the first digital boxes being deployed by that medium will accept no higher than 480P transmissions, although the next-generation boxes will be able to pass through HDTV signals to digital television sets to decode and display. It's anticipated that the FCC will be asked to step in on this and other digital carriage problems.

HDTV sweeps CES

That was the message at the Consumer Electronics Show as major manufacturers showed their prototype HDTV television sets. Most were large rear-projection units measuring over 50", although some manufacturers also showed HDTV-capable 16:9 flat-panel displays and prototypes of smaller direct-view HDTV sets and DTV converter boxes for use with existing analog units.

High-definition video was on display everywhere, including two live over-the-air broadcasts delivered by CBS station KLAS and PBS station KLVX. An in-house programing feed was also delivered over cable by HDTV production company REBO Group.

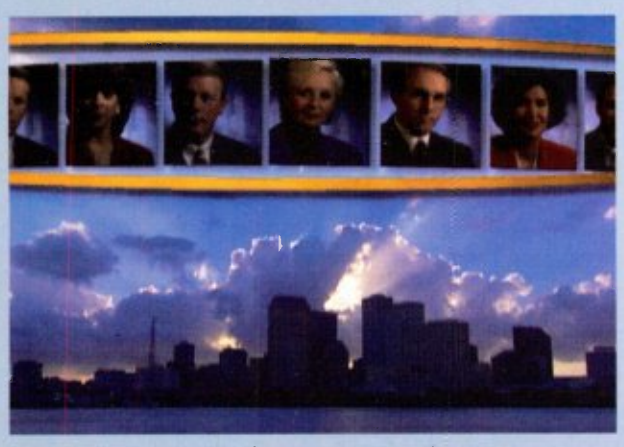
Broadcasters were very much in evi-

(continued on page 12)

WWL's Upgrade Focuses on Non-Linear Editing Equipment

By Rob Ettridge, Quantel

Being the best in your field is one thing, but staying competitive is what separates the best from the rest. A sound business plan, dedicated staff and the right technology are all important ingredients for success.



WWL's 60-second news image spot.

WWL, the CBS affiliate in New Orleans, Louisiana, seems to have the recipe just right.

For the past 20 years, Channel 4 has been considered one of the great broadcasting legacies in America. In the last ratings period ending in July 1997, it ranked as the number one CBS affiliate across all network affiliates nationwide in the 40 metered markets surveyed.

The station has always placed a high priority on station promotion. As a result, the promotion department has won more than a hundred awards throughout the years. Most recently it took home two coveted Promax International Gold Medallions for this past year's award-winning sports and community project promotional spots.

Executives at WWL praise their talented designers, directors, photographers and state-of-the-art editing system for keeping their station on top. As

(continued on page 26)

NEW TECHNOLOGY

Digital Video Recording, Networking

SPACE is a full-bandwidth, CCIR-601, eight or 10 bit digital video recorder that is designed for speed and reliability in storage, recording, and networking applications. The unit handles 525 and 625 formats, film rates and pull down. It can be "strapped," allowing 4:4:4, 4:2:2:4, or up to 8:8:8:8 recording. SPACE also offers shock-mounted drives to optimize disk performance and improve MTBF. This feature also protects the internal connectors from vibration corrosion and provides sound dampening. **Pluto Technologies International, Inc.**, 2511 55th Street, Boulder, CO 80301.

■ **More Information - Circle 101**

Serial Video to Fiberoptic Links

The RF-3004 is a standard 19" sub-rack frame designed to complement the current Matthey 3000 series digital interconnect and distribution system from Matthey Electronics. Applications can be found in any broadcast, post-production or mobile environment where the transport of digital video is required over distances greater than that achieved with standard coax cable. **Television Equipment Associates, Inc.**, P.O. Box 499, South Salem, NY 10590-0499.

■ **More Information - Circle 102**

Transport Stream Generator

Digital Transport Systems' second generation Transport Stream Generator is designed to provide greater system flexibility, PCI bus-based architecture and WindowsNT® functionality. The Transport Stream Generator allows equipment designers and manufactures to perform real-time capture and playback of MPEG-2/DVB Transport Streams for use as a test source. **Digital Transport Systems**, 11545 West Bernardo Court, Ste. 200, San Diego, CA 92127.

■ **More Information - Circle 103**

A D V A N C E D D I G I T A L

PANASONIC INTRODUCES Advanced Digital Television and Video

Not just digital video, advanced digital television and video (ADTV). The basic, video production tools, advanced beyond 525i for both the 1125i and 525p formats. We're developing basic production tools for 1998 and beyond. Welcome to the next generation of digital television. From Panasonic, the company with the most firsts in digital video.

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DVCPRO 50

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A range of advanced studio monitors constitute a complete set of display tools for the production of Advanced Digital Television and Video.

Panasonic 1125i studio cameras and 525p and 525i camcorders are essential members of the visionary ADTV family of products, offering an extensible, scaleable and affordable path to digital television.

VTRs like the AJ-HD2000 and AJ-HD580/HDP500 combination offer state-of-the-art full bandwidth 10-bit digital video in the 1125i image format.

For more information on the latest Panasonic ADTV products, call:
1-800-528-8601 (Upon request enter product code 03)

Panasonic
Broadcast & Digital Systems Company
www.panasonic.com/pbds

More Information Circle 191

Letter from the Editor

Donald V. West
Editor-In-Chief

Broadcasting&Cable's
DigitalTelevision™
Technology For The Digital Age
245 West 17th Street, New York, NY 10011

Dear Television Industry Executive:

Digital television, the medium, is not just another pretty picture tube. It is an electronic miracle that turns bits into bounty.

So, too, with Digital Television, the magazine. That's Broadcasting & Cable's newest contribution to industry awareness and understanding. The first issue is in your hands.

The editors have designed Digital Television to close the gap between question and answer. Its first priority, every month, will be to track the progress being made by all the industries converging on the DTV target: broadcasting, cable, computers and consumer electronics, principal among them. We'll cover the hardware and the software **and** the strategic planning that goes into bringing this new medium into focus.

Broadcasting & Cable has been the publication of record for two-thirds of a century – more than 66 years. It missed the birth of radio by 11 years, but was there for most of the growing pains. It has never missed a medium since, from television through cable through satellites and now through digital. We're old hands at new technologies.

In this and future issues, you will learn about the latest developments in digital technologies, strategies being employed by leading-edge companies and new product introductions. The mission of Digital Television is to keep you on the cutting edge of this rapidly changing environment.

You have been selected to receive Digital Television because of your role in evaluating and implementing this technology that will shape television into the next millenium. **To continue to receive Digital Television, free of charge, just complete the subscription card on the back cover.** There you will also find an additional form to pass along to a colleague.

We hope you enjoy Digital Television. We've designed and organized it to be a valuable tool and an easy read. Inside you'll find a handy reader service card for simple access to new product information. We know you'll find this new magazine an important business tool.

We want ours to be a two-way street. Please let us know what you think of Digital Television – the magazine as well as the medium. Please tell us what you need to know, and how we can serve you best. We're all pioneers this time around.

Sincerely,

Donald V. West
Editor-In-Chief

The new Origin video computing platform. It's about time. It's about money.

ON AIR

Introducing the Origin™ video computing platform from Silicon Graphics. It's time you had everything you wanted, everything you needed and everything your competitors didn't want you to have in one, rack-mountable, digital broadcast platform.

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When you're ready to see what the best system in the industry can do, visit us on the Web. But don't wait too long. Time is money and of the two, we can only make you more of the latter.

SiliconGraphics

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APPLICATION

Canon Lenses Capture Super Bowl XXXII

Canon's Digi-Super 70 camera lenses have been used at many sporting events, and this year it appeared at one of the most watched events of the year: the Super Bowl. Super Bowl Director for NBC, John Gonzalez, praised Canon's lenses and said "It allowed us to get inside the helmet of the players. We were able to show a full range of emotions of the players and coaches."

The Canon Digi-Super 70 camera lens was the main tool for capturing this year's Super Bowl action.

Canon's 70X zoom lens Digi-Super 70 provides one of the industry's longest telephoto and wide angle capabilities. More than 14 Digi-Super lenses were used at this year's Super Bowl, which featured the Denver Broncos and Green Bay Packers.

EQUIPMENT

BBC Chooses Philips Digital Transmission System for Public Television

BBC Project Management Services said that it had ordered a MPEG-2/DVB digital transmission system from **Philips Broadcast Television Systems Company**. The system will be used to feed via satellite the BBC Public Service Channels, which include BBC1, BBC2, and more.

The system is being installed alongside a main compression and multiplexing center located at Television Centre in London that will output a number of channels on to the various transmission media. The main center will also encode and distribute several sustaining feeds via the BBC's ATM system to the three National Regional broadcast centers of Belfast in Northern Ireland, Cardiff in Wales, and Glasgow in Scotland.

At each National Regional center, the London signals will be received and regional content will be inserted to produce the final National Regional Services.

The BBC system uses Philips MPEG-2 video encoder. According to information provided by Philips, the BBC was concerned with encoding quality, especially with regard to transmissions at reduced bandwidth. The system also uses the advanced and flexible TokenMux multiplexing architecture that met the complex multiplexing requirements of the BBC's system.

CERTIFICATION

CEMA Introduces DTV Certification Logo

As the excitement of digital television reverberated throughout the 1998 International Consumer Electronics Show in Las Vegas, NV, the **Consumer Electronics Manufacturers Association** (CEMA) and the **Advanced Television Systems Committee** (ATSC) introduced its new logo for the DTV Receiver Certification Program.

The logo introduction was made as TV manufacturers were displaying commercial HDTV for the first time at a CES. The certification logo will appear on television sets, computers, and other consumer devices to signify to consumers that the product for sale is capable of receiving and displaying all ATSC video formats, according to the ATSC.

Manufacturers must use a CEMA/ATSC-supervised certification program to fully assess their products for conformance to ATSC standards. The ATSC will establish the conformance standards and compliance testing procedure.

DTV™
ATSC CERTIFIED
DIGITAL TELEVISION

"The new DTV certification logo is part of our efforts to minimize consumer confusion in the digital TV marketplace," said Gary Shapiro, president of CEMA. "This logo signifies to consumers that the products carrying this label will work with all the ATSC video formats."

DEMONSTRATION

Zenith Digital Technology Delivers HDTV Signals

Zenith Electronics Corporation took part in a historic transmission of HDTV signals at the International Consumer Electronics Show, held last month in Las Vegas, NV.

Zenith's VSB (vestigal sideband) technology helped CBS affiliate KLAS-TV and PBS member station KLVX-TV transmit programming via high definition signals to the Las Vegas Convention Center, one of the CES venues. Zenith supported the broadcasts with digital equipment and technical consultation, and all television manufacturers that received the live HDTV broadcasts used Zenith VSB technology, according information provided by Zen

"We are especially proud our transmission technology bringing the digital HDTV ex rience to this history-mak CES," noted Zenith Chief Te nical Officer Nick Mehta, spe ing from the show. "The dig television age, which for U consumers will begin this with the first digital receivers and commercial bro casts, has the potential to revo tionize and reinvigorate both consumer electronics and bro casting industries," he added.

As a key member of the D ital HDTV Grand Allia Zenith developed the VSB di tal transmission system adop by the Federal Communicati Commission as part of ATSC DTV broadcast standa

The Grand Alliance-ba digital TV standard was una mously adopted by the FCC 1996, and from then on, push for nation-wide transiti to digital television broadca ing began.

Using the VSB syste broadcasters can assure view of broad HDTV coverage ar little or no interference to exi ing analog broadcasts, a immunity from interference i the digital signal.

Zenith's high-performan modulation technology is te nically significant because allows broadcasters to trans digital video, audio, and d services reliably and with distortion of any kind.

TECHNOLOGY

Philips Semiconductors Announces TriMedia DTV Reference Platforms

Philips Semiconductors TriMedia™ Product Group, a four-year-old Philips Electronics North America subsidiary that specializes in multimedia processor technology, announced last month that it will develop a series of TriMedia DTV Reference Platforms, the first of which is a complete reference design for developing ATSC TV sets, set-top devices, and PCs that support all 18 ATSC formats from standard definition video to wide-angle, high definition video.

"With its standards-based open architecture, the TriMedia DTV platform has the power to handle HDTV video/audio decoding, as well as the flexibility to process advanced interactive services," said Dirk Logie, general manager of the DTV Product Sector for Philips Semiconductors' TriMedia Product Group. "We are demonstrating our commitment to establish TriMedia as an industry standard by partnering with leading TV/set-top box manufacturers and establishing a common framework to support new digital services."

The TriMedia DTV Reference Platform includes a network interface module using the Philips VSB (vestigal side band) chip that provides all channel decoding functions from tuning to transport stream generation. The unit's design also provides hardware to support existing NTSC broadcast signals. The TriMedia processor can support image enhancement algorithms to improve NTSC video quality.

Philips provides a turnkey DTV software application to help manufacturers reduce time to market for products. The TriMedia processor is designed to let developers add custom features or incorporate software modules for applications such as communications and video telephony.

"The DTV market is still evolving throughout the world, so there is a clear need for a programmable solution like the TriMedia DTV reference platform," said Doug Dunn, chairman and CEO of Philips Consumer Electronics.

"We chose to standardize on the TriMedia platform because it gives us the flexibility to design devices that support today's standards, as well as emerging interactive services the industry plans to implement. Philips has been a pioneer in TV technology, and DTV provides us with yet another opportunity to provide exciting new services associated with the TV," Dunn added.

Every step in video production affects the next.

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DIGITAL-S Acquisition

To get the most out of today's digital editing systems, you need to begin with the best raw footage possible. And that means shooting in 4:2:2. With DIGITAL-S, you get 4:2:2 color sampling with perceptually lossless compression. This produces an image that remains free of annoying artifacts that could build up through various steps in post production and digital distribution.

DIGITAL-S also offers superior chroma resolution, producing more well-defined colors, chroma keys and effects. In fact, all high-end systems, including the best non-linear editors, require 4:2:2 to achieve these benefits. The result is performance and quality that can stand up through each phase of digital video production. Shooting in a 4:1:1 DV format compromises your image, and you can't bring back the quality once it's lost.

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4:2:2

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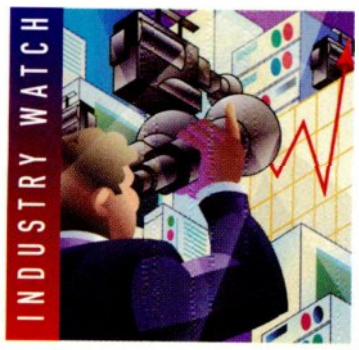

COLLABORATION

Mitsubishi and Lucent Deliver Complete Digital Television Chip Set

Mitsubishi Electric America and **Lucent Technologies** announced at last month's Consumer Electronics Show that the companies had developed a chip set that will allow digital televisions, set-top boxes, personal computers and other digital appliances to receive digital video and CD-quality audio signals from terrestrial broadcast stations.

The announcement came during a CES where the main attraction was HDTV sets and their ability to receive and display ATSC format-compatible signals. The end-to-end, receiver-to-display digital television chip set meets the North American ATSC digital television standard for both high definition TV and standard definition DTV applications.

The chip set consists of five application-specific integrated circuits: a single-chip DTV terrestrial demodulator, an MPEG-2 main profile at high level video decoder, a Dolby® Digital AC-3, 5.1 channel audio decoder, and a DTV display processor.

The demodulator and demultiplexer chips were developed by Lucent Technologies' Microelectronics Group and Bell Labs, the R&D arm of Lucent. The video decoder was developed by Mitsubishi Electric Corporation and Bell Labs, and the audio decoder and the display processor were developed by Mitsubishi.

"This chip set offers the most complete solution available today for high definition television," said Tommy Poon, senior vice president for strategic planning in Mitsubishi Electric America's DBBA division. "Lucent and Mitsubishi not only offer the most robust receiver chip set, but Mitsubishi also provides the encoding technology for HDTV broadcasting and also industry-leading big screen technology with our HD-1080 series receivers that are slated to ship at the end of 1998."

The chip set interfaces with a variety of RF tuner front-ends to receive incoming DTV signals from terrestrial broadcast stations and cable systems. The chip set receives and decodes all 18 digital TV formats defined by the ATSC for HDTV and multichannel SDTV, and displays them in both interlaced and progressive formats, allowing greater flexibility in the reception of DTV broadcasts. Additionally, the audio decoder is included as part of the chip set making it the most integrated DTV chip set available.

"We leveraged the research and development experience from Lucent's Bell Labs and Mitsubishi's wide screen TV expertise to be able to offer this complete first-generation chip set for the emerging digital television market," said Ed Roberts, general manager of Lucent's broadband network communication ICs group.

COMMITMENT

EchoStar Launches HDTV Transmission Plan

Following on the heels of **DirecTV**'s pledge to broadcast two channels of high definition television programming, **EchoStar** announced that it is already set to broadcast HDTV, and do it better than DirectTV's DSS (Digital Satellite Systems).

At last month's CES, Eddy Hartenstein held a briefing and demonstration of direct-to-home satellite feed of a high-definition TV signal. Hartenstein said that his DSS service would provide homes with two dedicated HDTV channels beginning this year, giving high-quality programming to almost three million DSS subscribers in the continental United States, Canada, and Mexico.

EchoStar, the only U.S. provider that uses state-of-the-art fully MPEG-2/DVB compliant satellite television systems, is partnering with several companies to increase its ability to provide digital programming and products. **JVC** is one of those partners, helping to develop integrated HDTV sets and JVC-designed digital VCRs that can record at 14 megabits. EchoStar said as soon as the public has HDTV sets in their homes, the company will be ready to broadcast.

To support sales and integration of HDTV, EchoStar also announced that it has partnered with **Philips Consumer Electronics Company**, which will be marketing and selling the DISH Network satellite television system through their national retail network. Philips will team with EchoStar to develop an array of convergent products with advanced digital technology.

"EchoStar is both pleased and excited to announce this alliance with one of the foremost consumer electronics manufacturers known for its high quality and advanced digital technology," said Mark Jackson, senior vice president or EchoStar Communication Cooperation. "Teaming with Philips allows the DISH Network to give its customers products that will be some the most advanced yet user-friendly available."

Harry Elias, JVC executive vice president and COO, also said that the partnership with EchoStar is a step in the right direction. He said he "feels very confident in the partnership between EchoStar and ourselves. Just as we view maintaining relationships and communication with our dealers as being very important, we feel it is important with EchoStar." Elias said the partnership is off to good start, as retail accounts for the JVC/DISH Network are being opened at promising rates.

PRODUCTION

Samsung Leaps Into Digital Game with HDTV Set

Demonstrating its commitment to digital television technology, **Samsung Electronics America, Inc.** unveiled the company's first high-definition television set at the International Consumer Electronics Show last month. Samsung's SVP-555JHD HDTV is a 55-inch rear projection system that displays all signals in the highest resolution of 1080 lines interlaced using an advanced projection engine developed by Samsung.

"We are proud and excited to introduce an HDTV product based on Samsung's advanced technology," said Mark Knox, senior marketing manager for the Digital Products Group of Samsung. "These key research and development efforts clearly demonstrate Samsung's expertise in the areas of digital broadcast, MPEG-2 decoding and digital interpolation."

The Samsung HDTV includes a complete Dolby Digital® Decoding system used for HDTV broadcasts and DVD. This system will also decode Dolby Pro-Logic® signals from NTSC stations or other video sources.

The SVP-555JHD incorporates five key components designed by Samsung's Advanced Visual Information Research and Development Center to comply with all 18 ATSC formats, as well as tr tional NTSC signals in a sir set. The devices include an i grated ATSC demodulator decoder, a matching digital t vision broadcast signal equali to eliminate multipath errors advanced MPEG-2 vi decoder compatible with all ATSC formats, and a unive format converter to translate DTV or NTSC signal to eit 1080 interlace, 720 progres or 480 progressive format.

DEVELOPMENT

Scientific-Atlan and NCI Collaborate to Develop Digital Applications

Scientific-Atlanta, Inc. **Network Computer, I** (NCI) announced that the companies are working to p vide enhanced and interac television applications for c television subscribers throu Scientific-Atlanta's Explo 2000 digital set-top terminals

DTV Navigator™ is NCI's l est product for digital appli tions. It is an open softw platform for Enhanced T applications, which can inclu Web browsing, electronic m television guides, personaliz news tickers, interactive sho ping and home banking.

"Working with NCI is a step in our efforts to help de op a market for two-way, int active TV technologies throu new services and application said Michael Harner, Scientifi Atlanta's vice president a general manager for digi video systems. "We're delight that NCI chose the Explor 2000 set-top as their first digit platform for delivering co pelling new services for cab subscribers."

Wei Yen, NCI president, al lauded the partnership that expected to yield promisin results. "NCI's relationship wi Scientific-Atlanta demonstrate our commitment to provide standards-based software pla form on an industry-leading se top box," he said. "Our com bined software and hardwar solution will produce the cabl industry's first digital set-to with Enhanced TV capabilities."

DTV Navigator also provide an application developmen platform for content authors an network operators to build thei own applications. Both th Explorer set-top and the DTV Navigator will support pro grams written in HTML an JavaScript™. NCI anticipate that DTV Navigator will b available on Explorer 2000 set tops early this year.

DIGITAL TELEVISION SYSTEMS

Harris gratefully acknowledges the contributions of their Major League Baseball Partners:

Allbritton Communications (WJLA-TV)
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Mitsubishi Electronics America
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WETA-TV
WHD-TV
Zenith Electronics Corporation

On September 16, 1997, Harris set a baseball record that will stand forever.

Once again, Harris belts one over the wall while our competitors can't get to first base. In a dramatic display of our end-to-end digital systems expertise, over 300 delighted spectators at the National Press Club in Washington, D.C. cheered history's first live high-definition television broadcast of a Major League Baseball game.

Exciting as it was, this milestone was just the latest proof of our unique DTV capabilities.

Since 1990, when the ATTC used our RF test bed to establish U.S. standards for HDTV, Harris has proven time and again to be the most reliable, safe, efficient and profitable choice for the transition to DTV, anywhere in the world.

In fact, six of the first seven U.S. DTV stations use Harris digital transmitters, including WRAL, the world's first commercial HDTV station. And recently, a Harris transmitter broadcast a digital television signal from Beijing to the Great Wall of China.

Harris does far more than provide every step in your digital path. Our experts will assist you in all aspects critical to your success, including proposal development and budgeting, DTV RF system analysis, building design and architecture, custom fabrication, system design and optimization, program and facilities management, installation, commissioning and documentation, training, warranty protection and unparalleled after-sale support. *Only we do all this, and do it in-house.*

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ATSC Exciter – VHF and UHF Digital Television Transmitters – Antenna Systems

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Product Review

Ocelot Routing Switchers

The Ocelot family of routing switchers adapts to dynamic routing environments. The product line is built on basic 8x8 and 16x16 matrix sizes, with a series of 8x8 and 16x16 modules designed to allow flexible customization to specific switching environments. Modules are housed in a compact 1 rack unit chassis. An X/Y control panel is built in to the front panel. Computer control is possible through the RS-232/RS-422 serial interface. The Ocelot anticipates users future needs by featuring the ability to control up to seven routers from a single RS-422 external port.

PESA Switching Systems, Inc., 35 Pine Lawn Rd., Ste. 99E, Melville, NY 11747.

■ **More Information - Write In 130**

Video DA Cards

The VDA 3006 is a high performance differential input and eight output distribution amplifier. This DA is ideally suited for the distribution of high level Digital H and V Sync signals from graphic workstations. In addition, the VDA 3006 can distribute V Sync signals from graphic workstations. It can also distribute analog or digital data telemetry signals to multiple destinations with complete transparency. The 3006 is capable of equalization for up to 200 ft. of Belden 8281 coaxial cable.

PESA Switching Systems, Inc., 35 Pinelawn Rd., Ste. 99E, Melville, NY 11747.

■ **More Information - Write In 131**

Subscriber Management System

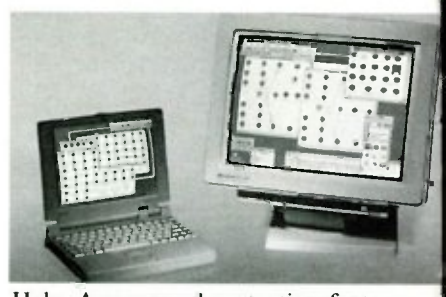
Provider is the Subscriber Management System (SMS) for the broadcasting industry. It is a single package that delivers customer service, sales and marketing facilities, field operations, technical operations and helps with the overall management of a broadcast business. Provider is one of the first Subscriber Management Systems that can offer optional, multilingual and multicurrency capability.

NDS America, Inc., 3501 Jamboree Rd., Ste. 200, Newport Beach, CA 92660.

■ **More Information - Write In 132**

Network Control System

The MediaView System Controller SC20 uses HP OpenView™ SNMP management software with DiviCom's applications to configure and monitor any collection of DiviCom networked components. The SC20 offers an easy-to-use GUI with graphical interconnection status indications, and context-sensitive



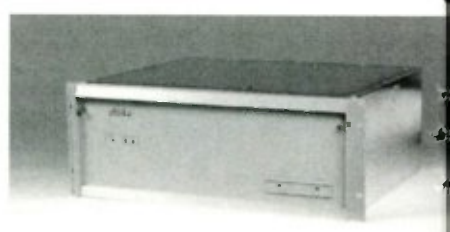
Help. A password protection feature provides controlled access to system parameters. The MediaView System can remotely execute diagnostics on any component. It can also generate MPEG-2 Program Specific Information (PSI) and provide them to a component for insertion into the outgoing MPEG-2 transport stream.

DiviCom Inc., 1708 McCarthy Blvd., Milpitas, CA 95035.

■ **More Information - Write In 133**

Automated Information System

The Drake Automation System (D-AIS) is a station automation database linking Drake Multi-Channel Automation Sys-



tems to broadcast equipment database and library computer systems. When a request for information is sent, either by an operator generated search or as a request from the automation system, D-AIS uses information held in its database to make an intelligent estimation as to where the material is located. Before returning the location information, the device holding material is interrogated again to check for correct information. D-AIS retains an interconnection map for Fibre Channel, SDI and Video, as well as a list of preferences for transfer in the event of multiple copies of the same material. The D-AIS interfaces with several applications, including Quantel Clipbox™ video disk recorder, Tektronix Pro*file*™ video disk recorder, and Sony LMS running BZC1100 software, among others.

Drake Automation, Inc., 1793 Macopin Rd., West Milford, NJ 07480.

■ **More Information - Write In 134**

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More Information Circle 185

1998: DTV'S YEAR

Continued from page 1

Thomson's 61-inch rear projection HDTV set has a target price of $7000.

dence at the show, which CBS's Bob Ross attributed to the television industry's fast DTV ramp-up since the FCC approved the ATSC standard in December 1996.

"We've gone from 0 to 100 mph in a year," said Ross, VP of engineering and operations for CBS Television Stations. "We've got booths receiving real off-air signals, on real consumer-based hardware that really works from different manufacturers with different chipsets."

While the estimated prices for the first large-screen HDTV sets ranged from $6,000 to over $10,000, both set manufacturers and network executives were optimistic about set sales. At a CEMA-sponsored DTV panel, Circuit City President and CEO Allan McCollough predicted that one million HDTV sets would be sold by the end of 1999. Thomson Consumer Electronics President and COO Jim Meyer projected the year 2000, as did CBS VP of technology Joe Flaherty, and even USA Networks President Kay Koplovitz expected the millionth HDTV set to be sold by 2001, despite the unsettled position of cable operators on HDTV.

"HDTV will help us sell TVs," said Circuit City's McCollough.

"Everyone wants one," said Philips' Gus Spencer of dealers' reactions to the HDTV rear-projection model in the Philips booth. One reason dealers may want HDTV sets is simply to draw consumers into stores, giving them a better chance of selling them a TV, even if it's only an analog one.

Broadcasters also pledged to help promote DTV sets when they hit the shelves in fall 1998. LIN Television president Gary Chapman said that LIN's Dallas station will begin producing Texas Rangers baseball games in HDTV, and Chapman wants to work with set retailers on cross-promoting the benefits of HDTV to consumers, possibly going through CEMA to develop a joint marketing plan with set manufacturers.

Chapman also sent a message to cable about digital TV. "Cable's talking about having a 20% penetration of digital in 3 to 5 years," said Chapman, who thinks competition among broadcasters will accelerate their DTV rollout. "Well, we're going to have a 100% penetration with digital by that time, and 20% is not going to be a good position to be in."

DIRECTV steps up to HDTV plate

DIRECTV president Eddy Hartenstein made a big splash at CES by announcing that the DBS service will begin beaming down HDTV signals to subscribers in fall 1998.

As the guest star at Thomson Consumer Electronics' press conference, Harstenstein presided over a live broadcast of HDTV programing from DIRECTV's uplink facility in Castle Rock, Colo. The broadcast was received by an 18-inch dish at the Riviera Hotel in Las Vegas and displayed on the 61-inch rear projection HDTV set that Thomson plans to introduce at an entry-level price of some $7,000.

"This shows we can do high definition to all of the households in America," said Hartenstein. "We'll have a national delivery platform for digital sets, and we'll be positioned to be the first national broadcasting service with high definition."

For retailers, the DIRECTV announcement assures them of a 24-hour a day, seven-day-a-week programing source to demonstrate HDTV sets on their showroom floors.

Thomson is obviously interested in tying DBS service into its HDTV plans, too, as executive vp/COO Jim Meyer announced that all of its digital television sets would include built-in DSS functionality. Having a DSS receiver built into the sets means that digital TV buyers will simply have to add an 18-inch DSS dish to be ready to receive DIRECTV and USSB programing.

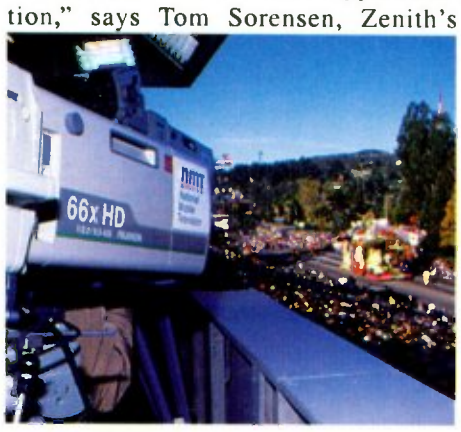
Here comes convergence

Zenith Electronics and Intel Corporation are working together to develop an 8-VSB demodulator card that will allow personal computers to receive digital television broadcasts.

Intel has integrated the 8-VSB technology into a prototype PCI board design, with Zenith providing its expertise in digital demodulation and 8-VSB technology and Intel doing software-based MPEG-2 decoding. Zenith showed the 8-VSB card in action at the Consumer Electronics Show in Las Vegas, using an Intel-based PC to receive HDTV signals from Las Vegas PBS station KLVX and display them in 480p form on the computer's monitor. An HDTV output was also fed to a Zenith HDTV projector for large-screen, 1080i display.

But Zenith, which also introduced a large-screen HDTV projection set and HDTV set-top at CES, thinks its development with Intel is targeted more to the datacasting market.

"It's more of a PC/TV type solution," says Tom Sorensen, Zenith's director of new technology and strategic business development, who thinks the PC product will be a good receiver for the data broadcasting services that broadcasters want to send as part of their DTV signals.



KTLA used a Sony HDC-700 studio camera with a 66X Fujinon lens

KTLA camera operator Randy Baer shooting high-definition video at the Tournament of Roses Parade.

"A consumer can use rabbit ears to keep a PC up to date," says Sorensen. He says that PC buyers can expect to see some product availability in the fourth quarter of this year.

While Sorensen says pricing for the board would vary depending on the amount of video processing involved, he imagined a "minimal scenario" would add only a couple of hundred dollars to the cost of a PC.

Harris, Lucent unveil DTV encoder

Harris Broadcast and Lucent Technologies have introduced an ATSC-compliant digital television encoder that they will begin delivering this March.

The modular product, which will be marketed by Harris as the "Harris FlexiCoder," will be capable of both SDTV and HDTV encoding in both interlace and progressive scan formats. It can deliver multichannel SDTV encoding now, which Harris and Lucent demonstrated in New York last week, and HDTV encoding by October. A base 480I encoder starts at around $90,000, while a full-blown unit capable of encoding 480I, 480P, 720P and 1080I will sell for around $450,000.

Initial FlexiCoder customers include Cox station and ABC affiliate WSB-TV in Atlanta and three A.H. Belo stations: ABC affiliate WFAA-TV in Dallas; CBS affiliate KHOU-TV in Houston; and NBC affiliate KING-TV in Seattle. All of the stations will get SDTV models in March; the three Belos have ordered HDTV capability as well while WSB-TV is sticking with a 480I SDTV unit for now.

"We want to come up with converters that match what the network's formats are going to be," says John Swanson, VP of engineering for Cox Broadcasting. "The last I heard they were leaning toward 720p. That's what I've heard, but we're waiting to make a determination until they tell us something."

Rose Bowl in High Def

KTLA Los Angeles, Tribune-owned and WB-affiliated, used the Tournament of Roses Parade on Jan. 1 to test HDTV production.

The station shot slightly over two hours of Rose Bowl parade footage with borrowed HDTV equipment including a Sony HDC-700 studio camera, Fujinon 66X lens and Sony HDW-500 HDCAM 1/2-inch tape deck. Sony also lent KTLA a 38-inch HDTV monitor, which the station set up in a nearby Elks Lodge to demonstrate the HDTV footage to media and parade dignitaries.

KTLA positioned the HDTV camera up in the broadcast booth, side-by-side with an NTSC camera, so cameraman Randy Baer could shoot from a standard position along the parade route, says KTLA director of operations and engineering Ed Kennedy.

Since the HDC-700 also has a downconverter that produces a simultaneous 525-line, 4:3 component digital output, KTLA switched to the SDTV output at one point during the broadcast for its live NTSC feed. Concurrently, on-air hosts Stephanie Edwards and Bob Eubanks informed viewers that the picture they were watching was being shot with an HDTV camera.

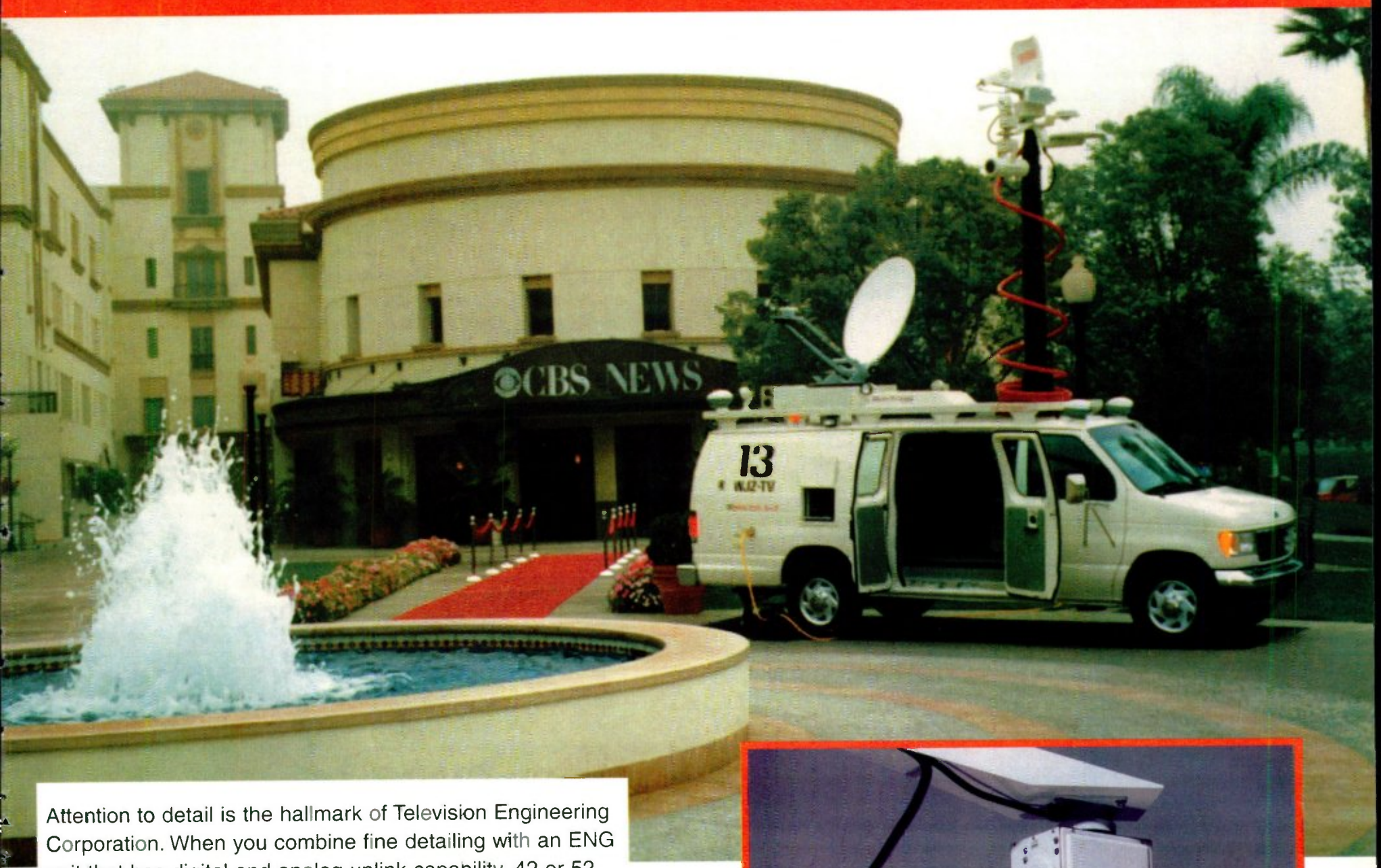
"That allowed us to get an HD-created signal over the NTSC airwaves," says Kennedy. "The picture on the NTSC monitors was noticeably crisper than the one from our standard NTSC camera, which proves the downconversion inside the camera is of sterling quality."

All the equipment worked flawlessly, says Kennedy, resulting in a very good tape of HDTV footage. It helped, he adds, that the Rose Bowl parade "lends itself to the wide aspect ratio" and thus didn't require any different camera positioning. KTLA plans to use the parade footage for promotional and testing purposes when it begins its DTV transmissions later this year—the Tribune station is within the "18-month group" of stations that have pledged to begin DTV broadcasts by November. Sony also plans to use the footage for promotional purposes.

"The shooting aspect was easy," says Kennedy. "Our main limitations were the cable runs to the VTR, and to the monitor, which we wouldn't have to do if it it wasn't a demo...The nature of the show, with long floats and people coming by, is not as challenging as a ball game or a news event, where things are happening that are not in control."

In that vein, KTLA wants to try shooting a Los Angeles Dodgers baseball game in HDTV. "We want to do at least one game this spring," says Kennedy. "It's an availabilty of equipment issue, since there are only a few trucks out there. But we want to at least get one game under our belts, so we know what to look forward to."

Quality Shows



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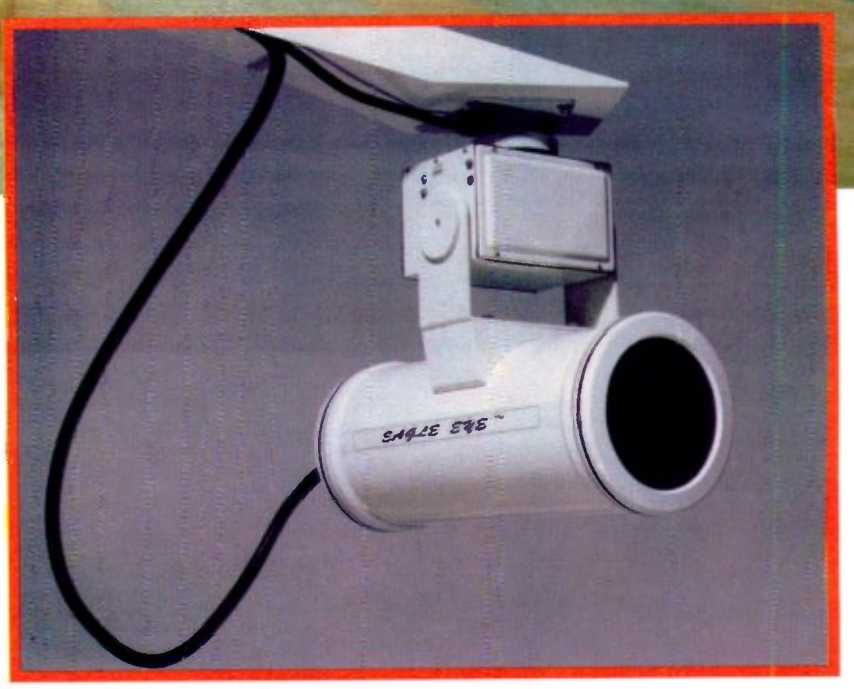

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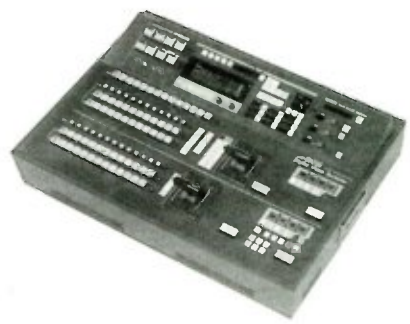
Product Review

Digital Video Switcher

Panasonic has introduced the 1125I HD digital video switcher for post/editing/production and OB-VAN use. It accepts multiple input standards, HD-SDI, parallel or analog, and features high picture quality using 10 bit+74.25 MHz sampling. the 1125I HD also features 2M/E structure with drop shadow and mask function assigns able option high performance back color generator. Users are given scene and preset memory function along with serial control interface and simplified layout and operation.

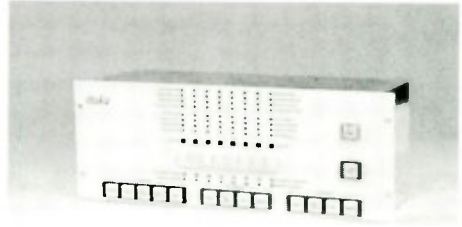


Panasonic Broadcast and Digital Systems Company, One Panasonic Way, Secaucus, NJ 07094.

■ **More Information - Write In 135**

Automated Material Acquisition System

The Drake Automated Material Acquisition System (D-AMA) is a timed, automated recording and routing system which also controls and manages satellite receivers and satellite dish positioning. The system architecture is similar to other member of the Drake Multi-Channel Automation System (D-MAS) family of fault resilient mirrored controllers managing multiple record schedules simultaneously and in real-time. The system runs on two automation controllers, a main and a reserve, linked by Ethernet and RS422 running fully mirrored schedules. Each controller can be supplied with a 21-inch monitor and keyboard for viewing, editing, and preparing schedules. The D-AMA can control satellite receivers and antennae which are designed to work in conjunction with automatic switching of the input matrix to allow maximum flexibility in recording.



Drake Automation, Inc., 1793 Macopin Rd., West Milford, NJ 07480.

■ **More Information - Write In 136**

Origin2000™ and Onyx2™ Digital Media Solutions

Silicon Graphics offers digital media s lutions through Origin2000, a high-pe formance scalable server, and Onyx2 visualization supercomputer. Among many capabilities, these units can be us for input, distribution, or processing various digital media types. Standard each Onyx2 system is a real time graphi to analog video output, eight-channel o tical ADAT® , and stereo AES/EBU di ital. Onyx2 and Origin 2000 allows use to scale audio, video and compression c pabilities to match their requiremen without the constraints of bus-based s tems. The Digital Video Option (DIVO gives the units their scalable capabilitie The DIVO supports simultaneous inp and output of eight- or ten-bit single dual link digital video in either SMPT 259M or SMPTE 272M formats.

Silicon Graphics, Inc., 2011 N. Shor line Blvd., Mountain View, CA 94043.

■ **More Information - Write In 137**

Downstream Keyer/Mixer

Microvideo's Keyer is a stand-alone dig ital keyer that allows production engi neers to add captions and other graphic to a background picture. The Keyer ca also operate as a two-channel mixer th can be used for fades and cuts betwee two Serial Digital Video Sources. Th

unit has front-panel controls that allo access to the key processing, mixing an fading options. And an RS232 or RS42 interface allows it to be controlled by th Microvideo Remote Panel and T-Ba Fader options. The Keyer can handle se rial digital video at 270 Mb/s, and off auto retiming of inputs.

Microvideo USA, Inc., 333 Down Road, Bethany, CT 06524.

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Comark Digital Services: Tel: 1-703-838-5655 Fax: 1-703-838-1687

More Infromation Circle 182

Product Review

Triax Patching System

Trompeter' Triax Patching System is designed to meet the broadcast requirements of cost effectively patching triax camera cable with connections. Trompeter's system allows patching directly from the camera through the panels with distribution to any location. The system is made for cable management from the cameras

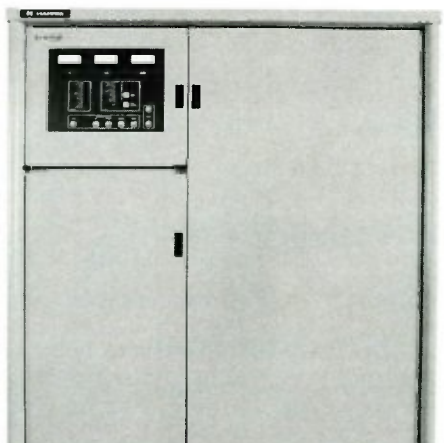
directly to monitors, recorders, or displays, allowing complete routing throug the system. The design accommodates coax jacks as well as Triax jacks allowing for mixed panels or multiple panels with both coax and Triax. Available accessories include Looping Plugs to obtain a "normal through" signal from a standard source to standard destination.

Trompeter Electronics, Inc., 31186 La Baya Dr., Westlake Village, CA 91362.

■ **More Information - Write In 139**

Digital Terrestrial Transmitters

The Harris SigmaCD system provides full functionality for all terrestrial digital broadcast needs. The SigmaCD transmitter with only one power amplifier is



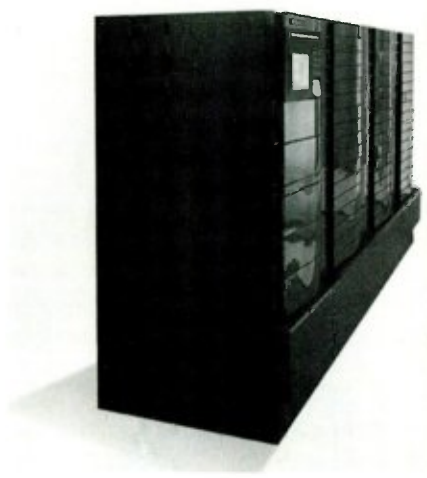
contained in a single cabinet. A SigmaCD transmitter with multiple PAs has a separate control cabinet as well as a cabinet for each PA. The control cabinet on multiple PA models houses system control logic, remote I/O board, system monitoring, power meters and single or dual exciters. The Automatic Level Control (ALC) circuitry and high-speed thyratron protection circuitry extend power amplifier life.

Harris Corporation, Broadcast Division, 3200 Wismann Lane, P.O. Box 4290, Quincy, IL 62305-4290.

■ **More Information - Write In 140**

Solid State UHF Transmitters

Harris introduces the DiamondCD family of solid state UHF television transmitters specifically designed for digital television. DiamondCD transmitters combine leadership solid state technology with the industry-standard 8-VSB excite



The result is a level of reliability and performance that will give users the power to fully exploit the potential of digital TV. DiamondCD transmitters are designed for straightforward operation and maintenance. Simple pushbuttons and corresponding LEDS are provided for ON, OFF. LOCAL and REMOTE CONTROL.

Harris Corporation, Broadcast Division, 3200 Wismann Lane, P.O. Box 4290, Quincy, IL 62305-4290.

■ **More Information - Write In 141**

MPEG-2 Encoding Solution

The MediaView MV5 is DiviCom's

MPEG-2/DVB encoder, designed for cost-effectiveness and real-time functionality. The MV5 is geared toward corporate video applications or specific broadcast applications where full resolution is not required. With much of its technology borrowed from the MediaView MV10, the MV5 accepts either analog composite or serial digital component video, either analog or digital audio, and data via Ethernet or RS-422/232 and compresses it all together into an MPEG-2 transport stream. The small footprint of the MV5 allows flexible installation into areas where there is limited room for equipment. All parameters of the MV5 can be programmed using the front keypad and LCD, eliminating the need for an external computer.

DiviCom Inc., 1708 McCarthy Blvd., Milpitas, CA 95035.

■ **More Information - Write In 142**

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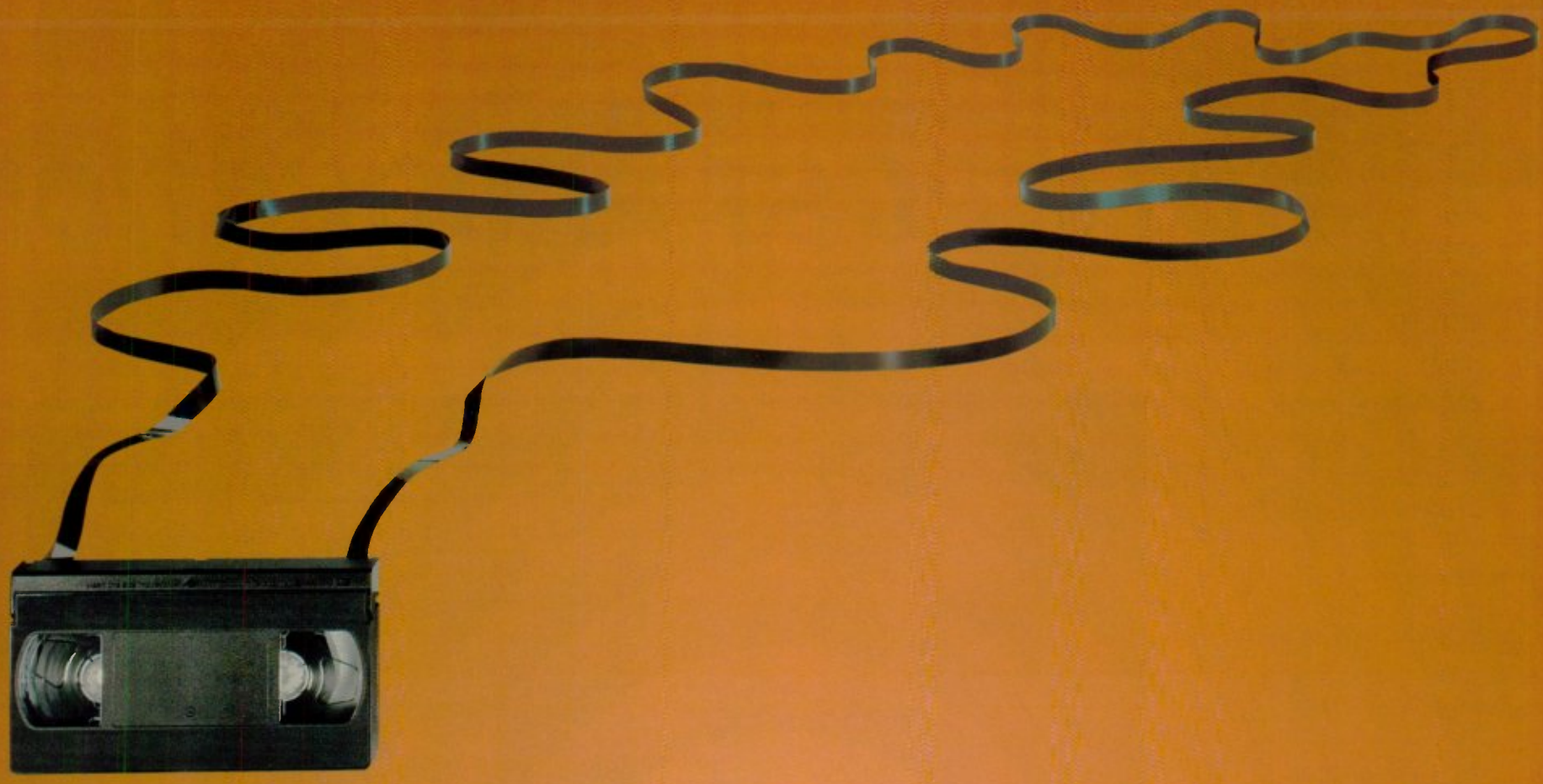

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HDTV POST PRODUCTION

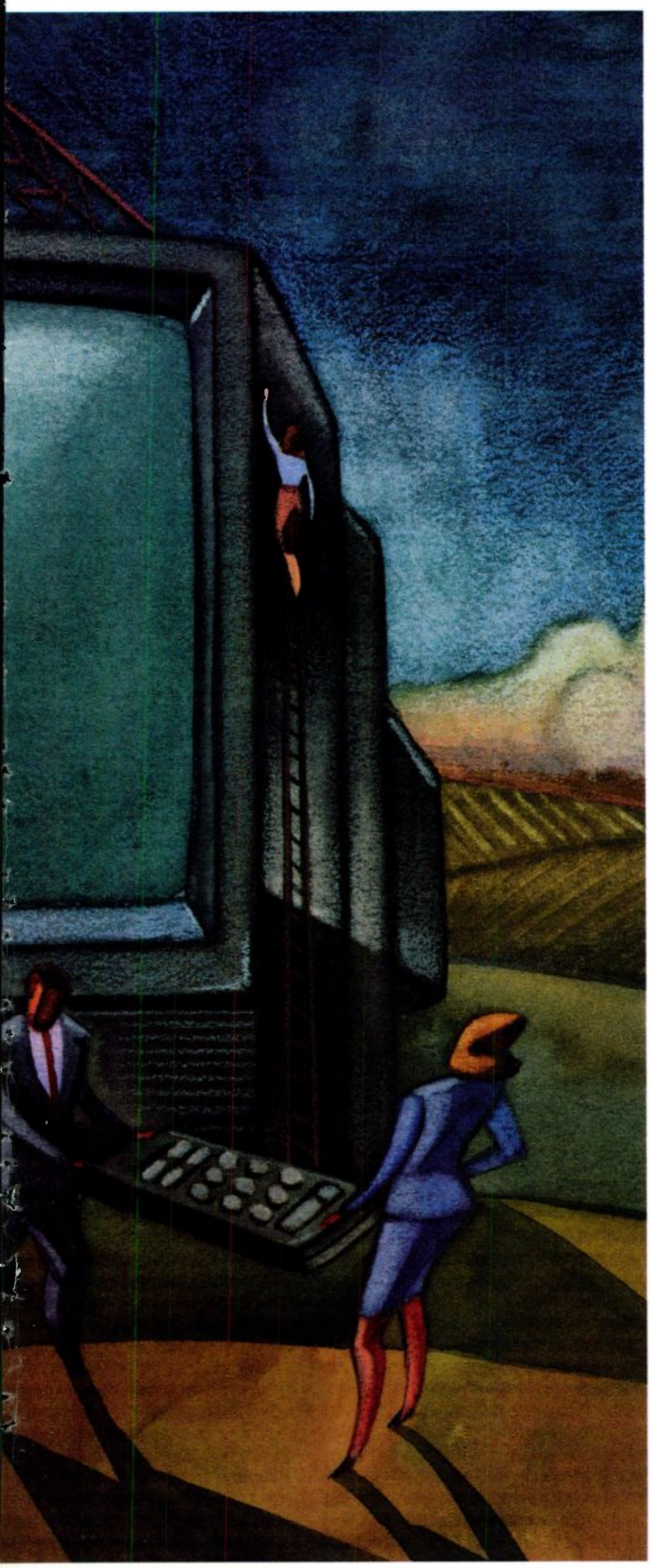
By John Spencer

With computers providing total editing solutions, who would go back to a linear single-format, application system ever again?

With the finalization of High Definition Television (HDTV) standards, one of the immediate tasks for broadcasters, production companies, and media conglomerates around the world is to prepare content for future high definition distribution later this decade. This is creating the need for facilities to have production tools that are able to work interactively with HDTV formats in addition to SMPTE 259M and CCIR-601. This article documents the current abilities of open industry-standard graphics workstations and servers to manipulate images in the proposed HDTV resolutions for editing and visual effects. It also quantifies the size and bandwidth requirements of HD throughout the computer system, the HD input and output options to workstations, and the ability of computer networks and servers to act as the high-definition distribution system in a production facility. The goal is to demonstrate that computer-based production solutions promise to be the most economical and flexible path to offering HDTV services, and are immediately productive assets for standard-definition and film projects.

The landscape of digital television in the United States, as mandated by the Federal Communication Commission (FCC), is defined by the Advanced Television Standards Committee (ATSC) standard. It specifies eighteen different digital formats that range from the resolution of today's NTSC SMPTE 259M to high-definition formats that deliver a "theater" quality experience. The four major United States broadcasters — ABC, CBS, Fox, and NBC — have publicly stated that they are committed to broadcasting high-definition programming,

Solutions for Today and Tomorrow



and several will start in November 1998.

HDTV formats are up to six times larger in size than standard definition video. To input and output (I/O) high definition video today, there are several solutions including digital disk recorders, RAM recorders, HDTV telecines, and computer graphics output. These solutions can provide adequate I/O solutions for HD post production until native real-time HDTV I/O solutions are first available in the near future.

New switch-based computer architectures, such as Silicon Graphics S2MP, have the external and internal bandwidth to meet the requirements of HD editing and effects applications today. Traditional computer system architectures that rely on a central bus will not have the performance to deal with uncompressed high definition video at real-time rates.

High-definition on-line creative editing suites will employ two basic workflow models: 1) a system where the editor works directly with the uncompressed video; and 2) a proxy editing station where the editor creates an edit decision list for a full-resolution conform server. Both workflows offer advantages such as uncompressed image quality and real-time non-linear access to video. These suites can be used for editing standard-definition and multiple HD formats as well as for SD video, HD, and film effects. Open computer-based edit and effects suites also provide a facility with solutions that limit the amount of capital investment required in fixed format HD video equipment that may become obsolete as different or new high definition formats gain favor over the next few years. Discreet Logic, Jaleo, and Philips all have HD editing systems under development for the Silicon Graphics platform.

There are many HDTV effects systems available that have been production-tested at even higher resolutions than HD for feature film effects. Finally, high performance computer networks have the performance to provide a cost-effective alternative to HD switching routers.

Advanced Television Standards Committee Digital Formats

Before discussing high-definition television post production, a thorough understanding of the formats defined by the United States Federal Communication Commission (FCC) Advanced Television Standards Committee (ATSC) is helpful. In their final ruling, the ATSC set 18 different standards that U.S. broadcasters could use to comply with digital television transition requirements. The HDTV formats are up to six times the data size of standard-definition (486H x 720W) video. The size of the uncompressed image data streams for the high resolution formats (720 x 1280 and 1080 x 1920) defined by the ATSC standard in YUV color space range from 40 Mb/s to 186 Mb/s and in RGB color space range from 66 Mb/s to 248 Mb/s. (See Table 1 on page 22).

High Definition Television

High definition television has arrived with data rates up to six times larger than SMPTE 259M. And the question this raises to manufacturers and broadcasters is, How will computers manage this added lading? Post production applications from vendors such as Discreet Logic have shown real-time (any frame, at any time) access to multiple streams of CCIR-601 uncompressed video. At NAB`97, personal computers showed high-quality non-linear editing systems using lossless compression. While this demonstrates that the system throughput of computer input and output buses, operating software, and applications are capable of working with high-quality standard-definition video. HD formats create issues of a different magnitude. There are two sets of issues when dealing with HDTV. The first set of issues is how to interface the computer with high definition video equipment. The second set of issues is how to move and manipulate the video stream once it is in the computer system and network.

The recent adoption of parallel and serial digital interfaces for 1080 x 1920 30Hz interlaced high definition video gives the computer industry the specifications to build native video input and output boards. These standards and the others for high definition video (see Table 2 on page 22) define the analog, parallel digital and serial digital interfaces.

Within a reasonable time period, most likely by the end of 1998, the first native HD video cards will appear in high performance computing systems like Silicon Graphics workstations and servers. Standard computers systems are unlikely to have native uncompressed high definition boards for two to three years or more.

Until native HD video cards are available, interim input and output solutions are needed. These interim I/O solutions are going to be the next generation of the tools that were built for solving this basic problem when computer animation and effects for video became popular: digital disk recorders, RAM or "frame" recorders, and converted computer graphics output. The new additional input devices are HD telecines that have direct computer connections like the Philips Spirit Datacine and the Kodak Cineon Telescanner. Cintel and Sony have also announced HD telecines but have not detailed plans for a computer data output as of yet.

Some high-end computer workstations can output all of the high resolution ATSC image formats, including the 1080 x 1920 interlaced at 8-bits, in real-time. Computer graphics subsystems output RGB analog video which needs to be converted to YUV color-space before it can be recorded to the Panasonic HD-D5 and the Sony HWD-500 HD VTR's or routed through HD dig-

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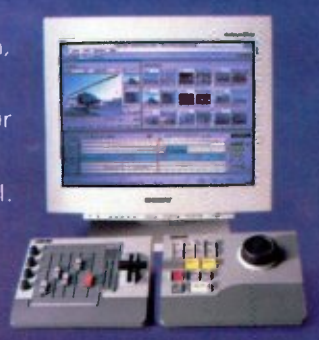


Comprehensive array of real-time effects

Multi-channel audio mixing

Server-based or stand-alone operation

SONY

More Information Circle 198

Table 1. How Big is High-Definition Video?

Format				Stream Size
1080 H x 1920 W	YUV	8-bit	422	124 Mb/s
30 Fr/sec Interlaced	YUV	10-bit	422	186 Mb/s
	RGB	8-bit	444	186 Mb/s
	RGB	10-bit	444	248 Mb/s
720 H x 1280 W	YUV	8-bit	422	110 Mb/s
60 Fr/sec Progressive	RGB	8-bit	444	165 Mb/s
486 H x 720 W	YUV	8-bit	444	165 Mb/s
30 Fr/sec Interlaced	RGB	8-bit	444	31 Mb/s

Table 2. SMPTE HDTV I/O Standards

Interface Standard	Formats Supported	Analog or Digital
SMPTE 240M	1035i	analog
SMPTE 260M	1035i	digital
SMPTE 274M	1080i	digital
SMPTE 292M	1080i	digital
SMPTE 296M	720p	digital

Table 3. PCI and SGI Computer Input and Output Buses

Bus	Bits	Clock Speed MHz	Peak Bandwidth Mb/s	Theoretical Peak Bandwidth Mb/s	Availability
PCI-32	32	33	1,056	132	Today
PCI-64	64	33	2,136	267	Today
PCI-64	64	66	4,272	534	4Q 97
SGI GIO	64	33	2,128	266	Today
SGI HIO	64	50	2,560	360	Today
SGI XIO	16	400	12,800	1600	Today

Table 4. Computer Input and Output Network, Disk, and Peripheral Interfaces

Interface	Used for Disk Interface	Used for Network Interface	Peak Bandwidt (Mbits / sec)	MegaBytes per second Mb/s	% of Real-Time for 1080I 60 Hz YUV 10 Bit 186 Mb/s	Cabling	Available
GSN / Super HiPPi	Future	Yes	6,400	800.00	430%	Fibre	2H 1998
Gigabit Ethernet	No	Yes	1,000	125.00	67%	Fibre	Fall 1997
Serial HiPPi	Limited	Yes	800	100.00	54%	Fibre	Today
Fibre Channel	Yes	Yes	800	100.00	54%	Fibre	Today
ATM-OC12	No	Yes	622	77.75	42%	Fibre	Limited
Ultra-SCSI	Yes	No	320	40.00	22%	SCSI	Today
SCSI-II F/W	Yes	No	160	20.00	11%	SCSI	Today
ATM-OC3	No	Yes	155	19.38	10%	Fibre	Today
100bT Ethernet	No	Yes	100	12.50	7%	CAT-5	Today
FDDI	No	Yes	100	12.50	7%	Fibre/CAT-5	Today
DS3	No	Yes	45	5.63	3%		Today
10 bT Ethernet	No	Yes	10	1.25	1%	CAT-5	Today

ital routing switchers. Several devices are available to do this conversion from HD analog RGB to YUV. Three devices that provide this functionality are the Digital Video Systems (DVS) ISP500, YEM's CVS-970B and ADC-1125. The DVS ISP500 is a RAM recorder that can be configured for the full range of 1080I RGB to YUV and RGB to YUV digital or analog conversions. This unit is designed primarily for HDTV research labs and has much more functionality than is needed just for graphics output conversion.

The YEM CVS-970B takes computer outputs ranging from RGB 480 lines x 640 pixels to 1024 x 1280 and in real-time raises the resolution and converts the color-space of the images to 1080 x 1920 YUV high definition video. This product might be useful for post production applications that would work internally at 720 x 1280 30 Hz progressive which requires approximately half the computer capacity. This device may be very useful for real-time broadcast graphics applications. YEM has just begun delivery of the ADC-1125, a 1080I analog to serial digital converter that takes both RGB and YUV inputs and costs the same as other HD A/D converters that only work on YUV images. The Philips D6, the Toshiba D6, and the discontinued Sony HWD-1000 HD video tape recorders can directly record the RGB analog graphics output at 1035I and do not need an external color-space conversion device.

Silicon Graphics Octane MXI, Onyx InfiniteReality, Onyx2 Reality, and Onyx2 InfiniteReality graphics systems have the ability for real-time graphics output of all the ATSC formats.

High definition digital disk recorders, RAM recorders, and telecines currently sustain from two to twelve frames a second data transfer between the HD video source and the attached computer's disk drives. This level of throughput is generally acceptable for animation, visual effects, and paint. For editing applications these devices have to deliver more throughput which usually means using faster or multiple computer interfaces or a combination of both. An example of this would be an upgrade of the ProntoVision HD DDR (from DVS in Hamburg, Germany) to have four Ultra-SCSI connections which would theoretically give almost real-time transfer of full resolution 1080I 8-bit YUV. Another example of this is ViewGraphics' Viewstore RAM recorder that has a high-speed HiPPi data connection.

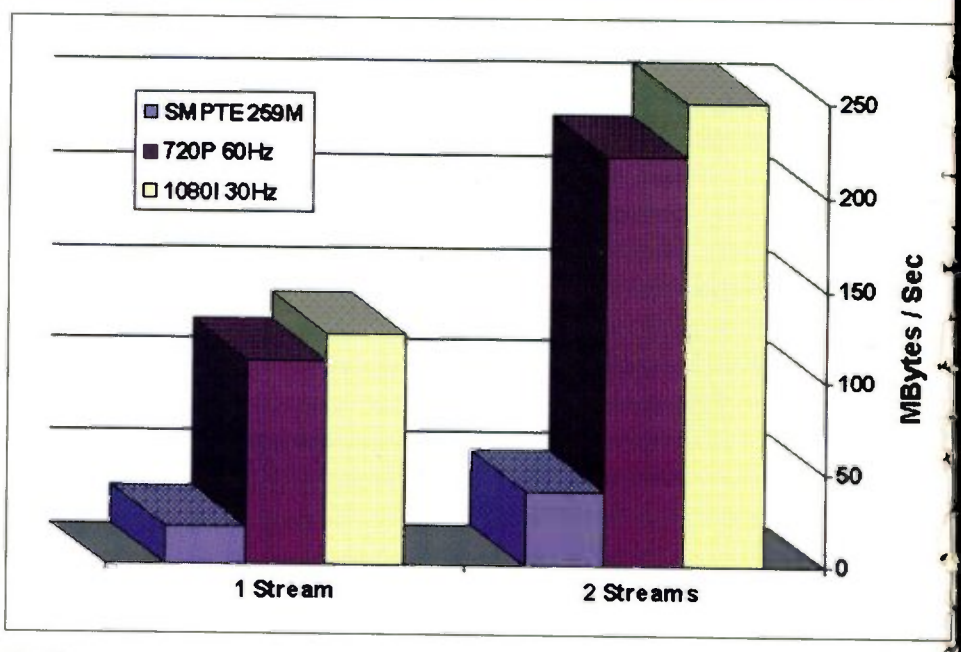
Table 3, "Computer Input and Output Network, Disk, and Peripheral Interfaces," lists the major interfaces being implemented in computers today and compares their peak ratings to the throughput requirement of a high definition video stream.

Several open computer networking solutions and disk interfaces that deliver over 80 MB/s per connection are available today. These connections can be striped together to deliver real-time or even faster than real-time network and disk performance which provide an interesting alternative. Detailed later is a Silicon Graphics system that demonstrates a server acting as a virtual non-linear HDTV VTR to distributed workstation viewing stations. The system also delivered uncompressed HDTV at over two times real-time to other workstations and servers on the network.

Tomorrow's Options for HDTV

In the future, computer workstations and servers will have native high definition video cards. These cards need to plug into the various input and output computer buses being implemented today in order to be delivered in the next two years. The dominant expansion bus architecture for the computer industry is PCI. The PCI bus standard specifies both 32-bit and 64-bit versions with several different clock speeds. The other primary computer buses used in post production solutions are Silicon Graphics GIO, HIO, and XIO. GIO is implemented in Silicon Graphic's Indy and Indigo2 workstations and provides 266 MB/s peak bandwidth. HIO is implemented in Silicon Graphics Challenge servers and Onyx workstations and provides 360 MB/s peak bandwidth. XIO is implemented in Silicon Graphics new Octane and Onyx2 workstations and Origin Servers and provides 800 MB/s bi-directional or 1.6 GB/s total throughput.

Theoretically, a real-time single stream 8-bit YUV 4:2:2 video card for 1080 x 1920 60Hz interlaced can be built for the PCI 64-bit 33 MHz bus. In practice though, very few PCI cards exist, outside of several designed for the Silicon Graphics platform, that deliver even 30 MB/sec of throughput today. A whole new round of ASICs, device drivers, operating system upgrades, and disk and memory subsystems are needed if PCI based systems are going to solve this I/O problem. It will most likely be several years before this happens. The PCI standard board size limitations will also demand major ASCI development for any vendor developing a real-time HD I/O, effects, or compression device.



Caption

Silicon Graphics' new XIO interface has enough bandwidth to provide real-time I/O for any of the ATSC high-definition formats in 8 and 10-bit YUV or RGB, even with Alpha.

Gigabyte System Network or GSN (previously known as SuperHIPPI) is a next generation network technology that has a peak performance rating of 800 Mb/s. GSN cards and chip sets will be available this summer and cards are expected to cost between US$3,000 and US$7,000. This technology will provide a single connection that allows three to four times real-time uncompressed HD movement. This technology is available to be directly integrated into HD production equipment such as HD telecines, HD VTRs, and asset servers. The GSN standard is based on the core interconnect technology developed for Silicon Graphic's S2MP architecture.

John Spencer works in Silicon Graphics Advanced Media Products Division focusing on post production, broadcast graphics, and HDTV applications. For more information or to contact SGI, contact: www.sgi.com/postproduction.

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More Information Circle 190

Doubling Transponder Channel Capacity Economically

By Joe St. Jean, Scientific-Atlanta

With the introduction of digitally-delivered satellite programming and an increase in overall transponder availability, the market has placed greater demands on the programming community. Cable operators are now beginning to anticipate additional content from their current providers and are expecting the programming to be tailored to their specific region or demographics. The customizing of programming for a cable operator may take the form of time-shifted programming to suit an appropriate time zone or delivering an alternate program to target a specific market.

However, leasing additional transponder capacity for time-shifted programming or to deliver additional content is expensive and is difficult to justify in a business case. Fortunately, an economical delivery vehicle is available using existing transponder capacity and MPEG-2 compression technology. An alternative approach to leasing additional capacity is transponder sharing which allows a programmer to double their channel capacity by dually illuminating the transponder with an analog and digital carrier.

The PowerVu IRD's variable rate capability enables it to be configured in the field.

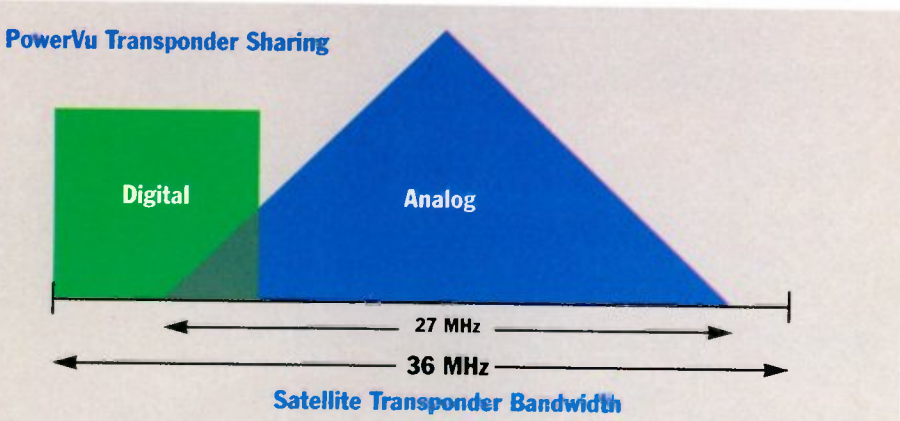

Table 1 - Analog / Digital Carrier Parameters

Transponder Loading	Full Transponder	Transponder Sharing
Nominal IF Analog Bandwidth	36 MHz	27 MHz
FM Deviation	10.75 MHz_p	10.75 MHz_p
Video Format	525 line NTSC	525 line NTSC
Analog Carrier OBO	0 dB	3 dB
Transponder Aggregate OBO	0 dB	2 dB
Nominal Digital Bandwidth		6.2 MHz (4.5 Msym/s)
Digital Carrier OBO	0 dB	5 dBc*

*dBc: Relative to the Analog Carrier

Table 2 - 4.5 Mbaud (6.2 MHz) Digital Carrier Performance as a function of FEC Rate

FEC Rate	½	⅔	¾	⅚	⅞
Threshold Eb/No (IF Loop)	4.5 dB	5.0 dB	5.5 dB	6.0 dB	6.4 dB
Occupied BW (-3 dB)	4.5 MHz	4.5 MHz	4.5 MHz	4.5 MHz	4.5 MHz
Information Rate	4.15 Mbps	5.53 Mbps	6.22 Mbps	6.91 Mbps	7.26 Mbps
Transmission Rate	9 Mbps	9 Mbps	9 Mbps	9 Mbps	9 Mbps

Using a full-transponder analog transmission as a starting point, the approach is to establish a single channel digital carrier adjacent to the analog carrier. The link design takes maximum advantage of the flexibility of current digital transmission systems to minimize impairment to the analog transmission.

The digital channel may be used to offer time-shifted programming, alternate programming, or provide a means of simulcasting an analog and a digital program to allow for transition to digitally based services, thus eliminating the need for a flash cut-over. After establishing the digital program, and as the need for additional programming increases, an operator can simply replace the analog transmission and widen the digital carrier to allow several programs to be carried within a 36 MHz transponder. If the intent is to grow to a multi-channel (MCPC) digital carrier, it is important to plan in advance for this activity by specifying equipment that is scaleable and fully variable in terms of encoding rate and carrier bandwidth. As with Scientific Atlanta's PowerVu digital video compression system, the availability of full variable rate modulators and IRD units enables the proposed capacity upgrade of the digital carrier to be achieved without the need to swap out the IRD unit at every site.

In preparation for the digital carrier, the bandwidth of the analog carrier may need to be reduced if it is occupying most of the bandwidth of the transponder. For a high quality digital signal, a nominal bandwidth of around 6-7 MHz is desirable. In a 36 MHz transponder, this means restricting the analog carrier to 27 MHz with an IF filter. The IF bandwidth of 27 MHz has selected on the basis that this is a standard bandwidth and high performance filters will be readily available for the video exciter. By limiting the analog carrier with a 27 MHz filter and not changing the center frequency, there is sufficient space available for a relatively small digital carrier (4-5 Msym/s). A 4-5 Msym/s digital carrier is typically sufficient to carry a single high quality program with associated audio.

Amplifying the Digital Carrier

From a theoretical perspective, when operating in the narrower 27 MHz bandwidth, a lower FM deviation should also be used to minimize the effects of non-linear distortion and truncation. However, in practice, the analog signal could be operated at full deviation and if the transponder and uplink chain have been properly equalized for amplitude and group delay, the effects of over-deviation are barely discernible when measured subjectively. Operating at full deviation may also be necessary to avoid the potential loss of authorizations on analog- encrypted services.

An economical delivery vehicle is available using existing transponder capacity and MPEG-2 compression technology. An alternative approach to leasing additional capacity is transponder sharing which allows a programmer to double their channel capacity by dually illuminating the transponder with an analog and digital carrier.

Also in preparation for the digital carrier, the power of the analog carrier will need to be reduced ("backed-off") as well to make transponder power available to amplify the digital carrier. Because the transponder is a non-linear amplifier, it will produce intermodulation products if operated at close to full power ("saturation") with more than one carrier. The total transponder power must be reduced to a level where intermodulation products generated are sufficiently low so that they do not cause interference to other users of the satellite system. The relevant operating point depends on the type of transponder and the operating guidelines of the particular satellite system.

(continued on page 35)

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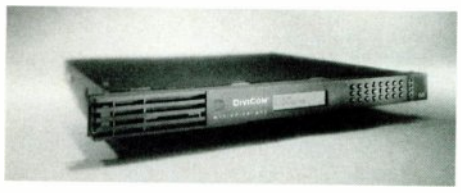
More Information Circle 188

Product Review

MPEG-2 Encoding Solution

The MediaView MV5 is DiviCom's MPEG-2/DVB encoder, designed for cost-effectiveness and real-time functionality. The MV5 is geared toward corporate video applications or specific broadcast applications where full resolution is not required. With much of its technology borrowed from the MediaView MV10, the MV5 accepts either analog composite or serial digital component video, either analog or digital audio, and data via Ethernet or RS-422/232 and compresses it all together into an MPEG-2 transport stream. The small footprint of the MV5 allows flexible installation into areas where there is limited room for equipment. All parameters of the MV5 can be programmed using the front keypad and LCD, eliminating the need for an external computer.



DiviCom Inc., 1708 McCarthy Blvd., Milpitas, CA 95035.

■ **More Information - Write In 143**

Video/Audio Switching and Multiple Camera Control

ParkerVision's CameraMan CONTROL Center™ integrates camera automation and tracking, "live" video and audio switching, blackburst outputs and multiple-camera CCU functionality. The CONTROL Center is designed to help personnel operate and adjust eight CameraMan cameras, as well as preview and switch between multiple video and audio source inputs. The system features eight input/one preview/three program output vertical interval switcher control for previewing upcoming shots, and switching between cameras, VCRs and auxiliary video sources. A numeric keypad provides simplified switching from camera-to-camera, preset-to-preset, and preview to program output.

ParkerVision, 8493 Baymeadows Way, Jacksonville, FL 32256-9886.

■ **More Information - Write In 144**

3-CCD General Pan/Tilt Camera Sytems™

ParkerVision's 3-CCD Camera Systems are an expanded version of the company's 1-CCD Camera Systems, featuring higher resolution and more accurate color for applications requiring higher performance. The 3-CCD System implements 1/2-inch IT Power HAD™ CCDs with 380,000 effective picture elements. The improved HAD sensor structure is designed to reduce smear level by as much as 20 dB while attaining a high sensitivity of F9.5 at 2000 lux. The high-resolution camera operates at 750 TV lines. A choice of 13x or 17x zoom lens is available with the camera. The CameraMan provides camera functions such as linear matrix shading compensation, master pedestal, gamma selection, selectable knee position and detail level.

ParkerVision, 8493 Baymeadows Way, Jacksonville, FL 32256-9886.

■ **More Information - Write In 145**

One-Half Digital HD Studio VTR System

The AJ-D580/AJ-HDP500 digital V system compresses 1125I HDTV stu standard signals and records them w digital picture quality. The system is

signed to help users cost-effective broadcast high definition signals. The u uses 1/2-inch standard D5 cassette ta that combines high performance wi space-efficient storage. Its installati procedures are simplified by SMPT 292M serial digital input and output. S multaneous development of D/A and A/ converters, serial and parallel converte and a digital distributor provides tot system interfaces necessary for existi digital and analog HDTV equipment.

Panasonic Broadcast and Digital Sy tems Company, One Panasonic Way, S caucus, NJ 07094.

■ **More Information - Write In 146**

Technology Watch

WWL's Upgrade Focuses on Non-Linear Editing Equipment

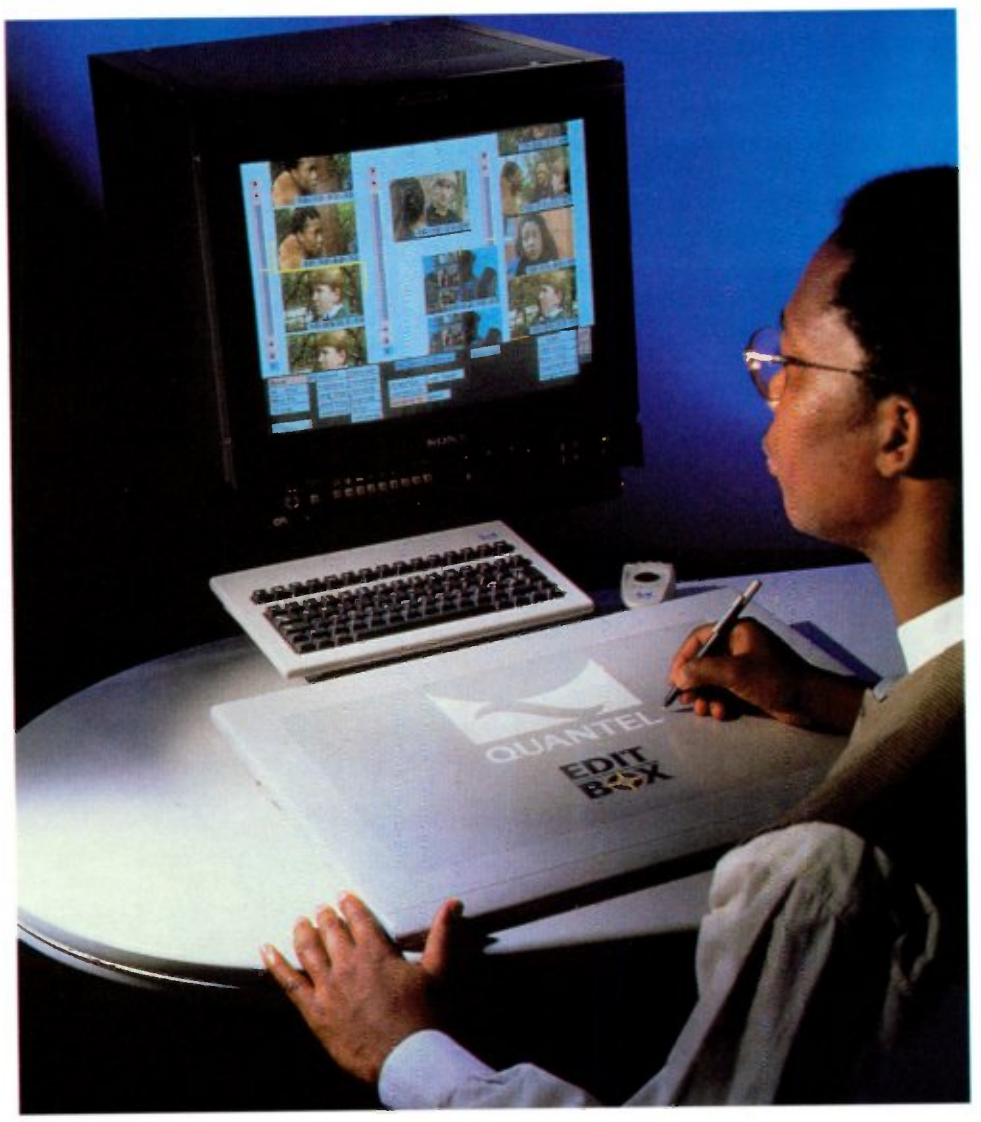
Continued from page 1

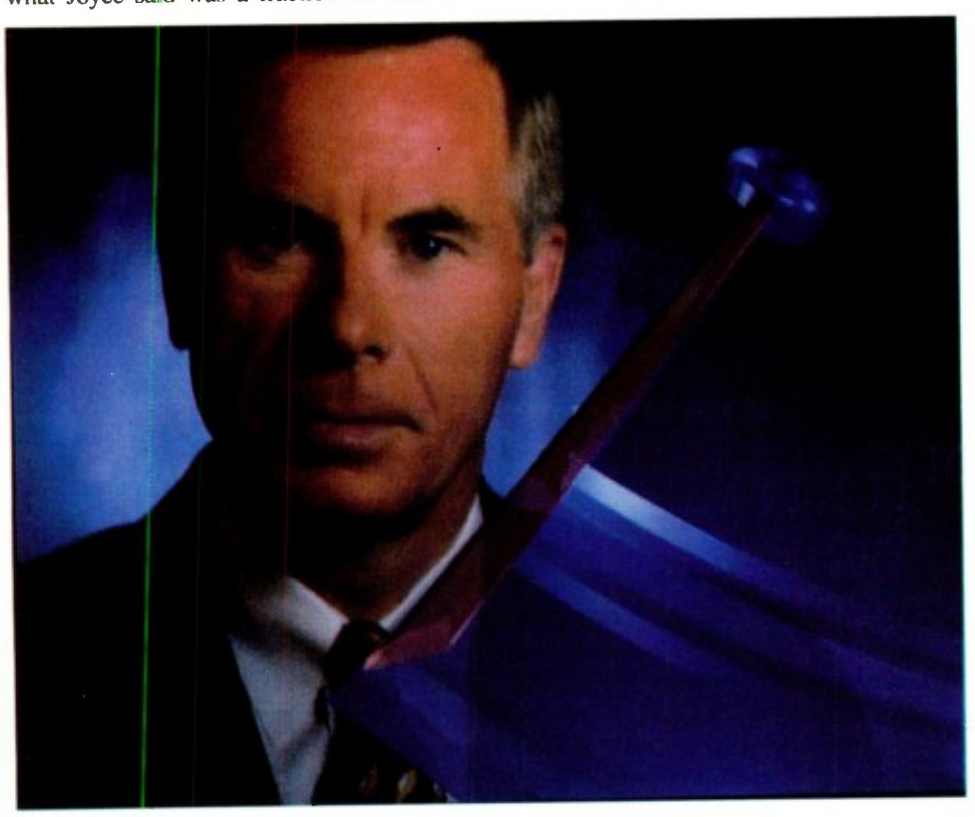
part of a station-wide equipment upgrade sixteen months ago, WWL stepped up its promotion department and purchased its first Editbox, Quantel's on-line, non-linear editing system for various applications. The Editbox only uses broadcast standard signal and control interfaces ensuring compatibility with the widest range of external equipment. Its serial digital interfaces provide component video and four channels of embedded audio.

Pleased with the system's performance, management opted for a second system for the station's commercial post business. "From a managerial point of view, the Editbox has enabled us to do the kinds of projects we would have normally had to go out of house to complete," said WWL's Creative Services Director, Dee Joyce. "I really feel if we had not gotten that tool we were going to lose our competitive on-air edge."

WWL has forged a reputation for producing artistically creative promos and station image campaigns that increasingly stretched the promo department's budget to its breaking point. With the Editbox in-house, the department soon learned that it was possible to save money and achieve a professional looking product in a shorter period of time.

Recently the department produced an entire entertainment look for the station, including all of the IDs and graphics for what Joyce said was a fraction of what it would have cost if she had used outside services. "If we had gone out-of-house it would have been close to a six figure project," Joyce said. "We did it all here: all of the layering, drop shadows under type, including all of these incredible things that can give such polish to our on-air look for nickels on the dollar. Really and truly I think we look as good if not better than any station in a top 10 market and we are in the 41st."





On Editbox (above), users have access to dynamic blur, 3D blend, wrap and turn, and other features to create sharp, dynamic images, like WWL's news image spot (left).

WWL is no stranger to Quantel equipment. It was one of the first broadcasters in the U.S. to own a Paintbox. In fact, one of the first things A.H. Bell Corporation did when it acquired WWL in June 1994 was upgrade its arsenal of equipment and purchase the Editbox.

For a 60-second news image spot called "Louisiana's News Leader", the Editbox was employed to accomplish editing tasks and effects that would have been virtually impossible to achieve in a traditional suite, according to Photographer/Editor Dune Perfume. The piece comprised a multitude of cityscape shots taken in and around New Orleans. These scenes were subsequently interspersed with shots of the station's 11 news anchors using time lapse and slow-motion effects. The entire piece was then set to a passage-of-time motif with the second hand of a CG clock sweeping in the next image. The goal of the spot was to establish in the viewers' mind that Channel 4 will go anywhere, anytime to report on everything in New Orleans.

Joyce was particularly impressed with the ability to manipulate type to produce a creative and sophisticated look in revealing each of the anchors' names. "In the old days the name would have been a necessary evil," Joyce explained. "Now the name is a beautiful design element in the spot because of what you can do with type in the Editbox."

Using Dynamic Blur, 3D Bend, Wrap and Turn, Profile Stretch, Slow-mo, and sophisticated text manipulation features on the Editbox, WWL was able to air a first-class positioning statement promo that set it apart from competitors. "We never could have done a spot like that before. In terms of creative imagination, there is no limit to what you can do with this tool," said Joyce.

In addition to long running image promos, WWL also uses the Editbox to edit its topical news series promos. "The Editbox is great especially during sweeps when we have to turn these spots around very quickly," Joyce stated. "Many times we're editing the promos for the news series at the same time that news is editing the series itself. We can grab the original tapes, import them into the Editbox and edit without interrupting the reporter's edit session."

Editor Perfume says he routinely relies on the Editbox to enhance the quality of images the station puts out, be it a series or a promo hyping the story. "Recently we helped our news department when they had a problem with white balancing one of their cameras," Perfume recalled. "Everything they shot was purple. I was able to take it into the Editbox and color correct it so you couldn't tell there was anything wrong with the original footage."

The system is also regularly used to strengthen a news promo that sometimes may offer compelling content but lack the aesthetic visuals needed by the promotions department to adequately sell the piece. "There may be a bunch of talking heads, especially if it's an investigative series, with very little cover or B-roll," explained Joyce. "Using the Editbox helps us move type and create graphics to really make that eye candy needed in promotion that you just can't get from plain news footage."

Furthermore, Perfume values the system's indispensable speed and ability to make changes instantly to spice up his work. "We have actually edited a promo for a news series and the news director has come in and looked at it and thought it was great but that we may have divulged too much information prior to airing the series," related Perfume. "With the Editbox that problem can be fixed instantaneously, saving a lot of time. In a traditional suite you might have to spend another edit session to make those spots worthy for airtime."

A Commercial Service Provider

Although local news is the cornerstone of WWL, the station is gearing up to be a major player in servicing commercial clients. For years, the station offered production services for clients who aired commercials on the station. But like the television side of the business, the commercial side was also badly in need of a technology upgrade.

"Everyone has been so impressed with what we have been able to do in promotions on the Editbox that they wanted an Editbox dedicated for our commercial clients," said Joyce.

Executives were keenly aware of the stigma that had developed regarding a television station offering post production services. Today the reality is that clients want to work at a boutique-style facility. "Keeping this in mind, we decided that's the direction we would take," says Joe Sciortino, a production manager and set designer at WWL. "To attract the more high-end video business in town we built a really nice edit suite with all of the creature comforts and offered the Editbox."

Producer/Director Jim Bower said stations like WWL can remain competitive with other facilities and offer clients a little something extra. "The Editbox gives us a big quality bump over the Avid guys, said Bower. "We also have three full time commercial producer/writers here at our disposal who know how to create spots that are effective and will sell product."

Whether it's producing commercials and longform programs for outside clients or winning awards for editing promos and news series, WWL has placed new found emphasis on their editing equipment purchases. "The Editbox has enabled us to stay the market leader in our on-air look. As Paintbox transformed what our graphics looked like years ago, buying the Editbox was just another logical step."

More Information - Circle 300

Spotlight

CAMERAS & ACCESSORIES

One-Inch HDTV Metal Tape

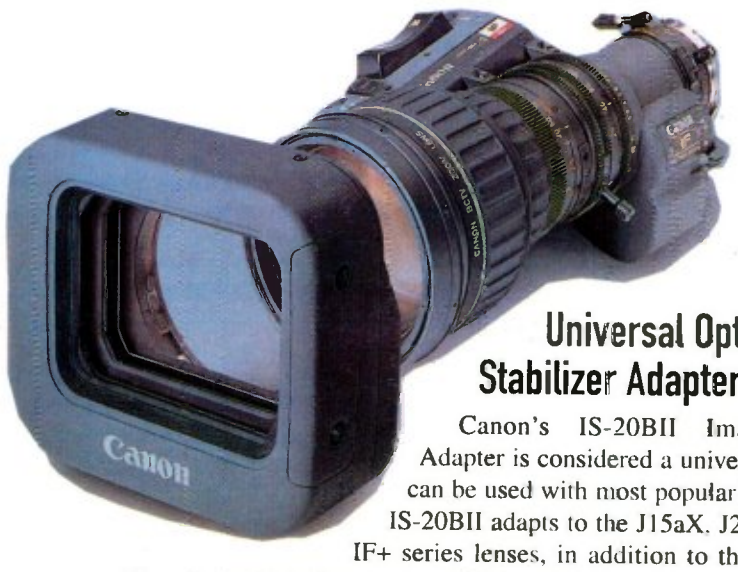
Maxell Corporation offers an advanced one-inch High Definition Television metal tape that fully meets the strict requirements of HDTV broadcasting. The tape is designed for use with digital VTR's that conform to BTA Hi-Vision Studio Signal Standard VTA S-001, which specifies a frequency bandwidth of 30 MHz for full Hi-Vision signal recording at a total bit rate of 1.188 Gb/s. The tape's high level C/N ratio produces a low error rate and clear HDTV picture reproduction. Maxell's tapes also use a high-performance binder system and Ceramic Armor Metal Particle coating to produce a stronger and more durable magnetic layer. Maxell Corporation of America, 22-08 Route 208, Fairlawn, NJ 07410.

More Information - Circle 109

Digital Camcorder

The LDK 120 DVCPRO Camcorder is designed to deliver superior performance through the power of revolutionary digital signal processing for both video and audio. The functional design and ergonomic layout of the new Philips LDK 120, with its wide range adjustable shoulder pad, gives the operator needed balance. The 120 offers greater user functionality and flexibility through an optional DSC output for one video and two embedded audio channels from camera or built-in VTR. A genlock for video and a time-code lock are also provided. The 120 also uses a credit-card-sized Smart Card to store up to 4 scene files and operator files. **Philips Broadcast Television Systems Company**, 2300 South Decker Lake Blvd., Salt Lake City, UT 84119.

More Information - Circle 111



Universal Optical Stabilizer Adapter

Canon's IS-20BII Image Stabilizer Adapter is considered a universal adapter that can be used with most popular IF+ lenses. The IS-20BII adapts to the J15aX, J20aX and J33aX IF+ series lenses, in addition to the J14aX series. The adapter is designed to provide broadcast-quality, shake-free shooting from helicopters, boats, and cars, and ENG/EFP applications where high winds or unsteady surfaces can impact quality. **Canon U.S.A., Inc.**, One Canon Plaza, Lake Success, NY 11042.

More Information - Circle 112

High Definition Television Lenses

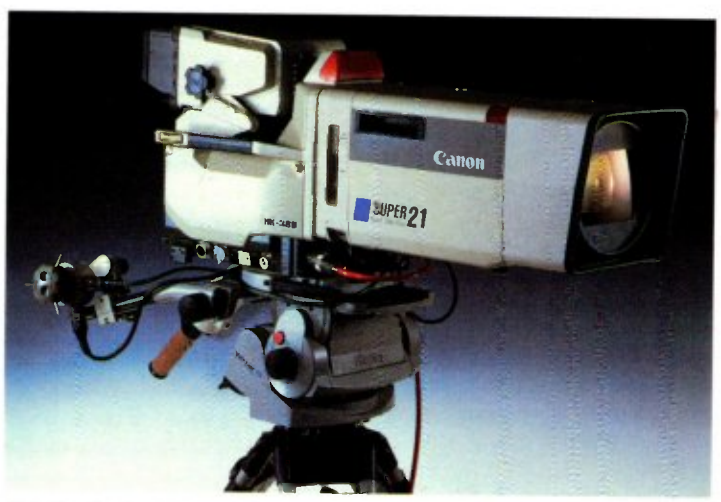
Fujinon's Broadcast and Communications Products Division manufactures a family of HDTV lenses to address the emerging digital television market. The HA 110X5.2BEVM portable lens has a focal length of 5.2 mm to 52 mm without extender, and 10.4 mm to 104 mm with its 2X extender deployed. It also features an iris range of F2.0 to F16, Minimum Object Distance (MOD) of 0.6 meters, horizontal field of view of 85 degrees, and a maximum relative aperture of F2.0 from 5.2 mm to 37 mm, and F2.5 at 52 mm. Other products in the HDTV lens family include the HA 14X8EVM, the HA 20X7.5BEVM, and HA 24X7BESM. **Fujinon, Inc.**, 10 High Point Drive, Wayne, NJ 07470.

More Information - Circle 114

DVC Pro Formatted Camera/Recorder

Hitachi's Z-VIA is a one-piece camera/recorder that uses Panasonic's DVC Pro tape format. Designed for ENG applications, the Z-VIA is smaller, lighter in weight, and consumes less power than previous one-piece camcorders. The device uses 2/3-inch CCDs and digital image processing. It has a resolution of 850 TV lines, a signal to noise ratio of 63 dB, and a sensitivity of f8 at 2000 lux. As an accommodation for ENG usage, the camera's eyepiece allows the operator to hold it at a distance from the eye. The Z-VIA is equipped with a removable memory card, which stores a user's setup information. **Hitachi Denshi America, Ltd.**, 150 Crossways Park Drive, Woodbury, NY 11797.

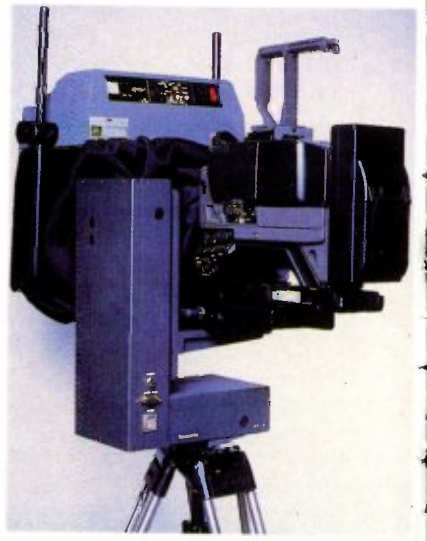
More Information -Circle 110



Digital, Switchable CCD Camera System

The HK-388W is a full-digital camera that employs newly-developed digital processing ICs (ASICs) to deliver high picture quality and reliability. The unit uses 3 2/3-inch, 640,000-pixel FIT CCD image sensors. Because the aspect ratio is switched digitally, the 16:9/4:3 switchable modes can be accomplished with easily. The HK-388W comes standard with SMPTE 259 (component). It incorporates non-compression digital processing circuitry with 10-bit analog-to-digital conversion and up to 16 bits of internal processing. The camera has various DTL functions, including Diagonal DTL, Soft DTL, and Skin DTL, to facilitate flexible and creative videography specific to full-digital architecture. **Ikegami Electronics (USA) Inc.**, 37 Brook Avenue, Maywood, NJ 07607.

More Information - Circle 113



Camera Pan/Tilt Mechanism

The PT-LP is Telemetrics' serially controlled camera pan/tilt mechanism. The unit incorporates a serial control receiver compatible with Telemetrics' line of serial control panels to facilitate remote studio operation of cameras. The unit is ideal for a variety of applications in the broadcast, teleconferencing and instructional television markets. The PT-LP pan/tilt mechanism's variable speed operation is provided by heavy-duty cross roller bearings and Swiss motors with isolation mounts. The unit's lens connector provides direct connection and interface to all lens functions. Telemetrics, Inc., 6 Leighton Place, Mahwah, NJ 07430.

More Information - Circle 115

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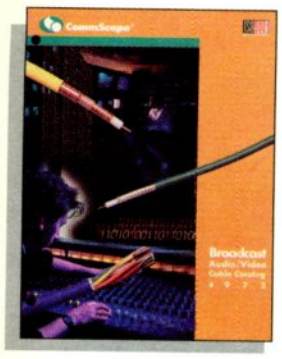
Technical Literature Review



Broadcast Audio/Video Products

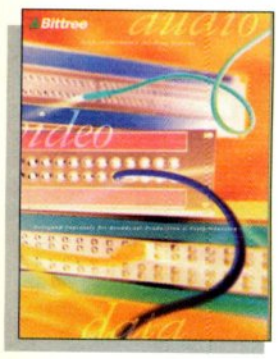
CommScope first entered the cabling business in 1966 as a producer of coaxial cable for video and CATV systems. The company's current reach includes a wide range of broadcast quality cabling products, which are showcased in their latest catalog. In addition to being manufactured to strict quality and performance standards, CommScope cables are designed to meet or exceed safety standards as set forth in the National Electric Code (NEC) for their intended applications. CommScope's range of cables include Plenum-rated, Riser-rated, and general purpose-rated varieties. **CommScope, Inc.**, P.O. Box 1729, Hickory, NC 28603.

More Information - Circle 116

Test and Measurement Products

The Philip Crosby Quality Process is an integral part of Videotek's operations, from design to final product. The company's products, design and manufacturing procedures are ISO-9001 certified and comply with the most stringent worldwide quality standards. Videotek's product catalog provides comprehensive information on the company's full offering of test and measurement devices, including the VTM-200 multi-format on-screen monitor, the VTM-100D digital video signal monitor, and TVM-821-D combination digital waveform monitor/vectorscope audio monitor. **Videotek**, 243 Shoemaker Road, Pottstown, PA 19426-6433.

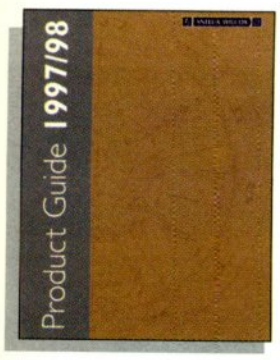
More Information - Circle 117



High-Performance Patching Systems

Founded in 1978, Bittree provides high-performance patching products specifically for the broadcast, production, and post-production industry. Its latest brochure showcases some of the company's premier devices and technology, including its rear panel interconnection technique. Bittree's original three-pin rear connection interface uses a proven tuning fork hermaphroditic contact and incorporates the positive aspects of crimp-on snap-in technology. Bittree Patching system products have been designed and tested to meet rigid quality standards to ensure their long term dependability. **Bittree Incorporated**, 555 Riverdale Drive, Ste. D, Glendale, CA 91204.

More Information - Circle 118



Broadcast Electronics Catalog

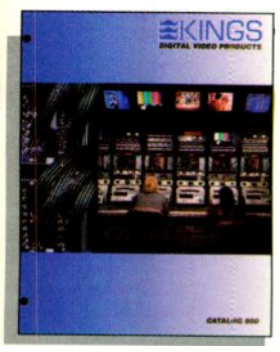
Snell & Wilcox, one of the world's largest manufacturers of broadcast electronics, has one of the industry's largest team of design engineers dedicated to creating state-of-the-art products to process images in real time for multi-standard markets. The company, which has sales offices in France, Germany, India, Japan, Singapore, and other places, has earned an international reputation for the design and manufacture of advanced image communications technologies for the world's broadcast television, video, satellite, cable and film industries. Snell & Wilcox products are designed to provide seamless interfaces between the world's diverse television standards and formats. **Snell & Wilcox, Inc.(USA)**, 1156 Aster Ave., Ste. F, Sunnyvale, CA 94086.

More Information - Circle 119

Expanded Product Line

In light of the coming digital broadcasting age, Matthey Electronics has expanded its product line that represents a major departure from its traditional product base. Matthey Electronics, whose sole domestic distributor is Television Equipment Associates, Inc. in South Salem, NY, now offers routers, converters, and interfacing products for a variety of signal distribution needs. In an effort to increase its presence in signal distribution even more, Matthey introduced the Nexus32 digital video router to the expanding 3000 Series distribution and interfacing range. Matthey Electronics is an autonomous company that is part of the Cookson Matthey group of companies. **Television Equipment Associates, Inc.**, P.O. Box 499, South Salem, NY 10590.

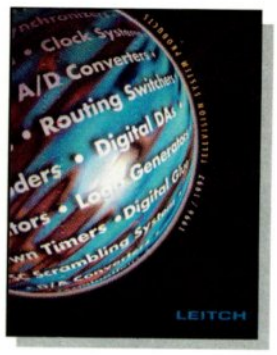
More Information - Circle 120



Digital Video Products

Kings' latest catalog highlights the company's line of RF coaxial connectors and digital broadcast products. Their contributions to the development of connector technology include several forms of the K-Grip® design configuration which simplifies assembly and reduces production time, and the Tri-Loc® series connectors, BNC connectors, and serial digital jackfields for broadcast applications. The company, founded in 1947, is active in FIA, SMPTE, and various other standards activities and is ready to respond to a range of broadcast product requirements. To assist customers with technical inquiries, Kings maintains a customer application engineering group. **Kings Electronics Company, Inc.**, 40 Marbledale Road, Tuckahoe, NY 10707.

More Information - Circle 121



Television Systems Products

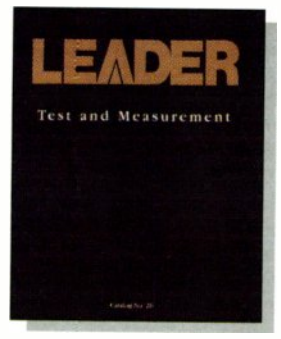
Leitch has more than 25 years of experience in the television industry, and has grown significantly in the last several years. Its latest catalog discusses the company's growth as well as facility additions since the publication of its last catalog. Leitch now has offices in Canada, USA, Japan, Australia, Europe, and Brazil. The company's catalog gives specifications and technical information on products ranging from digital conversion systems, digital converters and synchronizers, and routing switchers, to NTSC scramblers and modular digital products. **Leitch Incorporated (USA)**, 920 Corporate Lane, Chesapeake, VA 23320.

More Information - Circle 122

Broadcast Products

According to Trompeter's catalog, the company strives to be the leading designer, producer and marketer of high quality/premium value RF interconnect components, assemblies, and other related products which provide superior performance in high frequency and data rate transmission to the broadcast market. Trompeter's product profiles include the RGB patching system, which offers long life, low contact resistance, and consistent contact forces. Also featured are standard 19-inch panels available as insulated black phenolic, and insulated or non-insulated aluminum. Trompeter also serves the needs of other markets, including telecommunications and military. **Trompeter Electronics, Inc.**, 31186 La Baya Dr., Westlake Village, CA 91362-4047.

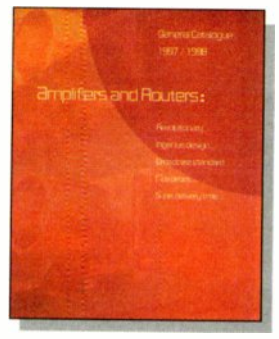
More Information - Circle 123



Test and Measurement Performance

Leader is equipped and staffed for producing competitive, high-quality products originally developed for production testing and servicing. These are applications in which ease-of-use and highest reliability are essential. By expanding into a broad line of industrial and video instruments, Leader has become one of the largest providers to the television broadcast community. **Leader Instruments Corporation**, 380 Oser Ave., Hauppage, NY 11788.

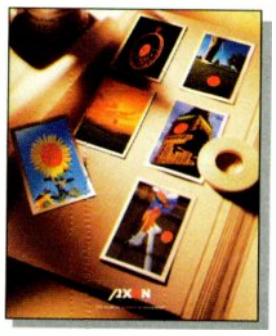
More Information - Circle 124



Amplifier and Router Products

Network provides professionals dedicated to the broadcast and telecommunications market with products, services, system and consultancy work. The company's comprehensive range of products are designed to offer customers optimum functionality and specifications, long-life construction and compact design by using latest SMD technology. The latest Network catalog gives an overview of its product families, including rear view amplifiers, router control software, and the 8x8 router family. The company is ISO-9000 and AQAP-120 certified. **Network Electronics AS**, Ranvik Brygge 10, N-3212 Sandefjord, Norway. US Representative: 133 West 19th St., New York, NY 10011.

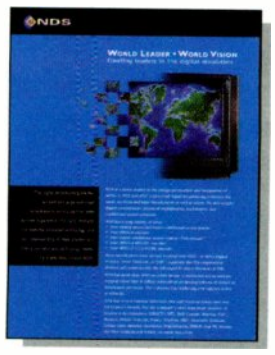
More Information - Circle 125



Digital Design Technology

Axon manufactures products and applies technology to handle television broadcasting needs in the digital age. From the beginning of the new technological era, Axon has pioneered developments in digital signal conversion, processing, and switching. The latest edition of the Axon Collection illustrates the company's commitment to provide broadcasters and system houses with one of the most comprehensive product portfolio available in the marketplace. Axon's product catalog reviews the entire portfolio, ranging from digital to analog conversion products, analog to digital, backup switching, signal processing synchronizers, and digital distribution products. **Axon Digital Design BV**, Building Brabant Corner, Spoorakkerweg 2b., 5071 NC Udenhout, The Netherlands.

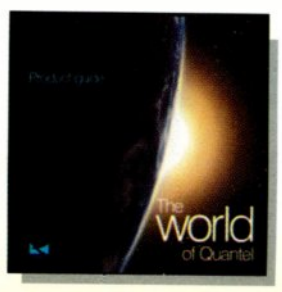
More Information - Circle 126



High Performance Broadcast Solutions

NDS provides a variety of fixed and mobile solutions for the contribution market. Its latest information brochure gives highlights of the company's projects and goals. The brochure includes news of the NDS MPEG-2 4:2:2 system's selection by the EBU to upgrade its Eurovision network. NDS specializes in optimizing solutions to meet individual needs of system providers across diverse market segments. **NDS America, Inc.**, 3501 Jamboree Rd., Ste. 200, Newport Beach, CA 92660.

More Information - Circle 127



Full Range Product Guide

Quantel's product catalog provides a brief look at the innovative company's competitive products for editing and graphics production applications. The catalog includes descriptions of Paintbox® Bravo, a full-featured video graphics tool. With Paintbox Bravo the world's favorite graphics system unleashes huge creative potential. **Quantel, Inc.**, 28 Thorndal Circle, Darien, CT 06820.

More Information - Circle 128

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More Information Circle 201

Router Technology: Moving

By Dave Tewel

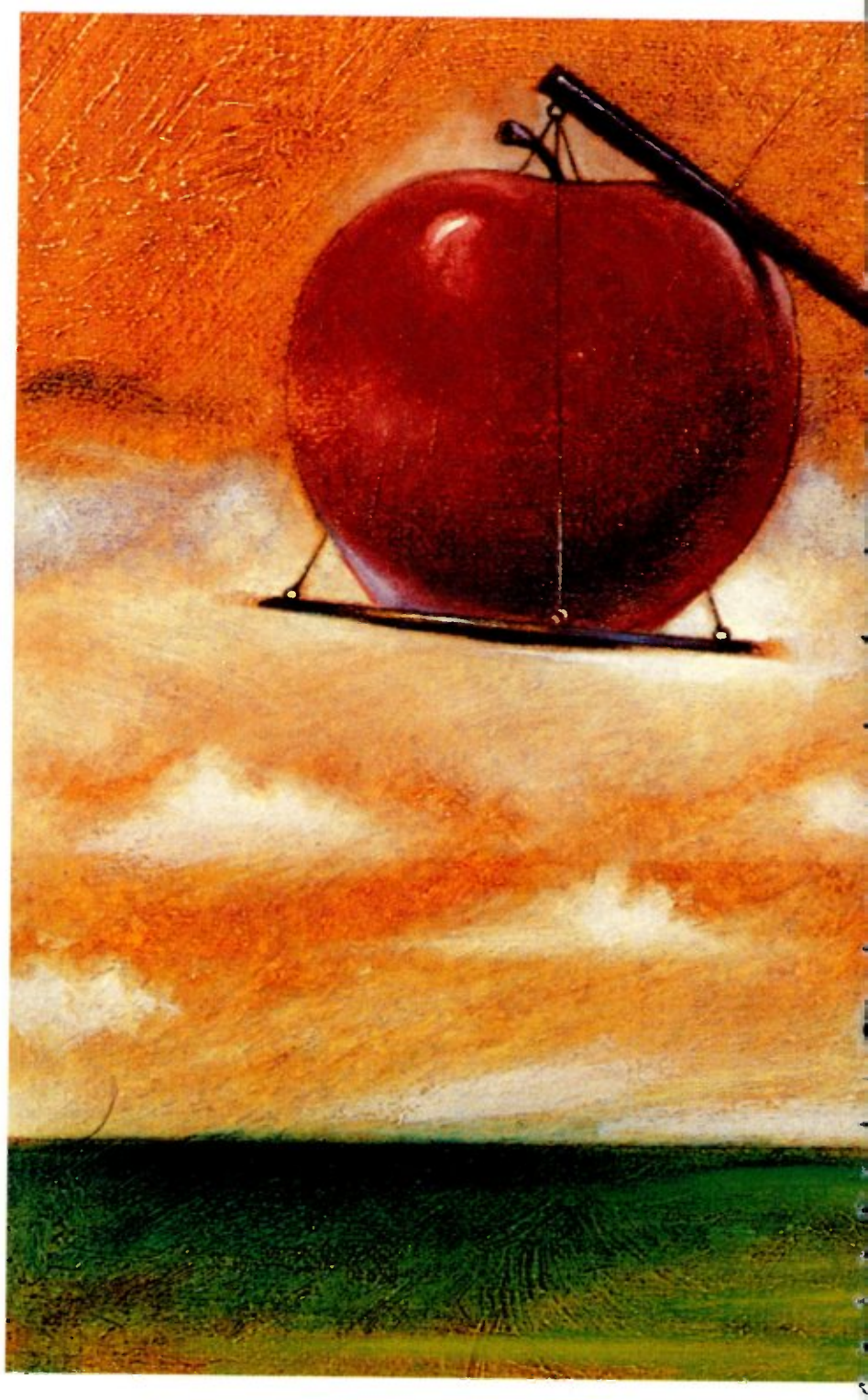
In the search for performance, flexibility, and cost effectiveness, broadcast engineers are ignoring the adage 'Bigger is better,' opting instead for the benefits of smaller, decentralized routing systems.

When massive mainframe computers first appeared on the scene, no one would have believed that within a relatively short period of time, desktop PCs and distributed processing would replace them as the practical, cost-effective solution for most business computing needs.

Businesses soon discovered that the large, centrally-located mainframe and its family of "dumb" terminals was an underutilized, hard-to-manage, costly piece of equipment — in most cases, much more horse power than individual users needed on a day-to-day basis. It wasn't long before the concept of decentralized processing began to emerge as the common sense solution: individuals could have their own personal computers with full capabilities, yet still communicate with others as needed through a local-area-network. No massive central control unit was needed, and companies could expand one computer at a time. The solution worked, and today the concept of distributed processing reigns supreme throughout the entire business landscape.

Currently, as the broadcasting industry grapples with the relentless march of digital technology, a similar trend toward distributed routing is beginning to emerge. More and more broadcasters and production houses are shying away from large mainframe router purchases, opting instead for a decentralized routing system utilizing more cost-effective smaller routers which handle the job at hand, yet don't create more capacity than is needed.

Indeed, in many situations these smaller routers offer more than a Band-Aid solution to handling the broadcasters' ever-changing environment. With careful planning, they can provide a cost-effective long- term routing system for many facilities.



Ease Into The Digital World

Today every broadcaster in America has a mandate to convert their facilities from analog to digital. Finding a cost-effective way to accomplish the changeover is a challenge. With large mainframe digital router technology costing millions of dollars and still far from being refined, today's smaller routers with digital conversion capabilities are a logical way to tackle the transition. By allowing broadcasters to handle the change a bit at a time, rather than undertaking the entire job all at once, smaller routers can make the transition a lot more manageable and cost-effective.

Even for those broadcasters who have the resources to make the change to digital rapidly, investing millions of dollars in a single piece of equipment at this stage of digital technology development may not be the wisest course of action. There is perhaps a valuable lesson learned in the computer industry which also applies to the broadcast arena: never buy today what you won't need until next year or the year after.

Technology improves every year, making products faster, smaller and cheaper as time goes on. The router products showcased at this year's NAB are a prime example; they offered about three times the performance, half the physical size, and three-quarters of the cost of last year's models. Who knows what digital products will be available five years down the road? And what's worse, many of these new large mainframe routers will not be compatible with future products, even from the same company. Several smaller routers, on the other hand, are backward compatible with their predecessors, allowing for easy expansion.

A Simple Solution for Managing Growth

While some broadcasters have a new facility in the planning stages for the near future, the vast majority don't. However, many of these existing facilities are in need of some type of expansion, perhaps a new editing bay or additional newsroom capabilities. For the most part, these users will only need connection to their own workgroup and equipment, while occasionally feeding to and from other locations. In such a case, the addition of one or two smaller routers to handle the job makes good sense, and more and more broadcasters and production houses are going in this direction.

Even by adding the smallest possible incremental increase to a large existing mainframe router, the end result is the creation of a staggering amount of capacity that probably will never be utilized. For instance, in a typical large 256 x 256 matrix router configuration, 65,536 crosspoints are already available, and most likely the vast majority of those have never been used. Each output has access to all 256 inputs, yet in reality, the user probably only needs access to perhaps 12 of those sources. This means the other 244 inputs are totally underutilized.

Increase this system by just 32 increments to a 288 x 288 for additional growth, and the total router capacity jumps to a

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this your home address? ❑ Yes ❑ No

A. Which best describes the primary business activity at this location?

❑ TV Broadcast Station
❑ TV Broadcast Network
❑ TV Cable Network
❑ Cable System/Satellite/Telcom
❑ Production/Post-Production Facility
❑ Corporate/Industrial TV
7 ❑ Government/Military TV
8 ❑ TV Engineering Consulting Firm
9 ❑ Hardware/Software Distributor/Manufacturer
10 ☐ Other (please describe)
11/_____

B. Which best describes your primary job function? (check only one)

15 ☐ Engineering Management
16 ☐ Engineering Staff
17 ☐ Operations Management/Staff
18 ☐ Production/Programming Management/Staff
19 ☐ News Management/Staff
20 ☐ IT Management/Staff
21 ☐ Corporate/General Management
22 ☐ Other (please describe)
23/_____

C. I recommend, specify or approve the purchase of the following products: (check all that apply)

25 ☐ Amplifiers
26 ☐ Animation Software/Hardware
27 ☐ Audio Equipment
28 ☐ Audio Workstations, Digital
29 ☐ Cable (Fiberoptic, Coaxial)
30 ☐ Cameras
31 ☑ Camera Lenses/Accessories
32 ☐ Compression Equipment
33 ☐ Digital Disk Recorders, Video
34 ☐ Editing Systems
35 ☐ Hard Drives (Mass Storage)
36 ☐ HDTV Production Equipment
37 ☐ Lighting Equipment
38 ☐ Multiplexers
39 ☐ Projection Systems
40 ☐ Scan Converters
41 ☐ Test Equipment
42 ☐ Time Base Equipment
43 ☐ Video Effects
44 ☐ Video Monitors/Filters
45 ☐ Video Servers
50 ☐ None of the above

D. Do you use a personal computer at:

60 ☐ Home 61 ☐ Work

E. Do you have access to:

63 ☐ CD-ROM 64 ☐ Internet 65 ☐ Neither

EDITORIAL FEEDBACK

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Please use the boxes below for additional numbers

Please help us with our market research. Over the next 12 months, which of the following types of digital television equipment do you anticipate purchasing (check all that apply)?

1001 ❑ Acoustical Systems
1002 ❑ Amplifiers
1003 ❑ Animation Controllers
1004 ❑ Animation Software
1005 ❑ Audio Equipment, Consoles/Mixers
1006 ❑ Audio Equipment, Digital Recorders
1007 ❑ Audio Equipment, Monitors
1008 ❑ Audio Equipment, Signal Processors
1009 ❑ Audio Equipment, Tape And Other Accessories
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1012 ❑ Cable, Fiberoptic
1013 ❑ Cameras
1014 ❑ Camera Accessories (other than lenses and mounts)
1015 ❑ Camera Lenses
1016 ❑ Camera Mounts (tripods, pedestals, etc.)
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1018 ❑ Digital Disk Recorders, Video
1019 ❑ Editing Systems, Linear
1020 ❑ Editing Systems, Non-Linear
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1022 ❑ HDTV Production Equipment
1023 ❑ Lighting Equipment
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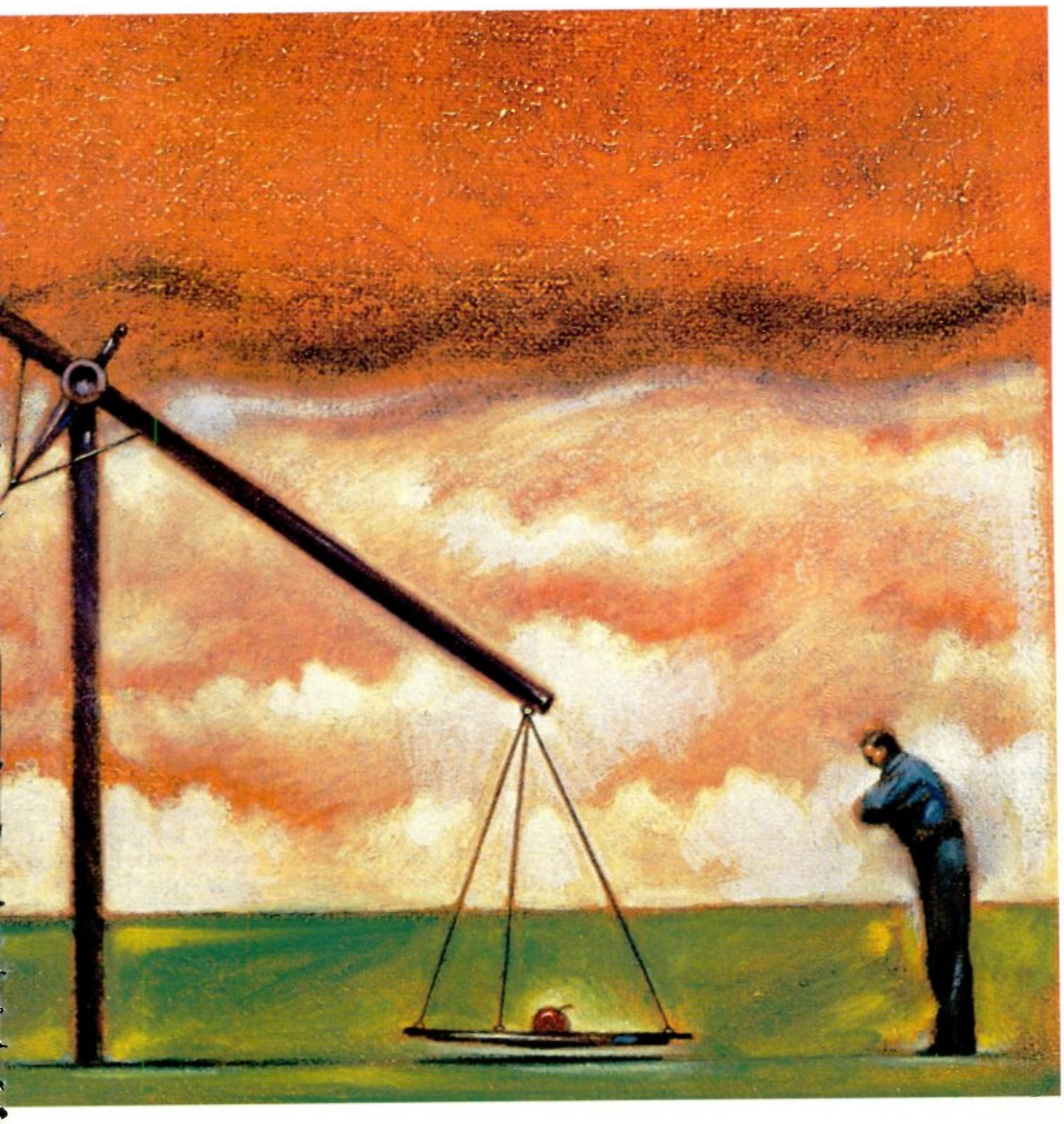
Toward Distributed Routing



chopping 82,944 crosspoints. An enormous amount of capacity and cost have been added to the system, and in all probability, the majority of this new capacity is simply not needed.

Perhaps the facility was adding a new editing room. That being the case, they could have added a smaller 16 x 16 or 32 x 32 router and satisfied their needs with growing room to spare. With the proper software and interface connections, the smaller router would allow the user to independently complete his work, yet connect seamlessly to the large legacy router when needed, and no one would ever know the difference...except the company controller!

A Close-Up Of One Facility

KREM-TV, the CBS affiliate in Spokane, WA., has taken such an approach to handle their rapid growth. Part of the A.H. Belo chain of nationwide stations, KREM recently needed to expand their routing capabilities when they added a second station, KSKN-TV, to their operation as part of a Local Management Agreement. They needed additional routing capabilities immediately, but were severely limited by their budget.

KREM's 60 X 50 Philips router, purchased in 1987 for several hundred thousand dollars, was at capacity and could not be expanded. "When we tried to upgrade the router, we learned the company no longer manufactured that version, so it was basically an obsolete router," said Boyd Lundberg, Chief Engineer for the station. "That created a whole new set of problems, as we weren't ready to make another large router purchase," he added.

By carefully analyzing their needs, KREM decided that a small router could carry the extra load. "We sat down and looked at every input and output and decided that we really didn't need a big router to handle the job; a smaller one could do what we needed, and it would be well within our budget," Lundberg said.

The company chose a Telect VersaFrame 2000 with a 40 X 32 router configuration. "We were sold on getting a smaller router, and we chose this particular product because we could put audio and video DAs into the same chassis." Lundberg said. "The modular design was a big plus because of the additional versatility it gave us. We added a lot more capabilities to our system at a very reasonable price."

Lundberg suggests that those considering the smaller routers should look for products that can handle a variety of functions and signals. "The more the router can do, the greater freedom it will give you as far as inputs and outputs to add to your system," he said.

The distributed routing concept works well for KREM because they carefully analyzed their needs in different areas. "When we were thinking about adding the additional router, we decided we could earmark different parts of the station where just the new router would feed," Lundberg said.

"Basically the news department uses the new Telect routers, as they only need certain sources. We were able to successfully segment the station a little bit according to what each area needed," Lundberg reported. "In some areas we are using both the Philips and the Telect routers, and in those situations we have both a Bosch and Telect control panel. Of course, not every input connects to every output, but in many cases you don't need all that connectivity. The key is careful planning," he added.

According to Lundberg, if he were to add another router configuration right now, he once again would go for a smaller router rather than a large mainframe. "Right now I would simply add to the existing Telect product, just to expand it a bit. It would be more cost-effective for us while meeting our current needs with a little room to spare," he said. "These smaller routers are great for handling incremental expansions," he added.

If engineers can look at the their station's needs with an open mind, decentralization of the routing functions will often be found to be a viable option for most small to mid-size operations.

A Bold Proposal For New Facilities

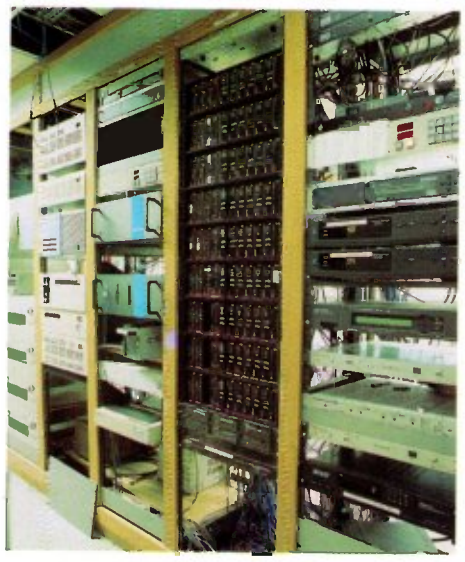
Those broadcasters who have a new facility on the drawing board have an opportunity to break away from the old way of thinking about mainframe router technology. By carefully analyzing their needs, many engineers, especially those in small to mid-size operations, might discover that a decentralized routing system could serve them far better than one large mainframe.

What's to be gained? A significant cost savings of potentially hundreds of thousands of dollars. In reality, very few operations need every input linked to every output. Even in the most demanding environments, the large router configurations can have 75% or 80% of their capacity completely unused. True, the cost per crosspoint decreases in the large routers due to economies of scale for components and packaging, but how cost-effective are these crosspoints in the real world if they are never used?

If engineers can look at the their station's needs with an open mind, decentralization of the routing functions will often be found to be a viable option for most small to mid-size operations. A series of 5 or 6 smaller router configurations. say 16 x 16s all linked together, will be a much more cost-effective approach than purchasing one large router.

To link the routers together easily, it's

Distributed routing is becoming the popular option among cost-minded, broadcasters switching to digital.



Telect's VersaFrame was a key tool in KREM-TV's move to smaller routers.

In reality, very few operations need every input linked to every output.

Instead, try a series of 5 or 6 smaller router configurations all linked together.

Moving is made simpler by smaller routers' compact, mobile design.

important to be able to address a number of decentralized routers individually from the same network of controllers. Using the same cable to daisychain all the controllers greatly simplifies the controller installation planning and cabling, while reducing the cost. A programmable controller that can address multiple routers from the same keypad further eases the migration to a decentralized concept.

Why continue on with something just because that's the way it's always been done, when there are more practical, cost-effective solutions available? Here again a lesson from the computer industry also applies: bigger isn't always better.

The Advantages Of Distributed Routing

The advantages of a decentralized routing system are many. Of course, cost ranks chief among them. Several smaller routers connected with the appropriate software and control panels will still be much more cost-effective than a large router purchase, plus the majority of the system will be used, not underutilized.

Secondly, the facility will no longer be at the mercy of just one mainframe router that can bring the whole operation to its knees should it fail. With a decentralized system, users have a built-in backup, allowing them to work around the router that is not functioning.

Smaller routers also save valuable real estate; they reside right in the rack with all of the other equipment. They do not require a dedicated equipment room, raised floors or a complicated cable layout, so installation costs are significantly less than with large routers. In addition, if it becomes necessary to relocate an editing bay or news area, the move is made much simpler since the router and its related equipment can simply be picked up and moved to the new location. To put it simply, smaller routers do not need the specialized "care and feeding" that large routers require.

Planning Is The Key

Decentralized routing requires a new creative way of thinking, one in which preplanning plays a critical role. In many ways, the large mainframe allows all of us to be a little lazy in our thinking; we know that whatever connection we need will be there, plus many that we don't need...but at what cost?

Planning a distributed routing system is not complicated, but it does require a detailed analysis of the facility. The engineer must carefully define his/her current and future routing and connectivity needs in different areas of the operation, then select the various routers that meet those needs, tying them all together when necessary.

With a little creative thinking and preplanning, a distributed routing system may be the right choice for your facility, allowing you to get the most from your investment in router technology.

Dave Tewel is the Eastern Region Account Manager for Telect, Inc, a manufacturer of professional audio/video and telecommunications equipment in Liberty Lake, WA. He can be reached at davet@telect.com.

More Information - Circle 302

Broadcast Flexibility with VersaFrame™

As broadcasters look for the best ways to ease the transition to digital technology, compact distributed routing is an answer that frequently arises. Telect's VersaFrame™ 2000 is one product in the marketplace that is designed to handle a variety of tasks in a distributed routing environment. The product offers a convenient, cost-effective way to combine audio and video, control distribution, switching, and processing functions all in one modular unit.

The VersaFrame consists of a three rack unit chassis and power supply with 10 card slots available for system expansion through a variety of modules. The modules may be a scalable router with input and output, or any number of other application modules. The UL-listed power supply, which occupies the 11th card slot, features universal input and switching power supply technology for safe, reliable power management within the frame.

All modules may be "hot swapped" to allow reconfiguring without shutting down the system.

The VersaFrame system can grow to meet the needs of a fairly large size router configuration as needed in some broadcast operations and production houses; the frames daisy-chain together for combining not only all of the router functions, but also all controller and video sync signals. The VersaFrame's modular approach of either 8-input x 8-output (50 Mhz) or 8 x 16 (150 Mhz) allows for cost-efficient expansion in small increments as needed. Users can closely select the actual router matrix required, knowing they can easily expand later.

The VersaFrame is an industry standout for users seeking configuration flexibility and packaging density. In addition to scalable routers, a variety of application modules are available for the VersaFrame, including audio and video DAs, serial digital DAs, serializers and de-serializers, stereo audio amplifiers, color bar/black/sync/tone generators, router controller modules for smaller configurations, plus a 16 x 16 serial digital router. In addition, a programmable remote controller is also available. The controllers, which come in 8, 16, 24, or 32-button configurations, allow users to set routing switches from a hand-held keypad programmer. Each button can be independently programmed for source, destination, levels and system identification, allowing users to essentially configure any kind of system to fit their needs.

Doubling Transponder Channel Capacity Economically

Continued from page 1

At the receiving sites the existing antennas and Low Noise Blockconverters (LNBs) generally will be adequate to receive both the analog and digital carriers. LNBs with very poor frequency stability should be replaced. Typically LNBs with frequency stability of 900 KHz or better will be adequate. The IRD can be fed with a split of the L-band signal feeding the existing analog video receiver.

A fully variable rate receiver, that supports variable symbol rate and FEC, should be used to maximize performance on both the analog and digital signals. Trade-offs in terms of bandwidth and power of the digital carrier are required to maintain an acceptable analog signal. The variable rate receivers allows the digital carrier to be sized so that maximum encoding rate (Mb/s) can be used.

Easing the shift to digital: Scientific-Atlanta's PowerVu system.

After preparing the transponder for the digital carrier, the revised parameters of the analog carrier are set out as shown in Table 1. Depending on the satellite system, the operation and back-off will vary from system to system. Table 1 below is intended to be a guideline. In practice the system will need to be "fine tuned" in terms of power and bandwidth to maximize the performance of both the digital and analog signals.

Table 1 used a 4.5 Msym/s digital carrier, and Table 2 shows the digital carrier's performance as a function of the FEC. As observed from the information rate data, the carrier at a conservative 3/4 FEC will yield 6.22 Mb/s available for the transmission of the digital program. This information rate should provide high quality pictures, given the improved encoding algorithms that are available today in digital systems.

It is important to remember that digital carriers have a very abrupt threshold. The video and audio will appear totally unaffected by transmission impairments above the threshold, and be completely degraded upon exceeding threshold. The threshold may be adjusted by varying the FEC or modifying the symbol rate. Margin for the digital carrier is achieved by either increasing the power, narrowing the carrier without changing the power, or increasing the error correction. By comparison, analog carriers degrade gracefully, becoming gradually more obscured by truncation noise over a wider C/N range.

By carefully selecting fully flexible transmission equipment, an operator looking to expand channel capacity is assured of the smoothest, most cost-efficient transition, and the flexibility to grow channels in the future.

Dual illumination does impact the analog carrier. S/N decreases 5 dB and C/N decreases about 4 dB. This degradation in signal quality may pose problems for the operator if the network serves a high concentration of consumer TVRO dishes. However, most consumer and simulsat TVRO dishes will be able to receive the signal if they are adequately peaked, and cross pole interference is kept to a minimum.

Over time, some operators may wish to increase the bandwidth of the digital carrier to increase the number of programs available to all sites. Having a flexible IRD, such as those in the Scientific-Atlanta PowerVu system, permits the digital carrier parameters (frequency, symbol rate, and FEC rate) to be changed over the air by downloading a new frequency plan from the uplink. The key benefit of the flexible IRD is that it can be configured in the field to operate with any combination of digital carrier parameters. This permits the operator to configure the digital carrier as either SCPC (Single Channel Per Carrier) or for multiple channels (MCPC).

In MCPC operation, utilizing a 36 MHz transponder entirely for digital transmission, an operator can carry 6 to 8 high quality programs in a single transponder depending upon the video encoding rates. A 36 MHz transponder will support symbol rates as high as 26.47 Msym/s. The information rate or available payload for video and audio will depend upon the margin of the transmission system and will be a function of the actual FEC. At 3/4 FEC, the information rate of a 26.47 Msym/s carrier is 36.59 Mbps.

A Workable Solution

In summary, for those operators who want to add channel capacity or desire to upgrade to digital, but do not have the luxury of adding additional transponder capacity, the transponder sharing approach provides a workable solution within the existing transponder capacity at minimum cost. By carefully selecting transmission equipment which offers full flexibility, the operator is assured of the smoothest transition and the flexibility to grow channels in the future. The Scientific-Atlanta PowerVu digital video compression system supports transponder sharing for an economical transition to digital, or for time-shifted or customized feeds to selected markets.

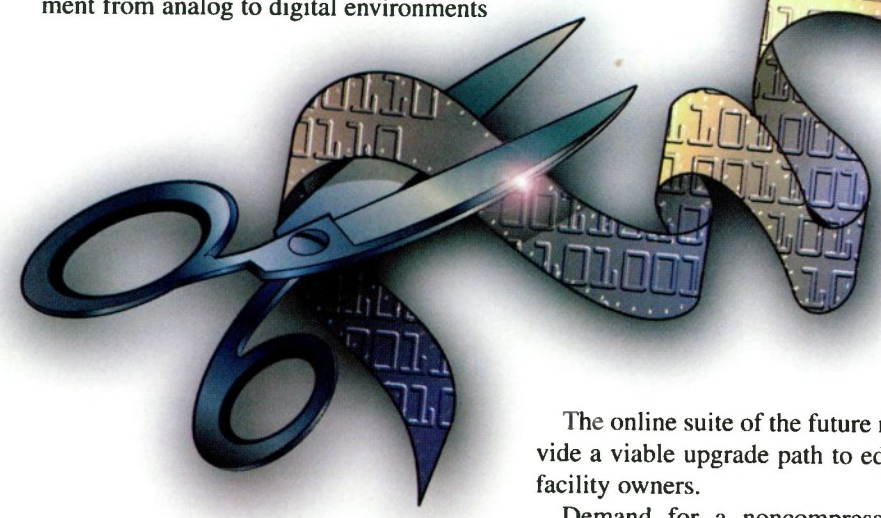
Joe St. Jean currently serves as director of Systems Engineering for the Satellite Television Networks business unit at Scientific-Atlanta. In 1993, he was the systems architect for Scientific-Atlanta, designing broadband interactive television networks for the interactive television trials. Joe was also the technical manager and lead architect for the SCARLET advanced video, audio, and data distribution system provided to the 1996 Olympic games by technology sponsors, Scientific-Atlanta, Panasonic, and BellSouth.

Digital Horizons

The Future of Online Editing

By Stéphane Blondin, Editing Product Specialist and Sandra Buckingham, Editing Product Manager, Discreet Logic Inc.

Time waits for no one. Nowhere is this more apparent than in the world of post-production and broadcast. In less than a decade, the change in the way creative people work has been nothing short of staggering. Most significant among these changes is the movement from analog to digital environments



and the emergence of standard platform or open system workstations. Discreet Logic's FIRE is one such system.

Linear online editing suites have attempted to replicate the real-time material access and versioning that non-linear systems provide, but until recentlly have been frustrated by their lower image quality. With recent announcements that HDTV technology will soon be set in motion, image quality has never been more important.

To succeed, the new digital online suite must build on the strengths of current linear systems and eliminate the weaknesses of non-linear systems. The online suites of the future must also provide seamless integration into today's post production facilities.

The Digital Transition

Until recently, the concept of online finishing was linked to linear systems such as Beta SP, Digital Betacam, D1 or D2. Traditional linear editing systems have been unable to match the power and features of ever-evolving general purpose computer platforms. If online, non-linear editing is to be not just a desirable, but a fully viable, solution for the industry, it must provide several key benefits: improved image quality, improved productivity, a flexible open platform, and seamless integration within the facility are the preeminent industry goals.

Early non-linear editing systems seized upon digital video compression as the technique to deliver real-time random access. For a variety of reasons, however, compression-based systems have enjoyed only moderate success as online solutions and have been primarily used and categorized as offline tools. Chief among these is the fact that compressed image quality degrades radically upon decompression, processing and recompression, and adversely affects the quality of keys and composites. The online suite of the future must provide the real time random access to source material and versioning capabilities that non-linear editing provides, while maintaining the noncompressed image quality achieved by traditional linear systems.

Enticed by the flexibility and fast-pace of software development, the industry has moved inexorably away from single-purpose black boxes and toward fully-integrated open platforms. In an effort to make the most of their investments, facilities now view software upgradability as a priority.

The online suite of the future must provide a viable upgrade path to editors and facility owners.

Demand for a noncompressed, non-linear online suite is voiced primarily by editors, facility managers, and administrators. Representing the more artistic side of the industry, editors need the speed and interactivity that only disk-based non-linear systems can provide. More concerned with efficient business practices, facility managers need integrated solutions that streamline the work of the editors and integrates well with the other aspects of the facility. After all, reducing operations time decreases overhead and increases billable time. Finally, accountants need equipment purchases to remain viable and provide upgrade paths, curtailing the purchase and support costs of black boxes.

Editing systems are now poised to fulfill the promise of early non-linear systems. There was a time when online editors made most editorial and creative decisions. Online editing is now ready to reinstate that creative control without sacrificing quality or efficiency.

Online editors must be able to make creative and editorial decisions, retouch graphics, perform complex layering and sophisticated audio editing. Online non-linear editing is much faster than with linear systems, allowing editors to develop concepts and experiment with new approaches.

Workflow Requirements

Creating an all-digital facility is a big job, requiring fundamental reconsideration of the way projects are accomplished. Digital infrastructure must combine the best characteristics of traditional post production management with the expanding capabilities of open systems. Emerging technology must provide seamless integration with other workstations.

In the ideal editing environment, complex activities operate seamlessly in the background. Editors can request and receive material quickly and reliably, and exchange images independently of resolution or formats, and thereby fix their focus on being creative. Advanced storage and connectivity-based infrastructure make this possible within a collaborative context, enabling editors to easily import effects, composites, and 3D graphics.

The editing process must be intuitive and interactive. Picture-based editing, where each clip is presented visually along with its timing and edit attributes, liberates editors from the tedious task of timecode computation, as all changes to the clip are reflected automatically in the displayed attributes. A natural extension is the use of a stylus and tablet, which provides editors with increased flexibility and the same sort of tactile creativity enjoyed by graphic artists.

A timeline is a convenient means to provide a graphical view of assembled shots along with logging and timecode information. When selecting shots, editors can mark in and out points and drop shots on the timeline.

From the timeline, the editor must be able to trim, slip and slide shots, and edit transitions. The system should be non-compressed and support real time playback of two streams of video, ideally at any resolution, to enable instantaneous viewing of transitions. The editor requires the flexibility to create an infinite number of video and audio tracks.

Trimming must be easy: drag the picture to the desired frame and the shot is trimmed. In addition, editors must be able to select, move, or extend transitions visually — just as they would clips — without having to manually type head and tail frame additions or subtractions.

Editors have longed for the ability to make uncommitted edits, allowing instantaneous versioning, as opposed to the time-consuming, and therefore costly, dubbing associated with traditional suites. This also reduces the wear and tear on taped source material.

Industry-standard EDLs need to be imported as selective edits or complete lists, and auto-captured with user-definable head and tail handles.

Editors also require easy access to clip libraries for in-depth source information on audio and video material. In addition, editors need to be able to manage separate projects by creating and customizing their own clip libraries.

Online editors also benefit from features such as selective colour correction, wire, scratch and dust removal, lighting and camera moves with true 3D perspective, and reliable stabilizing and tracking tools to be part of the digital edit suite. With these tools, editors can either finish graphics and effects tasks in the online suite to save time or send the job to dedicated suites. This allows facilities greater flexibility in the scheduling and performance of different types of projec saving time and money.

In traditional suites, dedicated hardwa is used to perform colour correction. Due the cost associated with these systen most facilities are limited to control of hu saturation and black and white levels.

Online editors want colour correction be more controllable and more precise. the ideal digital online editing suite, all a justments are accomplished with an int grated colour corrector. Adjustments a made in RGB or HLS colour spaces. Ed tors can adjust colour attributes interactive and make individual adjustments to t global image or just to highlights, midton or shadows. Foreground, background, a matte channels can be loaded into t colour corrector for colour matching and s lective colour correction. Editors can al crop images to make comparisons betwe original and completed shots. Most no linear systems include some colour corre tion capabilities, but they are often limite and provide minimal accuracy.

Many traditional linear suites compr mise key quality due to the cost of high pe formance dedicated equipment. Whi many non-linear systems offer keying c pabilities, it is often a labor-intensiv process to provide simply adequate qualit

As material often originates from a va riety of sources, online editors need th flexibility to approach a key in RGB YUV or HLS colour spaces to achieve th best result possible.

An extensive array of matte retouchin tools, including sub-pixel shrinking an eroding, as well as garbage mattes, are re quired to guarantee the most precise fit.

The provision of sophisticated colou correction algorithms enable editors to pu quality keys: color suppression to remov spills on key edges, and precise colou matching of foreground and background.

In a typical linear editing environmen when mattes are unavailable, a garbag matte must be generated through switcher using wipes.

In a non-linear, noncompressed editin environment, editors can generate clea garbage mattes or design multi-point geo metric mattes that can be automatically varied over time using keyframes an tracking techniques. Mattes can be re touched in the online suite for faster work flow or sent to the graphics suite. Editor can also perform wire, scratch and dirt re moval or make last-minute corrections avoiding costly delays and reshoots.

Online editors are often required to ad or replace objects into scenes, while matching motion and emulating perspec tive changes. Tracking may be difficult t accomplish if the point of reference is tem porarily hidden from view, so a tool equipped to handle this eventuality is cru cial. The combination of tracking and DVE tools allows editors to adjust and distor images, making complex functions such as four-point corner pinning possible.

Online editors often receive unusable hand-held shots or film-to-tape transfers with motion jitter. In the past, this neces sitated tricks with DVEs and slow motion to try to stabilize footage. Today, a reli able tracking tool helps editors achieve high-quality stabilization.

More Information - Circle 304

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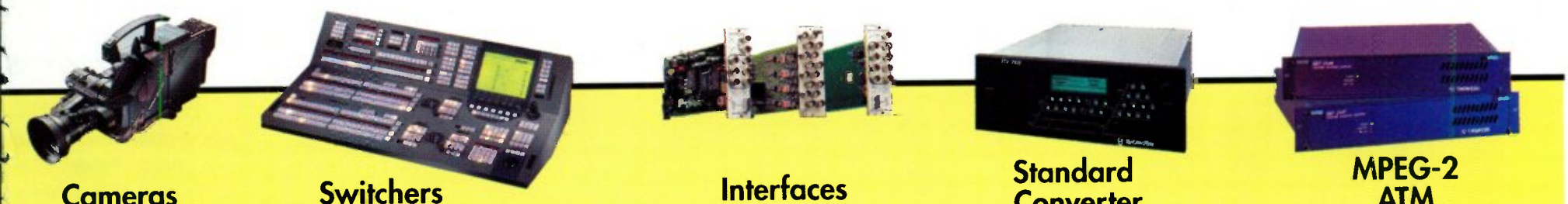

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THE BIG PICTURE

More Information Circle 200

FCC Reallocates Television Channels 60-69 (746-806 MHz) To Other Services

The Federal Communications Commission last month reallocated television Channels 60-69 (the 746-806 MHz band) to other services. This action fulfilled one of the FCC's obligations under the Balanced Budget Act of 1997. The Commission stated that the reallocation of these channels will help to alleviate a critical shortage of public safety spectrum, make new technologies and services available to the American public, facilitate the ongoing transition to digital television (DTV), and allow more efficient use of spectrum in the 746-806 MHz band. Specifically, the Commission allocated 24 MHz at 764-776 MHz and 794-806 MHz to the fixed and mobile services for public safety use. This spectrum allocation is the single largest allocation to public safety services in history, and more than doubles the total spectrum available to public safety agencies.

The remaining 36 MHz at 746-764 MHz and 776-794 MHz were allocated to the fixed, mobile, and broadcasting services. Licenses in this spectrum will be assigned by competitive bidding. These allocations were mandated by Congress in the Balanced Budget Act of 1997, which required the allocations to be made by January 1, 1998. On April 21, 1997, the Commission adopted a Table of Allotments to be used for DTV service during the transition from analog to digital television service. The DTV Table also facilitates the early recovery of a portion of the existing broadcast spectrum, specifically, channels 60-69, by minimizing the use of these channels for DTV purposes. All full service television broadcast stations will be protected against interference during the DTV transition period, which is targeted for completion at the end of the year 2006.

In 1995, the Commission and the National Telecommunications and Information Administration created the Public Safety Wireless Advisory Committee (PSWAC) to study public safety telecommunications requirements. On September 11, 1996, the PSWAC issued its Final Report. The PSWAC found that the currently allocated public safety spectrum is insufficient to support current voice and data needs of the public safety community, and fails to provide adequate capacity for interoperability channels or to meet future needs based on projected population growth and demographic changes. The PSWAC found that, in the short term, new public safety spectrum is needed, and concluded that public safety users should be granted access to portions of the unused spectrum in the 746-806 MHz band. This proceeding was initiated to address an additional spectrum allocation to meet expanding needs for public safety wireless communications.

The FCC has issued a proposal in a separate proceeding to develop rules for the public safety services that will operate in the channel 60-69 spectrum. This subsequent proposal includes the criteria for protecting existing analog TV and future DTV stations against interference. Service and licensing rules for the commercial portion of the channel 60-69 spectrum will be addressed in a future proceeding.

FCC Approves DBOVS As an Exempt Telco Company

The Federal Communications Commission in January granted Digital Broadcasting OVS, an LLC based in California, and its affiliate, Digivid, Inc., status as and exempt telecommunications company under Section 34 of the Public Utility Holding Company Act of 1935, as added by Section 103 of the Telecommunications Act of 1996.

The Open Video System, created by Congress through the Telecommunications Act of 1996 and regulated through the FCC, was focused on eliminating the exclusive position of the telephone and cable industries by structuring a way for them and other to compete in other telco territories, which were formerly monopolized. This structuring, which created equal access opportunities for television channel ownership, was also meant to foster vigorous competition among potential vendors. Among those vendors is Digital Broadcasting OVS, a licensed television broadcasting network.

"The goals set forth by Congress for the Open Video System are consistent with those of DBOVS," reads a statement available on the company's Web site (www.dbovs.com). "We want to make as many channels available for Video Programming Providers as possible and make it as easy as possible for VPPs to participate in our network."

DBOVS is the nation's first OVS Operator (network) licensed by the FCC to administer 500 channels of enhanced broadcast television sources covering the metro-area of Southern California with more than six million homes and 18 million viewers. The enhanced services will include higher quality programming signal with DTV and HDTV, expanded channel capacity and capability (500 6 MHz digital component channels), MPEG-2 broadband access, video-on-demand, and broadband MPEG-2 ML-MP Internet access.

DBOVS has also been approved to provide carriage privileges for VPPs in several categories, including 170 digital channels grouped into three sections (100 premium programming channels, 12-15 standard services, and 50-55 independent interactive channels), and 260 digital broadcasting channels.

Only five applicants have been approved as OVS operators, according to DBOVS. Four of the new OVS are larger telephone companies in the New York and New Jersey areas. DBOVS maintains that it is the only OVS on the West Coast, with license to cover the second largest television market in the U.S.

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