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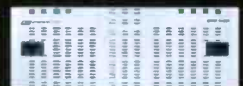
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Broadcast Engineering

THE JOURNAL OF DIGITAL TELEVISION

CONTENTS

FEATURES

57 NAB Replay

By BE Staff

Top products and detailed coverage from this year's NAB.

58 Pick Hits

By BE Staff

A panel of independent judges bestows awards on some of the best products displayed at NAB2005.

62 New tools

By BE Staff

From the first press conference to the closing hurrah, the *Broadcast Engineering* team covered it all. Readers go here to find what they missed.

62 Product jackpot

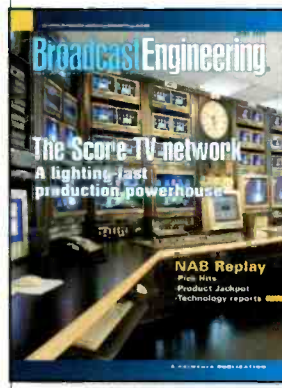
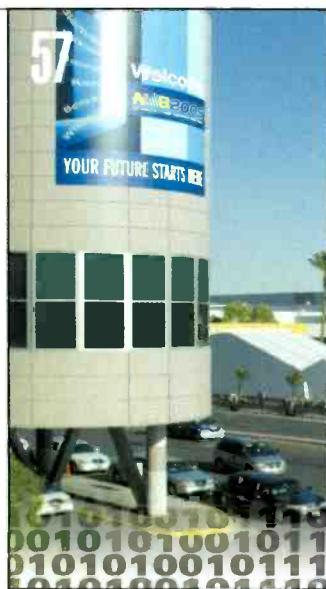
By BE Staff

This year's lineup includes products for applications from acquisition to post-production.

114 Special report: Implementing new workflow principles

By David Rosenberg

The author provides a roadmap to rethinking how things get done in the production environment.



BEYOND THE HEADLINES

Download

14 Close to the edge

FCC Update

20 Online tower construction notification

DIGITAL HANDBOOK

Transition to Digital

22 Digital video compression and noise

Computers and Networks

30 Switches for broadcast

Production Clips

41 Audio consoles

ON THE COVER:

The Score's master control room relies on dual Saturn production switchers, Grass Valley FeedClip ingest systems, Profile XP servers and Venus SDI/analog routers.

(Continued on page 8)

A man in a plaid shirt is seen from the side, operating a Panasonic AJ-SDX900 camcorder. The camera is pointed towards a beautiful landscape featuring a river, a field of golden grass, and snow-capped mountains under a clear blue sky. The word "sdxquisite" is written in large, bold, yellow lowercase letters across the middle of the image.

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CONTENTS

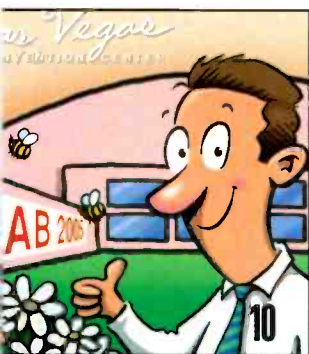
SYSTEMS DESIGN & INTEGRATION

Transmission & Distribution

46 The challenges of datacasting

Systems Design Showcase

52 High-performance production distinguishes The Score



NEW PRODUCTS & REVIEWS

Applied Technology

120 Fujinon's Precision Focus Assist system

126 Harris H-Class Content Delivery Platform

Technology in Transition

128 Production switchers



120

DEPARTMENTS

10 Editorial

12 Reader Feedback

131 Classifieds

135 Advertisers Index

136 EOM



126

FreezeFrame



What was the official attendance at this year's NAB convention? Up to 20 *Broadcast Engineering* T-shirts will be given away by random drawing. Enter by email. Title your entry "FreezeFrame-June" in the subject field, and send it to: editor@primediabusiness.com. Correct answers received by July 1, 2005, are eligible to win.

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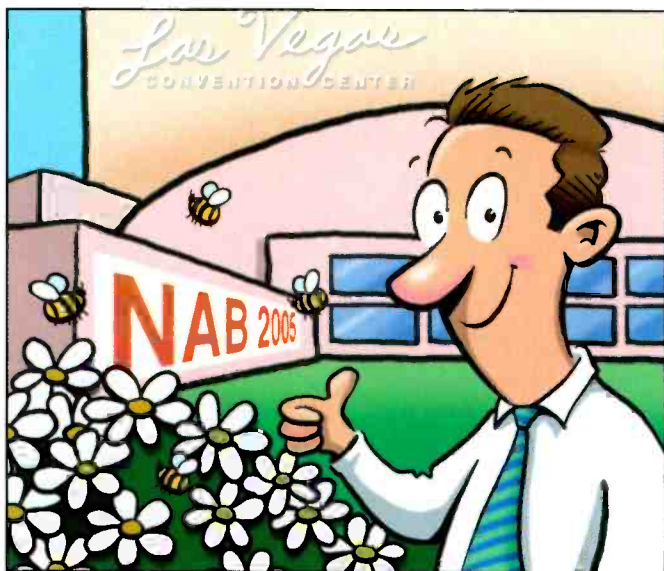
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The buzz is back

There was a loud buzz at this year's NAB convention, and it wasn't the honey bees swarming around the flowers at the Las Vegas Hilton. It was convention attendees and exhibitors excitedly talking as the television industry returned to Las Vegas to take the industry's collective temperature: maybe not hot, but certainly warming nicely.

The last five NAB conventions have been trying events. First, HDTV was hot, and then it wasn't. Enhanced 8-VSB technology was promising and could



even trump COFDM, but then it couldn't. The DTV conversion was here, but then it was delayed.

So what made 2005 a good year for the industry convention? Optimism. (I know, hard to believe, especially from this skeptical lot.)

What was obvious: Attendees were there to select technology, make plans and even spend money. That's what gave this show the buzz. People finally believe the worst is over, and better times are ahead.

Here are some of the, perhaps not so obvious, signs of change:

- *Fewer newbies:* The convention had the lowest number of new product introductions in at least 10 years. I don't remember when so many companies brought so few new products to the convention floor. You could count on one hand the number of new products be-

ing introduced in most booths. I recall one year when Sony announced some 80 new products. Not so this year. But, that's actually good.

The products in the booths were typically real and ready to ship. No one wants to see vaporware on the show floor, and there wasn't much this year. Attendees want to know that the products shown are available for purchase.

- *Serious attendees:* Exhibitors told me there was strong interest in buying. Booth traffic wasn't merely tire kicking — except by the totally inappropriately dressed student types, but that's another story. Perhaps because the heavy front-end expenses for transmitters has leveled off, facilities now have funds to spend on content and signal processing.

- *Mature HD:* Costs for HD products have come down, features have gone up, and it's possible to buy compatible SD and HD technology without needing a Ph.D. in astrophysics to install or use the products.

Oh, it didn't hurt to have several HDV introductions. Stations realize that their bread and butter is news, but few are interested in \$100,000 news cameras. The HDV products may not give news crews 100 percent of what they'd like, but at 10 percent of real HD's cost, I found no one complaining. Expect to see many more HDV products in the coming months.

Well, if the buzz is back, maybe we should bundle that bunch of bees and bestow them in the bonnets of our brain-dead congressional bureaucracy. Maybe then they'd get their collective behinds in gear and help us complete this digital transition.

Nah, that'd be too much to ask.

Brad Dick
editorial director

Send comments to: • editor@primediabusiness.com • www.broadcastengineering.com

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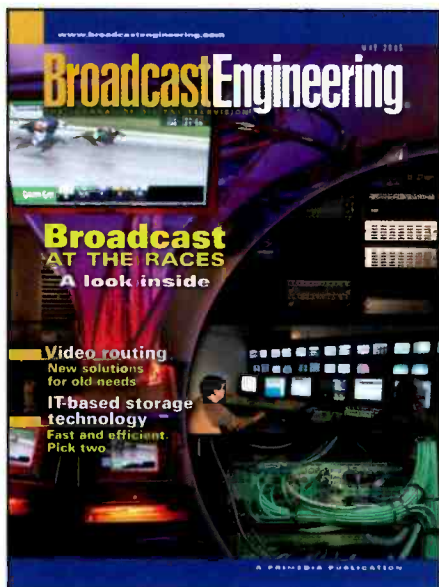
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It's all in the details

Michael,

I enjoyed your article called "Digital video basics" in *Broadcast Engineering's* May 2004 issue.

Where can I find a detailed block diagram of a CMOS (or CCD) broadcast digital video camera?

FREDERIC HAUBRICH
LUMIERE MEDIA
DOYLESTOWN, PA

Michael Robin responds:

For detailed product descriptions, you can consult their manufacturers, such as Sony or Panasonic. For general technical briefs, visit www.princetoninstruments.com.

Timing jitters

Can you recommend some reference guides on digital integration and trouble-shooting of timing jitter?

I'm trying to reach the Holy Grail of .2UI. The equipment seems fine until I try to genlock it all together. The generators are Tektronics SPG422, freshly cal'd. I'm at about .26UI. The generator bars are at .14UI. I'm looking to get maximum performance. Thanks.

STEVE A. ANDREWS
LOS ANGELES, CA

John Luff responds:

SMPTE RP184-1996 is the best reference on how to specify and measure jitter (available electronically at www.smpte.org). Tektronix, Synthesis Research, Videotek and others provide hardware to do the measurement. Keeping jitter low requires more than just good gunlock signal stability. Take particular care to ensure that all other sources are performing well and reclocking is done appropriately. If your system includes multirate routing, be sure to verify what clock rates it will reclock, and ensure reclocking is set the way you intend.

References

Dear Mr. Robin,

You have written many articles in *Broadcast Engineering* that have educated me throughout the years. I recently threw out a stack of magazines to conserve space. Do you have a book or CD that references most of what you have written?

DAVID VELAZQUEZ
SYSTEMS ENGINEER
SBC FREEDOMLINK
WI-FI GLOBAL MARKETS

Michael Robin responds:

You can access my articles going back to Sept. 1, 2000, on the *Broadcast Engineering* Web site. When displayed, go to "Search" and enter "Michael Robin." Then select "List results by date newest first" and enter "Search." For a wide range of subjects, you can buy my book *Digital Television Fundamentals*, published by McGraw-Hill.

Lost at NAB

A response to *Broadcast Engineering* e-newsletter writer Phil Kurz's May 12 NAB Update editorial on the confusing booth numbering system used at NAB:

I have been trying, for the life of me, to figure out the numbering system

used for layout of NAB booths in recent years. I am so glad that someone else has noticed. Taking into account the size of the show space and the number of booths, finding that vendor who is in a small space often becomes a real challenge. There have been times that I gave up on trying to locate a booth after wandering in circles, looking at the map, reading the numbers on the show floor and not being able to make sense or determine where the booth is located.

This year for the first time, I took the map printed in *Broadcast Engineering's* March issue with me to the show and used it as my primary locator. I found its 8 1/2inx11in size much more accommodating than the road map size handout you receive at the show. Opening up the giant road map with a crowd of 100,000 milling about and holding a briefcase and a bag of materials is a daunting task. Some of the booth numbers on your map were too small for my bifocal lens, but that is a result of my age and need for stronger prescription lenses.

ART KILLEY
ALLSTATE INSURANCE
TECHNICAL MANAGER
VIDEO/SATELLITE SYSTEMS
NAB ATTENDEE SINCE 1978

February FreezeFrame:

Q. What broadcast product company's name was fun and chief product's name resides in the Matrix?

A. Company: Play; Product: Trinity

No correct entries were received.

Test your knowledge!

See the FreezeFrame question of the month on page 8 and enter to win a *Broadcast Engineering* T-shirt.

Send answers to bdick@primediabusiness.com

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Close to the edge

BY CRAIG BIRKMAIER

Do you remember the first time you saw video playing in a postage stamp-size window on a desktop computer? Apple announced the first version of QuickTime at the American Film Institute in Hollywood 14 years ago.

Many broadcasters and video equipment manufacturers considered this to be some kind of a joke, certainly no threat to the TV in the family room or tools needed to create and distribute high-quality video. Besides, how could these new video files be delivered? Most PCs were still using floppy disks, and the ARPANET — the precursor to the Internet — was a virtual unknown research project created by the U.S. Defense Advanced Research Project Agency.

My first encounter with a video file came in the form of a floppy disk, from a company named SuperMac. The disk contained a modified version of the now famous Apple 1984 Super Bowl ad

introducing the Macintosh. SuperMac was intent on changing the world of media, with plans to turn a Mac into a platform for video production and distribution. It succeeded in convincing Apple that the vision was viable, which in turn led to the announcement of QuickTime, but the company did not

Video Team of the ITU and ISO. The popular acronym for this new codec is AVC, or advanced video codec. The standard is also known as the ITU standard H.264 or the ISO standard MPEG-4 part 10. ("Squeeze harder" on page 80 examines the AVC codec and other compression technologies,



As with any disruptive technology, some companies will fail to grasp the importance of what is happening — and will not survive.

survive long enough to see the full realization of its dream.

Fourteen years later, the Internet was abuzz in the wake of NAB2005. Veterans of the desktop video wars were amazed once again as they played full-screen 1280x720p movie files on their Macs, enabled by QuickTime 7 and a new standards-based video compression codec developed by the Joint

which drew considerable attention at this year's NAB.)

The delivery of high-quality video using broadband networking technologies has been feasible for several years, though it can be a time-consuming process, especially for program length material. The availability of affordable broadband connections to the Internet and a wide range of private data networks that offer improved performance for backhaul applications has set the stage for another revolution in the business of television.

As with any disruptive technology, some companies will fail to grasp the importance of what is happening — and will not survive. And some companies will embrace the changes that the new technology enables — and will thrive.

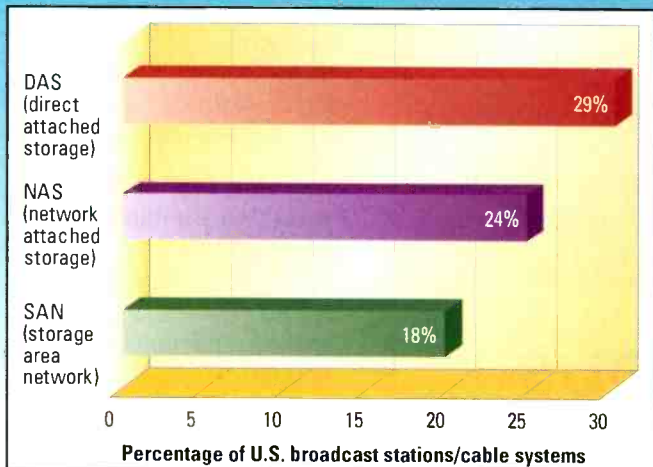
New plumbing

Most broadcast facilities were designed to deal with video as a continuous baseband signal. Analog routing switchers became a staple of the industry over the past two decades, allowing signals to be routed from one device to another. For example, to make a copy of a videotape, the outputs from one VTR would be routed

FRAME GRAB A look at the issues driving today's technology

Broadcast/cable storage capability

One in three U.S. broadcasters use DAS



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to the inputs of another.

In recent years, computer networks have been added in facilities, but rarely to handle the routing of video files. In the computer world, routing is very different from routing baseband video. Traditional audio/video routing switchers use arrays of crosspoints to facilitate connections that look much like those of a patch panel; electronic circuits act like the pieces of wire used to make connections in those patch bays.

Routing in a digital computer network is completely different. A network node has an address and the ability to receive and send data packets. Typically, many nodes share the same physical network links. Any device on the network can route packets to any other device on the network by identifying the address to which the packets are being sent; the other nodes ignore these packets. Because multiple devices can send bits at the same time, the data network re-

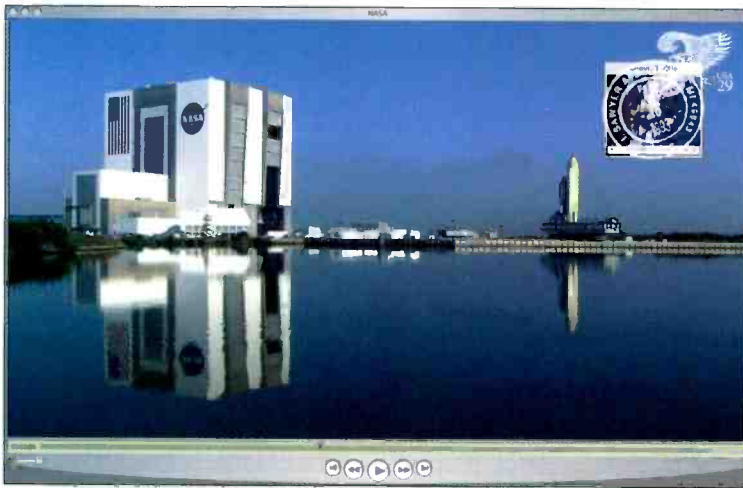
quires overhead to handle contention for access and the collisions that may occur if two or more devices try to transmit at the same time. As the data network becomes more complex, routers and switches are typically used to segment users and create connections between various sub-networks.

This all leads to a continuing debate

Ethernet nodes, or should the data networks be provisioned to deal with the movement of large media files?

The answer should be obvious, but perhaps not for obvious reasons. Most broadcasters believe that they will still be in the same business in the future, feeding one or possibly a multiplex of TV channels. The notion that in the future broadcasters may be delivering files to their viewers via over-the-air digital broadcasts and broadband networks has yet to sink in. However, the notion that it is now possible for broadband networks to replace satellite links and the physical movement of media (e.g., tapes and discs) for backhaul applications is beginning to sink in.

Ultimately, the survival of local broadcasting is likely to involve both traditional and new technologies, and thus, it would be wise to plan for the digital plumbing to support both. The main competitive advantage broadcasters



In 1991, QuickTime movies were the size of a postage stamp.

about the plumbing requirements for the broadcast and video production facilities of the future. Should the traditional routing switcher be upgraded to add dedicated switching for

casting is likely to involve both traditional and new technologies, and thus, it would be wise to plan for the digital plumbing to support both. The main competitive advantage broadcasters

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enjoy now — one that will continue to be important in the future — is that they are close to the edge of the Internet (not the digital cliff).

Any content, anywhere, anytime

Emerging digital technologies present broadcasters with all kinds of disruptions to what was once an easy-to-make-money business model, albeit, a model based on the concept of scarcity of programming choices. Cable and DBS have made inroads by addressing the issue of scarcity and, to a limited extent, by selling content directly to the consumer in lieu of all of those annoying ad interruptions.

The personal video recorder (PVR) makes it easier for consumers to time-shift their viewing and to skip ads. The delivery of video programming via DVDs and potentially broadband networks in the future, further undermines the traditional role that broadcasters have played as the gatekeepers of content for their communities.

There is a big buzz around IPTV. The term for the delivery of television programming using Internet Protocol networks is often misapplied. Several of the regional Bell companies in the United States are beginning to deploy IPTV systems. Like digital cable, these networks will support broadband data services, but the television services will not be delivered via the public Internet. These systems are being designed as walled gardens and provisioned to deal with the delivery of multiple programs simultaneously to TVs located throughout the home. A wide range of program choices will be routed to a neighborhood using IP multicast techniques, allowing viewers to select from the available multicasts. And only the programs the customer chooses to watch will be routed to the home. To do this, the system needs the ability to route between 25Mb/s and 50Mb/s to each home.

Today's broadband services are incapable of dealing with the delivery of hundreds of channels to the thousands of viewers in any community.

The bottleneck comes at the edges of the network, close to the customers, where everyone is vying for access to a new world of content. To alleviate these bottlenecks, companies such as Akamai mirror bandwidth-intensive digital media content on hundreds of servers around the world. This allows customers to access servers that are close to the point of consumption, avoiding many Internet traffic jams.

Broadcasters have been close to the edge from day one. They serve local markets and in the emerging digital world, they have the ability to serve up content of interest to their com-

Emerging digital technologies present broadcasters with all kinds of disruptions to what was once an easy-to-make-money business model.

munities — potentially offering a wide range of programming customized and localized to sub-markets and individual homes.

A DTV transmitter can push a virtual avalanche of bits into the homes in a community, and when properly integrated with broadband networks, it can become a two-way system capable of handling transactions and the localization of content to the IP addresses of individual viewers.

For today, broadcasters should be thinking about dealing with the internal movement of video files and the ability to ingest content from suppliers via public and private digital networks. With next-generation codecs, such as AVC, an SD video feed can be delivered at 700Kb/s to 2Mb/s, and an HD feed can be delivered at 8Mb/s to 15Mb/s. Already, many companies use broadband networks to deliver commercials to broadcast facilities; the delivery of program-length material is beginning as well. Cost saving relative to the physical movement of assets or the satellite time required to move them will be a major factor in the shift to broadband delivery.

Companies such as Telestream have been providing the systems necessary

to create distribution networks for companies with multiple locations and vendors for several years. And virtually all of the companies involved with video compression technology have the systems needed to take content from baseband into the world of IP, where it can be transported via public and private networks.

Likewise, many STL and remote microwave links are benefiting from the ability to compress the signals. JVC is promoting HD ENG, using its MPEG-2 encoder to squeeze HD signals into the bandwidth of a single baseband microwave link. As WiFi networks are

built out across the country, it may be possible to feed live radio and TV news reports using a notebook computer. We are all familiar now with live news reports delivered via broadband networks and satellite phones.

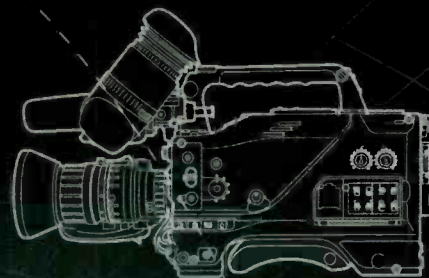
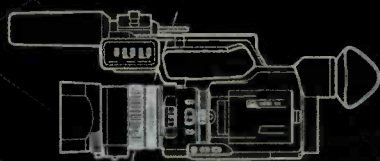
As broadcasters move into the world of Information Technology, they may discover a new world of opportunities to serve their markets. The ability to deliver bits of interest to your market and to use IT to reach sub-markets and individual homes, rather than feeding one signal to a transmitter that sends the same programming to the entire market, is likely to revolutionize our business. It is time to embrace this revolution; resistance is futile. **BE**

Craig Birkmaier is a technology consultant at Pcube labs. He hosts and moderates the OpenDTV Forum.

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Online tower construction notification

BY HARRY C. MARTIN

As most broadcasters are now aware, the National Programmatic Agreement (NPA) has gone into effect. The NPA implements new procedures that must be undertaken to assure that proposed tower construction complies with the National Historic Preservation Act of 1966 (NHPA), particularly with respect to the potential impact on areas under the jurisdiction of State Historic Preservation Officers (SHPOs), Indian tribes or Native Hawaiian Organizations (NHOs).

Last year, the commission established an online Tower Construction Notification System (TCNS) to facilitate compliance with those procedures. In April, it provided clarification about how that system is supposed to work in terms of assisting construction notifications to Indian tribes and NHOs.

Using TCNS, SHPOs, tribes and NHOs may enter and update the geographic areas for which they are interested in receiving notices. When you want to build a tower, you are re-

quired under the NPA to make reasonable good faith efforts to identify and make contact with any SHPO, tribe or NHO that may attach religious and cultural importance to your proposed site. Someone planning to construct a tower can, through TCNS, identify and make initial contact with organizations that may have an interest in the project. Keep in mind, however, TCNS is intended only to facilitate early notifications; sending TCNS notifications does *not* constitute a legally sufficient resolution under NHPA.

The system works like this: A tower proponent enters the geographic information about the proposal into TCNS. TCNS then forwards the notification to the SHPOs, tribes and NHOs that have expressed an interest in that geographic area. And, if one or more of these organizations has not specified any particular geographic area, then the FCC forwards *all* notifications throughout the entire United States. SHPOs will receive notifications of tower construction in their own and adjacent states. For example, an Indian tribe in Alaska will receive only notifications relating to proposals in Alaska, unless the tribe sets different preferences.

SHPOs, tribes and NHOs are entitled to respond to a TCNS notification. But, the NPA does not specify any deadline by which such responses must be made. So if you propose a site in an area in which an SHPO, tribe or NHO has specified an interest, and if the group does not respond to your notification, you have to make a reasonable effort to follow up. And if they *still* don't respond, you must then seek guidance from the commission.

The job is even tougher when it

comes to tribes and NHOs that have not designated any geographic areas of interest through TCNS. For them, you must undertake reasonable, good faith efforts to determine whether any tribe or NHO might attach historic, religious and cultural significance to the property. If you conclude that such an organization may attach such significance, but has not responded to the TCNS notification you filed, you have to follow up and, if you still get no response, you, too, must seek guidance from the FCC.

Of course, if you determine that no tribe or NHO is likely to attach such significance to the area, you don't need to take further action unless a tribe or NHO at some later point indicates some interest or other evidence of potential interest comes to the applicant's attention.

Thus, while it is true that by entering your proposal into TCNS, you theoretically can notify all potentially interested SHPOs, tribes and NHOs, the burden is still on the applicant to check into whether the proposed site may be of particular interest to any tribes or NHOs that have not indicated any specific interest in the area of that site. And once notices have been given to all potentially interested SHPOs, tribes and NHOs, the applicant must still follow up if no response is received. If no response to the follow-up is received, the applicant is *still* not out of the woods — the next step is to seek guidance from the FCC. **BE**

Dateline

Aug. 1 is the deadline for TV, TV translator and Class A TV stations in Illinois and Wisconsin to file their 2005 renewal applications, biennial ownership reports and EEO program reports (FCC Form 396). Forms must include the station's EEO public file reports for the 12-month periods ending in July 2004 and July 2005.

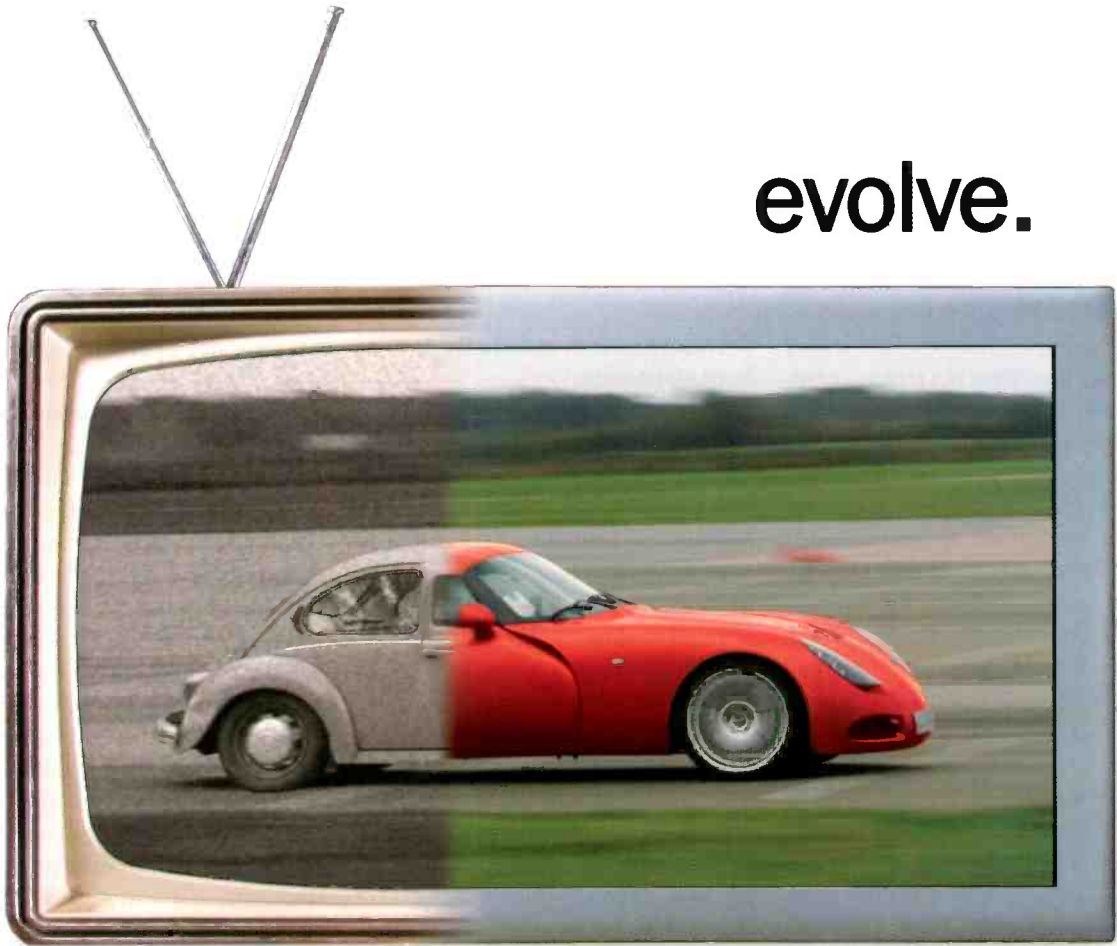
Aug. 1 also is the date when TV stations in Iowa and Missouri must begin their pre-filing renewal announcements.

Harry C. Martin is president of the Federal Communications Bar Association and a member of Fletcher, Heald and Hildreth PLC, Arlington, VA.



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Digital video compression and noise

BY MICHAEL ROBIN

Analog video performance tests are usually carried out using static waveforms. Signal quality measurements are a reasonably good way to determine the picture quality. This is due to the fact that there is a strong correlation between the shape of the video test waveforms and the perceived picture quality with very few exceptions.

The reason signal quality measurements work with analog and full bandwidth digital systems is that uncompressed systems are linear. Signal quality testing does not work well with the compression/decompression processes. Traditional test signals are easily compressed with little distortion or loss.

Due to the lack of distortion, these signals do not evaluate the compression/decompression process. For example, classical signal-to-noise ratio (SNR) measurements using a flatfield

or a ramp are not a reliable measure of compressed picture quality. They are not constant and can give misleading results.

Compression-related impairments

Video compression is a nonlinear process. The picture quality is a function of bit rate, picture complexity and encoding algorithm capabilities. MPEG-2 is essentially a lossy compression method. The compressor analyzes a video image, decides what is important information and discards the unimportant information.

Compression algorithms are very good but not perfect. Sometimes certain areas of the image are considered to be less important than others. If important information is discarded, this becomes evident after decompression. Typically, the background of the image, particularly the darker

areas, are affected. These distortions have a noise-like appearance and can be categorized as:

- *Edge business*: Distortion concentrated at edges of objects, moving artifacts or noise patterns superimposed over objects.
- *Mosquito noise*: Edge business associated with movements.
- *Quantization noise*: "Snow" or "salt & pepper" similar to random noise but not uniform across the image.

None of the standard analog SNR tests are adequate. Compressed video tests compare the picture changes to a reference. The tests are useful only if they have a good correlation with subjective tests. One of the testing methods was developed by Tektronix and uses the PQA200 picture quality analysis system. This system expresses the compress/decompress performance of a system in picture quality rating (PQR) and peak signal to noise ratio (PSNR). The system is based on the Just Noticeable Difference (JND) concept developed by the Sarnoff Research Institute.

The PQR performance measurement compares the reconstructed image present at the output of the system with that present at the input of the system, pixel-by-pixel, and expresses the difference in numbers representing the deterioration perceived by the human vision system (HVS). The comparison is carried out by a computer that uses an algorithm simulating the HVS. The performance levels expressed in PQR on a scale of one to 10 are interpreted as follows:

PQR = 1: The picture degradation is hardly perceptible.

PQR = 3: The picture degradation is slightly visible.

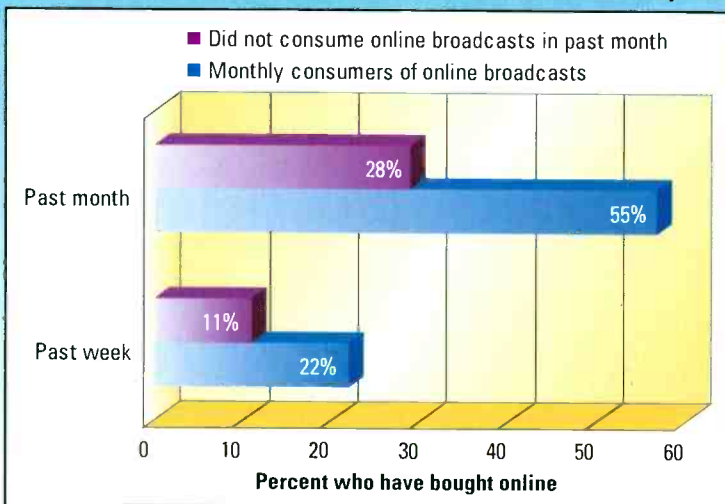
PQR = 10: The picture degradation is highly visible.

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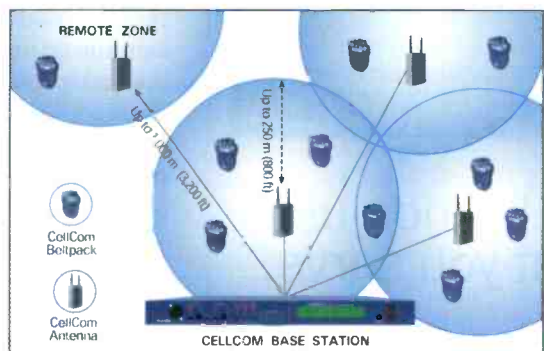
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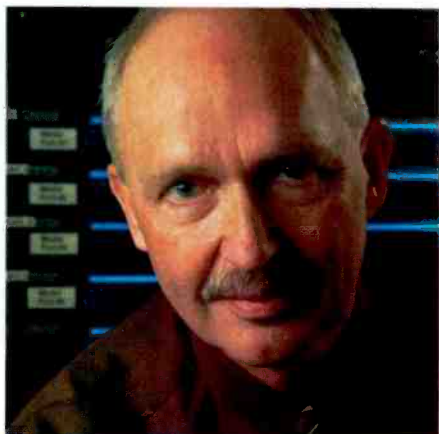
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The PQR measurement can be carried out on the luminance signal (PQRy) or on the luminance and chrominance signals (PQRyc). The PQRy measurements are carried out only on the Y signal to speed the process. The results permit the comparison of various technologies or equipment in most cases.

The PQRyc measurements are carried out on the luminance and chrominance components. They last longer and allow a more complete analysis. The result is a single number that characterizes the quality of the reconstructed image.

The PSNR measurements are esti-

	Sequences	Diva	BBC	Mobile
Measured parameters	PQRy	2.14	3.10	4.95
	PQRyc	2.22	3.2	5.12
	PSNR (dB)	40.28	34.31	28.41

Table 1. Test results of the MPEG codec

mates of the quality of the reconstructed image compared to the original image and are expressed in dB. Acceptable PSNR figures vary between 20dB (acceptable) and 40dB (excellent).

Double-ended systems have access to the pre- and post-compression program material. By comparing the original image and the post-compression image or the level of pre- and post-compression impairment, an indication of picture quality can be gained. This obviously has the limitation of the need to have access to the original signal.

Various video test sequences are available on CD-ROMs. A sequence

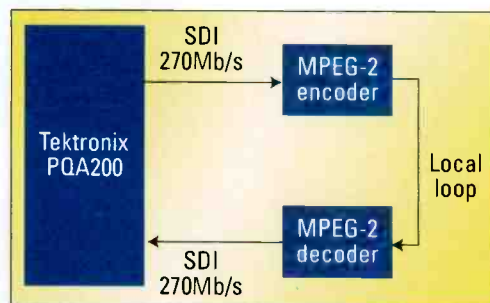


Figure 1. Equipment evaluation test setup

lasts five seconds, of which two seconds are used for analysis. I have been using three sequences, known respectively as "Diva," "BBC" and "Mobile with calendar." These sequences have different image details and movements complexity. "Diva" is the least

stressful, and "Mobile with calendar" is the most stressful.

It is important to note that manufacturers of MPEG compression and decompression equipment (at least the

ones I know of) do not offer performance specifications other than as PAL or NTSC analog composite linear distortions, nonlinear distortion and noise. These performance figures are relevant to the analog composite input-decoder/output-encoder (if any) performance and, therefore, have nothing to do with the MPEG-2 compression/decompression performance.

Typical measurement results

Some time ago, I was involved in the specification and acceptance tests of a bidirectional (Canada>Europe>Canada) MPEG-2 system with input

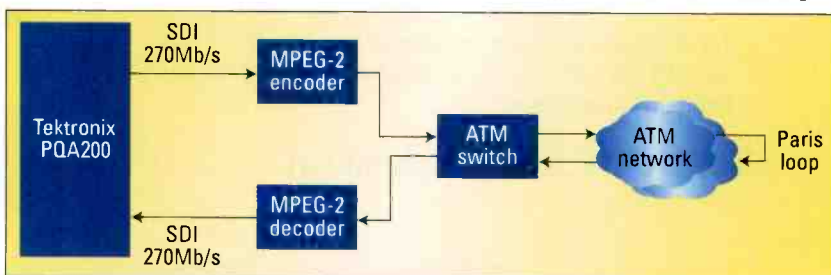
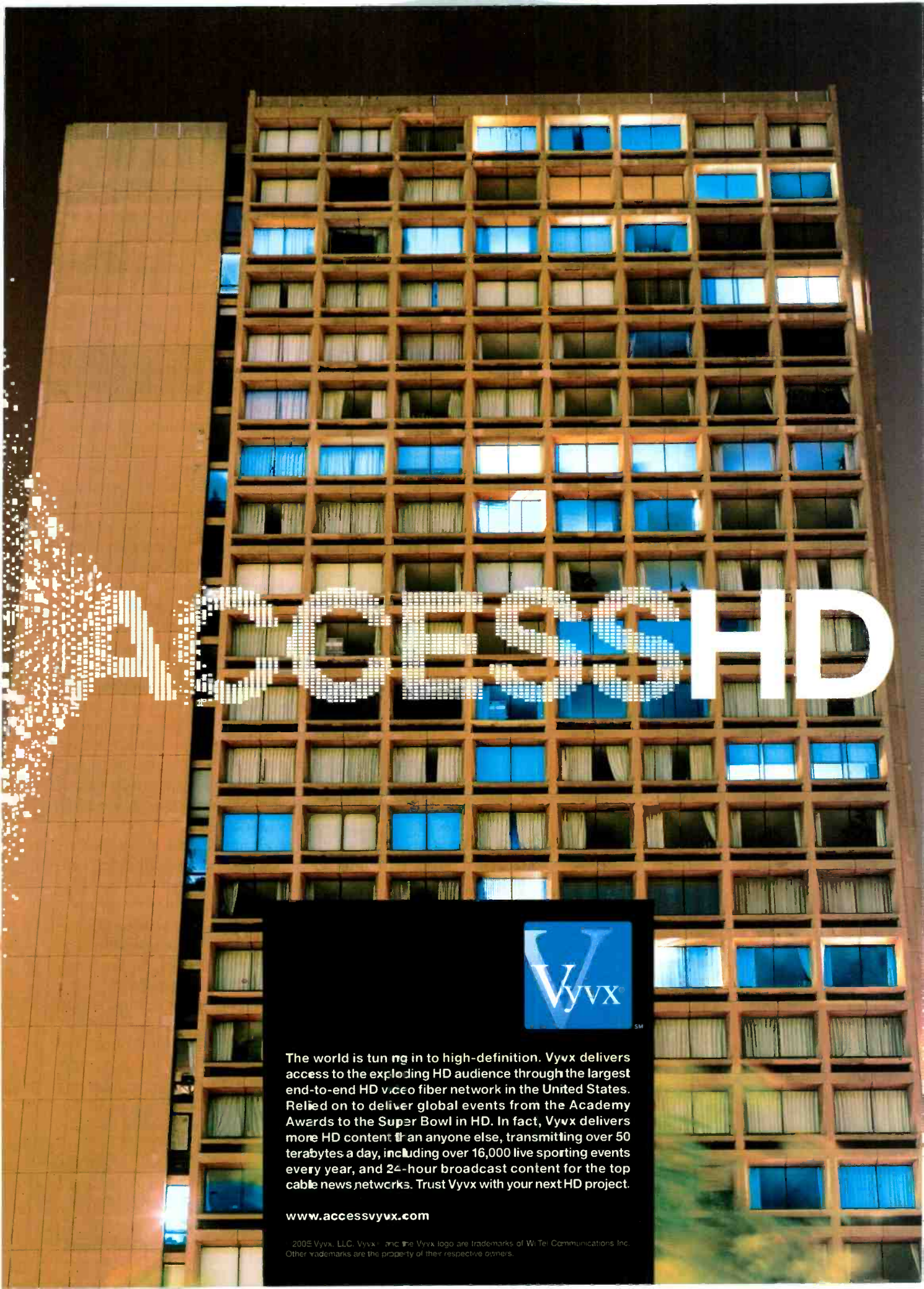


Figure 2. Bidirectional test setup with loop-through in Paris



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and output SDI 270Mb/s and a 4:2:2 compressed video bit-rate of 7.3Mb/s. The distribution network was fiber-optics, and the transport mechanism was ATM. I carried out several sets of tests using the three video sequences known as "Diva", "BBC" and "Mobile with calendar." I am presenting the results of two tests:

Test #1: A local equipment evaluation consisting of a PQA200 analyzer, an MPEG-2 compressor and an MPEG-2 decompressor. The test setup is shown in Figure 1 on page 26 and the test results in Table 1, also on page 26.

Test #2: A bidirectional (loop-

	Sequences	Diva	BBC	Mobile
Measured parameters	PQRy	2.15	3.14	4.98
	PQRyc	2.24	3.224	5.16
	PSNR (dB)	40.13	34.04	28.52

Table 2. Test results of the MPEG codec with the intercontinental loop

through) test comprising the transatlantic bidirectional ATM transport with a loop-through in Paris. The test setup is shown in Figure 2 (on page 26) and the test results in Table 2.

Comparing the results in Table 1 with those in Table 2, you will notice an almost imperceptible picture degradation. This reinforced the expectation that under normal circumstances, the picture quality is essentially determined at the beginning (compressing) and the end (decompressing) of the transmission link. Given error-free transmission of the data signal, the picture quality remains unchanged over the entire path.

Conclusion

The compressed picture quality affects everyone in the broadcast chain. The most effective approach to assessing the performance is a combination of subjective and objective tests. The test setups and the video sequences used need to be consistent, and the measurement results should be referenced to an industry standard.

Broadcasters still have the problem of ensuring adequate picture quality through the transmission chain. This requires the maintenance of the highest standards, including the interoperability of concatenated compression/decompression systems using different technologies. An often neglected aspect is the statistical multiplexing of several programs, which generates a time-varying quality factor. As you undoubtedly noticed, we are not quite there yet. **BE**

Michael Robin, a fellow of the SMPTE and former engineer with the Canadian Broadcasting Corp.'s engineering headquarters, is an independent broadcast consultant located in Montreal, Canada. He is co-author of "Digital Television Fundamentals," published by McGraw-Hill and translated into Chinese and Japanese.

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The Cast (In Order of Appearance)

Aspect Ratios: Native 16:9 and 4:3	As Itself
Frame Rates: 60i, 30p, and 24p	As Itself
3 Progressive Scan CCDs	As Itself
Customizable Cine Settings	As Itself
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Switches for broadcast

BY BRAD GILMER



As I travel around the country, I find that more and more broadcasters are deploying IT-based technology in the core of their facilities. But at a recent SMPTE meeting in Atlanta, people expressed a high degree of frustration with IT engineers, while simultaneously saying that they recognize that they need the skills that the IT engineers possess.

As IT-based technology becomes more central to our core operations, one area of extreme importance is switching. Analog and serial digital interface routers are critical to our operations, and broadcast engineers understand the nuances of these components better than anyone, except

face questions about why we need to purchase a \$2000 Ethernet switch when the same switch is available for \$95 at a local office supply store. Well, here are a few areas to consider:

Backbone capacity

The ability of a switch to get all the traffic from input to output is affected by the overall backbone capacity of the switch. If both switches have 10 ports, the less expensive switch may have a backbone capacity of 200Mb, and the \$2000 switch has a backbone capacity of 1Gb. This means that theoretically, the more expensive switch will be able to carry all the traffic without delaying or dropping traffic because of insufficient bandwidth on the backbone.

network faster, but a blocking switch just means that the network will run slower. Depending on the criticality of the network, a loss in speed may be acceptable. But if the speed of delivery of data across the network is critical, then a non-blocking switch may be worth the extra money.

Management

More expensive switches frequently provide remote management. Remote management allows the people responsible for the network to be able to collect performance and maintenance statistics from the network components while the network is in operation. This is usually provided using the Simple Network Management Protocol (SNMP).

Typical SNMP applications allow the user to build a map of the network. The components of the network can be color coded to show their status. Such a map provides a quick assessment of network health and can allow

maintenance personnel to quickly determine the location and nature of a fault. Some SNMP monitoring applications provide phone-home capability in which the monitoring application notifies maintenance personnel of failure by e-mail or cell phone.

Redundancy

More expensive network switch components can be configured to provide redundancy on several different levels. Port redundancy allows the system to mirror traffic on multiple ports. Should one port fail, the second port continues to function. Of course, this capability assumes that the server,

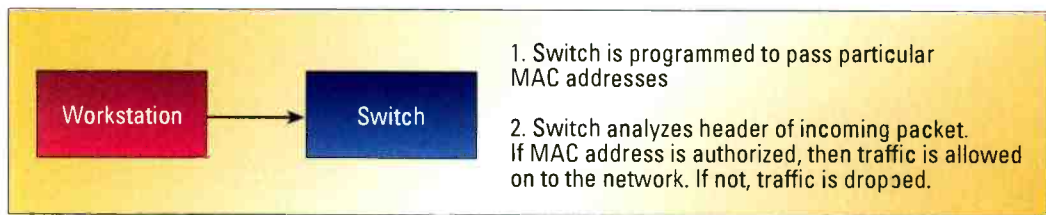


Figure 1. Layer 2 security allows the network engineer to permit traffic to pass through a switch based upon the MAC address of the individual workstation.

perhaps the people who designed them. The time is soon approaching when broadcast engineers will need to understand Ethernet and Fibre channel switches just as well.

For those of you who are saying, "Ethernet switches in my core!? No way," I would like to remind you that the same thing was said about MPEG compression, DV cameras for news and countless other technologies.

Not only have many of us had to deal with the introduction of new technologies, but also we have had to implement these technologies under closer financial scrutiny than ever before. In this environment, we often

The more expensive switch is non-blocking. That is, it can carry the maximum amount of traffic that could possibly be presented at its input without dropping any traffic. However, when the less expensive switch is presented with data to switch at all of its inputs, some of the data will have to wait because the switch does not have enough capacity to handle it all. This is known as blocking.

Because of the way Ethernet and various protocols are designed, a blocking switch may result in slower throughput, but it is not usually fatal to the network. In other words, a non-blocking switch will make the overall

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WEEE: requires suppliers to arrange "take back" and **achieve recycling minimums** of end-of-life eqpt.

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workstation or other equipment connected to the network is capable of using two network interfaces and of switching to a backup interface should the main interface fail. While this capability may seem rather exotic, I am finding that it is becoming more common.

Protocol support

If your network is only supporting conventional traffic such as e-mail, network file services, Web browsing and so on, chances are that the less expensive switch will perform just as well as the more expensive model. However, if you are trying to do multicast streaming or QoS reservation, you will most likely find that the switch will not meet your needs. The reason is that as users needs become more advanced, more protocols have been developed. Some of these protocols build intelligence into the network itself.

In the case of multicast, there is a lot of knowledge built in to the network about who is participating in the multicast and where streams of the multicast are replicated.

If you are trying to do multicast streaming or QoS reservation, you will most likely find that the less expensive switch will not meet your needs.

With QoS reservation, there are a number of protocols available. There are also small variations in implementation of these protocols.

Even though the Internet Engineering Task Force (IETF) has produced a number of Request for Comment documents dealing with QoS, the implementation of these in less expensive routers is spotty at best. The result is that a client requesting a specific QoS may not receive what it is expecting because a less expensive switch somewhere along the way did not know how to interpret the client's request.

Customer support

If your needs are basic, then there is almost no need for customer support on a switch in an Ethernet network. In this case, the less expensive switch is the way to go.

One should realize that these switches are produced in consumer quantities. It is almost impossible for a manufacturer to provide in-depth customer support on a product when there are hundreds of thousands of items in the field. If you are using more advanced features, such as network management or less common protocols, then you may find that you have a need for more advanced customer support.

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Firmware upgrades

In many cases, it is not necessary to have a switch that is software-upgradable. But if you are deploying the switch in a network where you need to be able to deal with advanced protocols or where the switch is also serving as a firewall, then software upgrades will be important.

Usually upgrades are downloaded from a Web site and then loaded on to the switch. When the upgrade is executed, new software is loaded into EPROM on the switch. In all but the most expensive switches, you will have to reboot the switch to load the new software.

Layer 2 level security

Security on broadcast networks is frequently a serious concern. In most facilities, the last thing you want is to have someone carry an unauthorized laptop into a technical area and plug it into the network.

More expensive switches can be programmed to allow only certain computers to connect to the network based upon that computer's Media Access Control (MAC) address. Once a computer's MAC address is verified, the computer's packets are allowed to transit onto the network. While MAC addresses can be spoofed, this approach does provide an enhanced degree of security and it prevents someone from plugging into the network inadvertently. (See Figure 1 on page 30.)

Protocol blocking

Broadcasters frequently would like to prevent particular protocols on their networks. While undesired traffic is usually blocked at a firewall, it is possible to program a more expensive switch to refuse to pass particular protocols. For example, you could block the SNMP if you wanted to be sure that mail traffic was not allowed on the network.

One key thing to consider is that you *can* mix full featured switches with less capable ones, but you need to be careful. For example, if you are using QoS protocols that are not supported by the less capable switches, then QoS will fail across the entire path. This points out the value of becoming educated about IT. Learning about the technology will allow you to take advantage of high-volume, low-cost products to lower your overall facility costs. But you must know what you're doing to get satisfactory results.

BE

Brad Gilmer is president of Gilmer & Associates, executive director of the AAF Association and executive director of the Video Services Forum.



To order Brad Gilmer's book, *File Interchange Handbook for Images, Audio and Metadata*, from Focal Press, visit www.focalpress.com or call 800-545-2522. The book is also available from most major booksellers.



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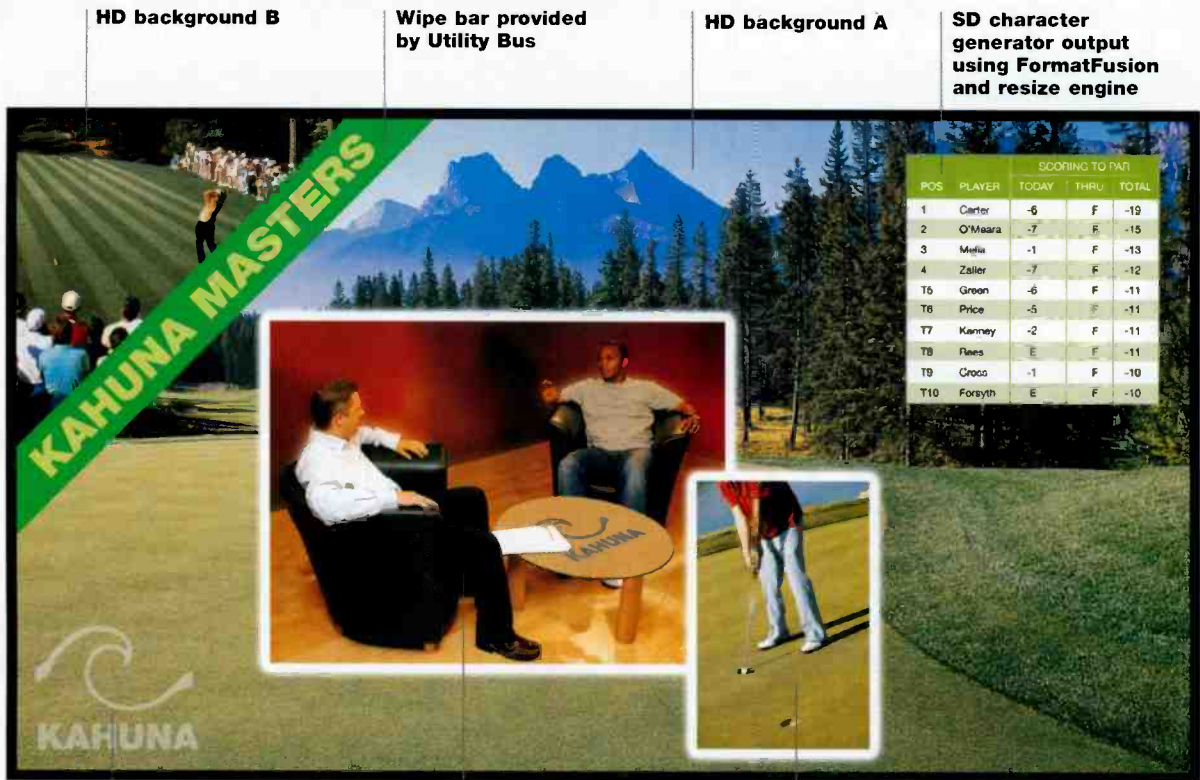
Even more remarkably, thanks to a new technology called FormatFusion, it enables you to integrate any SD material, such as camera feeds, graphics or archives into live HD productions, seamlessly, without the need for upconversion.

Kahuna is a truly multi-format system that puts you in control of your transition to HD. It gives you the flexibility to use existing SD equipment, without the cost of completely re-equipping with HD.



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Example of HD Output from a Single M/E Using Mixed SD/HD Inputs



HD background B

Wipe bar provided by Utility Bus

HD background A

SD character generator output using FormatFusion and resize engine

Animation via one of the internal clip stores

HD camera studio shot 'squeezed back' using picture resize engine

SD hand held camera shot using FormatFusion and resize engine

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- Familiar, intuitive control panels
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- DMEM and GMEM snapshot save and recall memories

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Options

- Four twin channels / 8 channels of 3D DVE effects with warps, lighting and trail store



Audio consoles

BY JIM STARZYNSKI

In the mid 1990s, the professional audio console business was engrossed in the transition from analog to digital technology, keeping pace as recording studios and television networks and stations laid out the groundwork for a digital revolution of their own. Now, in 2005, looking back at the evolution of first- and second-generation digital mixing consoles, they have all but replaced analog consoles. Broadcasters are reaping the benefits of each and every development that these early digital mixers pioneered.

Today's console features are up, reliability is strong, and pricing is lower than the cost of their early ancestors from the 1990s. Research and development costs have been recuperated, the price of DSP is down, and suppliers are now concentrating on maximizing their investment by offering a family of similar and powerful products targeted at different customers across many TV markets.

A winning combination

Console manufacturers may start a new product line focusing on the flagship model that can be fitted with the most channels and can have the largest physical footprint and an abundance of features. This product can cover all the bases for the most de-

manding broadcaster, but at a "network level," cost may not be within reach of a market primarily composed of hundreds of TV stations with limited budgets.

facturing. The next logical step is to offer a scaled-down version of the already designed top-of-the-line model. This desk is designed around a smaller, less expensive control surface with similar features of the flagship in a more cost-effective, but limited, package. It benefits by using the same mixing engine while being targeted at a broader customer base. Although this version of the console may have fewer channels and features, it's still a win-win situation for the station and engineer.

When selecting a smaller to mid-size console, the station profits from all the development gone into the flagship console. Often this means the customer gets identical hardware and gains an advantage from the technology, expertise and service of the high-end product at a lower cost.

Know your requirements

The person tasked with ordering a new audio console first needs to collect some important information

about the operation to be able to identify the right console to do the job.

The primary question often becomes: How many channels should the console handle? Because the console is digital, the number of faders necessary to

access them becomes a second issue. Inputs can be running under the direct control of a fader or assigned to the "B" layer (or more) of the console, only tying up a fader input strip when an adjustment is required.

However, operators typically need instant access to a channel's level. Though digital technology makes it possible to run many channels of audio from an assignable and smaller control surface than from analog desks, there must be enough strips to access all necessary channels immediately, and layering should be reserved for less demanding sources.

Next, you need to determine how many outputs are needed. Start by considering the most demanding show your facility produces. Unlike adding additional input channels with



Presets, automation, snapshots and other tools make today's audio engineer's job easier. NBC Universal's mixing engineer Fred Zeller uses a Calrec Alpha 100 in Studio 6A at Rockefeller Center.

Today's console features are up, reliability is strong, and pricing is lower than the cost of their early ancestors of the '90s.

Enter digital technology and manu-

a mini mixer for election night, it's difficult and often impossible to add unique outputs to the mix without a complicated add-on matrix. Mix-minuses for talent, clean feeds for control-room monitoring, in-house MATV feeds, and a main monaural mix, stereo, and even 5.1 channel program busses all require separate outputs. Some consoles offer a mix-minus per input channel as standard, and some use an assignable buss. Aux send outputs are available from the input strip and vary in quantity, usually between six to 10.

Getting the right mix of I/O interfaces can be a real challenge. Every signal that's connected to the digital audio console will need the proper format connection. A list of microphones, analog sources and destinations, AES digital sources and destinations, and monitor paths should be used to calculate the amount of necessary conversion frames required for each format. Costs can quickly add up when standard I/O frame packages are exceeded and another frame is required for only one or two leftover circuits.

The added benefit of this type of interconnection is its built-in routing capabilities. Any source can be applied to any input and any input to any output. In some cases, inputs and outputs can be connected without the audio console in the circuit, potentially handling all the audio routing needs of the facility.

Today's features are abundant

Digital consoles with today's lower-cost DSP chips offer a tremendous variety of features while using mature digital control and solid mixing engines. Consoles often provide easy-to-see TFT metering displays, but conventional LED bargraphs and mechanical VU meters are also available.

TFT displays may offer more customizable information in less space with choice of scaling and ballistics. They not only monitor the signal but also can analyze it by showing EQ, dynamics

and signal path information on an as-needed basis, whether the signal is mono, stereo or 5.1, from a choice of points in the circuit. Much of this is now standard on many consoles.

Inputs may be assigned as mono, stereo or 5.1 as well, all under the control of one fader or broken away to individual channels when discrete adjustment is required.

Processing functions are available on fixed, selectable or centralized con-

trols. Each input strip will provide dedicated controls, and some may have assignable functions to a particular knob. A full array of control is available when an input can be interrogated and then sent to single or multiple master panels for fine-tuning.

Digital consoles often can provide a bank of as many as 100 memory snapshots. This provides the operator with the ability to electronically reconfigure the console for different shows or broadcasts with the push of a button. Changes can include router crosspoint and electronic scribble strip changes along with trim, bussing and processing configurations. If your facility needs to handle back-to-back shows, this feature is a real time-saver.

Remote microphone input panels that digitize the analog signal at the talent stage are available, eliminating the disadvantages of long analog cable runs. Taking it a step further, sophisticated multi-studio, multi-control room applications can benefit from networkable interfaces. This level of optional sophistication allows input and output sharing across multiple systems, surrendering conventional audio distribution to IT-based routing and connectivity. Moving from facility to facility and show to show can be near instantaneous and under the control of a single push-button.

Digital reliability is solid

Much of the DSP technology used for the audio mixing engine in today's consoles are redundant, fault-tolerant and/or self-healing, though this does vary. Software routines monitor the console's heartbeat and then command online resources to re-establish any failed paths almost instantaneously and without loss of audio. Many consoles will continue to pass mixed audio if the control system goes down.

Much of the DSP technology used for the audio mixing engine in today's consoles are redundant, fault-tolerant and/or self-healing.

On-board and remote diagnostics may be available. Many permit remote interrogation by the manufacturer to access critical console data logs that help facilitate local repair.

Look for components from faders to I/O and for DSP cards to be hot-swappable. This is key to effecting a speedy recovery while minimizing outage in the event of a problem. This is especially critical if other portions of the system are not completely fault-tolerant or redundant.

Today, console commands are typically carried out by dedicated and secure operating systems, with control surface resets taking seconds and full system rebooting usually at or under a half-minute. Look for redundancy here, but regardless, control surface resets should not affect the on-air output.

As the DTV transition continues, it's evident that sophisticated audio devices like consoles will become more IT-friendly. The ultimate benefactor is the TV station engineer. With the many features, functions and capabilities of today's digital consoles, engineers can more easily specify new mixer requirements, complete with a full set of digital features that meet their operations' needs, while staying within budget.

BE

Jim Starzynski is principal engineer in advanced technology for NBC-Universal.

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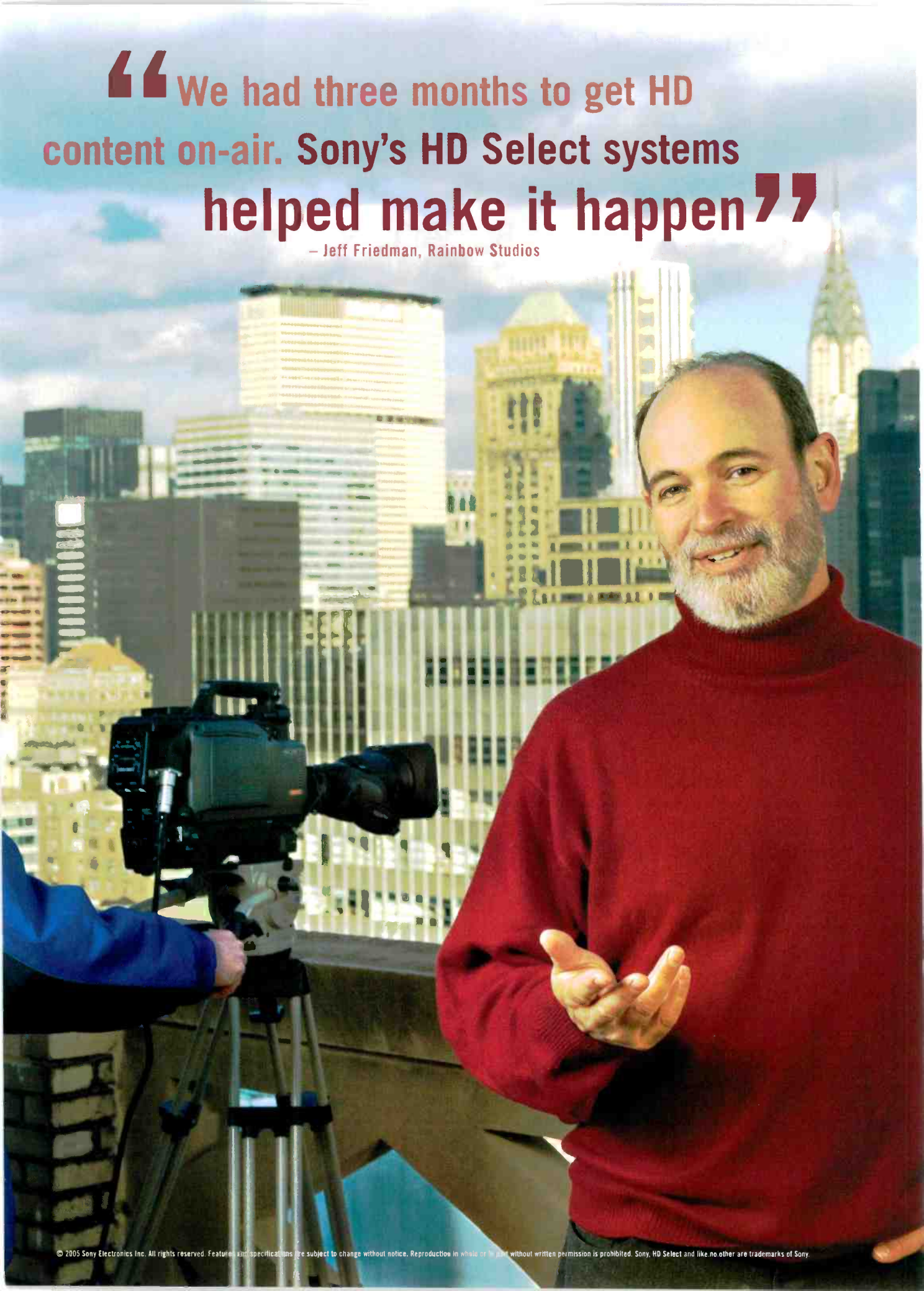
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The challenges of datacasting

BY MICHAEL GROTTICELLI

Like interactive television before it, the prospects for sending secondary data within a station's digital bitstream, or datacasting, were hyped for years as a viable business model that would allow broadcasters to make DTV transmissions as financially successful as their NTSC channel. Unfortunately, like ITV, several factors have led to a series of failed business ventures and wasted resources, namely getting the 8-VSB modulation scheme to work, building out the DTV infrastructure to meet FCC mandates and competition from outside the industry.

Although some of these now defunct services (e.g., Geocast, DTVPlus, iBlast, Spectra Rep and Wavexpress) could have been ahead of their time with consumers, the technology they used, which has since improved, is readily available. Using standard digital RF transmitters, some terrestrial

transmission-delivered business-to-business services are online and thriving. File-based push services, such as The Walt Disney Company's Moviebeam, are also surviving, though not thriving. Also notable, WRAL-TV in Raleigh, NC, serves hundreds of subscribers each day with its AccessDTV service to PCs with a receiver card and a small antenna.

The emergence of the Internet has also hurt subscription-based data delivery models. The initial data services that provided news, sports and weather information to subscribers' desktop computers have been usurped to a large degree by free information from stations' Web sites.

In addition, commercial TV networks are concerned about how using 2Mb/s to 4Mb/s of spectrum to send MPEG-2 compressed data might affect the quality of their simultaneously broadcast HDTV programs.

Finding the right recipe

Commercial success is possible. Just ask PBS, which understands that with the myriad of channels on the air, distributing standard programming is not its best chance for datacasting success. Most stations are using Trivini Digital's SkyScraper Data Broadcast System to insert data packets into their digital spectrum. PBS' real asset is its broadcast frequency and the cost-effective delivery of educational and public safety and service content. There is a growing demand for educational content delivery systems and local emergency and homeland security alerts, sent, as well as received, as digital files. (See Figure 1 on page 48.)

Kentucky Educational Television serves PCs and networked servers across the state with a network of transmitters. The network also streams live local government meetings OTA to government employees' PCs, disseminating valuable information cost-effectively. And there's also talk of delivering school curriculum to the home as well.

Within the commercial segment, there is more activity (and opportunity) than some realize. A company in Maryland called Cident Entertainment is building a datacast network to push cultural programming to dedicated PVRs. The company is leasing spectrum from a local broadcaster in Washington, D.C., and soon will expand into other select markets. This provides a much more cost-effective way for consumers to view native language content while providing broadcasters with new revenue.

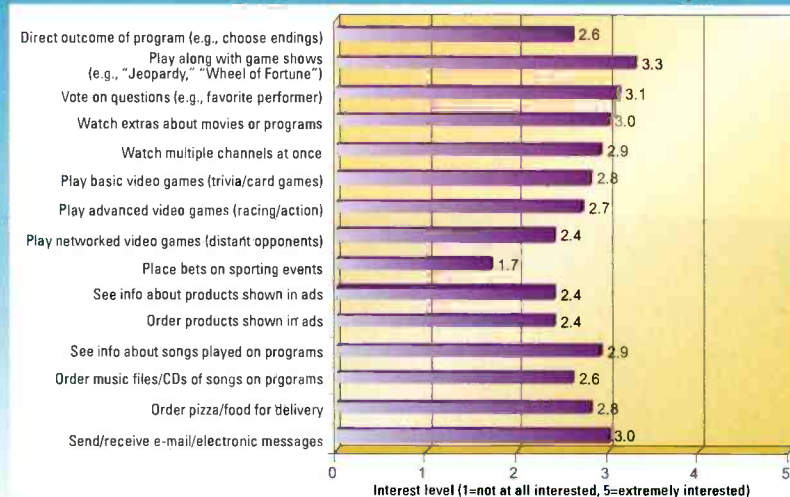
High-speed competition

For commercial stations, beating the competition is tougher. WKRC-TV, a

FRAME GRAB A look at the consumer side of DTV

Interest in interactive TV features and functions

TV viewers want to play along with game shows



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CBS affiliate in Cincinnati, OH, got its datacasting start with Geocast in 1999, but that service proved short-lived after it could not get access to the types of content consumers wanted. Thus, subscriptions were paltry, and the service was not financially viable to maintain.

In 2001, station management decided to offer high-speed Internet access to underserved rural communities. Chief engineer Hank Hundemmer worked with several software engineers to develop a service called Web-Hopper.com.

Along with a microwave dish on the roof of the station, the service used the telephone line for requests on the front end and about 3Mb/s to 4Mb/s of its over-the-air digital spectrum as

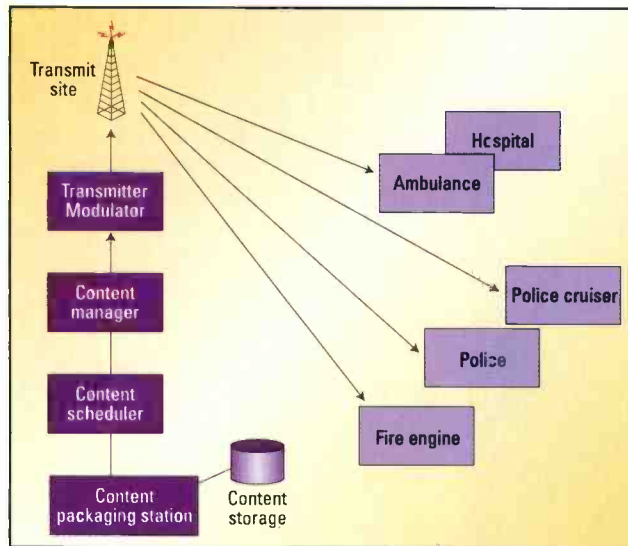


Figure 1. Datacasting emergency and public safety alerts. Illustration courtesy Harris.

the return channel. The remaining 15Mb/s to 16Mb/s was dedicated for the station's local and CBS network HDTV content.

At its height, using a Thales Broadcast solid-state digital transmitter at full power and an IP encapsulator sys-

tem from SkyStream, the high-speed Internet service included about 500 subscribers in the rural areas of Kentucky, Indiana and Ohio. However, after about 18 months, local DSL and cable modem service providers came into the market. Hundemmer says it was an uphill battle all the way. The telcos were aggressive in the areas WKRC was trying to serve, and the Web-Hopper.com service was slower and more expensive than DSL. For a TV station,

Web-Hopper.com proved too costly, and the station's owner, Clear Channel, shut it down.

The technology is sound

While it's clear that the current transmitters and related technology to send

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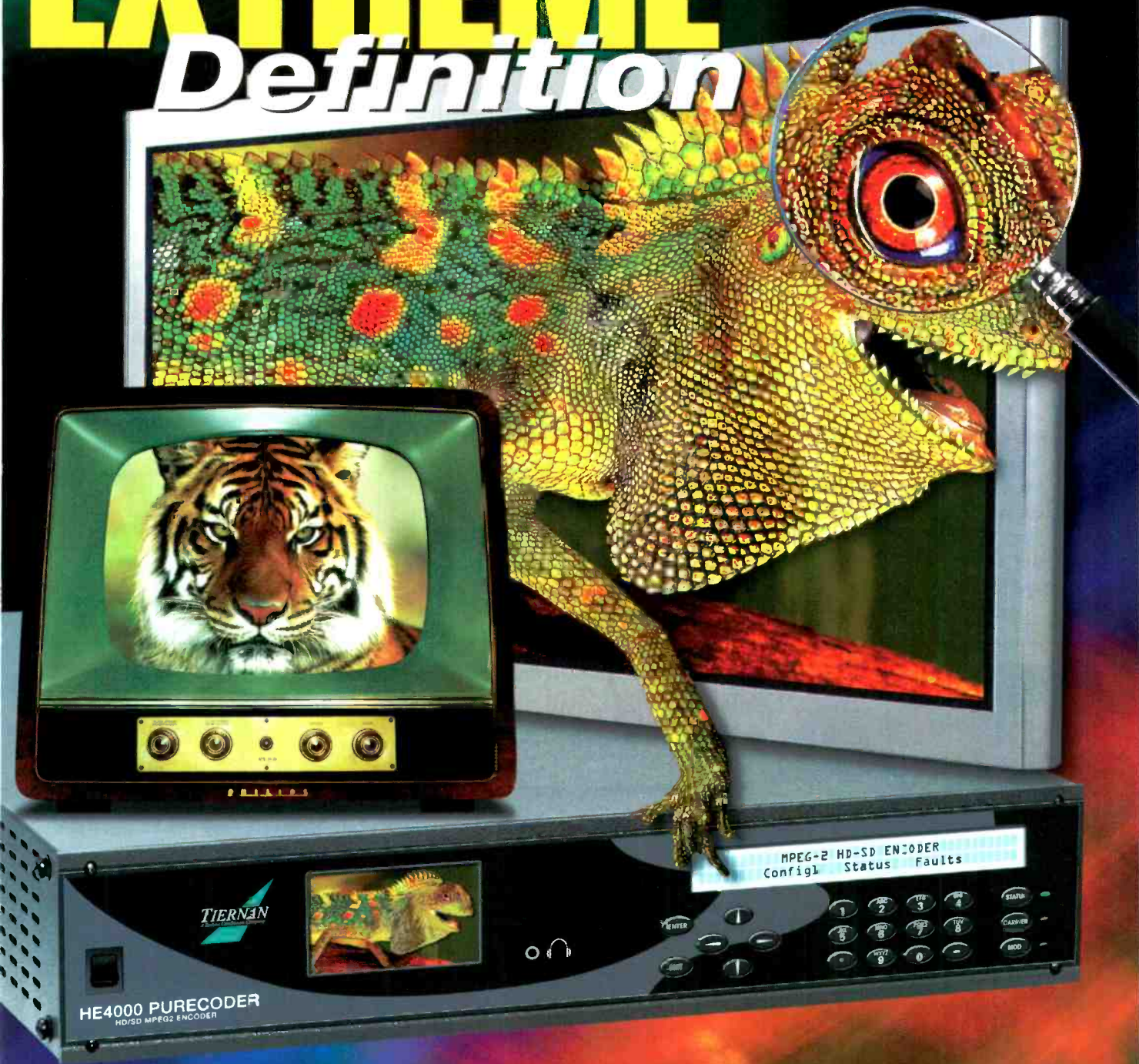
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IP-encapsulated data transmissions over the air are sound and reliable, early implementations of an ATSC stream were problematic to receive in many urban areas. Improvements in forward error-correction and noise canceling in the enhanced-VSB specification have made a huge difference. Advancements have also been made in creating backchannels for terrestrial broadcasters, which is also key to two-way datacasting success.

Transmitter manufacturer Harris has been involved with datacasting since the late 1990s, supplying systems to Dotcast, Geocast, IBlast and others to build out their datacast services. The company currently works with a number of PBS stations, but no commercial stations. That's because even after years of discussions and trials, there's still no clear business model or killer app for stations to pursue.

Digital signage is an opportunity

broadcasters can and should experiment with in their respective local markets. The ability to send 2Mb/s to 3Mb/s of data (and paid advertisements) over the air to multiple receive sites throughout a city is a viable and cost-effective service for a station already broadcasting in digital.

The broadcast model

Axcera, another maker of analog and digital TV transmitters, is working with several PBS stations, including KERA-TV in Dallas, to keep local municipalities informed via terrestrial datacasting. Using a 28kW Innovator solid-state transmitter, data can be inserted into the digital program stream, getting information to users in a timelier manner than the Internet can. Local schools receive the information as data packets overnight, ready for uploading to a LAN in the morning.

Transmitting at less than full power,

which many stations have been doing as a way to save on operating costs, has also slowed datacasting's progress. Axcera recently announced it is working with Crown Castle Media to provide a 1.7GHz single-frequency consumer service via multiple transmission sites in and around Pittsburgh to cell phones and other mobile devices. Axcera is supplying 20 digital transmitters based on the European DVB-H transmission system in outdoor enclosures for the Pittsburgh trials. **BE**

Michael Grotticelli regularly reports on the professional video and broadcast technology industries.



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The master control room relies on dual Saturn master control switchers, which are slaved to Venus SDI/analog routers and are controlled by a Harris automation system.

High-performance production distinguishes The Score

By Michael Grotticelli

The frenetic production pace and significant output of packaged highlight clips appearing on The Score TV network is matched only by the actual sports they cover. Four teams, each made up of a reporter and an editor, typically ingest live video from an evening's 15 to 20 live games and turn around 40 one- to three-minute projects — most with graphics and voiceover — in an eight-hour shift. Multiply that by four, and you get an idea of how much con-

tent is generated to support prime-time coverage on the national 24-hour live event and sports news and information channel based in Toronto, Ontario.

Adding to the challenge, some shows appearing on the network, such as the two-hour live NBA show "Court Surfing," allow viewers to pick which games they would like to see covered. Once a viewer poll is complete, the network goes live to six games and bounces between them featuring the most impressive live action and highlights. For the reporters, this means capturing live clips and turning them around in as little as two minutes.

The network serves 6 million cable and satellite TV

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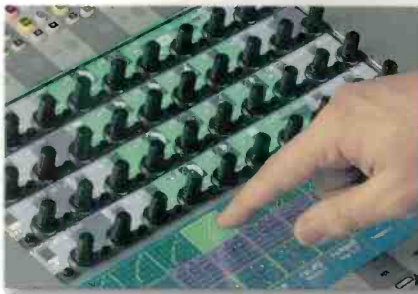
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subscribers across Canada. In order to facilitate the required fast turnaround and maintain the quick-pace workflow, the network relies on Grass Valley NewsEdit workstations and two two-channel Grass Valley FeedClip live feed capture systems in each of its four sports edit suites.

Juggling multiple games

The 15,000sq ft facility records more than 40 inbound analog feeds from around the world via satellite and fiber each day. From these, the producers decide which will be covered. On a typical night during baseball season, The Score uses the four edit suites to cover four games per suite, or 16 games simultaneously, for inclusion in that evening's highlight shows and packaged wheel. This means that a total of four reporters and four editors could be responsible for 160 highlight clips in a single night.

The facility uses a Grass Valley editing and storage platform comprised of FeedClip, NewsEdit and Profile servers. Video files are moved around via fiber at six to 20 times faster than real time without incurring additional compression hits. Because no drop-frame editing is performed, the facility uses real time 30fps, not timecode, for edits.

Depending on how they will be used, clips can be pack-



The production control room is supported by a 24-channel Allen-Heath audio console, a Ross Synergy 3 production switcher and a two-channel Abekas DVE. A Chyron HyperX CG is currently being installed.

aged as a cuts-only series with simple background stereo audio for use as an element in one of the live studio shows. Or, the clip might be edited and combined with graphics, CG, digital video effects, audio and VO on a NewsEdit, then transferred to the Profile for playout directly to air through the facility's Harris automation system.

Drag-and-drop file exchange

Each suite can ingest analog video at 18Mb/s (I-frame only) and is supported with 22 hours of storage on each FeedClip systems and an additional 22 hours of storage on each NewsEdit workstation. Once a clip, or series of clips, had been aired, it is sent from the server or edit suite to the video library. The clip is then laid off to DVCPRO and Betacam videotape and archived in a traditional library system.

Infrastructure

The signal routing infrastructure is SDI with stereo analog audio. All live-to-air analog video is converted to SDI baseband using DPS 465 A/D converters/frame synchronizers/TBCs for live-to-air use on the production switcher. All non-live-to-air sources are converted by Miranda Technologies' 10-bit A/D converters to SDI video or if the clips have been recorded in the sports edit suites, the FeedClip system converts them and the SDI signals are routed by a Grass Valley Venus 96x96 SDI/Analog audio routing switcher.



The equipment rack room features a variety of high-performance digital broadcast gear, including the Grass Valley Profile XP servers, Venus/Saturn routers, MCR switcher and Miranda processing equipment.

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Mike Simmons, Director of Engineering | WMFE, ORLANDO, FL

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Grass Valley
 FeedClip ingest
 NewsEdit NLE
 Profile XP server
 Venus SDI/Analog router
Harris automation
Leitch X75HD cross converter
Miranda A/D converters
Rademec robotic pedestals
Ross Synergy 3 production mixer
Sony DX-35 cameras

Design Team

Brad Keay, vp, engineering and operations
Kevin Harkins, technical op. manager
Matt Payne, sr. op. technician
Tim Hicks, broadcast technician
Kodam Ear, broadcast technician

The Score's MCR uses two Saturn 16-channel A/B switchers (one for redundancy, though they've yet to use it) slaved to the Venus SDI/analog router. A Venus 32x32 analog router is used to distribute incoming analog signals. This analog router is also used to support the FeedClip systems for production.

The facility's main production studio, with a full lighting grid and two Sony DX-35 pan-and-tilt head cameras on Rademec servo-based robotic pedestals, is now being paired with a new studio outfitted with two FOR-A Digi Warp EX2 virtual sets.

The production control room includes a 24-channel Allen-Heath audio console, a Ross Synergy 3 video production switcher, a two-channel Abekas DVE and a Chyron HyperX CG.

The Score also features a continuous sports ticker that displays real-time scores, betting odds and other information about live or completed games. The ticker is unique in that the network keeps it visible even during commercials and live events. The current system is being replaced with two Chyron HyperX CGs with custom code supplied by Video Design Software, resulting in a true HD ticker. The ticker will also display actual game clocks and up-to-the-minute scores via XML real-time data sources.

HD is coming

Next February, The Score will begin distributing its service in 720p HD as part of a two-phase HDTV project. At that time, it will be the only Canadian network in 720p and the only network displaying its entire lineup in full 16:9 widescreen. Currently, all other Canadian networks, when upconverting HD material from SD, maintain a 4:3 aspect ratio, which does not fill the 16:9 screen.

A Teranex upconverter will be used to convert its SD programming to HD widescreen. Native 1080i material will be cross-converted by a Leitch X75HD. The network plans to produce 30 to 40 games a year in native 720p.

Tapeless pioneer

The network has used an end-to-end tapeless nonlinear workflow since the network was launched as "Headline Sports" back in 1997. In those days, the editors worked on Scitex VideoSphere nonlinear edit systems and DigiSphere digital disc recorders.

While the technology and tools have changed, the company's strategy and commitment to delivering timely sports news and information has not. Making the technology transparent to the production team helps keep the network competitive. Basing the infrastructure on Grass Valley technology has allowed the network to leverage the benefits of an expandable and upgradeable infrastructure and enabled it to maintain high-performance growth. **BE**

Michael Grotticelli regularly reports on the professional video and broadcast technology industries.



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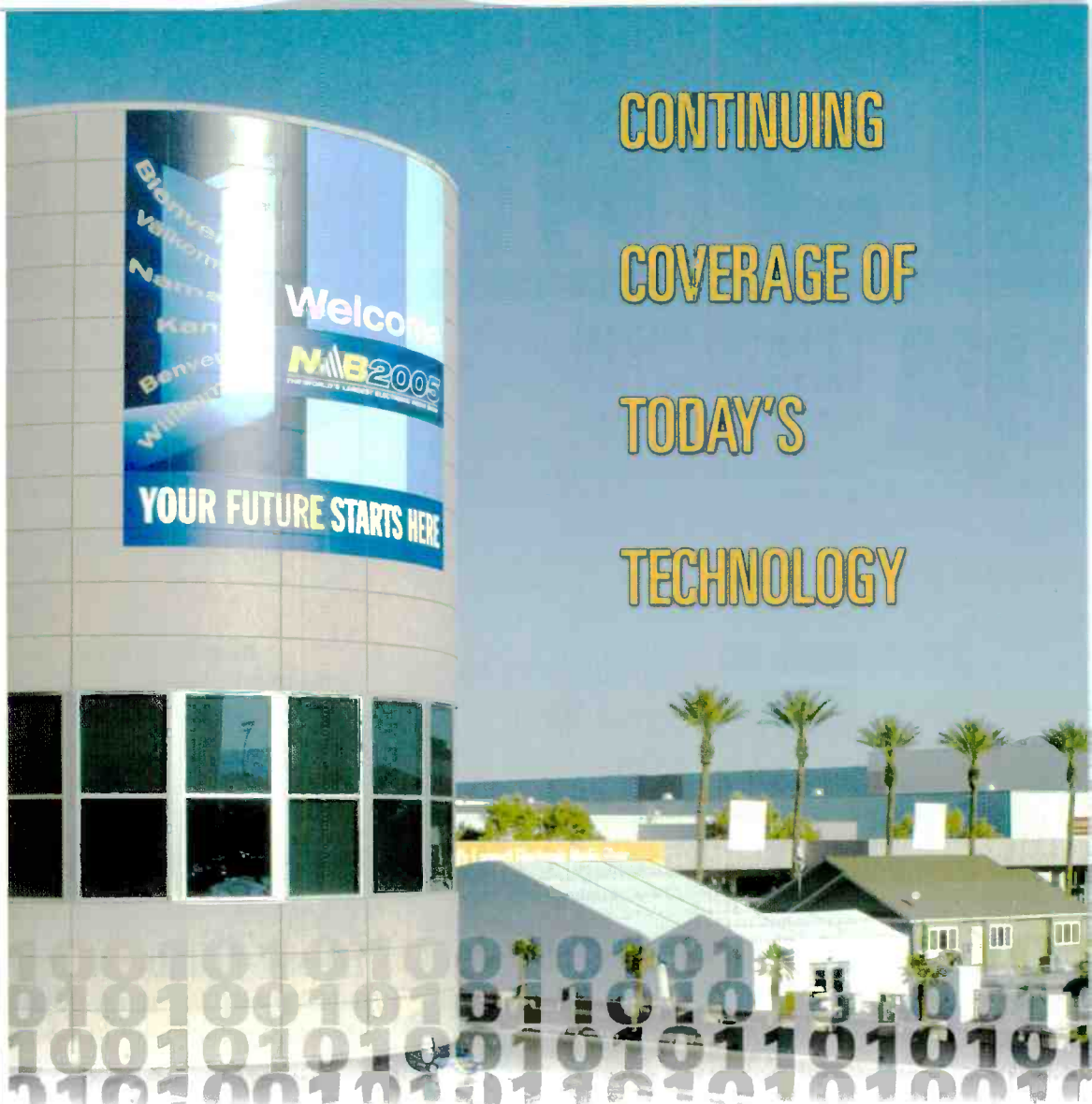
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NAB REPLAY



CONTINUING COVERAGE OF TODAY'S TECHNOLOGY

Pick Hits 58

The top 40 new products from this year's show — selected by readers like you.

The 2005 Pick Hits judges:

*Mark Brown, Signasys
Paul Byers, WQED-TV
Phil Cianci, Consultant
David Danto, Lehman Brothers
Ratna Kariyawasam, EAP Networks
Todd Loney, Consultant
George Maier, Orion Broadcast
Jack, McKain, Consultant
Brian Murray, Consultant
Gary Paxinos, USDTV
Steve Snyder, State Farm
Dan Stark, Stark Raving Solutions
Augusto Vallasenor, Globecomm Systems
Larry White, KOAM-TV
Bob Wyatt, KSPS-TV*

Product jackpot 62

The first batch of products from the show. See the NAB Special Report (packaged separately with this issue) for more!

New Tools 62

Broadcast Engineering's writers and consultants recap notable products and trends from NAB.

Routing switchers	62
By John Luff	
Cameras	64
By Dan Stark	
Automation	69
By Jim Boston	
Test, measurement and monitoring	74
By Phil Cianci	
Squeeze harder	80
By Craig Birkmaier	
Editing systems	82
By L. T. Martin	
RF systems	87
By George Maier	
Storage solutions push IT forward	92
By Michael Grotticelli	
Audio products	100
By Tom Patrick	

PICK HITS

NAB2005



1 Beyond 3817 HD

877-663-2396

www.1beyond.com

This HD laptop NLE is optimized for HD editing and delivery (including 720p and 1080i), and features a 3.8GHz Pentium 4 processor with Hyperthreading technology. Editors can mix HD, HDV and uncompressed SD and DV footage simultaneously. The laptop supports Avid's Mojo and external storage. It can output HD to its widescreen monitor and supports 5.1 or 7.1 audio.



360 Systems Image Server 7000

818-991-0360

www.360Systems.com

The server supports six video channels with up to 600 hours of RAID-protected storage. It can record two MPEG-2 files simultaneously and accepts SDI and composite video. It handles MPEG-2 and DV file types, plus TARGA graphics with key-and-fill. It includes a wide range of production tools and I/O standards, including fast FTP file exchange and MXF compatibility.

AEQ DR-100

866-817-9745

www.aeqbroadcast.com

AEQ's new handheld digital audio recorder is the size of a cellular phone. It includes a user-friendly, non-destructive audio editor. Users can edit audio by cutting, copying and pasting material. The internal flash memory has no moving parts and is capable of recording up to 4.5 hours of audio material. Files transfer remotely over RS232 and external modem or USB.



Axcera Dual-Use

724-873-8100

www.axcera.com

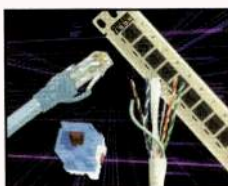
Dual-Use is an analog/DTV transmitter based on the Innovator LX transmitter and the DM8 digital modulator for 8VSB. As a backup transmitter, it allows a single Innovator LX broadband transmitter to back up both a main analog and a main DTV transmitter, eliminating the need for separate analog and DTV standby transmitters.

Belden CDT 10GX

800-331-0779

www.beldencdt.com

The 10GX is an end-to-end UTP cabling solution for 10Gb Ethernet service. Cables rely on four pairs of conductors with a bi-directional data rate of 2.5Gb/s per pair, producing an equivalent to a bandwidth of 500MHz.



Complex PRO-X C5

620-342-7743

www.complex.com

Complex's new camera control unit helps convert mini-DV camcorders into live production cameras via a Cat-5 cable up to 1000ft. System includes a dockable adapter with power for camcorder and all control signals over a Cat-5 cable.

Dielectric RF Scout

800-341-9678; www.dielectric.com

The RF Scout continuously monitors transmission-line VSWR and forward power and outputs data to remote terminals via RS232 or Ethernet interfaces.



Edirol V-400HD

360-594-4273; www.edirol.com

This multiformat video mixer/switcher handles HD video, SD video and SXGA computer signals. It supports up to eight inputs of four SD plus four HD or RGB and outputs 1080i or 720p for HD and RGB displays.

Fujinon Precision Focus system

973-633-5600

www.fujinon.com



The Precision Focus system provides a highly accurate focusing assist system to camera operators. Camera operators can select size and position of the focus area, which tracks the lens as it moves and zooms. The system instantly brings objects into perfect focus without searching for focus and can follow objects smoothly while maintaining focus.



Grace Distribution PIN-MIC

323-876-7888;

www.gracedistribution.com

The PIN-MIC back plate and cable go under clothing, and the capsule connects to protruding pins, eliminating the need for unsightly cables and connectors. The miniature microphone comes standard with back plate, sleeve and a case. The exterior capsule has permanent wind mesh over it, which can be hidden behind station logos or apparel.



Hamlet Flexiscope

866-442-6538
www.hamlet.co.uk

The unit is a handheld HD and SD waveform monitor/vectorscope analyzer. It provides measurement and monitoring using patented digital processing. It covers HD, SD and SDI standards, plus CAV, composite, YC and DV with plug-in options.



LARCAN PLUS series

303-665-8000
www.larcan.com

This fully-integrated multichannel digital LPTV transmission system is based on the LARCAN MXD series transmitter. It is capable of multiplexing digital signals together to provide multiple channels from one transmitter, enabling the flexibility to grow from one to many channels on a plug and play basis.



Ikegami HDN-X10 Editcam HD

201-368-9171
www.ikegami.com

This multiformat HD camcorder uses 2.1 megapixel CMOS sensors to capture 1080/60i, 1080/50i, 1080/24p, 720/60p or 720/50p, all as native format. By employing a new image device and superior video processing, the EditcamHD achieves 1000TV line of horizontal resolution, 56dB of S/N ratio and F10 at 2000 lux sensitivity.



Leitch X75-HD/X75-SD

859-371-5533; www.leitch.com

Leitch's multiformat converter synchronizer features auto-detection of inputs with auto-changeover and user-selectable alarms. Infinitely flexible I/O input options for the X75 with HD upgrade provide up-, down- and cross-conversion from up to seven input video formats to almost any output video format.

IDX X3-Lite

310-891-2800; www.idx.tv

The X3-Lite is an on-board camera light using new high-powered LED technology. The LED light provides high output with minimum power consumption without flicker or noise. It provides heat-free LED operation with 10,000 hour LED life.



Manfrotto FIG RIG

201-818-9500
www.bogenimaging.us

This modular camera support system smoothly supports the DV camera and acts as a frame to mount all accessories, including zoom controllers, mics, mixers, lights, monitors and arms. It consists of a circular frame with a crossbar to mount most mini DV cameras and becomes part of the body to produce smooth, steady traveling shots.

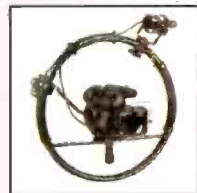


Image Video VxV-4

416-750-8015;
www.imagevideo.com

The VxV-4 features four 4:2:2 SDI/composite analog inputs and selectable 16:9/4:3 aspect ratio output. There are two versions available: DVI output 1280x1024 and

SDI output with composite analog monitoring. Any input may be zoomed to full-screen resolution.



Microwave Radio Communications CodeRunner 4

800-490-5700
www.mrcbroadcast.com

The CodeRunner 4 central receiver supports a wide variety of analog and digital configurations, including new BAS frequency plans. All receivers are switchable from today's analog operation to the new BAS COFDM digital transmission system.



K-WILL VP21H

949-553-9701; www.kwillcorporation.com

The VP21H is a powerful double-stimulus video quality measurement and analysis system for baseband video (HD/SD SDI). It achieves automated, real-time measurement and analysis by comparing the source and the tested video. Video synchronization is done automatically, and analysis is completed at the pixel level.



Miranda HD-Bridge DEC

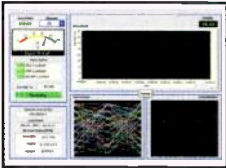
514-333-1772
www.miranda.com

Miranda's HD-Bridge DEC provides high-quality HDV to HD-SDI 1080i/720p conversion with embedded audio and Time Code, along with digital and analog video/audio outputs. Its built-in crossconverter allows users to convert between 720p and 1080i.



PICK HITS

NAB2005



Modulation Sciences msi 4400

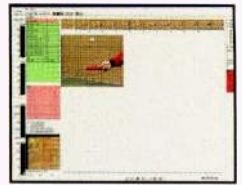
800-826-2603
www.modsci.com

This analyzer includes a single rack unit controller that receives and evaluates the 8-VSB signal and relays the data to a Windows-based PC. The front-panel indicators show the status of alarms and confirm RF level and signal strength. It features external connections for alarms, LVDS, SMPTE 310M and DVB-ASI.

Pixelmetrix VISUALmpeg

954-472-5445
www.pixelmetrix.com

VISUALmpeg is a product family of analysis tools for evaluating and testing MPEG-based advanced coding. Models are available for MPEG-1, MPEG-2 and H.264 (MPEG-4 Part 10). It requires only a modest PC with standard Windows software for full and detailed analysis.



MOG Solutions theScribe

+351 229 408 224
www.mog-solutions.com

TheScribe is a full-featured MXF editor enabling the user to create new MXF files and update existing ones with rich metadata descriptions. Synchronized with the audio-video essence, the files are fully compliant with DMS-1 (SMPTE S380M).



Rohde & Schwarz FSH3-TV

410-910-7988
www.rohde-schwarz.com

This TV analyzer combines the functions and features of a complete spectrum analyzer with those of a TV test receiver. The portable analyzer is ideal for performing on-site measurements and covers 100kHz to 3GHz with resolutions of 100Hz to 1MHz.



NEOTION MPEG-4 Card

+33 4 42 98 07 70
www.neotion.com

The MPEG-4 plug-n-play card allows broadcasters to implement MPEG-4 transmission over existing transmission platforms. System is compatible with current MPEG-2 receivers using DVB-CI or cable cards. The product facilitates new service expansion of TV-over-IP providing VOD-over-IP and other new services.

Optibase MGW 1100

800-451-5101; www.optibase.com

This integrated carrier-grade TV-streaming platform supports encoding, transcoding and conversion of MPEG-2, MPEG-1, MPEG-4 AVC and WMV. It supports up to 30 TV and music channels and offers sophisticated capabilities to control and monitor the IP/ATM video from a central SNMP-based interface.

Panasonic AG-HVX200

201-348-5300
www.panasonic.com

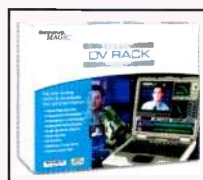
The AG-HVX200 camcorder combines a progressive native 16:9 HD 3-CCD imaging system with a HD-quality Leica Dicomar wide-angle zoom lens. It uses P2 solid-state storage of MXF files and supports all 1080, 720 and 480 signals at 24p and 30p frame rates.



Sierra Automated Systems Rubicon

818-840-6749;
www.sasaudio.com

The Rubicon audio console controls the Sierra Automated Systems 32KD digital audio network for mixing, switching, level control and effects. The frame sizes range from four to 40 modules, and there is a full router input select on each module.



Serious Magic DV Rack

916-985-8000
www.seriousmagic.com

This DV production software runs on a PC connected to a DV camera. The DV Rack puts 10 essential production tools at users' fingertips, letting them instantly preview, record, review and evaluate shots. HDV support is available.

Sencore ATLAS

800-736-2673; www.sencore.com

The receiver is configurable to specific applications, providing a flexible system base and powerful software package resulting in easy system integration. It features a versatile modular platform with local and remote signal monitoring and optional conditional-access interface.



Sencore VB-10 IP PROBE

800-736-2673; www.sencore.com

The VB-10 IP PROBE is a portable IP test and measurement unit for inspecting TV multicasts as found in fiber or DSL triple-play networks. The operator can monitor the signal quality of up to 10 TV multicasts anywhere in the network, ranging from cable headends through to customer set-top boxes.

Shining Technology CitiDISK HDV

714-761-9598; www.shining.com

CitiDISK HDV is a powerful, lightweight, portable, high-capacity hard drive storage platform. Complete with an internal rechargeable battery, it connects directly to HDV/DV camcorders and stores up to 90 minutes of DV, AVI, MOV or M2T storage directly from the camera's FireWire port.

Sigalarm Model 410

800-589-3769
www.sigalarminc.com

Sigalarm high-voltage detection system can save lives. It is designed to protect the entire mast and antenna from touching high voltage transmission lines. The system detects any nearby AC voltages and sets off an alarm within the ENG vehicle. It can also override any operator "raise" commands when AC is detected.



Sigma Electronics Arablest

866-569-2681

www.sigmaelectronics.com

The Arablest audio/video synchronizer system uses DATC technology and provides automatic detection and compensation for any delays incurred between a video signal and a corresponding audio signal in transmission environments. The process is transparent to the video image and accurately identifies the time relationship between the video and audio signals and makes the needed correction.

Snell & Wilcox Kahuna

212-481-1830
www.snellwilcox.com

This multifunction production switcher offers SD and HD operation in the same mainframe, with the same control panel. New pixel-filtering technology, FormatFusion, allows integration of any SD material into HD productions, seamlessly, without the need for upconversion. It also allows HD material to be incorporated into SD productions without downconversion. Fully software upgradable, the switcher can be installed in either SD-only or HD-only form and when required, converted instantly, resulting in a fully multifunction SD/HD operation.



SoftNI Subtiter Suite

310-312-9558; www.softni.com

This subtitling software lets you prepare subtitling/captioning files; encode closed captions; and burn-in subtitles using digital and HD professional video cards, CGs and VBI CC/Teletext encoders. The program also exports subtitling/captioning files compatible with most DVD authoring systems, NLE editing systems and multilingual cable/satellite transmission systems.



Telecast Rattler

508-754-4858
www.telecast-fiber.com

The Rattler is a mini HD/SDI fiber module that makes it easy to transmit video over fiber. The module uses BNC to ST media converters. The transmitters and receivers measure only 2.5in x .7in x .7in. It has an 18dB optical link budget and EQ for TX coax input and is standards compliant. Receivers provide integral power meter. It is powered by standard USB.

Vision III Imaging V3

703-478-5270; www.inv3.com

The V3 is a parallax scanner for Angenieux lenses. The V3 scanner uses a digital feedback (closed loop) parallax scanning iris mechanism that injects vivid impressions of depth into images to be recorded on standard film or tape. Camera output is fully compliant with standard film and video recording techniques.



Vistek V1681/1682

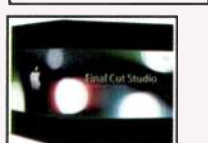
973-313-6416; www.vistek.co.uk

This audio/video ID generator/reader provides multiple test and ID functions in an SDI environment. It generates both 16:9 and 4:3 test patterns, confirms lip sync, and generates stereo tone with identifying silences that are locked to a specific visual pattern, and has a built-in text generator.

Special Technology Award

Sony: 201-930-1000;
www.sony.com/professional
JVC: 973-317-5000;
<http://pro.jvc.com>
Apple: 800-692-7753;
www.apple.com

The Pick Hits judges determined that three companies — Apple, JVC and Sony — should be recognized for their contribution to the development of HDV production technology. Specific HDV technology products include Apple's Final Cut Pro 5.0 with native HDV, the JVC GY HD100 24p camcorder and Sony's HVR-Z1U camcorder with HVR-M10U VTR.

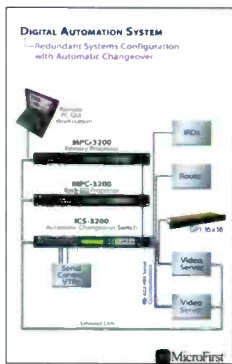


SATELLITE DATA SERVICE

SES Americom IPlex solution

609-987-4000; www.ses-amicom.com

Features LAN-to-LAN connectivity between a central office and numerous remote sites for e-mail transfer, database applications and more; videoconferencing between any number of designated offices, via satellite or SES AMERICOM's terrestrial backbone network. ■



DIGITAL AUTOMATION SYSTEM

MicroFirst Engineering D.A.S.

201-651-9300; www.microfirst.com

Provides meta data management and device control through real-time automation and management system; offers sophisticated logging functionality, dynamic near real time integration, full-functioned graphical device control, distributed or centralized IP control. ■

ASSET MANAGEMENT

ON-AIR Systems Kore

800-379-0809 www.on-air-systems.com

Application for scheduling, media asset management and database workflow automation; part of the ingest-playout workflow, providing a powerful set of tools for automating labor and data intensive tasks for program scheduling, media management and report generation. ■

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813-888-5353; www.pcomsys.com

Offers a host of services — from consulting, design and engineering to equipment procurement, documentation and training, and after sales support; specializes in design, installation, and maintaining turnkey audio and video communication systems. ■

Routing switchers

BY JOHN LUFF

This year's NAB offered some interesting new products from several routing switcher manufacturers. It is hard to say that anything in this mature business is revolutionary, but several manufacturers offered new generations of products. Some capabilities first shown last year became deliverable, and others introduced by a limited set of manufacturers became more widely available. IP networking for control has become almost a requirement for major control system products, and it became harder to find analog routing on anyone's new product list, with notable exceptions.

Grass Valley, formerly Thomson, and formerly Grass Valley, has added fiber and analog I/O to the Trinx line of digital routing switchers. Trinx comes in flavors as large as 512x512 in a single frame and offers wide-band switchers as well as I/O limited to SDTV applications. When fitted with analog inputs, a group of up to 16 inputs out of 32 on an input card can be analog, limited by physical space. This allows Trinx to work in mixed analog and digital environments without path finding from analog matrices. Fiber I/O is also available now.

Grass Valley is releasing the latest version of its Encore control system with enhanced capabilities, including the ability to use SMS-7000 series panels on Encore control, as well as the ability to natively control SMS matrices. Its Acapella line has additional offerings and comes with a subset of Encore (Prelude) embedded to allow control to extend using the same panels as Encore. Those control panels can be converted from Prelude to Encore by flash upgrade. Acapella offers up to 32x32 in one frame and can be configured for independent 8x8 matrices as well.

PESA held its first NAB press conference in 10 years, having recently been acquired by a private equity

group, QuStream. It announced an analog router with an incredible 500MHz bandwidth, ideal for high-resolution display routing in command and control centers.

Also new this year were the Cheetah 64NE and 64XE frames. The 64XE is expandable to 64x128, with the flexibility to offer multiple outputs or converting output cards in the matrix. It also can offer redundant crosspoints, which PESA calls "Watchdog," in a 64x64 format. Both of the new frames offer HD-SDI, SDI, ASI, analog video and AES/EBU capability. The 64NE is 1RU smaller, but is not expandable. PESA also offers fiber I/O on these switchers, as well as a totally photonic router series in sizes to 24x24. That router switches light, not electrons.

NVISION introduced two major products. The NV5256 is a TDM machine control router with bidirectional ports. Intriguingly, it offers the ability to interface to both RS-422 and RS-232 control circuits and convert between the two. In a first in machine control routing, the 256-port system can be expanded to 512 by adding a second frame connected using TDM Expansion buss ports built into the system.

The NV7512 digital audio router offers a full 512x512 synchronous audio matrix in just 14RU. The back plane density is achieved using high-density coaxial connectors typically used in the telecom industry (descriptively called "1.0/2.3"), allowing backplane density four times that possible with BNC connectors.

The new switcher offers balanced and unbalanced AES, time code, analog audio and MADI format digital audio. Four frames can be connected together to form a 4096x4096 mono matrix in less than two racks, assuming you could get the wire into the floor.



ROUTER

Quartz Electronics Xenon
530-265-2815; www.quartzus.com

Two frame sizes available; active assemblies are all hot swappable from the front of the frame; power, control, cooling and reference generation are all available in dual redundant configurations; every output can be switched in the same TV frame. ■

HD AND SD ENCODER

Radyne HE4000
602-437-9620; www.radn.com

In its minimal configuration, the unit can simultaneously encode one HD and one SD video stream as well as up to four stereo audio pairs; can be equipped with an advanced satellite modulator, making it ideal for both contribution and distribution. ■

WIRELESS CAMERA TRANSMITTER

Microwave Radio Communications Reporter
978-671-5700; www.mrcbroadcast.com

Broadcast live video to a central receiver site up to 1093 yards away; features integrated MPEG-2 encoding (4:2:2/4:2:0) with COFDM modulation. ■



MULTIPLIERS

MITEQ SYS2XA4509H and SYS3XA1957H
630-759-9500; www.miteq.com

Available in either carrier form or standard SMA housing form; model SYS2XA4509H is a doubler with 10 dBm output from 6GHz to 12GHz, for a +5 dBm input. ■

TRANSPORT STREAM MONITOR AND ANALYZER

Triveni Digital StreamScope
714-378-5841; www.trivenidigital.com

Enhanced version of real-time DTV transport stream monitor and analyzer family; monitors, measures, and analyzes DTV streams and signals to ensure their integrity, reliability and compliance with MPEG-2, ATSC and SCTE standard. ■

Utah Scientific showed its newest additions to the UTAH-400 line, including a 64-port data router that occupies only 4RU. By connecting four frames together over a high-speed buss, up to a 256-port switch can be assembled. I/O is on RJ45 connectors. As with a number of other manufacturers, UTAH now offers fiber-optic I/O. Each card carries eight signals on fiber, which allows considerable flexibility in configuration of systems, especially larger systems. The fiber I/O uses LC connectors.

Pro-Bel introduced the Sirius Gold series of routing switchers. Sirius Gold offers frame sizes to 512x512 and an

The Panacea Clean/Quiet Switch offers 16 inputs with two outputs that permit transitions between inputs (plus six additional outputs without transitions). Cuts, dissolves and fade to black transitions can be done with embedded audio undisturbed. With a logo inserter added downstream, some master control needs may be solved inexpensively. The switcher is capable of switching either HD or SD signals. Audio transitions are a "soft cut," eliminating disturbing pops and clicks.

Quartz is now delivering the Xenon routing system first shown at NAB2004. Xenon has the unique ability

to add signal processing modules to the frame, including keyers and multi-image processors.

At NAB2005, Quartz showed a dual quad split option, which allows any input to be shown in one quadrant of a combined output. Because the signals are SMPTE 259-compatible, they can be routed to conventional monitors. Also available is a module that allows overlays (keys) to be

done on individual outputs. Signal processing is available on blocks of up to eight outputs. Xenon can be delivered in two sizes, with 128x128 in 8RU. HD and SD are supported, as well as AES and analog audio, analog video, RS422 and time code. Future Signal Processing Technology (SPT) modules in development include Dolby audio processing and further features for master control lite. Quartz also announced a deal with Sony for distribution of its QMC master control switchers. **BE**

John Luff is senior vice president of business development at AZCAR.



Routing technology continues to evolve as shown by this year's introduction of optical routers as well as several high-bandwidth IP routers targeted for broadcast applications.

array of interface options, including, of course, HD and SD. The newest technology touted in a paper given at NAB by Pro-Bel's CTO, Neil Maycock, is Sirius Fusion, which extends the I/O set to include networked video and audio over conventional IT networks. By combining non-blocking conventional routing with compressed networked video over IT infrastructure, Sirius Fusion adds interesting capabilities. One possibility is to link distant frames together for wide area network tie line management and path finding.

Leitch continued to expand its routing line, introducing a new line of small routers with advanced features.

DIGITAL MIXING CONSOLE

Studer OnAir 500 Modulo
+41 1 870 75 11; www.studer.ch

Consists of one or two fader modules, one master module, the meter bridge and a 19in electronics rack, resulting in a six-fader or 12-fader mixing desk; is based on the same platform as the OnAir 500 in its fixed frame version but also offers the freedom to place the individual modules wherever it is most convenient for the users. ■



RECEIVER SYSTEM

Systems Wireless Venue
703-397-9249; www.swl.com

A modular UHF design that operates with Digital Hybrid Wireless transmitters, and a variety of analog transmitters; the receiver uses a host assembly that includes an antenna multi-coupler, computer communications interface and mechanical rack mounting for up to six receiver modules. ■

CONSOLES FOR BROADCAST ENVIRONMENTS

TBC Consoles intelliTrac
631-293-4068; www.tbconsoles.com

Laterally sliding and positionable rack turners easily upgraded or relocated as equipment and operational requirements change; continuous front and rear device tracks allow unlimited lateral positioning of critical equipment. ■

PHOTOGRAPHIC, VIDEO, CINE AND LIGHTING DISTRIBUTOR

Bogen Imaging
201-818-9500; www.bogenimaging.us

Distributor of products for the photographic, video, Cine and lighting markets; including Manfrotto and Gitzo tripods, heads and accessories; Avenger grip; Metz electronic flash systems; Elinchrom studio lighting systems. ■

VIDEO, AUDIO, MULTIMEDIA, AND COMPUTER BASED PRODUCTS AND SERVICES

Roscor
847-299-8080; www.roscor.com

Experience includes design and installation on a turnkey basis of countless broadcast television stations, ATSC transmission systems, commercial production facilities, digital 601 post production facilities, corporate production facilities. ■

Cameras

BY DAN STARK

This year, NAB again brought new technologies and products to the marketplace, as well as showed some more mature products from technology first introduced last year. New flavors of HD products were certainly a hit and caused much stir amongst attendees.

In the area of HD, HDV recording technology is causing a considerable amount of interest. JVC and Sony displayed new cameras and decks, with several editing manufacturers showing native HDV editing to help the finishing process. HDV now offers cost-effective HD production solutions. Although highly compressed to a 19.4Mbs MPEG-2 stream, the pictures are quite impressive, especially when one considers how inexpensive many of these new HD tools are.

The Miranda HD-Bridge DEC received a *Broadcast Engineering* Pick Hit award. The device provides high-quality HDV to HD-SDI 1080i/720p conversion with embedded audio and time code along with digital and analog audio and video outputs. Dual HD-SDI outputs are provided, one clean feed and one with time code and graticule markers.

A similar converter, the ASI-Bridge, is a camera-mounted HDV-to-ASI converter. It accepts HDV via an ILink connection and converts it to standard MPEG-2/ASI. This makes it ideal for HDV news applications.

JVC introduced the first HDV products last year, and this year it introduced the GY-HD100U. Based on three newly-developed 1/3in CCDs, the camera operates in 1280x720 progressive at 24fps and 30fps and 480 24p and 60i SD image formats. The GY-HD100U is the only HDV camera to currently support interchangeable lenses. It

comes standard with a Fujinon 16x ProHD lens, but a 13x wide-angle lens also is available. The camera offers two XLR inputs and a small footprint while still offering a shoulder-style mount. The camera records to standard DV tapes using the MPEG-2 HDV codec developed by JVC and Sony. It also has an optional DR-HD100 hard disc-based recorder. Deliveries are scheduled for July.



HDV recording technology was a huge hit at NAB2005. Miranda, JVC and Sony were three big players that introduced new HDV products.

JVC also displayed the GY-DV5100U SD professional DV camcorder. An upgraded version of the existing GY-DV5000U, the camera has improved 12-bit A/D with 24-bit digital signal processing. The camera is based on three 1/2in 410,000 pixel 4:3 native CCDs. It offers 16:9 images via anamorphic squeeze or letterbox.

Sony displayed the HVR-Z1U HDV camcorder. The camera is based on three newly developed 1/3in 16:9 Super HAD CCD imagers operating at 1080i in 50i/60i/30F/25F/24F and can also record in SD. Recording is achieved with the onboard recorder using DVCam or DV tape. The camcorder comes equipped with a Carl Zeiss 12x lens with auto or manual control of focus and iris, a

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KLRU Austin

KQED San Francisco

MPTV Milwaukee

NETC Lincoln

WEDU Tampa

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“

We test drove multiple digital audio consoles but the Euphonix Max Air console outperformed them all in regard to intuitiveness and value. It is truly a great console - easy to use and very well priced for the quality.

Lee Young – Director of Engineering, KQED

”



Max Air at KQED

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digital emotion

PRODUCT JACKPOT

AES AUDIO EMBEDDER/
DISEMBEDDER

AJA HD10AM

530-274-2048; www.aja.com

Is dual rate, with eight channels AES I/O; disembedder provides four AES outputs; embedder is user-selectable, on a channel pair basis, to either pass SDI input audio or to embed input. ■

3.5in LCD display, balanced XLR audio input and a variety of analog outputs, as well as iLink. The camera has been available for delivery for a few months now and has received good reviews from users.

Sony also displayed the HDC-X310

NEW Tools

camera. An upgraded model of the HDC-X300, the camera offers an optional fiber-optic interface that enables cable runs of up to 3300ft. Based on three 1/2in 1.5 megapixel CCDs, it offers 59.94i, 50i, 29.97psf, 25psf and 23.976 frame rates at 1080. Low-cost interface boards include a fiber-optic interface, VGA interfaces, CCU and RCU units.

The HDC-1000, 1500 and 1550 camera line offer 1080@60p images, answering the requirements for trucks to support both 1080 and 720 customers. All three cameras have 14-bit A-D and can connect to the HDCU-1000 CCU system through existing infrastructures.

In the area of SD, Sony introduced the MSW-970 MPEG IMX and DVW-970 Digital Betacam camcorders offering 24p images. Both cameras share 2/3in Power HAD EX CCDs and 14-bit A/D. In DVcam, the DSR-400 4:3-only and DSR-450WS 4:3/16:9 switchable cameras were introduced. Based on 2/3in Power HAD EX CCDs, both units offer 24PsF/25PsF (PAL model)/30PsF and 60i images.

Panasonic made a big splash with a small product — the AG-HVX200. The camera offers 1080/60i, 1080/24p, 1080/30p, 720/60p, 720/24p, 720/30p, 480/60i, 480/24p and 480/30p HD and SD images. The unit comes standard with a Mini-DV tape recorder and allocations for two P2 cards. SD images are recorded on Mini-DV tape or P2, and HD images using the DVCPROHD100 codec are recorded on P2 cards. The camera is based on three 1/3in 16:9 progressive native CCDs and a wide-angle Leica Dicomar HD lens, with two XLR audio inputs. The unit has an IEEE 1394 digital interface as well as analog I/O. Two 8-Gig P2 cards provide 40 minutes of 720/24p recording and 16 minutes of 1080/24p recording.

The AJ-HDX400 is based on DVCPRO HD-LP (1080/59.94i), with three 2/3in CCDs with 12-bit A/D processing. The camera offers cine-like gamma curves and standard

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PRODUCT JACKPOT

ENCODER

Scopus Network Technologies UE-9000
609-987-8090; www.scopus.net

Allows users to deploy existing MPEG-2 video compression technologies while providing a migration path to advanced compression schemes such as AVC and VC-1 encoding in both SD and HD formats. ■

HD-SDI output and built-in SD (NTSC) composite outputs.

SD cameras included the AW-E860 box camera with native 16:9 three 2/3in CCDs. It is switchable 4:3/16:9, has 12-bit A/D, with 510,000 pixels. The AJ-SPC700 DVCPRO P2 camcorder offers P2 recording cards at either DVCPPro/DV 25 or DVCPPro50 data rates. The camera is based on three 2/3in IT CCDs offering 520,000 pixels.

Hitachi introduced a low-cost HD camera in both 1080i and 720p versions, the SK3010P. Featuring new 2/3in IT CCDs with 2,200,000 pixels, the cameras offer a digital fiber transmission system with 3000m capacity. Separate HD and SD setup controls for numerous functions facilitate higher quality output of both formats.

In SD cameras, Hitachi showed the SK-900 with 14-bit A/D, and three 2/3in mega-pixel CCDs. Switchable between 4:3 or 16:9, the camera also features DSP that allows up to 38-bit accuracy. The Z-3500 is a 4:3 only camera with 410,000 pixel IT CCDs. The camera offers triax or multicore CCUs and offers a cost-effective ENG/EFP studio configured version.

Grass Valley added the LDK400 SD camera to its line, an upgrade of the LDK-300 with 14-bit A-D and a choice of DPM, FT, IT or ITW sensors. The optional LDK 5430 digital triax adapter also was shown. In HD cameras, the LDK-4000 was added to the line. It is essentially a lower-cost LDK-6000 that is either 1080i 50/60 or 720p 50/60 but not switchable.

Also added to the line was the Venom Flash pack solid-state recorder. Connecting to the Viper camera, it offers 10 minutes of 4:4:4 recording. ARRI also announced that the Venom would be interfaced to its D-20 camera.

Ikegami introduced Editcam HD capabilities using the Avid DNxHD codec at 140Mb/s 1080/60i, 1080/24p and 720/60p recording with a new FieldPak2 hard disc or solid-state recording pack. Numerous enhance-

ments and maturity of technology introduced at last year's NAB were shown in its camera line. This included the HDK-75EX ENG/EFP, HDK-790E full studio and the compact HD box-style HDL-40 cameras. Iconix showed a micro three-CCD



Everything looks better in 16:9.

Introducing the ERG HDM-EV85 portable HD monitor, designed specifically for the Sony HVR-Z1U High Definition Camcorder. With a 16:9 aspect ratio and an underscanned image, this monitor allows you to see exactly what the camera sees. So you can frame a picture-perfect shot.

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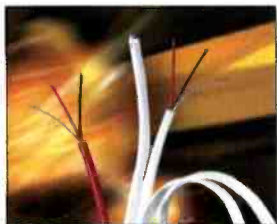
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Photo courtesy of Sony Corporation

ERG HD Monitors

PRODUCT JACKPOT



ANALOG AUDIO CABLES

Belden plenum cable
847-590-1110; www.belden.com

Plenum versions of the 9451 and 9451D analog audio cables; designed for line-level audio connections, audio distribution equipment and studio wiring with room-to-room and plenum versions. ■

FLUID HEAD

Sachtler DV II
516-867-4900; www.sachtler.com

For use with MiniDV camcorders; easy to operate, lightweight, and automatically create clean pictures; weighs 4.7lb; payload is 0.8kg to 3.6 kg /1.8lb to 7.9lb. ■

FIBER VIDEO TRANSPORT SOLUTION

Vyvx MPEG-2 compressed fiber video
918-547-2660; www.wiltel.com/vyvx/

Expands the reach of the MPEG-2 Compressed video network by enabling compressed signals to originate or terminate at any Vyvx TSC that offers 45Mb/s fiber video transport service. ■

HD camera offering three 1/3in progressive CCDs with 720p/1080i/1080p capabilities. The camera head measures 1.32in x 1.5in x 1.92in. The controller unit offers tri-level genlock input with analog and digital outputs, including dual-link in 4:4:4 and 4:2:2, as well as DVI-D.

Canon brought the XL-2 this year, an upgrade of the familiar XL-1 footprint. The camera offers 16:9 and 4:3 aspect ratio shooting formats, variable frame rates and customizable cine look functions from three 1/3in 680,000 progressive scan CCDs.

Autoscript released its Go-Prompt 12 teleprompter. It provides a high brightness display but also incorporates a wireless control that allows the user to select the files to be displayed and control the scrolling speed within the prompter. Go-Prompt 12 accepts Word, RTF and text files. Multiple languages are supported through Unicode, and it runs either on 12VDC or 110-240VAC. The prompter provides a video output for

NEW TOOLS

a second prompter and has the option of adding the Autoscript 3in preview screen.

This year's show did highlight some maturity in existing and new SD and



Advances in SD and HD cameras and technology brought many new products to NAB2005.

HD cameras and technology. The highlight for a lot of attendees was HDV and its implementation of low-cost HD production. While the tools are capable of unprecedented quality for the investment, it still takes the broadcast professional to harness the capabilities for success. **BE**

Dan Stark is president of Stark Raving Solutions.

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Automation

BY JIM BOSTON

Automation at this year's NAB mirrored the evolutionary changes that are taking place in the broadcast industry. As workflows inside a television facility change in response to new emerging business plans, automation is evolving to accommodate new directions that are taking shape. Automation took on centralcasting a few years ago; now monitoring and control technology are catching up.

What was big at this show was the explosion of asset management software that now spans programs from inception to delivery to the viewer.

Centralcasting technology

While geared towards the digital messaging/signage market, Leightronix's NEXUS might provide another approach to centralcasting. The NEXUS provides multichannel digital video playback and recording, digital messaging/signage, DVD/VCR machine control, and video/audio signal routing. The NEXUS operates as a standalone device and is managed via a network using provided WinNEXUS software.

Ingest

Crispin showed Catch Server Acquisition, which has third-party interfaces to content delivery systems, such as FastChannel, DG Systems and Media DVX. It also has developed, and is currently testing, an interface to Pathfire. In addition, Crispin is talking to potential customers about Multi-IP, which allows personnel within a facility to take instant control over on-air operations of channels or streams. This allows one release center, whether in the same facility or at a remote location, to take over for another center.

Sundance also is offering ingest management via its Digital Delivery Management System (DDMS). DDMS integrates with PathFire and MassTech's MMB to move content from the various cache servers in a



The Unique Azden 1000 Integrated UHF Receiver



Gold Mount 1000URX/AB

IDX "V" Mount 1000UDX/VM

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Note: Order cables specifically for your camera and battery configuration.



Bodypack transmitter (1000BT) with reduced current-drain for improved battery life, is available with Azden EX-503H, Sony ECM-44H.

Plug-in XLR transmitter (1000XT) works with dynamic mics.



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SD/HD MPEG-2 ENCODER

Snell & Wilcox MEMPHIS
818-556-2616; www.snellwilcox.com

Based on the company's Ph.C phase correlation motion estimation and Prefix compression preprocessing; seamlessly integrates into existing environments; accepts both SD and HD 1080/720 formats, uncompressed PCM, MP1L2, Dolby E and AC-3 audio. ■

SHORT HOP ATMOSPHERIC FIBER TRANSPORT

Telecast Fiber Systems Kermit
508-754-4858; www.telecast-fiber.com

Augments fiber-optic runs and provides signal connectivity where running fiber cable is impractical or impossible; plug in virtually any Telecast product, and Kermit launches its signal through the air, up to a half kilometer away. ■



MODULAR ROUTER
800-420-5909;
www.network-electronics.com

Network Electronics VikinX

Consists of the 128x128 AES router and the 64x64 analogue audio router; features dual, hot swappable and load sharing power supplies; supports dual and redundant system control and monitoring tools. ■

TRANSMITTER

Broadcast Microwave Carry-Coder II
800-669-9667; www.bms-inc.com

A portable module for video cameras; performs wireless digital transmission of video, audio, and user defined private data; can be used in a backpack configuration or plugged directly to the back of most professional video cameras. ■

BROADCAST DELAY

Accom AirClean
650-328-3818; www.accom.com

SD/HD digital video/audio delay system; built-in defocus engine; dual-operator screening for extra security, two models provide up to 11 seconds of delay in HD and up to 60 seconds of delay in SD. ■



station to the transmission video server.

At Telestream, the focus was on workflow. First on the company's list was the product Launch. The software-based DNG system for Windows and Macs lets journalists drag and drop media files to a desktop icon for flipping and transmission from the field back to the station over Internet connections. Telestream also showed the Flip4Mac MXF input product. Its MXF capability allows it to take files from Sony XDCAM and eVTRs and send them to Apple's FCP Pro HD.

Media asset management

As mentioned earlier, this was the hot area in the automation arena. Harris offered its H-Class platform, which provides broadcasters and content providers a means to integrate disparate processes into a single, modular system that handles content management and delivery enterprise-wide, from creation to consumption.

H-Class is geared towards serving the "audience of one" by managing the delivery of media across multiple networks, channels, formats and devices. This provides for more targeted programming and advertising possibilities. The joint automation-ingest platform solution enables customers to automatically process content for delivery in multiple formats for a range of customer devices

Blue Line Technology introduced its BlueSuite automated media management software. BlueSuite is a single software structure, and from that foundation, all applications operate as one suite of software. BlueSuite is billed as an Enterprise software package.

Crispin's NewsArchive enables a news department to store, catalog and later locate and retrieve news stories previously aired from a video server. In addition to clip storage, NewsArchive organizes and manages video content so that operators can find what they need

on the fly.

Although Sundance showed Seeker last year as a media asset management application, it has been reconfigured to provide three functions in one: asset management, media management and project management. The media management portion allows you to move content between various devices, using a transcode engine if needed. The project management engine allows operators to create tasks and subtasks, assign them to individuals or groups (i.e. editors) and track their status. Users can create alerts, move the assignment of tasks to others, create workflow rules, etc. The integration of these three functions results in an extremely interesting product.

Pro-Bel's Morpheus Media Management runs behind automation to en-

Media asset management was the hot area in the automation arena.

sure all media is accounted for and ready for playback when needed. The system works with the Morpheus automation platform, allowing the media to be accounted for and present for scheduled playback. Many applications are included in order to manage playback, recording, transfer and archive.

NVERZION's Xpansion software has the power to catalog, search and retrieve massive amounts of data, which allows you to combine existing data acquisition tools, data archive equipment and search mechanisms to create a single, open system, while still being able to quickly and efficiently manage your assets locally or throughout your whole system. Xpansion software can be accessed globally using existing Internet tools such as simple search engines and Web browsers.

OmniBus demonstrated its Content Management and Workflow systems, which provide an integrated, task-based solution that it claims unlocks

Ready when you are.

The new Vegas+DVD Product on Suite - which includes Vegas[®] 6, DVD Architect[™] 3 and a Dolby Digital[®] Professional AC-3 Encoder - provides advanced solutions for today's demanding workflows, and new technology for tomorrow's HD production.

Whether you're editing independent films, documentaries, events or feature productions, Sony Vegas 6 software provides a next-generation video and audio platform for working with DV, SD or HD content.

An industry standard, Vegas 6 software now includes: comprehensive HDV support; SD/HD SDI capture, editing and export using Blackmagicdesign's DeckLink[™] boards; enhanced multi-processor support; next-generation DVI/VGA external monitoring; project nesting; AAF import/export; VST effects; broadcast WAV support and superior framerate conversions. DVD Architect 3 software now features dual-layer authoring and burning; mastering to DLT, DDP, CMF; CSS and Macrovision[®] encryption tools; Photoshop[®] (PSD) layer support; multi-angle selection and more. The Vegas+DVD Production Suite also includes: Boris Graffiti Ltd, Boris FX Ltd for Vegas, and Magic Bullet Movie Looks HD50.

Functionality for today and tomorrow. The Vegas+DVD Production Suite - It's ready when you are.

For a free demo or to learn more: www.sony.com/imready



Sony HVR-Z1U Professional Camcorder shown with optional ECM-678 shotgun microphone


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PRODUCT JACKPOT

CAMERA SUPPORT SYSTEM

Anton Bauer STASIS

800-422-3473; www.antonbauer.com

A lightweight shoulder mount; redirects the geometry of a mini-DV camera to make use of the body as a stable support platform; the body support system improves both the ergonomics and performance of a professional min-DV handheld. 



NEW TOOLS

the value of video content. The OmniBus Content Management and Workflow systems integrate the searching, viewing and moving of video content into a desktop application.

Playout/release

Although Sundance's FastBreak has been around in various forms since 1994, FastBreak NXT is a complete rewrite of the interface and uses a number of components from the company's flagship Titan system. It is designed for playout control of one to four channels, while Titan is targeting at the larger channel count facilities, or for the groups who want to do distributed centralcasting.

Pro-Bel announced that the Morpheus was released at the beginning of this year. The Morpheus is scalable up from a single channel to limitless multichannel operations, with built-in flexibility and ease of use. Features include unlimited secondary event scheduling; Opt out, which allows zoned playback of commercials or other programming; and Media Ball, which is a grouping of scheduled events contained in an icon form and can be dragged into a schedule, allowing the operator to schedule an entire group of events as a single event.

At the show, Optimal Solutions Inc (OSi) highlighted its work with the 60 Sinclair stations. In the fall of 2004, the company embarked upon the largest traffic conversion in history, moving some 60 Sinclair broadcast TV stations to an integrated, centralized traffic system. With more than half of the stations already converted, the remaining 17 stations are scheduled to be completed by later this year.

The bottom line

While IT has been the foundation for the front office side of broadcasting, the technology is now becoming entrenched in the hardware playout layer as well. The delineation between software systems will continue to evolve and automation systems must be robust enough to play in an ever-changing landscape. **BE**

Jim Boston is a West Coast consultant.

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VIDEO-ON-DEMAND DESCRIPTION SOFTWARE

Anystream Agility VOD

703-450-7030; www.anystream.com

Enterprise-level description; allows content producers to serve VOD outlets; designed in response to demand from broadcast customers for a way to create and deliver content to burgeoning video-on-demand outlets affordably as opposed to outsourcing. ■



UHF DIGITAL AND ANALOG TRANSMITTER

Axcera Innovator HX

800-215-2614; www.axcera.com

Based on the advanced design of the Innovator HX VHF transmitter; high-power solid-state UHF transmitter; features broadband amplifiers and combiners, high-gain power modules and hot swappable amplifiers. ■

DIGITAL KLYSTRODE IOT

CPI/Eimac K2

650-594-4089; www.cpii.com

For use in digital UHF television service in the output stage of DTV transmitters; suitable for use with 8VSB and COFDM modulation schemes; have a magnetically focused electron beam that is density-bunched by an RF cavity-driven grid. ■

TRANSMITTER

E2V IOTs

914-592-6050; www.e2v.com

For high power analog and digital UHF TV transmitters; include low power plug-in types, higher power plug-in and build-up types, and a range of high efficiency water cooled energy-saving-collector IOTs (ESCIOts). ■



Test, measurement and monitoring

PHIL CIANCI

With the transition to digital infrastructures reaching critical mass in the last year, test, measurement and monitoring (TM&M) equipment manufacturers are now forced to address the marriage of broadcast and IT technologies. Somewhere in the neighborhood of 85 percent of all broadcast equipment now has an RJ 45 LAN connector. This presents an opportunity for TM&M equipment to capture and present at any instant a report on the health of the infrastructure.

New and improved

Perennial heavy hitters weighed in with either new equipment models or enhanced features to existing product lines.

Tektronix's new MTS4EA elementary stream analysis system can evaluate and compare H.264/AVC, VC1 and MPEG-2 codecs. The MTM400 MPEG transport stream monitor has added RF network interfaces for COFDM, 8-VSB, QAM-B and 8PSK. Motorola's DigCipher II is now supported. Digital program insertion, SCTE-35 and bit-stream compliance can be verified to help insure that down stream automation equipment can insert commercial messages. The WVR7100 and WVR6100 waveform rasterizer series now both support Dolby E and AC-3 with Lissajous and Surround displays.

Statmon Technologies highlighted its IP-networked based remote control and monitoring systems. At the booth was the EIF-32, a standalone remote control and monitoring interface. With a built-in CPU, it provides automated monitoring and control of re-

mote equipment. The 1RU package can monitor and control transmitters and other remote devices on up to 192 channels through Neuro, a software-based engine and database.

Also shown was the UIF-32 monitoring interface. It provides a cost-effective way to connect a wide range of devices via serial, TCP, WAN, LAN or the Internet. It relays in real-time information on remote sensors and comes with built-in temperature, humidity and mains voltage monitors.

Videotek continues to expand its offerings with the introduction of the VTM series of HD and SD monitors. Units offer combinations of measuring and display of picture, eye pattern, gamut, jitter, timing, data word, closed captions and other performance data. The VTM-950HD combines all of these features in a single unit with an inte-



The Snell and Wilcox booth was highlighted with the introduction of its new all-digital SD/HD production switcher, the Kahuna.

gral XGA TFT color LCD display. If you want a flexible, multi-image picture and waveform display, check it out.

Pixelmetrix announced ConsolidatorPlus, an SNMP-enabled multi DVStation management application. By collecting measurements, telemetry

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series

530-478-1830;

www.ensembledesigns.com

Provides HD up/down/cross conversion, 8-channel audio option with channel shuffling and audio mixing; supports multi-formats; accepts software upgrades for signal monitoring and alarms. ■

PRODUCTION SWITCHER

Echolab Novaidentity4

978-262-0063; www.echolab.com

Compact design; includes six keys, five pattern generators, two 2-D DVEs with rotation; 16 SDI inputs 16 SDI outputs; two matt generators, two DVE border generators; frame buffer with alpha channel. ■



LCD MONITOR

ERG HDM-EV85

949-263-1630; www.erg-ventures.com

Designed specifically for the Sony HVR-Z1U HD camcorder; the active LCD area has a 1024x768 resolution; displays 16.77 million colors by having eight bits per RGB; has HD analog video input terminal. ■

IP VIDEO GATEWAY

TANDBERG MA5400

678-812-6300; www.tandbergtv.com

Provides multiple ASI I/O; supports a GigE network interface and PRO-MPEG standards; XML and Web browser interfaces with dynamic network interface monitoring. ■



CROSS CONVERTER

Evertz 7710XC converters

905-335-3700; www.evertz.com

Available in four versions to convert between SD and HD formats; accepts embedded audio, re-embeds the audio on output along with appropriate delay; handles closed captions and time code. ■

and alarms from a network of DVStations, monitoring can be accomplished from a centralized location. The graphical interface displays network maps and diagrams of equipment rack layouts.

The Leader FS3019 signal monitoring system allows the performance of remote HD-SDI and SD-SDI equipment to be checked via an Internet connection. Up to 50 Leader LV5700, LV5700A and LV5750 multistandard SDI monitors and LT292 SDI line analyzers can be connected to an FS3019-equipped PC, enabling local or remote studio installations to be monitored continuously on a single display screen.

Jien Shen of Triveni presented a talk about extending DVB TS priority test-

TM&M to go

Rohde & Schwarz introduced the portable FSH3-TV spectrum analyzer/TV test receiver. It features spectrum analysis up to 3GHz. Equipped with a TV board, a preamplifier and a tracking generator, it supports TV standards NTSC and M/PAL, and can be upgraded for DVB-C, J.83/B or ATSC/8VSB. The battery-powered analyzer can store up to 100 measurement results and settings in memory and can transfer them by a USB interface to a PC for further evaluation.

Hand-held measuring of HD and SD-SDI video and embedded audio can be accomplished using Hamlet's FlexiScope, another Pick Hits award winner. A 3.5in diagonal TFT display shows a picture in 4:3 or 16:9 formats,

The idea of extending DVB TS priority testing to ATSC is to determine if an error is fatal.

ing to ATSC. The idea is to determine if an error is fatal and number-one priority. If so, the stream can't be decoded. Second, it can determine where quality may be affected or where it could result in an omission of screen information such as a letter in closed captioning. Products such as StreamScope MT30 can be configured according to this methodology.

DNF Controls has introduced data logging capabilities for The Analyst RS422/RS232 tester. Serial communication can be captured and logged for review and analysis, assisting in isolating and identifying communication problems.

The K-WILL VP21H baseband video analyzer is a Pick Hits award winner. The unit has SDI and HD-SDI inputs for double stimulus analysis of two video inputs in real time. This enables automated measurement and comparison of encoded vs. decoded signals in real time. It meets the requirements of J.144, the ITU-ratified standards recommendation on objective perceptual video quality measurement techniques.

while audio can be monitored on the internal speaker or via headphones. Digital cursors enable timing and level measurements. Error monitoring includes EDH, color gamut and stuck bit detection. Vidscope-VX, a video waveform, vector and audio monitoring software application, also made its debut.

Announced at last year's NAB, and now ready for shipment, Wohler's Penpal-HD test signal generator has 32 video test patterns in 18 HD standards, each of which can be combined with different audio tone settings. Its capabilities include three moving test patterns and four stereo pairs of AES audio embedded in the HD-SDI signal. The tool measures 6in long and weighs less than 6oz. It can be powered using a 3V power adapter.

Media network TM&M

IneoQuest Technologies, a well-known manufacturer of network test and monitoring equipment, was one of a growing number of IT companies

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PRODUCT JACKPOT

NEW Tools

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Grass Valley XtenDD HD

800-547-8949; www.grassvalley.com

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FIBER OPTIC CABLE CHECKER

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818-365-2446; www.canare.com

Simplifies use and maintenance of fiber cable; measures optical signal, power level; detects broken electrical lines; auto power off to conserve battery life; zero-calibration; complete with measuring unit and loop-back unit. ■

present at NAB2005. By combining IQMediaStim, a video-over-IP signal source generator, with IQMedia Analyzer, which is capable of displaying and measuring live video, voice or data over IP streams, complete testing of IP networks can be accomplished. Its IQMediaMonitor application uses SNMP to enable simultaneous monitoring of several IneoQuest units for jitter, delay, packet loss and bit rate, and it includes logging and event notification features.

VideoBRIDGE, a video-over-IP TM&M product, can generate, monitor and analyze conformance on both the IP and MPEG layers. The product is the result of a partnership between Sencore and Bridgetech. Compression standards H.264/AVC, WM9/AC1 and MPEG-2 SD/HD are supported.

Sencore also has partnered with Thales

to create MPEGScan, a system that has the ability to scan files on a video server and detect various kinds of MPEG errors. Sencore's MAP1850 MPEG service analyzer and the PC-based DTU-234 probe continue their tradition of RF-capable monitoring features.

Spirent Communications, another IT vendor at NAB2005, exhibited its Avalanche 2500 and Avalanche 220 load testing appliances. By generating realistic network traffic, media networks can be stressed and analyzed to ensure that file transfers never choke network throughput. Real-time statistics provide instant feedback during performance testing.

Acterna announced the addition of MPEG-4 real-time analysis to its DTS-330 and DTS-200.

The system supports QPSK, ASI, GigE, SMPTE-310, DHEI, QAM,



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COFDM and 8VSB inputs and outputs. With these capabilities, the system can be used to verify MPEG, DVB and ATSC standards compliance.

BRAIN is an SNMP-based monitoring and control system offered by BUG.TV, a vendor exhibiting at NAB for the first time. Based on open-source software, custom-user interfaces with features such as automatic switchover can be built, making it possible to implement a complete end-to-end strategy for monitoring signal flow.

Where do we stand?

Essence TM&M has never been an issue and is sufficiently addressed. MPEG TS streams now have been analyzed by several generations of equipment. However, still lacking are adequate means to monitor application health and computer configurations.

I don't understand why this technology is not exhibited at NAB shows. Similarly, security technology is noticeably absent.

The holy grail of complete infrastructure monitoring and analysis using one application is nowhere to be found. However, if one intelligently centralizes essence, media network, application and security status presentations onto one large multiple window display, all of a network's critical operation status will be easy to see. Even more important, with this type of centralization, ease of diagnosis and dispatch of support personnel in the event of an alarm condition will be a natural conclusion.

BE

Philip J. Cianci has been in the TV business for 21 years and has done circuit design in the Grand Alliance ATSC prototype system.



MULTI-FORMAT EDITOR

Dayang D3-Edit
+852 2730 2117; www.dayang.com

Capable of operating in HD and SD formats; editing features include real-time 3-D and 2-D effects, real-time multi-layered character generation, unlimited edit layers, unlimited effects layers. ■

BROADCAST INTERFACES

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954-334-5406; www.scheduall.com

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Squeeze harder

BY CRAIG BIRKMAIER

More than 25 companies demonstrated products in support of H.264 at NAB. Many of these products also support the VC-1 codec from Microsoft. These products span a wide range, including: real-time hardware encoding; software encoding; hardware decoders; software decoders; dedicated chips and/or programmable processors for encoders and decoders; and transport products to deliver compressed content.

As was the case with MPEG-2 encoders, implementing new real-time hardware encoders involves a significant learning curve. H.264 and VC-1 use many new tools, and it will take some time for manufacturers to develop and optimize products for real-time encoding, especially for HD formats. Software encoders and decoders have existed for these H.264 and VC-1 for several years; however, many broadcast applications require real-time capabilities.

Most of the product announcements and technology demonstrations related to real-time encoding reflect the reality that these products are still in the early stages of development. Several companies will offer standard definition encoders in the near future, with plans to support high-definition formats in the future.

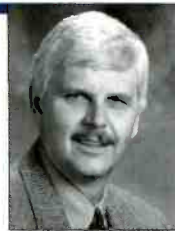
TANDBERG Television has taken an early lead with advanced encoding systems for H.264 and VC-1, claiming to have shipped more than 500 such systems. The company has developed a programmable approach for the new advanced codecs, which will allow them to be upgraded as the systems are optimized in the future. TANDBERG demonstrated two standard-definition en-

coders, the EN5920 for VC-1 and the EN5930 for H.264, and two new HD encoders, the EN5990 for H.264 and the EN5980 VC-1.

Modulus, which announced its formation just before NAB2004, came to NAB2005 with its new ME-6000 H.264 HD encoder, to complement the ME-1000 H.264 SD encoder announced last year. Able to support more than 600 billion operations per second, the programmable design of the ME6000 HD encoder will allow this product to evolve as the encoding tools are optimized.

The DiviCom MV 100 encoder from Harmonic is an advanced MPEG-2 standard-definition encoder with software options to support H.264 and VC-1. Harmonic also offered a technology demonstration of an H.264 HD encoder.

Envivio, an established developer of software tools for MPEG-4, is now adding real-time hardware encoding and



With optimism rising, attendance at this year's convention rose to more than 104,000 including 23,000 from outside the United States.

decoding to its product line with support for H.264. The company's 4Caster and 4Coder Broadcast series MPEG-4 AVC/H.264 encoders are optimized for digital news gathering (DNG), contribution/distribution applications and

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digital television services delivered via cable, IPTV, satellite or terrestrial, and enterprise networks.

While MPEG-2 encoders are now becoming mature products, Snell & Wilcox has pulled a trick or two out of its vast experience with inter-format (standards) conversion, to give the MPEG-2 tools a boost in performance. The Memphis encoder takes advantage of the company's Emmy award winning Ph.C phase correlation motion estimation and Prefix compression pre-processing to bring MPEG-2 to a higher level of compression efficiency. The Memphis encoder can be configured initially for SD applications and then upgraded to HD capabilities in the future.

Squeeze better

Compression technology is now playing an important role in video acquisition. The consumer DV format and several variants, including Panasonic's DVCPRO 25 and 50 and Sony's DVCam, have been using intraframe compression for several years. In the past year various flavors of HDV have emerged using Long-GOP MPEG-2 encoding at 25Mb/s; several products were shown at NAB that will extend HDV to higher bit rates to support higher frame rates.

The Frequency Range Extensions to H.264 are likely to play a major role in acquisition products in the future. Several off-the-floor technology demonstrations at NAB provided a glimpse into a future that will take advantage of the extended encoding ranges established via the Frequency Range Extensions, which include profiles that support high-definition formats with up to 12-bit samples in 4:2:0 (progressive), 4:2:2 (interlaced) and 4:4:4 color spaces.

The story of compression at NAB2005 does not end with H.264 and VC-1. Wavelets are showing up in more applications, including the new APR/ClipStore MXc HD/SD video clip server from Accom. And Ikegami

is now offering the HDN-X10 Editcam, which captures HD to hard disk packs using Avid's DNX compression technology. **BE**

Craig Birkmaier is a technology consultant at Pcube Labs, and he hosts and moderates the OpenDTV forum.

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MULTIPLEXING SYSTEM

Harmonic DiviTrackIP 408-542-2500; www.harmonicinc.com

Closed-loop statistical multiplexing system; incorporates remotely acquired video content to better optimize picture quality and compression efficiency; can support encoders using MPEG-2, MPEG-4/AVC (H.264) and SMPTE VC-1. ■

COMPACT ROUTERS

Sigma Electronics Dagger series

866-569-2681;
www.sigmaelectronics.com

A series of economical SD and HD video and AES audio routers designed to fit into a single modular frame; include equalization and relinking of all outputs; a variety of audio and video matrix sizes available for inclusion. ■

AUTOMATION

Digital Transaction Group XE

800-243-2001; www.dtgtv.com

A media asset management, content lifecycle and TV automation system; is capable of managing and controlling content from inception to its end of life, emphasizing delivery of uninterrupted, reliable workflow. ■

Editing systems

BY L. T. MARTIN

This year, the shape of the editing world changed drastically through acquisitions and rebranding, as well as through new technologies.

First, Avid Technology announced its intent to buy Pinnacle Systems for \$462 million. Then, Adobe Systems spent \$3.4 billion on Macromedia. Media 100 was separated into an individual division of Optibase, and Discreet's products were rebranded under the parent company AutoDesk. Finally, Thomson announced the revival of the venerable Grass Valley name for its post-production products.

Much of the technology excitement at the show revolved around the relatively new HDV format. Both Sony and JVC released camcorders capable of making the long-GOP MPEG-2 format into a sophisticated acquisition medium, although Sony records HDV interlaced and JVC in progressive format. Despite that incompatibility, many edit systems stepped up to the challenge of posting both.

Pinnacle Systems

Having been the first to accomplish native HDV editing last year, improvements to Pinnacle's SmartEDIT technology version 6.1 software for the Liquid line of real-time NLEs lets you mix HDV, Panasonic's P2 and Sony's XDCAM on the same timeline. The HD option for Liquid chrome supports uncompressed SD and HD through its SD/HDI breakout box, and Liquid can provide multi-speed SDTI background capture, as well as handle the DVCPRO50 format.

Apple

This year, Apple Computer also included editing native HDV in its Mac-based editing software by upgrading it to Final Cut Pro 5 as part of its Final Cut Pro Suite of software modules. That is in part thanks to

Apple's release of its new Tiger OS X 10.4 and QuickTime 7, which incorporate support of the H.264 codec. The other three components of Final Cut Pro Suite include Soundtrack Pro, offering a nifty waveform editor with flexible Action Layers; Motion 2, for real-time motion and animation graphics accelerated through 32-bit float rendering; and DVD Studio Pro 4, which, for the first time, enables burning HD DVDs directly from a PowerMac G 5.

Avid Technology

Although Avid decided to wait until later this year to provide native HDV editing, it introduced the new Avid Symphony Nitris. The product provides HD editors the power of bringing all the edit decisions, effects creation and associated metadata into the real-time finishing arena of Nitris DNA acceleration. The Media Composer Adrenaline HD NLEs received new version 2.1 software with 24fps HD support for film. And, the Avid DS Nitris family stepped up to version 7.6 with expanded DPX file-conform capabilities for digital intermediate (DI) workflows using 10-bit uncompressed HD and SK/4K media projects.

For desktop editors, Avid unveiled Avid XpressStudio HD built around Avid Xpress Pro HD video editing software, Avid Pro Tools LE audio editing/mixing, Avid 3D, Avid FX and Avid DVD by Sonic.

But perhaps one of Avid's most innovative introductions was Avid iNEWS Instinct, a newsroom composition tool that will let journalists create news stories by combining voiceover narration and video footage in a text-based content creation system, and then hand packages off to a more sophisticated craft editor for the inclusion of effects, titles and graphics.

PRODUCT JACKPOT

ANALOG/DIGITAL AUDIO ROUTING SWITCHER

PESA TDM3000

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STEREO CONDENSER MICROPHONE

beyerdynamic MCE 72

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www.beyerdynamic-usa.com

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SYNC AND TEST GENERATOR

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www.trilogy-broadcast.co.uk

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INTERNET BROWSE TOOL

Pebble Beach Systems Internet Media Browser

+44 1737 821 522; www.pebble.tv

Provides a means of viewing low-resolution copies of media content from anywhere in the world; features the company's metadata searching tools, which operators can use to formulate complex queries to search and find the required clips. ■



DIGITAL BROADCAST CONSOLE

Solid State Logic C200 version 3

212-315-1111

www.solid-state-logic.com

Includes support for a new DAW control option, providing workstation integration and using technology from the AWS 900 system; new snapshot system allows sequencing and crossfade of console set-ups under manual or automated control. ■



NEW Tools

Video Technics

Video Technics demonstrated its Proxy Editor for news applications. It provides enterprise-wide, low-res editing/browsing and asset management. While it's designed to work especially with the company's NewsFlow newsroom system, Proxy Editor is also compatible with Avid iNEWS and AP's ENPS.

Canopus

Not only can the new EDIUS Pro 3.3 software offer HQ batch capture from HDV, it also has a new Format Support Modules feature that includes MXF interchange and support for XDCAM, P2 and VariCam. Two of the most useful enhancements from Canopus are a tape export wizard that assists in outputting to various recording devices and an export-to-HTML feature that lets editors print and share clip lists.

Leitch Technology

The new version 9.1 software for VelocityHD from Leitch can edit HDV through its own proprietary transcoder. VelocityHD also can handle VariCam's overcranking and undercranking for off-speed effects. To accompany VelocityQ and VelocityHD, Leitch previewed its new software-only VelocityX NLE. It also expanded its news editing line with the VelocityXNG, which is designed for journalists who need to work on laptops or in remote locations.

Optibase

Another software-only offering came from Optibase in the form of Media 100 sw, which shares the same interface as its Media 100 HD. Although Mac-based, Media 100 sw is able to open any program created on their Media 100i for Windows, export material as a QuickTime movie and output via a Media 100i system to tape. The turnkey Media 100 HD received version 10.1 software, which includes a new Media 100 software codec that

lets editors using Adobe After Effects and other third-party packages render out QuickTime movies and drop into a Media 100 HD project.

Lightworks

Feature film editors welcomed that Gee Broadcast brought the Lightworks system back to NAB this year with new Touch Version 2.0 software, bringing a more robust editing engine, better DVE effects, stripview enhancements and new plug-ins for Adobe After Effects, Sapphire, Primatte and Boris Continuum. Because the HD output from Lightworks is increasingly being used to prepare audience preview screenings, the company also showed the Lightworks Touch M. E. outboard audio mixer with nine motorized sliders on a Mackie console.



By Thursday, the rush was over and attendees found ample seating at presentations that were overflowing on the first three days of the show.

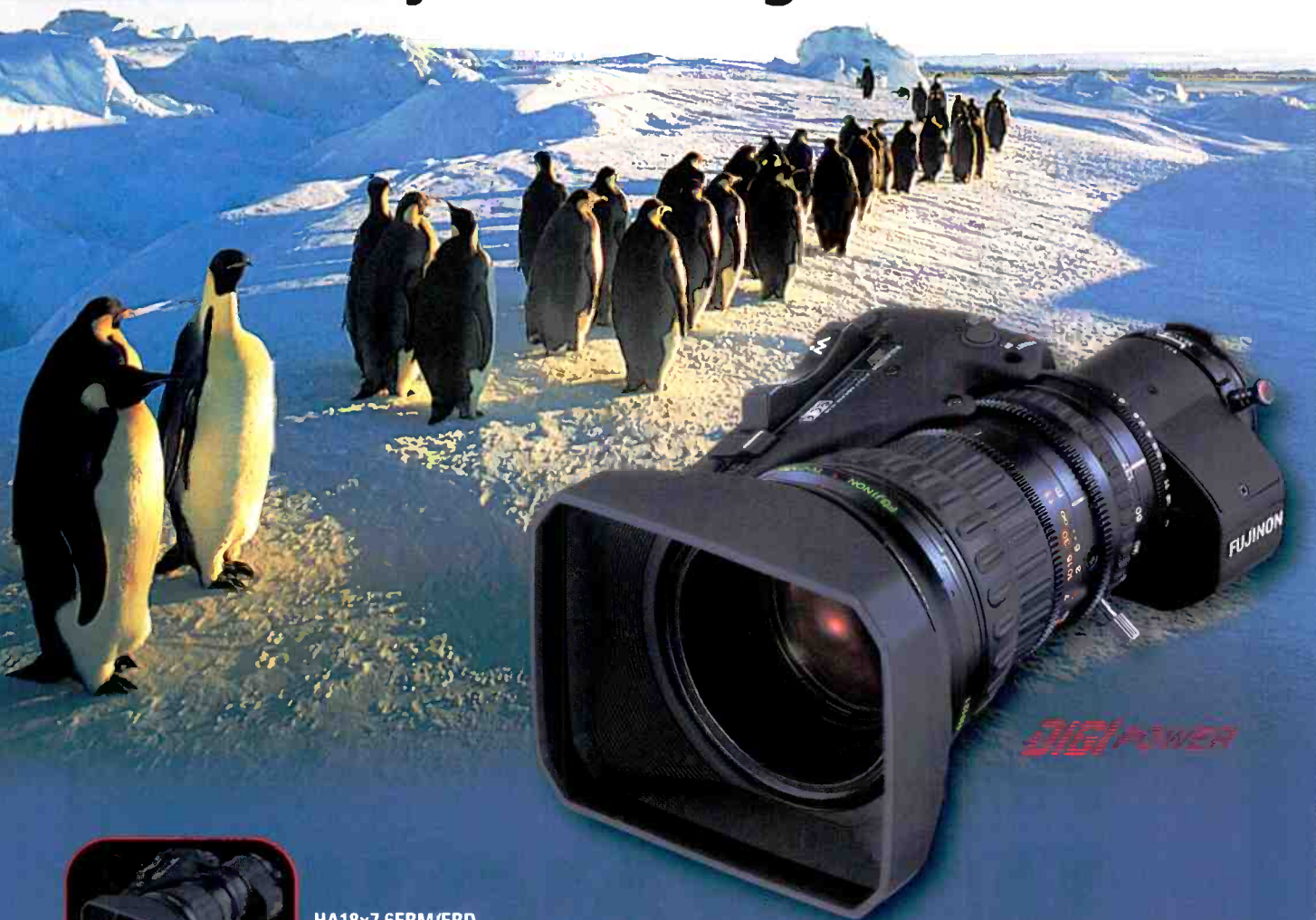
With DI creation becoming an increasing part of post-production, there were several moves toward handling this large file format. Previously, Avid's DS Nitris had been the only mainstream nonlinear system to handle 4K files, although not in real time. This year, however, it received some company.

Digital Video Systems (DVS)

CLIPSTER from DVS can edit, conform, color correct and finish a 2K DI in real time with its new version 2.0 software and then generate a 4K master with hardware assistance at half speed by rendering single-frame DPX files. CLIPSTER can record and play

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PRODUCT JACKPOT



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Features 10-bit SDI, analog composite and audio I/O; offers an advanced standards conversion algorithm for PAL to NTSC and NTSC to PAL, comprehensive audio synchronization facilities and a full set of signal processing controls; is field-portable. ■

HD-SDI TEST SIGNAL GENERATOR

**Wohler Technologies
Penpal-HD**
650-589-5676; www.wohler.com

Produces 32 video test patterns in 18 HD formats, each of which can be combined with three different audio tone settings; capabilities include three moving test patterns, pathologicals and four stereo pairs of AES audio embedded in the HD-SDI signal; 6in long and weighs 6oz. ■



NEW Tools

out data in any format, any resolution or color space in real time without conversions. When combined with DVS-SAN central DI storage, it has the bandwidth to handle three simultaneous 2K streams.

Digital Vision

If you need to work real-time 4K editing, consider the Film Cutter from Digital Vision, based on a single standard Windows NTFS workstation. Its Nucoda Digital Intermediate software also is used in Digital Vision's Nucoda Data Dailies and Nucoda Film Master color corrector systems.

Quantel

For those who are primarily doing SD production, but only occasionally need high-end post production finishing or would just like to try it out, Quantel in-

troduced the "Pay as you Go" concept. This allows users to adopt an eQ editing/effects/mastering system that handles both SD and HD tasks. With Pay as you Go, facilities can purchase an SD-enabled version of eQ and then incrementally turn on its HD (or higher) capabilities by purchasing a special password only for the time during which those features are needed.

This approach provides an extremely cost-effective approach to getting into the HD production business without the initial overhead of buying an HD system. Company officials said that the solution means customers don't have to pay extra for HD capability they won't use, yet full HD capability and functionality is there when projects demand. **BE**

L.T. Martin is a freelance writer and post-production consultant.

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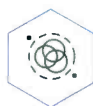
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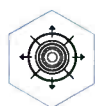
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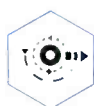
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RF systems

BY GEORGE MAIER

In looking through the maze of RF products on display at NAB this year, two items bubbled up to the top of the list with respect to "buzz" on the show floor. First, there was a literal flood of new microwave systems, antennas and related accessories to address the 2GHz BAS relocation process. Every microwave vendor at NAB had its own version of new or upgraded transition equipment and convincing stories to match.

The second hot spot was the unveiling of new transmitters and processing equipment to address the emerging DVB-H market. DVB-H refers to the ETSI standard for Digital Video Broadcasting to Handheld terminals. In other words: video IP streaming to cell phones, PDAs and similar devices. Services are in the trial phase at this point; however, many transmitter manufacturers are adding 700MHz and 1.6GHz DVB-H models to their product portfolio to be ready for large-scale implementations. Our report, however, begins with the microwave transition.

BAS is center stage

Traditional companies such as Broadcast Microwave Services (BMS), Global Microwave Systems (GMS), Microwave Radio Communications (MRC) and Nucomm all showed new or revised ENG product lines.

In the BAS-upgraded Truck-Coder II transmitter and Central De-Coder II receiver, BMS featured a substantial facelift with a new user-friendly control interface. Eight push buttons and a rotary encoder allow up to 100 channel pre-sets to be programmed and accessed rapidly. Its new Field-Coder II COFDM transmitter is a compact 1W portable that can be tripod-mounted for digital remotes.

Continuing the tradition of portables for every occasion, GMS introduced the High Definition Messenger Transmitter (HDMT), an HD version of its wireless COFDM camera link, along with a matching Messenger Smart Receiver (MSR) that can support multi-input diversity combining.

MRC focused on enhancement over replacement, a message that the company re-enforced by showing new accessories that add BAS transition enhancements to its existing ENG line-up. When connected to an existing CodeRunner 4 Central Receiver, the new MRX4000 integrated demodulator-decoder leverages existing technology to provide integrated functionality. It supports new and old FCC band plans for both analog and digital transmission. Full BAS enhancements are available for CodeRunner 2 ENG transmitters. The company also introduced the SCM4000, a variable rate digital modem; the DVC4000 MPEG-2 codec system, a fully integrated IP over ENG platform; and new features to its airborne HDTV package.

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COPPERHEAD HD/SD

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DIAMONDBACK II

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650-526-1600; www.pinnaclesys.com

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Keywest Technology MX5 Plus

800-331-2019;
www.keywesttechnology.com

Supports high-resolution displays; input NTSC source video and up-converts the video to native resolution; supports 4:3, 16:9 and 9:16 aspect ratio displays with a high-resolution RGB progressive scan and DVI output; key up to five crawls on screen. ■

MULTI-PORT, BI-DIRECTIONAL IP VIDEO GATEWAY

Path 1 Network Technologies Vx8000 VoIP Gateway

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HD HDV CAMCORDER

JVC GY-HD100U

973-317-5000; <http://pro.jvc.com>

Records 24p with timecode; utilizes three newly-developed 1/3in CCD image sensors, each one featuring an array of 1280x720 pixels with micro lenses. ■

AUTOMATION

Florical Systems Automated Join in Progress (JIP)

352-372-8326; www.florical.com

Featured in the AirBoss presentation controller; is fully automated to provide potentially unattended join in progress of local recorded programs based on a remote signal from the network. ■

Moseley Associates continued to build its presence in television with the introduction of its Event HD ENG portable systems for 2GHz and 7GHz. The company emphasized its choice of 32 carrier OFDM transmission as the optimum choice for data rates up to 85Mb/s in the BAS bands.

At Nucomm, the new Channel-Master TX1 ENG portable transmitter integrates digital and analog transmission, FM, COFDM and VSB modulation, and an integrated MPEG-2 encoder all in one user-friendly package. The Newscaster CR6D Central Receiver has a new Smart Display front panel with expanded diagnostics and includes all of the BAS upgrades. The Newscaster TX3 got a similar facelift and now offers a DVB-S option for satellite uplinking. The company also introduced the Go-Pack, a mini-COFDM transmitter with integrated MPEG-2 encoder and a new IP over ENG system with a diversity combiner receiving option.

With so much activity surrounding the NEXTEL-related 2GHz transition, it was no surprise to see newer players such as RF Central and Microwave Service Company (MSC) at NAB with a suite of products aimed squarely at ENG. The RF Central product line now includes a rack-mounted ENG transmitters and central receivers, plus a camera back transmitter with a suitcase docking station that converts it to a 10W portable.

MSC has been known for years as the folks that fix any microwave. This year, it introduced its own line of COFDM equipment, but with a new twist. Its Genesis systems can support two or more videos in the same RF channel without significant degradation.

Both NSI and RadioWaves had a lot to say about antenna upgrades in light of the 2GHz relocation. NSI has specific upgrade or replacement plans, depending on the age of the original

installation, and it also has a sophisticated control system that has been updated to support all of the new central receivers.

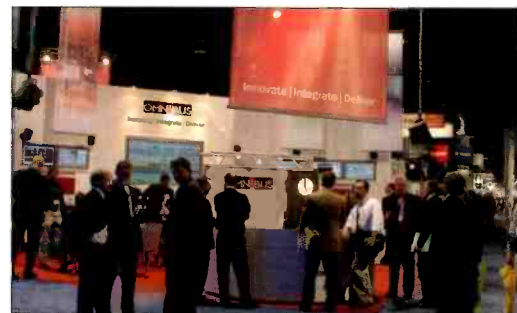
RadioWaves, which provides antennas under private label agreements, has a complete kit of feed assembly and antenna replacements to support the BAS relocation.

DVB-H solutions

In the heavy-duty TV RF department, some of the manufacturers showed a significant interest in DVB-H, with new equipment on display from Axcera, Harris, Rohde & Schwarz and Thales. Antenna manufacturers, including Dielectric products and Micro Communications, also showed DVB-H products.

Broadcast transmitters

Axcera introduced a new dual-use transmitter that can switch between analog and digital on command. The ratio-

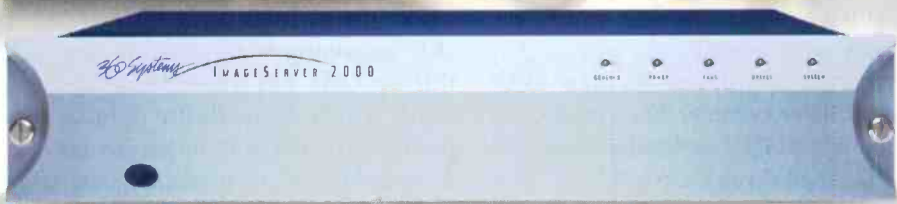


Automation vendors were busy with questions as engineers continued their quest to improve station efficiency and IT integration.

nale is that one transmitter can serve as a total spare for both analog and digital sides of a transmission plant.

Dielectric introduced the TFU-UT antenna, a new UHF bowtie slot antenna for low-power applications. The antenna is extremely broad, with a VSWR of 1.1:1 across the band. Its RF Scout is a new remote monitoring system that provides real-time Web-based transmitter metrics, including power output, VSWR, line pressure and temperature. VSWR is calculated in real time, and all data can be stored

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PRODUCT JACKPOT

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ESE ES-461U

310-322-2136; www.esweb.com

Is a microprocessor-based pre-settable SMPTE time code generator with Jam Sync; provides a front panel mounted thumbwheel switch that allows the presetting of hours, minutes and seconds data and six digits of user bits. ■



VIDEO SERVER

360 Systems Image Server 7000

818-991-0360; www.360systems.com

Designed for satellite ingest, production and play-to-air; the two-input, six-output multi-format design supports MPEG-2, DV and TARGA graphics; up to 400 hours of internal raid storage is available (accessible from the server's front panel). ■



NEW TOOLS

for up to one year.

Harris continues to invest in ATSC related products and upgraded its liquid-cooled Atlas solid-state UHF transmitter line to 30KW this year. Harris also showed its Truepoint digital microwave system combined with NetVX as an STL for 7GHz, 13GHz and 18GHz.

ERI showed a new and interesting UHF channel combiner. Optimized for N+2 spacing, the combiner requires about half the space of a traditional constant-impedance combiner, with a significant reduction in purchase price as well.

Larcan displayed its new Plus DTT500 transmitter that is positioned for digital LPTV applications, once the FCC digital rules are solidified. The new transmitter is a clever integration of MPEG-2, EBS and RF equipment that will support up to four digital streams on one channel.

Myat has added semi-rigid air dielectric coaxial cable to its product port-

folio, with sizes ranging from 1/2in to 6in diameter.

RFS highlighted the RD slot cavity antenna for UHF DTV applications at power levels up to 220KW. The antennas operate over 10 to 20 channels and are available with a variety of pattern options.

Rohde & Schwarz showed its new NH/NV 8200 series air-cooled UHF transmitters, available at power levels from 500W to 2KW for analog operation and from 200W to 1.2KW for digital operation.

RF Technologies featured its new SFNstar UHF slot transmitting antenna, which dramatically reduces ground-level RFR with no impact on the main lobe. This is particularly useful in side-mount and short tower applications with high-power analog or DTV transmitters. **BE**

George Maier is the founder of Orion Broadcast Solutions.

MegaPixel Resolution

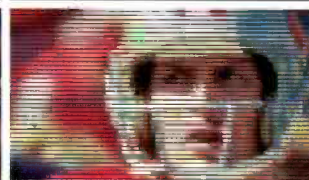


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www.fischerconnectors.com

Enable users to field-assemble and field-repair HDTV camera connectors anywhere; eliminates polishing fiber-optic elements as well as preparing special epoxies when using the new Series 1053T connector. ■

JPEG2000 SERVER

Doremi V1-HD
818-562-1101; www.doremilabs.com

Relies on JPEG2000 video compression up to 300Mbps providing visually lossless recording; provides over 12 hour of video recording on one hot-swappable drive; V1-UHD provides uncompressed JPEG2000 storage. ■

PRESENTATION CG

VertigoXmedia Powerpoint CG
514-397-0955; www.vertigoxmedia.com

Based on Microsoft's PowerPoint, turns presentations into high-end broadcast-quality video; runs in PowerPoint user interface; no scan converter required. ■

MODULAR LIBRARY

Storagetek StreamLine SL8500
800-877-9220; www.storagetek.com

Attaches to mainframe, supercomputing, UNIX, Linux and Windows; supports the T9840 and T9940 lines of tape drives, and LTO Ultrium and SDLT tape drives. ■



Storage solutions push IT forward

BY MICHAEL GROTTICELLI

No equipment category has benefited more from the IT world than storage. This includes solid-state memory, optical media, data drives, flash memory, hard drive storage and, yes, even digital videotape.

With the demand for digital SD and HD programming from cable, satellite and telco TV providers increasing, the importance of — and the need for even more — storage has never been greater. It's been said that any viable production facility or multichannel playout center is only as useful as its storage capacity.

At the NAB convention in April, everything from a small USB stick and Apple iPod to large, data tape-based archival systems and multiformat, multichannel video servers all showed signs of advancement, enabling production professionals to handle more content, easier, with the same amount of manpower and tools they had previously.

There were also a few surprises, such as holographic storage and intelligent DLT archive libraries that expand the storage capacity, system throughput and access to material stored on secure AV/IT drives. Indeed, when considering a storage purchase, it's important to think about sustaining access to the material (on and off the drives) as much as storage capacity.

Here's a look at some of the storage highlights shown this year.

Emerging storage

InPhase Technologies is offering a

data density of 200Gb per square inch, significantly higher than any other optical format. Using its patented polytopic recording method, the company's Tapestry drive family, which will be available in 2006, offers 300GB capacity on a single disk. This will be followed a family of products with up to 1.6TB capacity in 2009.

Fuji Photo Film U.S.A. showed its own version of the Holographic Versatile Disc (HVD), which the company said promises more than 200 times



With the demand for digital SD and HD programming from cable, satellite and telco TV providers increasing, the importance of storage has never been greater.

greater capacity (or up to 3.9TB) and 40 times the transfer speed of today's DVD media.

In July 2004, Optware demonstrated recording and playback of digital movies on a holographic recording disc with a reflective layer using its patented Collinear Technologies.

Holographic storage delivers high capacity by recording data throughout the volume of the recording material, and not just on the surface. A data page of approximately one million bits is recorded in one exposure of the laser. Each data page is located at a unique address within the material. Several

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INTEGRATED CONSOLES

Calrec System Plus
+44 422 842159; www.calrec.com

Technology upgrades of hardware and software are available as optional upgrades to existing 100 Series consoles, basic platform includes — fully redundant power supplies; 20 second boot time. ■



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Gepco VDM260
847-795-9555; www.gepco.com

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DUAL HD MONITOR

Marshall Electronics V-R72P-2HDA
310-333-0606; www.lcdracks.com

Rack-mounted monitor features high resolution, 1.2 million pixel screens with digital signal processing; designed for analog applications; accepts DV1 and HDMI computer or video signals plus HD and SD analog video standards and signal types. ■

hundred pages of data, each with their own unique address, are recorded in the same location of the medium. A collection of data pages is referred to as a book. This new recording technique enables more holograms to be stored in the same volume of material by overlapping not only pages, but also books of data. This dramatically increases the storage density.

Quantum demonstrated its SDLT 600A tape drive with DLTxchange Technology based on an enhanced version of the company's DLT technology. The SDLT 600A system is a network-attached, file accessible data tape storage drive designed for storing large amounts of data and full-length programs. It offers the benefits of data tape and the flexibility of video-tape, while supporting the Material eXchange Format (MXF), to quickly locate and retrieve files off specific data tapes.

Drive maker Ciprico demonstrated its DiMeda 1724 network attached storage (NAS) drive with iSCSI support, adding what it calls "block access capabilities" to its existing file-based architecture. A single DiMeda now supports both block and file access to a storage device, simplifying the overall management of different classes of storage.

The FireStore series of Direct-to-Edit (DTE) products from Focus Enhancements were virtually everywhere on the show floor at NAB this year. That's because the products convert any IEEE-1394 drive into a digital disk recorder/player. Using most tape-based DV and HDV camcorders, operators can record directly to disk and save time in editing. Like Panasonic's P2 card system and Sony's XDCAM family, the advantages include no ingest time and access to material as a digital file to log clips and for doing rough EDLs right inside the camera. There's no capturing, file transfer or

file conversion necessary.

Server storage

The advent of the storage area network (SAN) has revolutionized content production and distribution. As a key component of these multi-user networks, video servers have become so sophisticated that they now can store and distribute SD and HD files within the same frame, from the same timeline. At NAB, both the Grass Valley Profile 6G and Omneon Video Network's Media Spectrum systems showed the ability to play back SD and HD content simultaneously from a single timeline of any combination of SD and HD source clips.

With built-in up- and downconver-



Virtual sets continue to expand in features and drop in price. This year, the demos did not allow attendees to participate as was the case at previous shows.

sion, which eliminate external boxes and thus save space and money, the new servers deliver integrated playback for today's heterogeneous broadcast facilities and help smooth the transition to handling HD material. In addition, these servers can be controlled remotely via SNMP-based monitoring.

The Grass Valley Profile 6G family, including the PVS 300 and 3500, can be used for standalone, distributed or storage area network (SAN) applications. It is also available as an upgrade package for existing Profile XP Media Platform servers.

Profile 6G now offers 600Mb/s internal bandwidth for future expansion, up

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to seven video channels, 16 or 32 digital audio channels (16 AES pairs), and built-in decoders and encoders.

Omneon's Spectrum modules, part of its the MultiPort 4100 series of interface devices for MPEG-2 decoding, support simultaneous playback of both SD and HD MPEG-2 material. Incorporating built-in up- and downconversion capabilities, operators not only can mix SD and HD material to create a single output channel, but also they can use one program timeline consisting of intermixed SD and HD material to create two simultaneous outputs — one for SD and another for HD.

When an external conversion device is used, the MultiPort 4100 series' built-in, adjustable audio-delay compensation maintains audio/video synchronization.

The MultiPort 4100 series can be in-

corporated into any existing Omneon Spectrum media server to add integrated HD playout capabilities.

360 Systems announced a new, fully redundant server package, which employs new Image Server software to create an immediate protection copy of stored content. The system works with standard automation controllers and requires no third-party software or additional serial ports.

Unlike other mirrored servers, 360 Systems provides high reliability through simultaneous recording to two servers, rather than delayed transfers from a primary server to a secondary one. Similarly, automation commands are executed in parallel on both servers, using the company's new Dual Server Controller.

Sony introduced its new Media-Venue server at NAB, which supports

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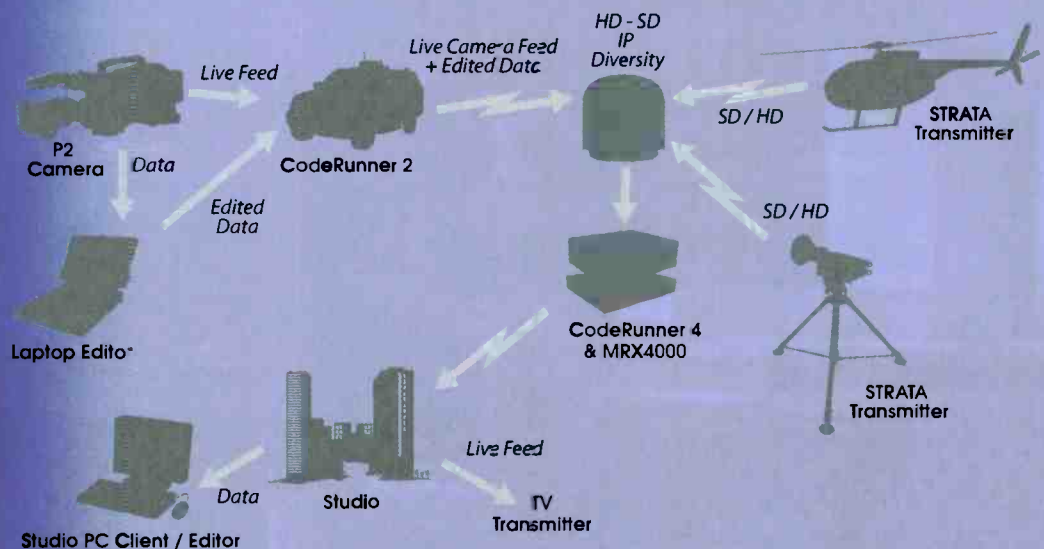
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- CR4 Central Receiver - New BAS Channel plans and IF filter selections
- MRX4000 - Universal demodulator and MPEG decoder with MRC Link Quality monitor
- CR2 ENG Van Transmitter - User friendly BAS channel plans & presets, source name ID
- DAR Plus 2 GHz STL/ICR - Fully compliant with revised FCC rules for 12 MHz channels
- SCM4000 - Digital modem supports user choice of interface, modulation, and MPEG coding.

For the BAS relocation, or for other microwave needs, we offer proven technology that has steadily evolved to support digital video transmission. MRC continues to be a reliable and stable source that the broadcast industry can rely on for timely shipments, regardless of the workload.

Looking at the Future ? So are we !



MRC has been providing world-class microwave transport solutions for over four decades. We made the first solid state STL's, and we were there when ENG was born. As future trends develop, MRC will continue to lead with innovations and applications.

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COMMUNICATIONS

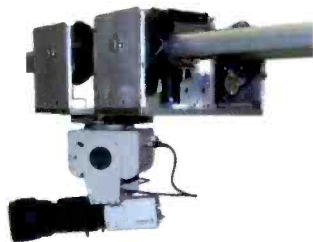
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856-423-0010; www.dmtonline.us

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CAMERA TROLLEY SYSTEM

Telemetrics TeleGlide

201-848-9818; www.telemetricsinc.com

Consists of a single or dual trolley for optimal load stabilization; the track is a dual rail system with connecting brackets; is fully servo controlled with location feedback for preset positioning and motion control. ■



NEW Tools

SD and HD material, as well as MXF as a native file format. It also provides complete interoperability across many commonly used formats and compression standards. MXF serves as a common denominator, bringing together multiple HD (1080i, 720p) and SD standards as well as numerous codecs, including MPEG-2 Long GOP, Intra GOP, VBR, CBR and DV25.

Industry-standard control interfaces include VDCP for real-time control and FTP (RFC959) for file transfer. Gigabit Ethernet capability allows high-speed access and direct-mount compatibility for nonlinear editors and other third-party devices.

Sony's RAID storage provides high reliability with multiple error correction for broadcast applications. All system components can be fully redundant to avoid having a single point of failure.

SeaChange International introduced the MediaLibrary X12100e — its largest online content library ever — capable of storing up to 344TB of media in any format with IP connectivity throughout a broadcast facility. The company also introduced the MediaClient 4201 SD/HD simulcast decoder, which can simultaneously produce a multiformat SD and HD output from a single video file. The SeaChange VOD Content Production System, jointly developed with Anystream, also was demonstrated, which provides an integrated system for automatically ingesting, producing and distributing content for on-demand television. **BE**

Michael Grotticelli regularly reports on the professional video and broadcast technology industries.



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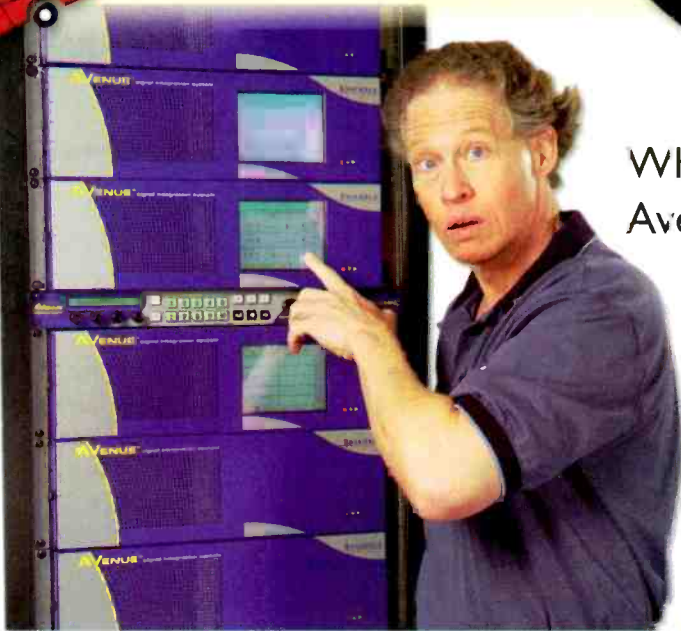
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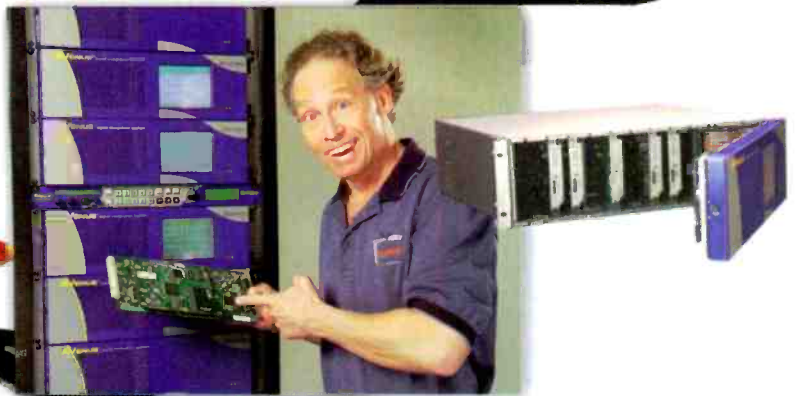
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HD AUDIO DE-EMBEDDER
Graham-Patten HDDM-8
 888-622-4747; www.gpsys.com

Provides eight channels of analog audio output in a compact package from a SMPTE 292M signal with embedded audio; rack mountable or battery operation; AES group and channel selectors. ■

GRAPHIC OVERLAY

Terayon Digital Motion Graphics Overlay (DMGO)
 408-235-5500; www.terayon.com

Enables broadcasters to implement high-quality, real-time graphic overlays in their digital services to brand, promote and advertise; does not require any decoding or re-encoding of the underlying digital programming. ■

Audio products

Digital audio products at NAB2005 help broadcasters sing a happy tune



BYTOM PATRICK MCAULIFFE

If the NAB2005 North Hall filled with audio products were a song, it might have been the tune "Happy Days Are Here Again!" It was the busiest show in recent memory, and the mood in the aisles was upbeat.

Solutions aplenty

To support remote recording, Edirrol demonstrated the R-4 portable field recorder. Small size, high quality, portability and long battery life make this a good fit for anyone needing to store

digital audio for later production. The recorder's connectors support full control functions for Sony HDV cameras.

Apple introduced its Soundtrack Pro software for audio editing and sound design. The program features a waveform editor with flexible Action Layers that allow users to instantly reorder, bypass or change any edit, effect or process. The new Mac-only software package has a new Intelligent Find-and-Fix feature, which provides

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Newscoder TX3



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PRODUCT JACKPOT

HD EDITOR

Leitch VelocityHD

757-548-2300; www.leitch.com

Supports SD, HD, HDV and Panasonic VariCam formats; direct timeline support for DV25 and DVCPRO formats; P2 support; direct 1394 I/O for both 1080i and 720p from HDV devices; HDV content can be seamlessly mixed with other HD formats on the same timeline; handles dual-stream, real-time HD transitions and effects and full-quality HD playback of dual video streams. ■

MULTI-FORMAT HD/SDI MONITOR

Videotek TVM-950HD

610-327-2292; www.videotek.com

Waveform monitor supports both HD and SD applications in a half-rack configuration; displays waveform, vector, gamut, audio, picture, timing and data analyzer functions in quadrant or full-screen views; displays up to four inputs simultaneously; advanced audio analysis with CineSound, Surround and Dolby decoding modes. ■

a quick fix for common audio problems such as background noise, pops, clicks and hum.

Audio-Technica featured three new products: the AT892 MicroSet micro miniature mic, 2000 series wireless mic system and the AT2020 cardioid condenser microphone. The AT892 is a miniature omnidirectional condenser headworn mic. It has an ergonomic under-ear design and a flexible contoured loop that hooks behind either the right or left ear for a secure, comfortable fit.

Azden showed its new 100LT UHF wireless microphone system designed for smaller DV cameras. The 100LT has 63 user-selectable frequencies. Its compact size allots the mic to fit directly in a camera's light shoe. The company also demonstrated its APS 25 wireless powered speaker system,

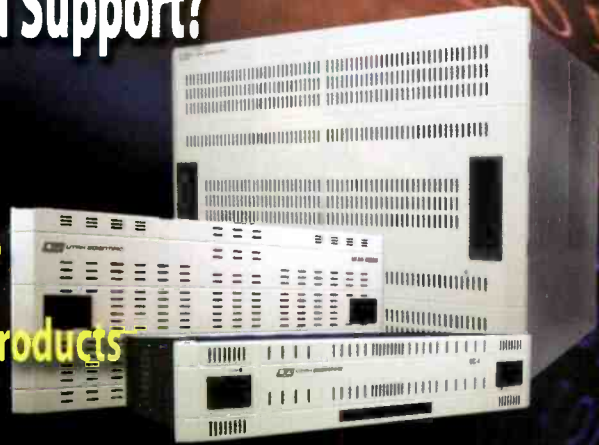
available with VHF, UHF and infra-red wireless transmission, as well as its popular SGM-1000 phantom-powered (or battery-operated) shotgun microphone that features a switchable low-cut filter and a shock-mount mic holder and windscreen.

Sometimes considered the 'big Kahuna' of audio software, Avid's Digidesign announced several new products at the show. The ICON D-Command is a new control system for Pro Tools|HD and is smaller than the original D-Command large-format console.

In a standing room only booth, Digidesign unveiled the newest version of Pro Tools 6.9 for the PC and Mac with a new cross-platform feature set and enhanced tools for video post production. One noteworthy announcement was Digidesign's new DigiDelivery

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DIGITAL/ANALOG RECEIVER

Nucomm CR6D

908-852-3700; www.nucomm.com

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SUBTITLING SYSTEM

Screen Protile

+44 1473 831700;

www.screen.subtitling.com

Solution for the preparation, editing, and timing of subtitles; creates in all major languages; all tools easily controlled from a PC keyboard via simple short cuts, drop down and contextual menus. ■

2.0 file delivery system. The program allows post facilities to securely exchange of digital files of any size.

Facilities that have adopted the DigiDelivery system include Warner Brothers, Fox Film, Technicolor, Ascent Media, Universal Music, SDI Media and Skywalker Sound. According to the company, the new delivery system is more secure than FTP and can save broadcast and post facilities money by eliminating overnight delivery services. Sorry Fed-X.

Digigram highlighted its first professional USB audio interface that has been specifically designed for broadcast applications. The small UAX220, which is about the size of a breakout cable, provides stereo input/output via USB. Using USB 1.1, the UAX220 is plug-and-play and provides 24-bit/48kHz audio quality with Zero-latency

for direct monitoring. (There's a handy headphone jack too). The device is powered via the USB port.

Euphonix had a busy booth, at the center of which was Max Air, a 96-channel digital mixing system designed for on-air, live-to-tape and outside broadcast applications. Also spotlighted were its System 5-B and System 5-BP digital audio mixing consoles. The System 5-P audio post mixer includes a film monitoring panel and multi-operator capability for film and TV post applications.

The System 5-BP includes dynamic automation and can support more than 300 channels for both live and audio post applications. Also new this year is the System 5-MC integrated DAW audio mixing system and the announcement that Euphonix and SAN Solutions have teamed up to offer a new audio facility network server solution, which was shown for the first time at the show.

What good is surround sound and HD audio if you can't hear it? Speaker maker Genelec hopes to help with that.

Perfect for audio control rooms measuring up to 3000cu ft, the 8030 LSE PowerPak system consists of five Genelec 8030A two-way, bi-amplified active monitors, one Genelec 7060A LSE series active subwoofer and a Genelec acoustic/tape frequency/wavelength measuring tape. In addition, an 8030 LSE PowerPak setup guide is included for accurate speaker placement, wiring and fine-tuning.

One of the more interesting products at the show was from a small company called Holophone. The Holophone-MINI surround sound microphone is specifically designed for broadcast applications. It enables instantaneous, professional quality, 5.1 surround sound capture on any camera for broadcast ENG and field applications.

The Innkeeper 2 is a new two-line, rack-mount digital hybrid telephone interface from JK Audio. The front-panel keypad, display and handset jacks provide easy speed dialing and call

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It is well-suited for any application from on-air to production and is easily configured by the user.

Its potential includes the networking to the scale of large broadcast centres and the realisation of simple and integrative workflows. Other basic features are the integration in radio automation and remote servicing via TCP/IP.

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PRODUCT JACKPOT




HD CAMCORDER

Panasonic AG-HVX200

800-528-860;


www.panasonic.com/broadcast

DVCPRO HD P2 hand-held camcorder provides 1080i and 720p recording at 100Mb/s DVCPRO HD; shoots in 1080/60i, 30p and 24p; in 720/60p, 30p and 24p and in DVCPRO50, DVCPRO or DV. 

NEWS PRODUCTION PLATFORM

Quantel Newsbox

203-972-3199; www.quantel.com

Pre-packaged integrated news production system; self-contained, users can ingest, view rushes, choose shots, edit stories, re-view finished pieces and play-to-air. 

setup. Digital hybrids allow you to send signals into the phone line while maintaining excellent separation between your voice and the caller. The balanced XLR output jacks contain only the caller's voice, so there's no more transmit/receive crosstalk common to analog units. It's only 7.2lbs and is about half the price of its competitors.

What is smaller than a pack of taccas yet captures great audio? The new Lectrosonics SuperMini (SM) audio wireless transmitter. Housed in a tiny splash-proof package, the SM features a native digital hybrid, so there's no analog compandor. Lectrosonics' patent-pending Digital Hybrid Wireless technology provides both 24-bit digital audio and analog FM signal transmission to encode a digital signal delivering a 107dB signal-to-noise ratio and a flat frequency response.

NEW TOOLS

NAB2005 saw Linear Acoustic leaving visitors impressed with its new LA-5421 StreamStacker audio bitstream multiplexer and LA-512 StreamStacker multiplexer and AC-3 splicer. The new LA-5124 offers enhanced channel density by extracting up to four 5.1 channel AC-3 encoded programs from a single AES-format digital signal. Stacked AC-3 streams produced by the companion model LA-521 multiplexer are fully compatible with all Dolby-certified AC-3 audio decoders.

Mackie, now a LOUD Technologies company, had plenty to show. Traktion 2 is Mackie's updated audio recording and production software. It sports a clutter-free user interface, multitrack digital audio recording, automated mix down, full VST instrument and plug-in support. The program can import and export all

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PRODUCT JACKPOT

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CARDIOID CONDENSER MICROPHONE

Audio-Technica AT2020

330-686-2600 www.audio-technica.com

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NEW Tools

major audio file formats, and is cross-platform Mac- and PC-compatible.

The new NAGRA V is a portable, digital two-channel recorder designed for television, film and documentary work. Recording 16-bit or 24-bit up to 96kHz on a removable hard disk, the recorder features pre-record, camera return monitoring, timecode with chase synchronizer, routable inputs, internal hard drive storage and audio limiter circuitry. It also records post-production compatible BWF files. According to the firm, the NAGRA V is designed as the successor to the popular NAGRA IVS-TC and is a possible replacement for R-DAT.

Neural Audio showed off its new NeuStar MultiMerge 5.1 product and announced that TV stations were already using it to broadcast 5.1 surround sound 24/7. Using sound from a two-channel mono or stereo source, the MultiMerge transcodes and merges audio sources and then provides an uninterrupted stream of 5.1 surround sound. According to the company, it is a simple and effective way for television affiliates to initiate 5.1 audio capabilities without breaking the bank.

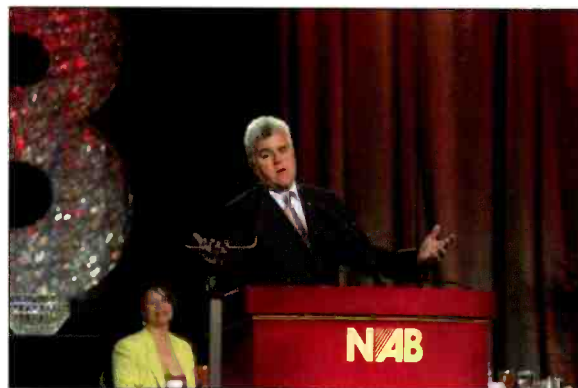
When it comes to being refereed to as a "standard," there are only a handful of companies that can claim their products are such. Neumann is one of them. Neumann booth visitors could try various mics, including the new BCM 705. The second microphone in the new Neumann broadcast line and the first Neumann dynamic microphone, the BCM 705 features the new Neumann mic capsule with mechanical suspension that helps reduce the mic's sensitivity to stand movement or handling shocks. The microphone comes with a mount that is elastically suspended and a mount that is compatible with standard broadcast-seg-

ment microphone arms.

The new Riedel DHY-101 digital telephone hybrid interface provides bi-directional communication between the intercom matrix and a standard DTMF capable analog telephone line. It features advanced DSP processing and echo canceling on both send and receive and can be used stand-alone or integrated in an artist intercom system.

Stagetec introduced an AES interface for its ORTATIS intercom. This nifty feature allows intercom signals to be sent over standard AES lines. This allows a conventional audio router to handle also the intercom feeds.

Stagetec also showed its new SDI embedding/de-embedding card for the



There were many notable speakers at NAB2005, including *Tonight Show* host Jay Leno, who spoke at a Television Luncheon sponsored by Microsoft.

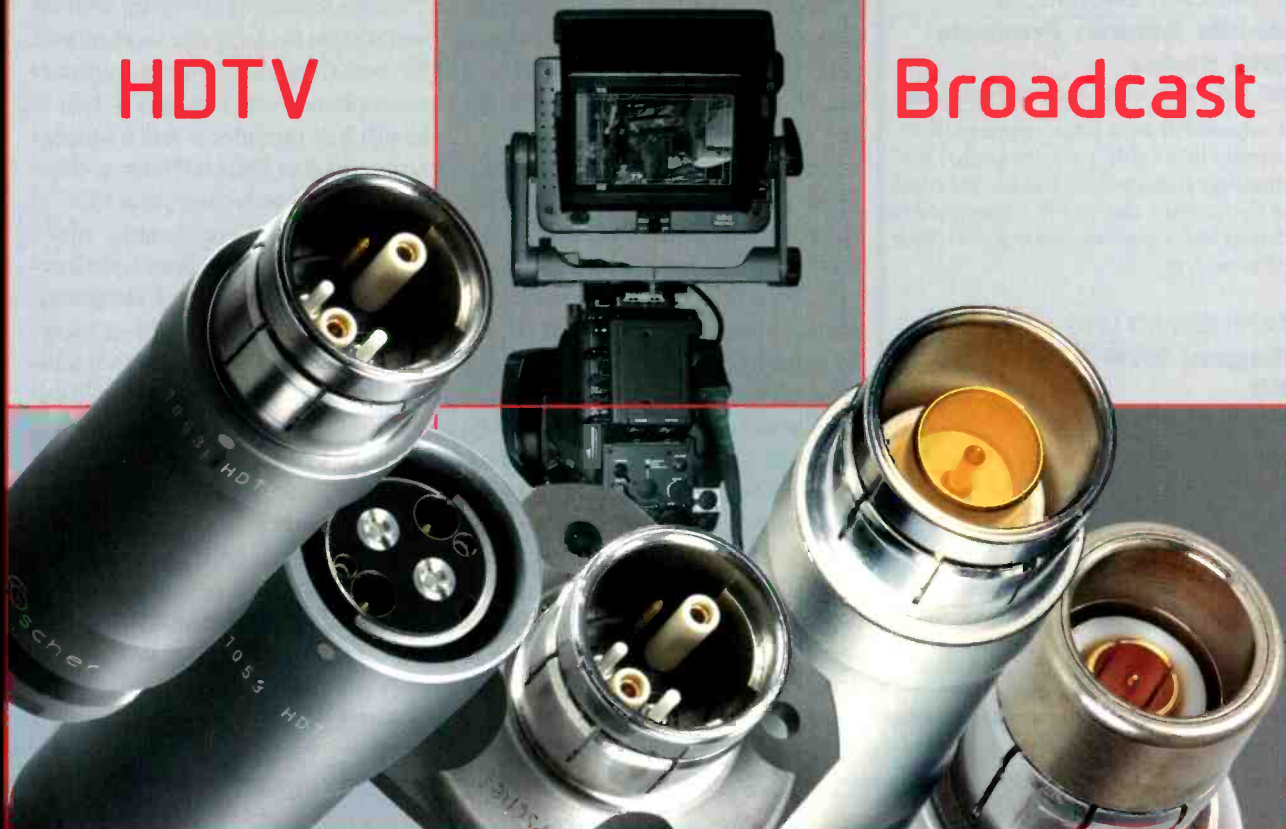
NEXUS router. The router allows asynchronous signals to have different clock sources. This means that an SDI signal does not have to be in sync with the audio at the router. Sample rate converters on the router's XSDI board perform all the necessary conversions. Also new to the router is an optional eight-channel analog output card.

Finally, the company showed its AURUS direct-access console for live broadcasts. This sophisticated and flexible console can handle a maximum of 96 channel strips supporting 300 audio channels. The AURUS fully integrates with the NEXUS STAR digital router, which further expands the console's versatility.

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TAPELESS HD DNG

Ikegami HDN-X10 Editcam HD

201-368-9171; www.ikegami.com

Provides 1000TV lines of resolution; 56dB of S/N and F10 at 2000lux; power consumption only 32W; uses three 2/3in 2.1megapixel CMOS sensors; uses Avid DNxHD codecs working at 8 or 10-bit sampling at 145Mbps and 220Mbps; portable FieldPak2 storage ingests directly into Avid HD NLE; proxy and metadata are stored on camera's USB flash cards. ■

NEW Tools

Smart AV presented its Elite Series Smart Console for the first time at NAB. The Smart Console provides a touch-sensitive arc that can summon up to 96 channels directly to the operator's fingertips. The Smart Console is currently available in 48- and 96-channel configurations, with a 72-channel version coming soon. The console uses an Ethernet I/O to connect to a growing number of signal processing and routing devices and was shown interfaced to a Mac Logic Pro 7 workstation.

In a booth that resembled a small city, it was easy to see why Sony is a leader in broadcasting. Unfortunately, it was a little harder finding its audio solutions. Sony introduced two new microphones this year. The new ECM-674 shotgun microphone is compact and lightweight. Its rugged design is made for use with Sony's new line of HDV, DVCAM and XDCAM camcorders, but it can be used with others. The cost-effective mic has a two-way powering feature, which allows for either phantom power or battery operation. The new ECM-674 offers high sensitivity, low noise characteristics and both a flat and wide frequency response from 60Hz to 18kHz, with a dynamic range

of at least 90dB.

For ENG applications, the Sony F-112 dynamic microphone features a rugged, ergonomic design with an omnidirectional capsule, capable of clear voice pick-up from all directions. When combined with the optional wireless plug-on transmitter, the F-112 becomes an essential tool for field interviews.

Japan's Sanken has come up with the world's first dual-capsule lavalier mic, the new COS-22. The ultra-miniature microphone measures only 1.25in in length but provides a full frequency response up to 20kHz. With two-channels, the dual-omnidirectional COS-22 is perfect for live broadcasting with a completely redundant dual capsule design with totally separated electronics.

It was standing room only as Sound Devices showed two new portable high-resolution digital audio recorders: the 722 and the 744T. Recording to an internal hard drive and/or a CompactFlash card, the small recorders capture uncompressed audio up to 24-bit at 192kHz and have analog and digital I/O's with linking capability for additional optional channels. The new 744T recorder features four channels, each with time code.

In the SSL booth was version 2

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Composite Video Input	✓	✓	✓	✓
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Component Video Input		✓	✓	✓
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3-D OPTICS SYSTEM

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973-812-3858; www.angenieux.com

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HD SERVER

Leitch NEXIO HD
757-548-2300; www.leitch.com

Software-based agile codec for HD recording with up/down-conversion for simultaneous applications; supports interpolated off-speed play and scrub audio. ■



NEW Tools

software for the SSL C100 digital broadcast console. It includes TouchPan, which provides full 5.1 panning access from one central touch screen. The mixing console features color-coded displays and comprehensive control of all surround parameter. The new software upgrade supports the I/O expansion for the Centauri core and increases the C100's range of applications by supporting 44.1kHz native sample frequency operation.

SRS Labs exhibited new enhancements to its Circle Surround (CS) product line and technology. The new Xtract 6.1 surround software utility helps users with mono or stereo audio upgrade to 6.1 channels. CS-encoded audio technology was also displayed in other booths, including Linear Acoustics and Holophone. CS encoding technology is specifically designed for the professional broadcast market, enabling instantaneous 5.1 surround sound capture.

With a 48-track hybrid hard disk workstation at its booth, TASCAM had one of its best shows in years. The new TASCAM X-48 offers the best of both the hardware and the software worlds in a state-of-the-art digital audio workstation. With 96kHz/24-bit recording across all 48 tracks and 192kHz recording across 24 tracks, the X-48 multitrack recorder also offers WAVE file and OMF import and export file support. In addition to the built-in automated 48-channel digital mixer, it has VGA display output, support for FireWire hard drives and Gigabit Ethernet with a built in DVD+RW drive for backups.

TSL could be heard at the show via the new compact loudspeaker, Cameo, which is a slim 1RU-mount audio monitoring reference speaker. With special internal processing and a state-

of-the-art speaker, the unit allows the operator to hear the audio signal above the din of the broadcast operations room.

The Yamaha DM2000 audio console was shown controlling Steinberg's Nuendo and Cubase software applications and vice versa via the Studio Connections protocol. Additionally, five new proprietary add-on effects have been added to Yamaha's version 2 digital mixing consoles. The new effects plug-ins — Surround Post, Virtual Stomp, Reverb, Channel Strip and Master Strip — are designed to be used separately or in combination, and the control software is compatible with both Max OS X and Windows 2000/XP operating systems.



Jonathan Prince, creator and executive produce of NBC'S *American Dreams*, urged broadcasters to avoid trying to imitate cable by chasing viewers with sex and violence.

As another indicator of how fast 5.1 surround sound is growing, industry giant Wheatstone introduced the new SR-9 Surround Sound mixing console. A 6-channel, 5.1 surround sound (plus three stereo output mixes) digital mixer with live radio 5.1 surround sound processing, the new product features support for surround/stereo control room audio monitoring and the ability to handle four telephone callers/remotes simultaneously. For audio metering, there are switched meters with system-wide access via an embedded signal that does not require any AES signal allocations. There's an intuitive graphic interface for setup via included software

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C-Band Receiver	OCCR-3442-1	3.4-4.2 GHz
Broadband Receiver	OCCR-95012750-1	0.95-12.75 GHz

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Model Number	Frequency
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OL-3442-1	3.4-4.2 GHz
OL-95012750-1	0.95-12.75 GHz

Fiber Optic Transmitter Models

Model Number	Frequency
ORT-103000-1	10-3000 MHz
ORT-3442-1	3.4-4.2 GHz
ORT-95012750-1	0.95-12.75 GHz

Fiber Optic Receiver Models

Model Number	Frequency
ORM-103000-1	10-3000 MHz
ORM-3442-1	3.4-4.2 GHz
ORM-95012750-1	0.95-12.75 GHz

For additional information please contact Chris Alfenito at (631) 439-9108 or calfenitc@miteq.com



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Wohler Technologies' new flagship product, the AMP2-E8MDA Dolby E audio monitor/converter, is a 2RU-mounted unit with a high-quality self-powered speaker system and eight 53-segment level meters. It functions both as an audio monitor and as a converter.

Zaxcom introduced the TRX900, a digital wireless microphone trans-

ceiver that can be custom-ordered with a wide array of features. The TRX900 has a unique built-in IFB that eliminates the need for on-air talent to wear two separate body packs. New products weren't the only things going on. For audio pros at the show, there were lots of pure technology demonstrations and educational opportunities. Fresh off an IPO, Dolby Laboratories had a large impact at the show, with several technology and product announcements. The company set up a simulated broadcast center in its booth demonstrating Dolby products being used end-to-end for over-the-air, cable and satellite HDTV broadcasting. The company also announced that Dolby Digital Plus and MLP Lossless audio technologies have been approved as options for the next-generation of DVDs called Blu-ray and that Dolby Digital is to be the mandatory audio standard for the new

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Tom Patrick McAuliffe is a journalist, entertainer and contributing writer and editor for Video Systems, Singer and Hawaiian Style magazines.

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By David Rosenberg

IMPLEMENTING NEW WORKFLOW PRINCIPLES

If you ask a dozen vendors what media workflow means, you'll get two dozen answers. With that said, let's develop one and stick with it throughout this article. The following definition can be applied to a wide variety of needs, yet covers the entire media lifecycle:

Media workflow is the movement and transformation of content across the three fundamental activities of the broadcast business: acquisition, management and distribution. Movement of content through each of the high-level activities is managed by a series of discrete operations called workflows. These add value or remove cost at each step of the process.

The challenge ahead

Broadcast engineers are faced with the challenge of reducing the number

of discrete steps required to move content through its lifecycle while assuring that critical business processes remain unaffected.

An ideal workflow system will be based on business rules and seamlessly integrate and automate, as far as possible, the following steps: acquisition, ingest, metadata acquisition, storage, asset management, search, retrieval, desktop cuts-only editing, transcoding, scheduling, automation, playout, billing, accounting and archival management.

To accomplish this, secure, scalable systems must be designed and built in ways that preserve to the greatest degree possible legacy infrastructure investments. These systems should allow asset-related data to be available to enterprise information systems that manage financial, customer, sales and

rights information and reporting. In other words, Mr. Engineer, this solution is a whole lot bigger than you may have thought.

Analog today

Let's examine an example of a typical analog linear workflow versus a digital, rules-based one. Consider a large media enterprise with the following attributes:

- incoming feeds from multiple sources, many arriving at once;
- the need to develop fresh, updated programming on a minute-by-minute basis;
- the need to feed multiple output channels;
- a large, growing analog tape library;
- a labor-intensive process of getting archived tapes;
- a chaotic production process.



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To repackage content from the tape archive requires multiple activities, decision points and employees. At its worst, it might take several hours to go through this process for each tape needed. (See Figure 1.) Once retrieved, tapes must be reviewed and

orienting the dish, selecting the channel, routing the feed to the encoder and capturing the digital file. Moreover, once the digital frame has been captured, it may become available to everyone in the enterprise, depending on access rules. Basic metadata is cap-

fore, editors were limited by their access to the content and crushed by deadlines. Now, content is always accessible and instantly deliverable. Also, editors can share content. No longer do they have to wait for a dub to begin work.

The number of staff changes required: few. You and your staff get to keep your jobs. Responsibilities increase and people focus on what they do best: creating programming. Finally, because such a system can be built with nonproprietary hardware and standard operating systems, it's easy to scale, maintain and integrate with an existing IT and broadcast infrastructure.

Scale to fit

Such an enterprise-wide workflow isn't cheap. For global media enterprises, those costs are justified by the potential to reduce operating expenses and realize new revenue streams from a system that integrates broadcast, cable, new media and handheld device distribution. Smaller broadcasters may not need to build their own solution at all. It's often possible to access these services on an outsourced or shared-resource basis.

Considering the options

Suppose you decide to implement an integrated workflow system. What are the options? The first is to build your own. There is a natural temptation for IT and broadcast engineers to demonstrate their skills and expertise to senior management. And, engineers often like having control over the solution. But a word of caution: Such systems can be complex to design and challenging to build when there is no out-of-the-box solution (and there isn't). This means that no single hardware or software vendor can provide more than a portion of the system.

This will require the staff to integrate all pieces of the puzzle. Also, demanding multiple equipment vendors to integrate with each other will greatly magnify the chance for failure, especially where software interoperability

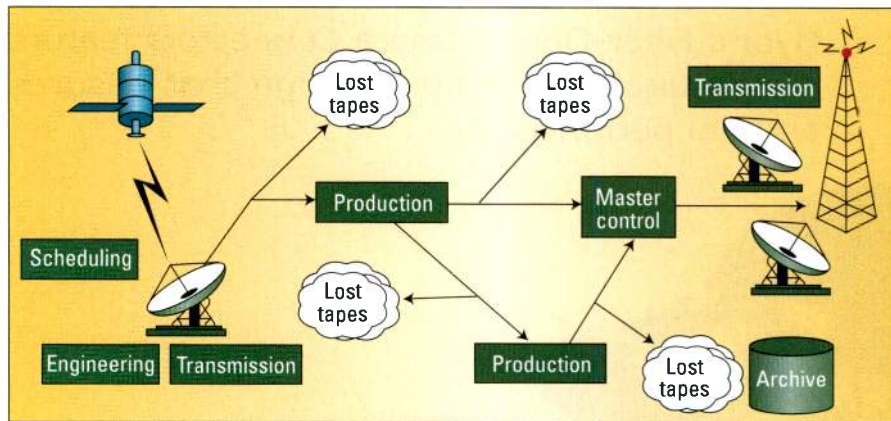


Figure 1. The traditional organization of workflow

ingested before they can be re-edited, after which they have to be played out to tape again and delivered to the NOC or MCR for broadcast.

This disarray is the result of a process that is inefficient from the outset: From ingest to archiving, the process is mostly manual and subject to inefficiencies and errors.

An integrated workflow

Let's look at this same set of tasks at a facility where the broadcaster understands the value of a digital workflow system. Obviously, any engineer worth his salt knows that only a completely integrated digital-based system with automated workflows can meet the demand for speed and efficiency. The savvy engineer will also recognize that no single vendor's software product can come anywhere near meeting the massive complexities in designing and building such a workflow system.

Let's examine what this new automated workflow management system looks like and some of the key benefits. (See Figure 2 on page 118.)

Digital workflow

Feed schedules reside in a database and trigger multiple events such as

ingested concurrently and can be used for immediate search and retrieval.

Producers can identify and retrieve current or legacy content (if it has been appropriately ingested into the system) and create programs on the fly. If craft editing is required, an EDL is sent to an edit suite, and the content is pulled into the NLE, where graphics, music, narration and effects can be added. Conforming and rendering is done in real-time, and the content is instantly forwarded to the play-to-air server and immediately available for broadcast.

Workflow benefits

Now this may sound like a utopia, but it is possible to come quite close with today's technology. Let's look at some of the potential benefits.

The time required to locate and retrieve content online goes from hours to seconds. No more looking for tape boxes. Requests are now filled from an on-screen database. Lost content happens less often. Once the material is stored and tagged, it's virtually impossible to lose. Compare that with trying to find that partially labeled box containing the tape of last week's fire.

What about creative flexibility? Be-



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IMPLEMENTING NEW WORKFLOW PRINCIPLES

is critical to success. Homebrew systems are rarely successful, and they can easily create more problems than they solve. If that happens, the finger of blame will point only to you.

The second option is to outsource to an IT consultant. Traditional IT consulting firms are great for enterprise systems, e-mail and desktop support. But few, if any, have the specific workflow expertise required to successfully design and build systems that automate complex broadcast interdependencies.

The third option is to outsource the project to a traditional broadcast integrator. This will give you broadcast infrastructure design and build experience and access to broadcast hardware sourcing. But, building these complex IT-based systems requires specific skills that may not be available from your broadcast integrator.

The fourth — and, in my opinion, the best — option is to partner with a firm that can staff both sides of the challenge with broadcast expertise and IT knowledge. Look for demonstrated skills in designing and deploying complex, enterprise-wide broadcast IT integrated systems. You don't want to be anyone's guinea pig when it comes to your IT broadcast project.

Fortunately, there are firms that can meet these demanding requirements. But, before you make a decision, do the homework. Look at the company's track record. Call its customers and then visit them. Look at both newly

workflow is merely connecting the dots. It isn't. Broadcasting is one of the more complex media workflows and you shouldn't be timid in recognizing that you need expert help in finding and building the best solution.

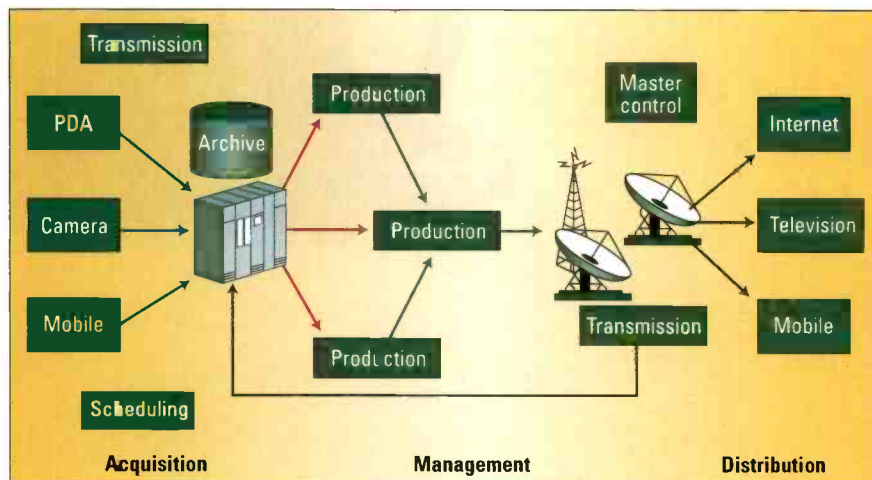


Figure 2. The organization of integrated, digital workflow

completed sites and those with many months of operation under their belts. There will always be start-up issues in complex systems. What you want to know is whether the vendor took care of them and whether the system works reliably over time.

Don't be lulled into thinking that building an enterprise-wide digital

After all, when the project is completed, you're going to get the recognition for the project anyway. Wouldn't you rather it be for a job well done?

BE

David Rosenberg manages the Media Consulting Practice for Siemens Business Services in North America.

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Fujinon's Precision Focus Assist system

BY THOM CALABRO

While HD video can produce pristine images, occasionally the resulting display leaves something to be desired. Often that something is a sharp focus.

A slight misfocus of an image is hardly discernable in SD, but in HD it is clearly obvious. To overcome this problem, Fujinon has developed the Precision Focus Assist system for HD lenses. It addresses the precise focus issues in HD production stemming from the format's shallow depth of focus and the requirement for small, low-resolution camera viewfinders. Although automatic in nature, the system places the priority for focusing on the operator, providing assistance when needed.

Camera operators focus by viewing the image on a 2in or 7in viewfinder. With a typical resolution of 450tv, these devices are quite sufficient for SD focusing. However, today's HD displays provide a vertical resolution of 640tv, making the camera viewfinder woefully inadequate for precise focusing and highlighting any focus mistakes.

Focusing a camera requires the operator to first zoom to the most telephoto position of the lens and then adjust focus while observing the edges of the subject. When done correctly, the high-frequency component of the subject's outline is maximized and therefore sharpest.

Focus problems in HD

With HD, the operator must always be at a maximum zoom position whenever focusing is required, making it difficult to focus anywhere else in the focal range. A key distinction between focusing in SD or HD is the difference in depth of field between the two lens types. Figure 1 illustrates

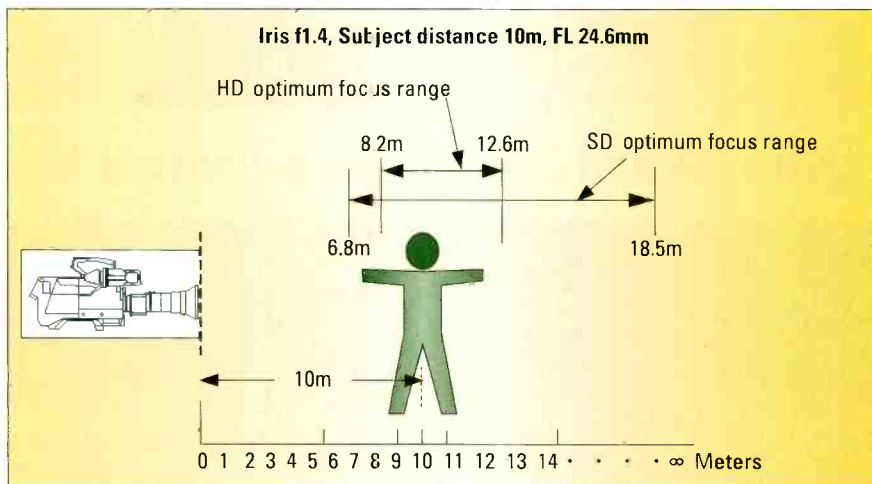


Figure 1. HD lenses have a smaller optimum focus range than do SD lenses.

this phenomenon. The irises on both SD and HD lenses are fully open, the subject is at a 10m distance, and the lenses are in the telephoto position. Note that the focus range of the SD lens ranges from 6.8m to 18.5m. Yet, the focus range of the HD lens is only from 8.2m to 12.6m. Now let's see what effect misfocusing would have on actual picture quality.

Figure 2 displays the difference in

depth of modulation for a pair of lenses, one SD and one HD. At 1000tv, an HD lens has a modulation of approximately 82 percent modulation depth, and the SD lens' modulation is approximately 65 percent. If the SD lens is misfocused to the point where we see a 10 percent drop in modulation (i.e., 65 percent - 6.5 percent = 58.5 percent), the same amount of misfocus would cause a 50 percent drop in modulation

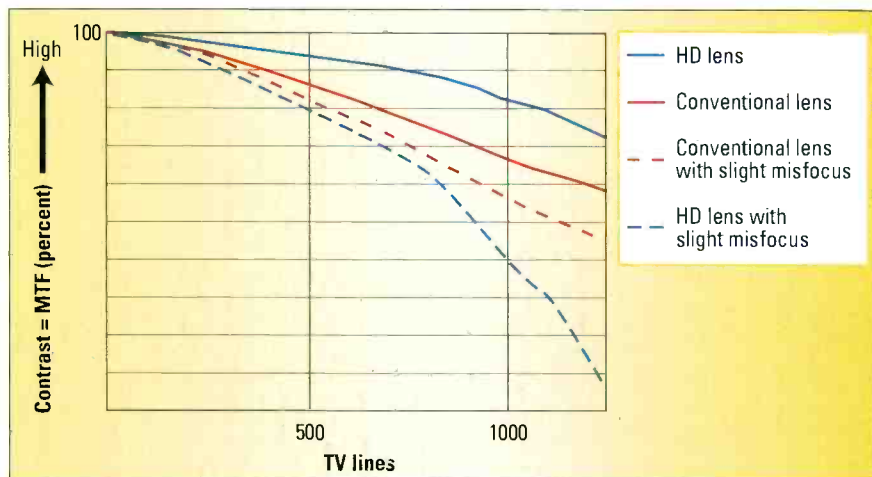


Figure 2. A misfocused SD lens results in a 10 percent drop in MoD. That same misfocus in an HD lens results in a 50 percent decrease in MoD.



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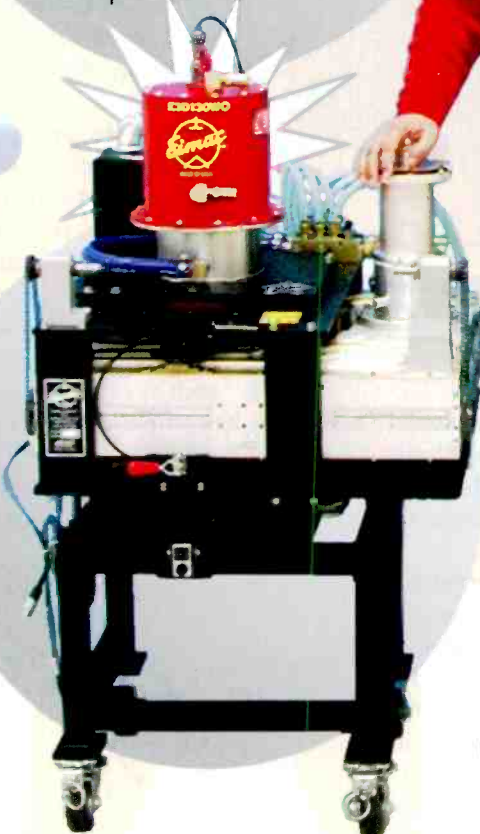
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for the HD lens (i.e., 82 percent - 41 percent = 41 percent).

Focusing methods

There are several methods to accomplish auto focusing, typically categorized into two groups. The first group is the focus detection method, which searches for the focus position. The second is the range finding method, which achieves focus by measuring the distance from the lens to the subject.

The focus detection method has two variations: the contrast method and the phase matching method. The contrast method detects the amount of misfocus based on the contrast of the



Fujinon HA13XPF lens with Precision Focus. Precision Focus Assist employs the contrast method for auto focusing, which derives its focusing points by means of optical path differences.

image. Home video cameras typically use the contrast method. The phase matching method, often used in still cameras, detects phase differences in the image.

The contrast method is preferred for video cameras. When a lens is precisely focused, both the contrast and the amount of high-frequency energy in the image is maximized. Typically, the lens' focusing group is moved until it finds the point of contrast where the high frequencies peak. The focusing group of lenses undergoes a "wobbling" process to search for that maximum point. There are several advantages of the contrast method. No range-finding sensors are required, critical focus will be obvious, and the point requiring focus can be viewed

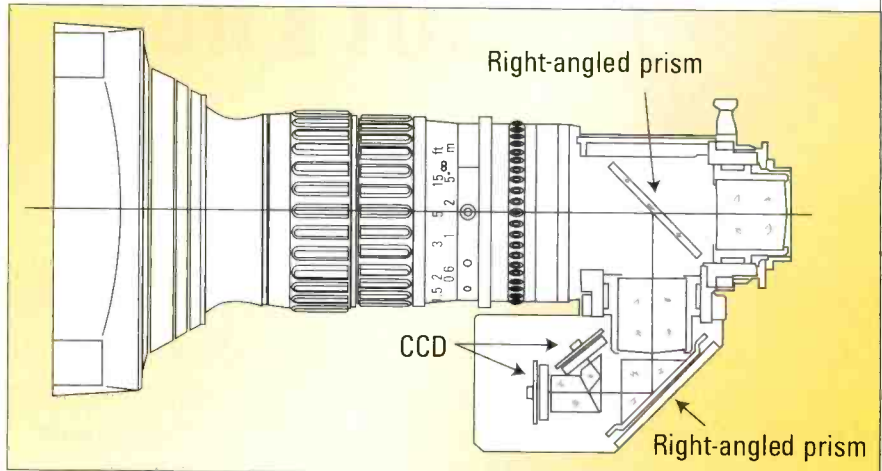


Figure 3. All of the automatic focus circuitry is contained within the lens, making the feature easily portable to other cameras.

in the viewfinder because there is no parallax with the image.

Unfortunately, there are some drawbacks to using the wobbling process with the contrast method. Simply put, today's large and heavy lens elements are difficult to move at high speed. Also, the slight changes in focus caused by the wobbling can be easily seen. Furthermore, moving objects such as a spinning football might be compared at different times, which could result in errors. Finally, the process may not be quick enough for high-speed objects, such

as those common in sports.

Fujinon developed the Precision Focus Assist system using the contrast method, but without using the wobble process. Instead, the system uses an optical path difference signal.

Focusing assistant

The focus assist replaces the lens extender by a half-mirror in ENG-style lenses. (See Figure 3.) This half-mirror works as a prism. The Precision Focus CCDs are arranged so that the focal plane is at the same position in the optical path as the camera focal plane and the two CCDs are equidistant from the focal plane point. The camera gets a simple software patch to allow the operator to specify the focus point. Because the entire auto focus system is incorporated in the

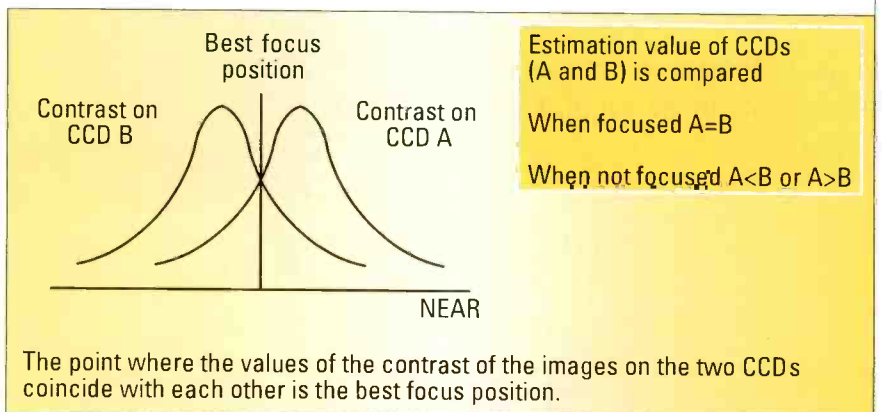
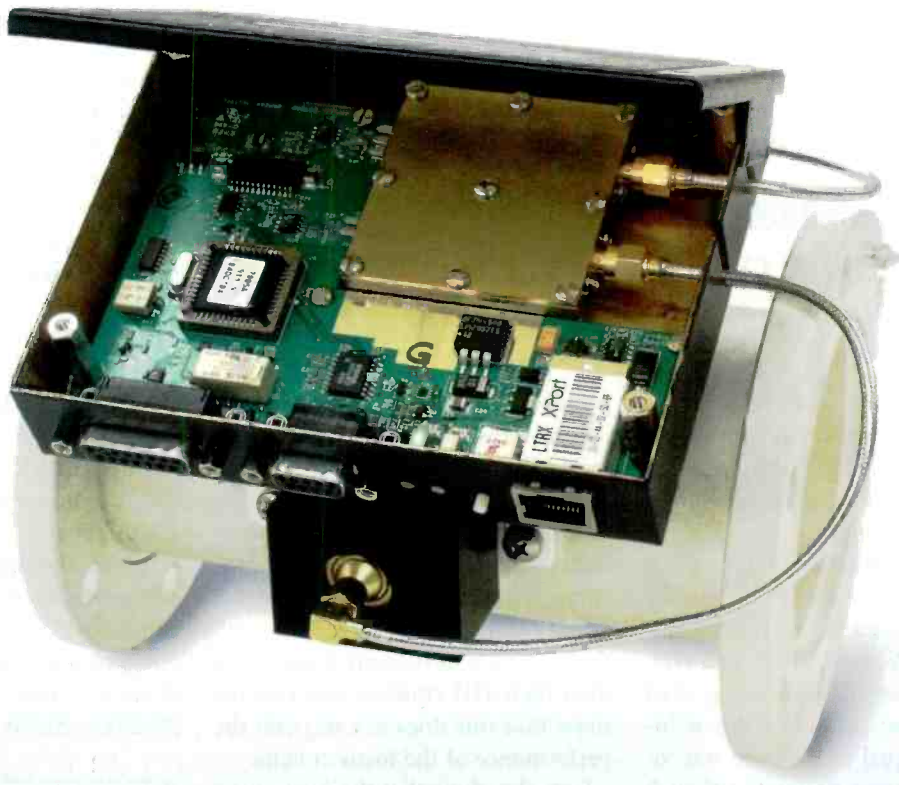


Figure 4. Image position and direction is calculated from the outputs of the two different CCDs. When the electrical outputs are identical, the lens is focused.



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lens, the lens can be freely used on various cameras.

The camera operator first specifies

adjusting direction can be determined from these values. The focusing group is then moved to reach optimal focus

The focus indicator tells the focus position, which helps the camera operator to more precisely manually focus the lens.

the focusing point in the viewfinder, and then selects either auto or manual focus. Finally, an LED shows the operator when the proper focusing point has been achieved.

The system must first determine which direction to adjust the lens for focus. The circuit compares the values of CCD A and CCD B. The relationship between A and B is described in Figure 4 on page 122. When focused, A is equal to B. When not focused, A is larger or smaller than B (i.e., $A < B$ or $A > B$). The required

position, while simultaneously keeping the movement of the focus lenses minimized.

All HD cameras use CCDs with an aspect ratio of 16:9. However, to minimize weight, costs and power consumption, 2/3in SD CCDs with 4:3 aspect ratios are employed. Although the SD CCDs have many fewer pixels than their HD cousins, experiments show that this does not degrade the performance of the focus circuits.

Tests also show that the focus assist area needn't examine the entire im-

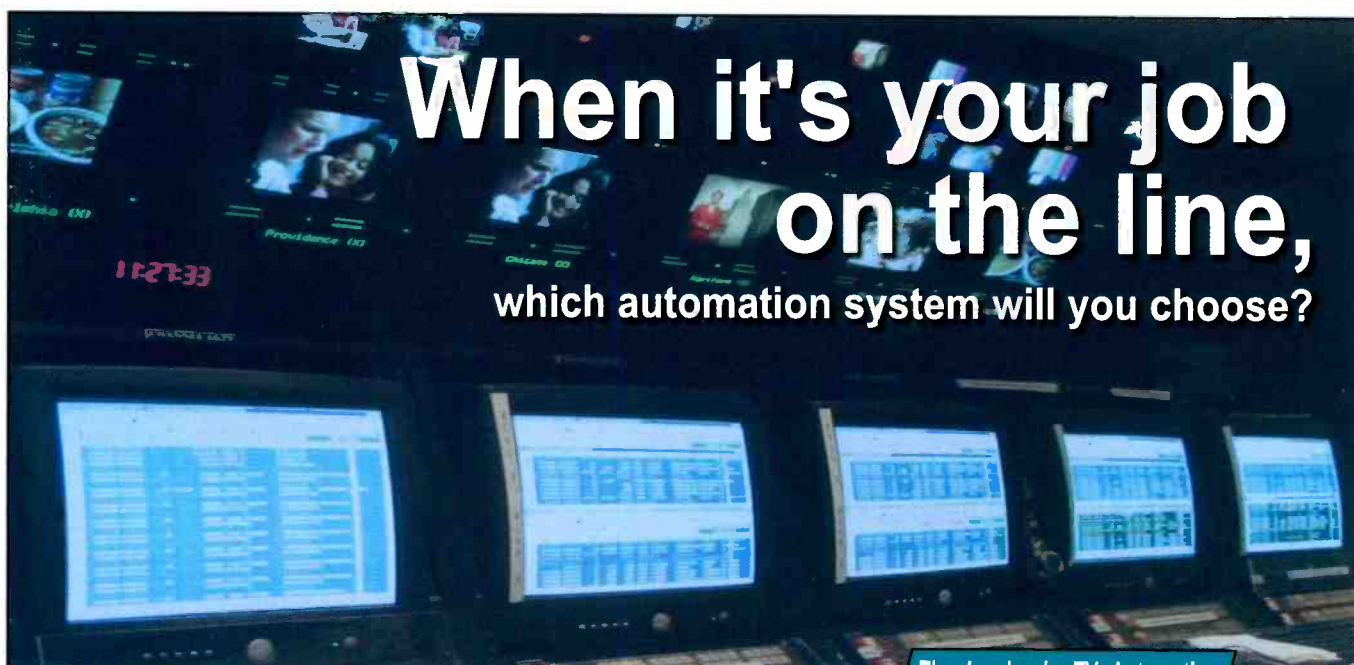
age area. In fact, this solution limits the examined area to approximately 90 percent of the image seen by the HD CCDs.

There are several advantages of the Precision Focus Assist system:

- Precise focusing is available even with wide shots.
- Images slightly out of focus, which are often difficult to recognize in the viewfinder, can be quickly corrected.
- The focus indicator tells the focus position, which helps the camera operator to more precisely manually focus the lens.

The technology is available on the company's XA101x8.9BESM HD zoom lens, XA87x9.3ESM HD zoom lens, HA13x4.5BRD-S28K wide-angle lens, HA22X7.3BRD HD EFP lens and HA26X6.7BESM studio lens. **BE**

Thom Calabro is national sales manager for Fujinon.



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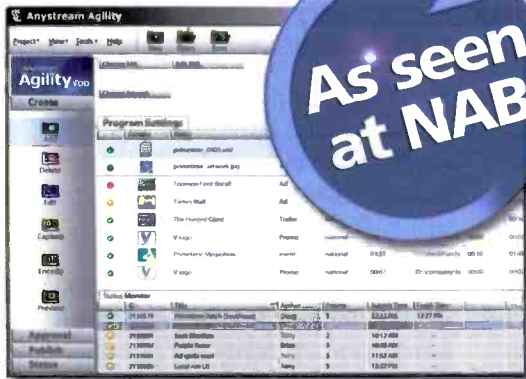
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Harris H-Class Content Delivery Platform

BY TARAS BUGIR

There are at least three key problems with trying to define workflow as used in the broadcast and media industry.

First, the term workflow is a relatively abstract notion believed to drive business processes but often does not. Second, workflow is seldom consistently managed across the departments within an organization, so the definition changes depending on who's using it. Third, content providers and broadcasters use a wide variety of point solutions, most inefficiently and poorly joined together to improve workflow.

Unfortunately, the result is often an assortment of point solutions that are inefficiently managed because each package has been generally coded to provide its best practice or solution workflow only within its own software solution. Usually, manual processes must be undertaken to get each point solution to talk to one another. This results in neither an efficient workflow nor a good application of business resources. Harris developed the H-Class Content Delivery Platform to solve these problems.

An integrated solution

For the first time, broadcasters have the means to integrate the many disparate business media processes into a single, modular system that handles content from ingest to consumption. This platform can intelligently manage the delivery of rich media across multiple networks, channels, formats and devices with a best-of-breed result to either one or many consumers.

Building an integrated broadcast solution requires two things: a consistent messaging schema that can connect multiple disparate applications together and modifications to the applications themselves to use this messaging schema. Unfortunately, because the required applications and framework must be tightly integrated, the only real solution is to build such a platform from the ground up.

For media applications, the H-Class platform provides this necessary development framework. Application

The platform provides a workflow engine that supports the integration of separate applets operating on a secure framework, through a database abstraction layer and the workflow engine itself. Because all interface blocks are consistently specified and respect a common security and auditing model, they all inherit the properties of the underlying services, because the workflow engine sits upon that security model.

This design results in lower development overhead for increased func-

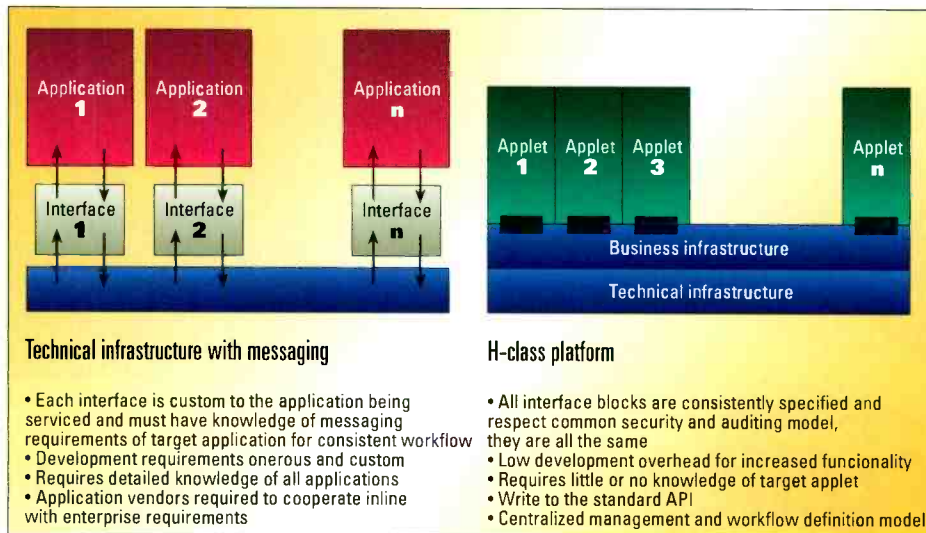


Figure 1. The Harris H-Class Content Delivery Platform represents an integrated approach to content management from ingest to distribution over a variety of devices or networks.

components can be developed using an n-tier architecture, where the many aspects of the business can be compartmentalized and scaled across different hardware systems throughout the network. (See Figure 1.)

Such a design provides great flexibility. For instance, if more CPU horsepower is required to manage core business services, then that can be added independently of other business services such as searching, media management or archiving tasks.

tionality and requires little or no knowledge of target applet. By writing to the standard H-Class framework API, the enterprise business model achieves centralized management and workflow definitions.

Modules

The platform provides an integrated solution for broadcasters and content providers to efficiently and cost-effectively control content distribution — even to an audience of one. The

platform supports traditional multi-channel broadcasts in SD and HD, but also VOD, IPTV and mobile video.

It relies on open standards and is network-, content- and service-agnostic. This means users can integrate other, third-party, applications with H-Class, providing support for legacy technology.

The H-Class platform is comprised of six applications:

- Media Business Systems handles end-to-end traffic, scheduling, billing, airtime, sales, DRM and content management. When integrated with playout automation, stations can sell any type of ad close to airtime without manual intervention.

- Media ingest is handled through a mission-critical record process for both essence and metadata. The module can index incoming feeds on the fly, schedule and capture live feeds, and move media across the enterprise.

- The Broadcast Presentation Manager serves as the playout automation. Its scalable and modular architecture allows stations to configure their system on-site or from remote locations, all in real time.

- The Intelligent Transport module delivers digital rich media to devices including STBs, transmitters and mobile devices. Live and file-based video is recognized at the point of content contribution to the network and at the point of content distribution to multiple devices or destinations.

The module is comprised of two transport products: NetVX for high-speed, IT-based network connectivity and DataPLUS, WAN-based media management for real-time capture, search, retrieval and scheduling of digital assets.

- NetVX is available with a transrating transport stream multiplexer (TMX). The TMX provides a multi-

service video-networking platform to optimize bandwidth usage while maintaining full video quality.

The Intelligent Transport module integrates with both the Ingest and DAM solutions to provide near-immediate recognition of digital media and metadata.

- The Shared Services API interface enables third-party applications to integrate with the H-Class Content Delivery Platform and solutions.

The advantage of a fully integrated content delivery platform is easily measurable. Workflow is more efficient and there are fewer mistakes on-air. Perhaps best of all, with this solution, the broadcaster is well-positioned to take advantage of new delivery opportunities, which can mean new revenue. **BE**

Taras Bugir is chief strategy officer of the Software Systems business unit within the Broadcast Communications Division of Harris Corporation.

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Production switchers

BY JOHN LUFF

There was a time, long ago and far away in another galaxy, when all television was essentially live. Only kinescope film techniques allowed recording live television for later playback. Film production allowed post-production without electronic cameras, but all the rest was truly live. The need to do most production in a live environment, complete with the (much) simpler effects that early monochrome hardware could support, spawned the development of the video switcher. The simplest had mechanically interlocked buttons and maybe simple fades. "Supers" were developed to allow titles to be added, which were shot on a high contrast background by another live camera. Keys as we know them were a later development, and external keys had to wait for the development of the character generator.

Other "special effects," wipes, modulated wipes, chromakey and digital video effects came in successive products from companies that included RCA, AMPEX, Duca-Richardson,

Vital Electronics, CDL and Grass Valley Group. Are you ancient enough to remember the introduction of the Squeezoom by Vital in the 1970s? Four channels took a full rack and had more wire wrap than a mainframe, and needed a full-time babysitter to keep it operating. By that point, it was clear that digital processing and image

adapted to both 525 and 625 variants of SMPTE 259M switchers.

Those who implemented systems in the late 1980s might have even chosen parallel input video switchers, which used SMPTE 125M for interconnection. But now we have an array of options that will map nicely into a business increasingly concerned

With up to 90 direct inputs, modern switchers can eliminate the need to have routing on inputs to the system, reducing system cost.

transform theory would ultimately lead to digital switchers, with Grass Valley Group introducing the Kadenza in 1988.

The HD factor

In the 27 years since the introduction of digital switchers, we have indeed seen an enormous change in both hardware and software technology. This has given us marvelous tools to complete live programming and sophisticated post-production.

Today we are in a significant revolution in the technology with new and old players moving toward products that bridge the divide between the era of 525 and 625 television to the future in HDTV. For decades, manufacturers built two models for 525 and 625, and later models that could be switched between the two, and later still digital switchers that

about ROI and depreciation, and products extensible into an unknown evolutionary facility future.

Oddly, the need to have scalar chips in consumer electronics, like set-top boxes and plasma displays, is an important part of the change we are in. You may not realize it, but there is a full HDTV format converter in every plasma display, which takes the output of the set-top and scales it to the resolution and aspect ratio of the display. Putting that capability into the input processing of a switcher can allow format-agile switching technology for the first time.

A second enabler are professional chip sets, which allow both SMPTE 292 and SMPTE 259 signals to hit one input processor. The two combined allow the video switcher to adapt to all standards a manufacturer wishes to support. That can take the form of a software switch that flips the entire system to a new standard, or, in the case of some manufacturers, to permit simultaneous SD and HD inputs, both usable in the cut program at the same time. Snell & Wilcox has enabled the use of both SD and HD in the same switcher at the same time, consider-



The UK's Neon Broadcast Services employs an SD/HD Kahuna production switcher from Snell & Wilcox in its newest mobile truck.

ably raising the bar and encouraging others to follow suit in the future.

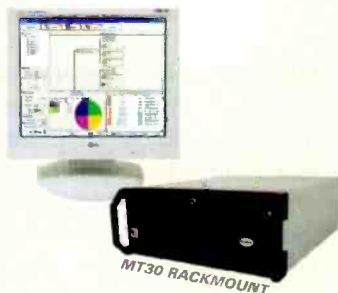
That is not to say that there are no differences between SD and HD switchers. Electrically, it is clear that a signal with roughly four times as many pixels per second will require more memory and a faster processor to do the calculations required. It also is true, however, that Moore's Law points out that processor speed and power continue to increase, making the calculations a video switcher does ever easier to achieve at any specific cost. Balancing that is the inexorable increase in demands for production power. Six or more channels of internal full-featured digital video effects are not at all uncommon now, and still stores, motion video clip stores and other advanced features are becoming standard in the equipped configurations generally ordered.

One common feature of digital switchers that was not possible at a reasonable cost inside an analog switcher is programmable outputs. Installing a three mix effects switcher a decade ago might have meant connecting one to two dozen primary outputs of the electronics frame (program, preview, preset, ME previews, DSK previews, etc.). Even with aux outputs, the total would be unlikely to get above 30. A digital switcher today might have 48 or more outputs, each of which can be selected in software to follow any signal in the switcher. Need 10 copies of program? Not a problem, and you would still have 38 more choices.

Output/input capability

Mirroring the output capability of modern switchers is greatly expanded input capability. With up to 90 direct inputs, modern switchers can eliminate the need to have routing on inputs to the system, reducing system cost and complexity. Keep in mind that key and fill signals from character generators and graphics systems (still and clip stores) take up two spigots though, making 90 seem a bit less over the top. Still, in very

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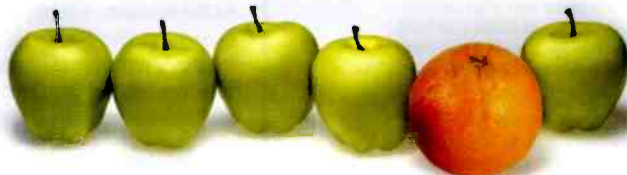
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Technology in Transition

large network installations, or those with multiple control rooms, which must flexibly access large bases of signals, routing might still be needed.

Operator interface is one part of a modern switcher that is not much different in concept from that of a decade ago. Large and complex panels are needed to allow operators to access complex features. However, modern switchers are highly customizable, and some manufacturers have begun to use buttons with LCD legends inside the actual button. This allows memory recall of setups without confusing the operator.

Additional features

Other features that are highly desirable and new in advanced production switchers include the ability to copy settings from one place on the work surface to another. One can even move entire MEs to other sets of buttons, or

address a three ME switcher with two MEs' worth of buttons.

Finally, the interface now includes almost universally a touch-screen with rich sets of configuration and operations menus. They allow control of other devices, display of still store operations on a GUI associated with that feature and many other new features that TDs would have killed for a few years ago.

In the end, a modern switcher can be flexible, grow and evolve with the facility during the HDTV transition, and provide highly advanced features. This kind of protection of investment is certainly worth it to facility owners and producers alike.

BE

John Luff is senior vice president of business development for AZCAR.



Send questions and comments to: john_luff@primediabusiness.com

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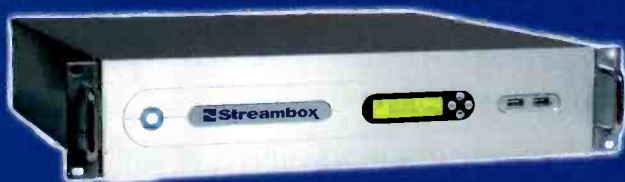
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Broadcasting à la NAB

BY PAUL MCGOLDRICK

There is a lot you can deduce from NAB2005, and there is a lot more that is not nearly so obvious unless you are in a position where you can sit back and look at it all objectively. That's me, not tied to any vendor on the floor, not tied to any trade associations or, any longer, any standards bodies — nor am I a customer whom the vendors need to treat nicely.

The first message is that HDTV is definitely becoming real, at least from the production end of things, but only time will tell whether all those viewers who think they are watching HD finally realize they are not. The booths this year were offering HD production products with little-to-no price premium compared with SD equipment. And there were buyers.

I was surprised that even an ex-dealer of mine said he is set to take his California LPTV station to HD whenever the FCC allows it. His station, with a Hispanic format, is designed around digital signals, and he gets HD at minimal costs.

Transmitters are also selling, with the domestic industry at full stretch, allowing some international vendors — principally Italian — a better chance at orders than before.

The official attendee count for the show was 104,000, with 25 percent coming from outside North America. That would explain all the British voices around and, no doubt, with the depressed U.S. dollar, it was a low-cost trip for both Europeans and Asians.

This was an important show for U.S. vendors to catch that international audience, because the number of U.S. vendor employees manning the stands of IBC in Amsterdam later this year will be limited because of the same dollar problems. As a percentage, the

international attendance was probably even higher because of how NAB counts every badge, including all the exhibitors.

If I had been an exhibitor, I would have been disappointed by the obviously slower traffic in the Central Hall compared with the two South Halls of the Las Vegas Convention Center. As

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a long-term attendee, with too many years on the vendor side of the aisle carpet, I always start my visits at the back of the halls on the first days, getting away from the morass of people who initially hover near the front.

In the always-serene North Hall, where the radio and audio manufacturers generally keep the levels down, the concerns were about satellite radio and what might happen with terrestrial operations. The beef continues that the FCC, in allowing the satellite operators to put rebroadcast stations in locations where their birds could not be seen, was tantamount to issuing a national broadcasting license. There was also disgruntlement about the size of the consolidated radio networks, the make-or-break nature of the size of the orders you might win or lose, and the pressures that can be put on price and features.

The self-titled HD Radio was also a big deal this year, but it seemed that most of the enthusiasm was coming from vendors and not station engineers. Companies have cunningly sorted out what needs to happen in the STL, but there are still questions about maintaining transmitter linearity and antenna bandwidth, both with

directional and night operations in AM. And why would you want to add digital to an FM operation? Just for the free channel? A sort of super SCA?

The most enjoyable paper in the technical sessions of the conference was not one of the seemingly endless standards updates or the descriptions of the headers in the latest digital sig-

nal. It was the story of Buckley Broadcasting in New York and its enforced physical relocation just 2500ft in the Meadowlands area of New Jersey. Thomas R. Ray III described the tribulations that the station went through to move the Class A WOR.

The problems came not from the FCC or local planning authorities, but from the FAA. It was an 18-month nightmare to get the agency to standardize the climb-out rate from a missed approach at Teterboro Airport to that used nationally — or lose 40ft from its towers, a large electrical length to correct for.

You have to love conference presentations with no math or pictures of pulse trains; like broadcasting itself, it's about content. **BE**

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