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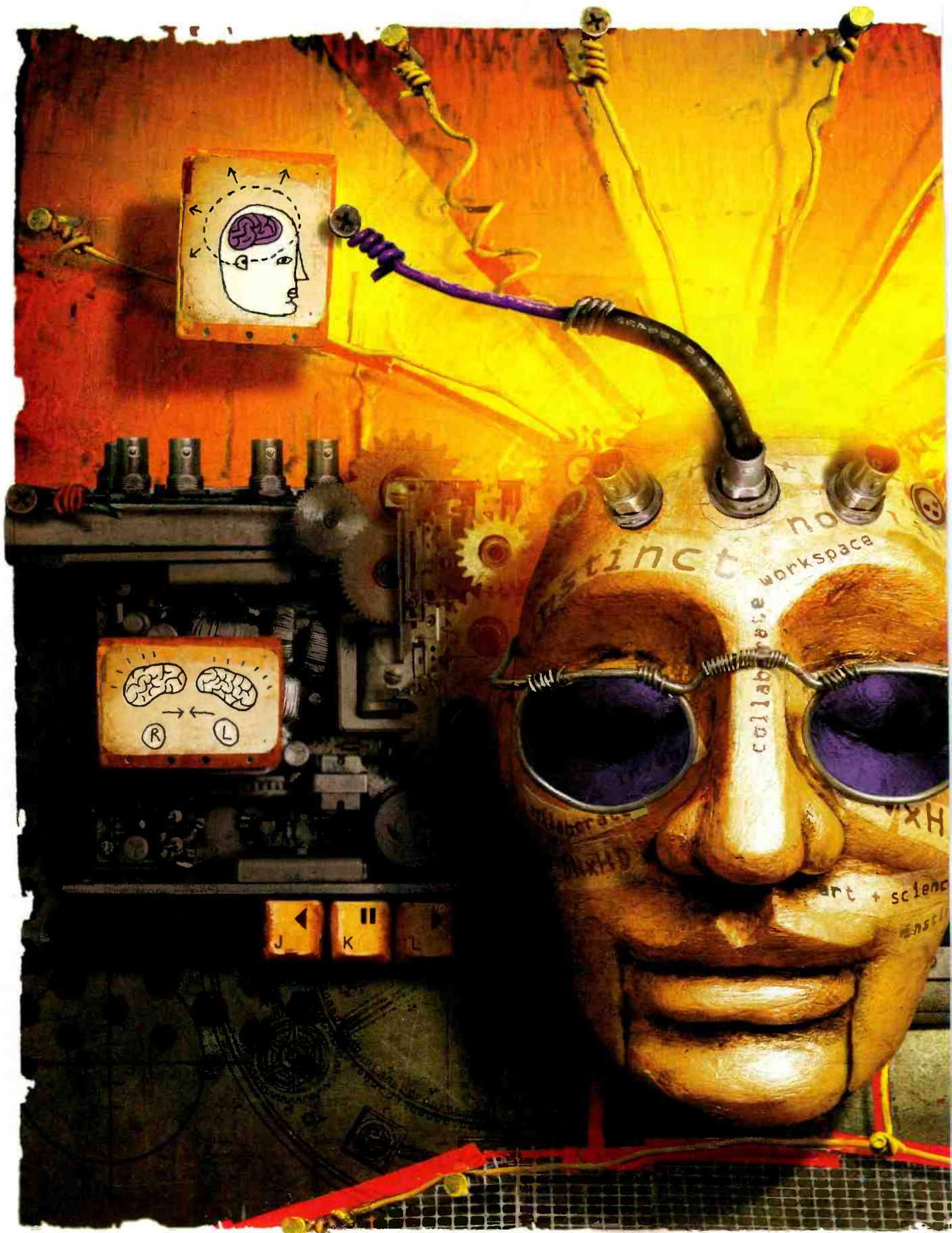
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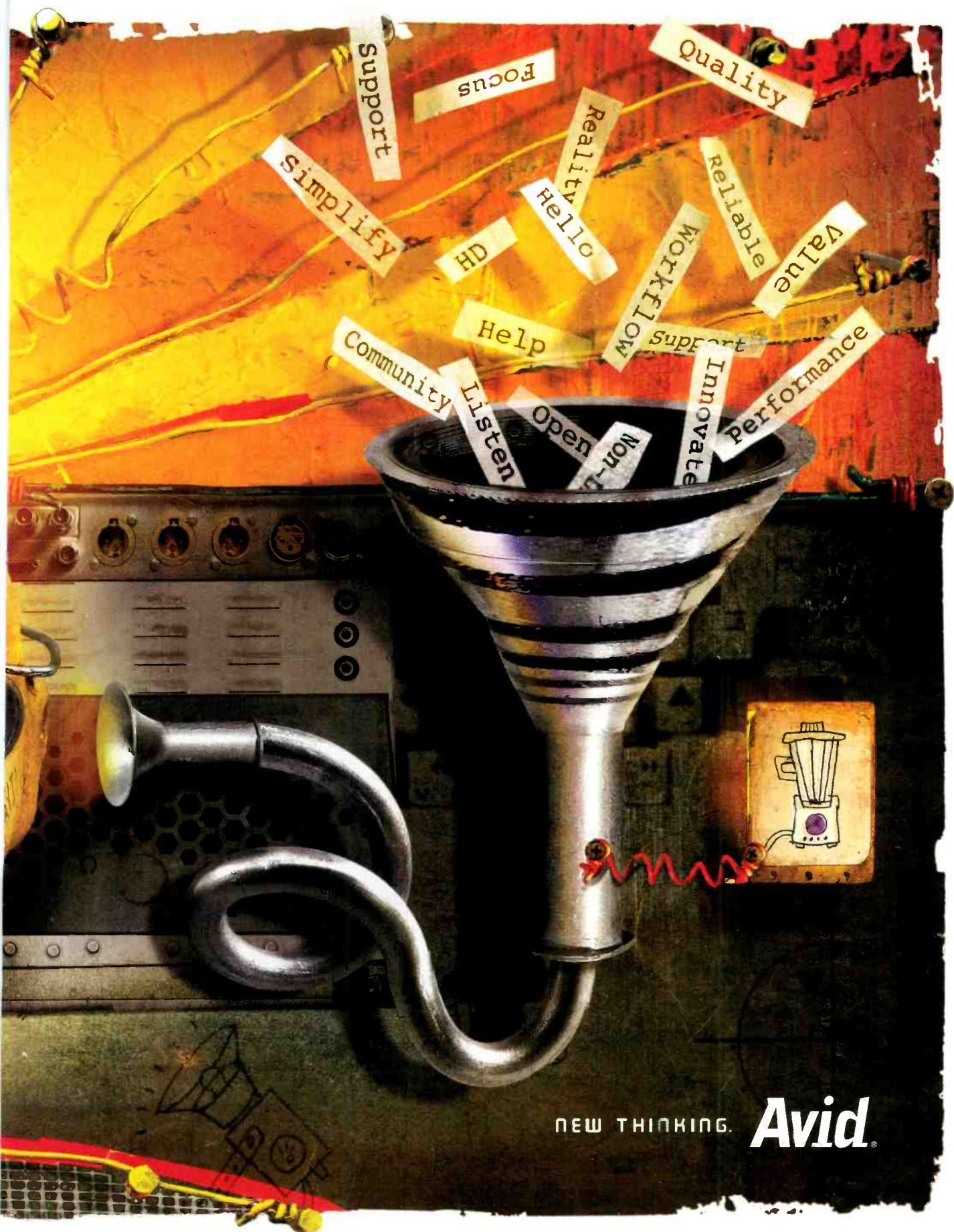
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APRIL FREEZEFRAME QUESTION

Hard disks and servers are becoming ubiquitous as storage devices in TV operations. However, not all servers provide the same level of resilience to disk failures. Match the RAID level with the appropriate definition:

RAID levels:	Definition:
RAID 0	Mirrored
RAID 1	Striped with distributed parity
RAID 3	Striped
RAID 4	Striped with dedicated parity

78



88



98



42



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APRIL FREEZEFRAME ANSWER

- RAID 0 - Striped
- RAID 1 - Mirrored
- RAID 3 - Striped with dedicated parity
- RAID 4 - Striped with distributed parity



ON THE COVER:

Versus cable network designed and built an HD production studio in Stamford, CT, to support the network's "Hockey Central" show. Photo by Robert Wright.

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The Top Ten Things you need to know about Fiber



The blame game

What could have been a relatively smooth transition to digital television is turning into an all-out political war. The recent movie title, "There Will Be Blood," might best describe what is starting to happen.

In early January, FCC chairman Kevin Martin reminded everyone that no matter what industry issues might arise, Feb. 17, 2009, was going to be a hard deadline because, "We get to reclaim that spectrum." In other words, Congress wants that money, so shut up and play ball.



By mid-January, Democrats John Dingell and Ed Markey began building a protective firewall for themselves and colleagues by announcing that DTV transition hearings would begin Feb. 13. "With just a year to go, we want this transition to be as smooth as possible for American consumers," Markey said.

In response to President George W. Bush's request to blow another \$20 million on the FCC's DTV education program, Dingell moaned, "I'm concerned about the size of the increase. When added to the original \$5 million that was allotted by the Republican Congress that enacted this program, this is far too little to educate a nation of 300 million people. We should not be attempting this transition on the cheap." Translation: "Don't blame Congress if this doesn't work. We held hearings."

In this bitter climate of political debate, it's also not surprising Dingell saddles a "Republican Congress" with the responsibility for the program.

By early March, FCC commissioner Michael Copps was screaming about the sky falling and comparing the digital transition to a Broadway play. What? The truth is, he's positioning so he can say, "I told you this wouldn't work, so now make me FCC chairman" with a future Democrat White House.

About the time the STBs were to arrive on store shelves, the Community Broadcasters Association (CBA) began whining because some of the STBs do not provide for analog signal pass through. In other words, the association's lower power (analog) stations won't be receivable on these boxes.

A collective, "Oh, my gosh! How could that happen?" with a sly *wink, wink*, could be heard and seen from the NAB and MSTV.

The CBA's vice president of technology, Greg Herman, said, "Distribution of the boxes, in our opinion, may well be illegal." Oh boy, call out the lawyers.

Another example of key people ducking for cover was the unexpected departure of NTIA's point person on the whole converter box program, Meredith Baker. Because she's held the job only since last November, you have to wonder if she knows something's up and wants to be long gone when it happens.

But don't worry. Our fearless FCC chairman has developed a solution. On Feb. 12, Martin issued a request for industry-wide cooperation to help LPTV stations reach their viewers.

He's decided DTV stations should voluntarily partner and carry the signals of their local LPTV stations on one of their digital multiplex channels. He was kind enough to say that full-power stations could be reimbursed for their costs of carriage.

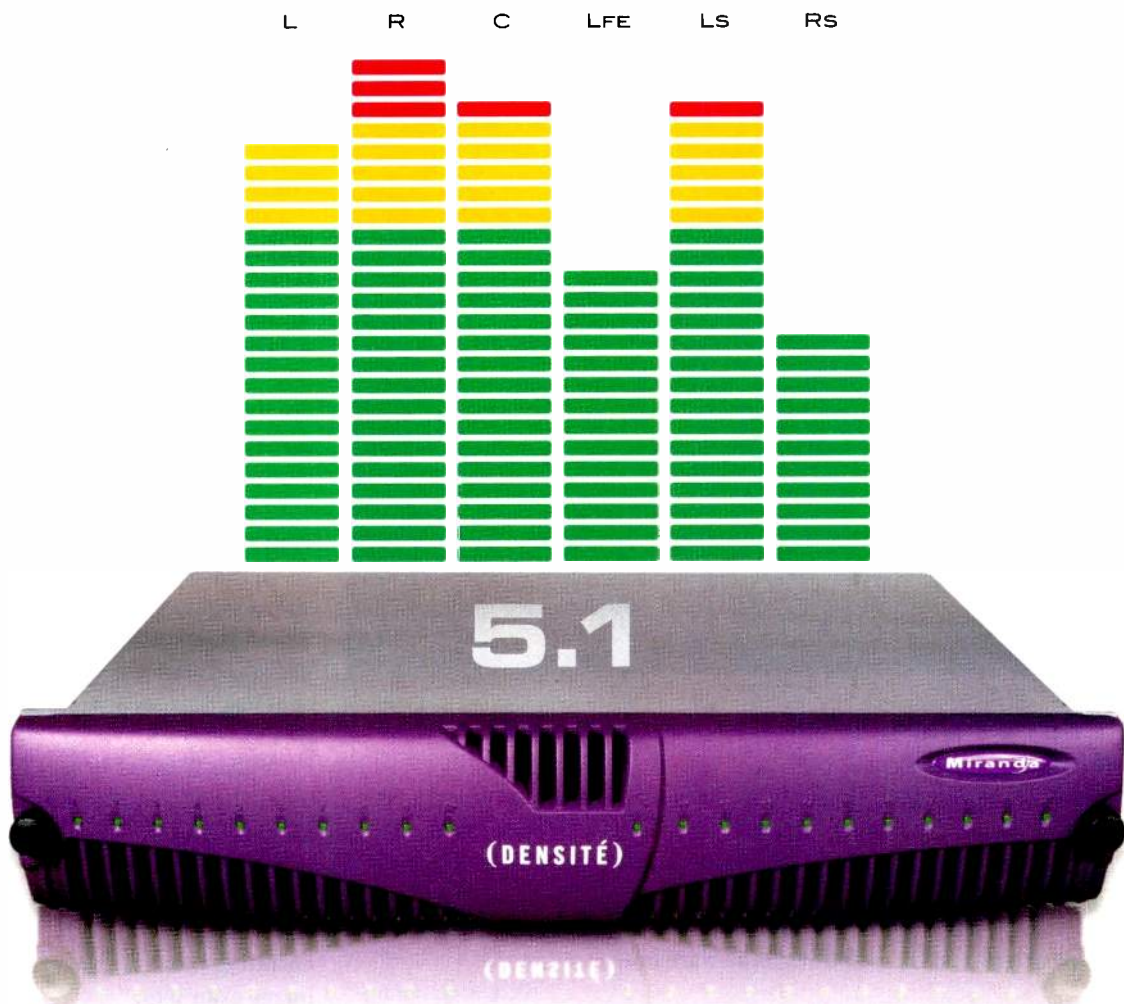
So, the blame game has begun. Congress has held hearings proclaiming that insufficient money was spent. The NTIA says the rules were clear. The FCC says full-power stations should carry the LPTV signals. The CBA says it may sue. And NAB and MSTV say, "Tisk, tisk, such a problem."

Bureaucrats and politicians are good at only two things: spending our money and avoiding blame. The DTV converter box program may well just be the latest example. **BE**

Broad Dick

EDITORIAL DIRECTOR

Send comments to: editor@broadcastengineering.com



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Look out below

Dear editor:

I noticed the opening photo for “The DTV dance” article on page S3 of the “Competitive Television Summit” supplement in your February issue. Do you see anything wrong with this picture ... as in unsafe work practices?

I hate to say it, but I’ve worked with many tower crews over the past 35 years. Some are very safety conscious; others are not.

Dick Sigurdson

KMSP-WFTC Fox/UTV Holdings

Eden Prairie, MN

Brad Dick responds:

Yep, we sure did notice it. But, we only print the photos. It takes wiser readers, like yourself, to realize there are people who don’t sufficiently value their own safety.

If you want to see safety violations, check out the new series “Ax Men” on the History Channel.

Tools of the trade

Dear Anthony Gargano:

I teach a two-year career and technical class on interactive media at a high school near Akron, OH. Thanks for your article “Advantageous resources” in the January issue of *Broadcast Engineering*.

Because I’m not in the production environment, it’s tough to keep up with the many changes in media. You saved me a lot of time digging for resources. Some parts of these white

papers are a little beyond my technical understanding, but I can glean enough to help keep students stay on top of developments.

Rich Barnett

Must reads

Dear editor:

I teach broadcast engineering at Hocking College in Nelsonville, OH. I was wondering if you can recommend a good entry-level textbook to use with freshman college students

to teach digital high-definition engineering and the transition from analog to digital.

Harry L. Tompkins

Brad Dick responds:

Here are some good reference books. While none address just HDTV, remember that HD is just a subset of digital television.

- “Digital Television Fundamentals” by Michael Robin and Michael Poulin is a great book that focuses on theory of DTV/coding/video. It’s the best reference for theory I know.

- “The MPEG Handbook” by John Watkinson is a good MPEG tutorial.

- “A Practical Guide to Audio and Video Compression” by Cliff Wootton is an excellent tutorial on compression, artifacts and encoders. It contains lots of images and examples.

- “Video Systems in an IT Environment” by Al Kovalick covers storage/IT/video and IT issues. It’s very easy to read.

- “Video Demystified” by Jack Keith is a good video production/MPEG encoding tutorial. It has lots of color image examples.

- “DTV Survival Guide” by Jim Boston is a great over-the-air broadcast engineer tutorial, especially on RF.

- “A Broadcast Engineering Tutorial for Non-Engineers” by Graham Jones is mentioned on the NAB Web site. The Web site says: This new edition of “A Broadcast Engineering Tutorial for Non-Engineers,” “the bible” for new hires and others in the field, builds on what worked in the previous edition while adding new standards and defining the emerging digital technologies that are revolutionizing the field. This book is a must have for anyone that has any contact with the field of broadcast engineering.

Let me know if I can help further.

Test Your Knowledge!

See the Freezeframe question of the month on page 6.



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The second time around

Can broadcasters fall in love with unlicensed white space devices?

BY CRAIG BIRKMAIER

In his book, "Defining Vision: The Battle for the Future of Television," reporter Joel Brinkley tells how the drive for advanced television has its roots in an FCC proposal from the '80s, which required broadcasters to share additional broadcast white spaces with the land mobile industry. In an effort to hang onto their precious frequencies — and inspired by Japanese HDTV experiments — the broadcasters struck a new plan.

They said they needed the underutilized spectrum space for HDTV. Brinkley's book describes the discussion that ensued at that NAB meeting in 1986. An unidentified participant in the meeting reportedly raised a concern, "Yeah, but what if we really get it?"

Wish granted

Ultimately broadcasters did get the opportunity to deliver HDTV to the masses. Rather than using two 6MHz

channels, as broadcasters originally proposed, the DTV standard that was adopted by the FCC in 1997 loaned each broadcaster a second channel for the new digital service.

After a simulcast transition period — now scheduled to end Feb. 17, 2009 — broadcasters will return the

primarily for wireless telephony and data services, as well as TV broadcasts optimized for mobile and handheld devices.

Broadcasters got two more decades of virtually exclusive use of this beachfront spectrum. Channels 14 through 20 are still shared with

Broadcasters are finally facing the end of the analog TV era. However, the debate over appropriate uses of the white spaces in the compacted TV spectrum still rages on.

spectrum used for NTSC broadcasts, and the TV bands will be compacted into channels 2 through 59, freeing up the 700MHz spectrum for new applications.

Auctions of the 700MHz spectrum ended in March. Based on the bidders, this spectrum will be used

land mobile services. Medical telemetry devices share several channels. And wireless microphones used by TV broadcasters and production companies operate in this spectrum. These are typically licensed applications, though many users never apply for those licenses.

So here we are 22 years later, and broadcasters are finally facing the end of the analog TV era. However, the debate over appropriate uses of the white spaces in the compacted broadcast TV spectrum (channels 2 through 59) still rages on.

It's like déjà vu

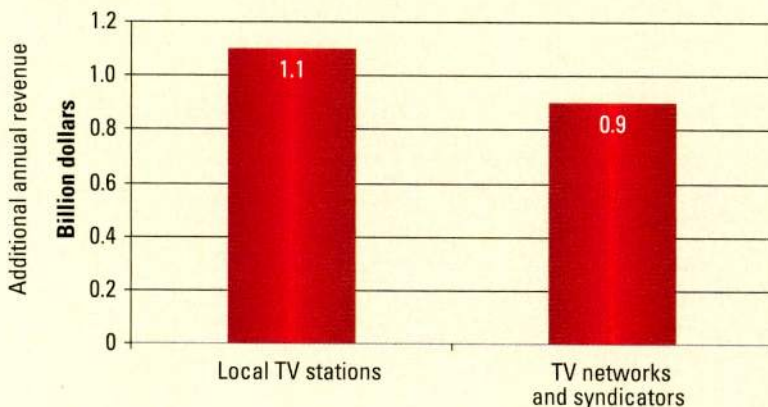
Several factors have historically contributed to the need for the broadcast white spaces. First and foremost, the use of high-powered TV transmitters on tall transmission towers cause signals from these transmitters to radiate into adjacent TV markets.

This is particularly true for geographic areas with high population density and multiple adjacent markets, such as the northeast corridor

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

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between Washington, D.C., and Boston, as well as in Southern California. Many channels cannot be used in adjacent markets because of interference considerations, and this legacy has been perpetuated with the new DTV service.

Second, the RF design of legacy analog TV receivers was limited in the early days of broadcasting. The lack of sensitivity in early TV tuners often required that several adjacent channels not be used to protect the one channel carrying a TV broadcast. Modern TV tuners offer improved sensitivity, as evidenced by the ATSC recommended practice A-74, which details minimum receiver performance guidelines.

And finally, the propagation properties of certain frequencies in the TV bands, and reserved use for other applications, such as radio astronomy (channel 37), require the designation of additional taboo channels.

Let's open up

In 2004, the FCC issued a notice of proposed rulemaking (NPRM) that would open up the white spaces for new uses. The commission proposed to classify unlicensed broadband devices to be used in the TV bands into two general functional categories.

The first category would consist of lower power personal/portable unlicensed devices, such as Wi-Fi cards in laptop computers or wireless in-home LANs. The second category would consist of higher power fixed/access unlicensed devices that are generally operated from a fixed location and may be used to provide a commercial service such as wireless broadband Internet access.

Unlicensed permission

In October 2006, the FCC issued a report and order and further notice of proposed rulemaking (FNPRM) for new uses of the white spaces. (See "Web links" on page 20.) This order authorizes the fixed/access unlicensed devices mentioned above. Service may begin Feb. 18, 2009.

After the first NPRM was issued, the IEEE began work on a standard for these fixed point-to-multipoint systems. The IEEE 802.22 standard is currently going through the final phases of documentation and adoption. (See "Web links.")

The FNPRM extended the opportunity for comments and testing of portable devices that would detect the availability of unused channels allowing their unlicensed use in the TV bands. Two such prototype devices were tested last year with mixed results. A second round of tests are currently underway with four prototypes.

accommodating the unnecessarily restrictive (and spectrally inefficient) recommendations of self-interested spectrum incumbents.

Love the one you're with

Obviously the debate over licensed vs. unlicensed uses of our scarce spectrum resources is steeped in history. It also has strong ties to the issue of government protection of the monopolies and oligopolies it has created via regulation of the telecommunications industries.

The breakup of AT&T serves as an excellent backdrop to the white spaces debate. Prior to the breakup of AT&T,

The debate over licensed vs. unlicensed uses of our scarce spectrum has strong ties to the government protection of the monopolies it has created via regulation of the telecommunications industries.

Yea vs. nay

Predictably, the NAB and the MSTV strongly oppose the use of unlicensed portable devices in the TV bands. (See "Web links.")

Several organizations are pushing for the unlicensed use of the white spaces. The New America Foundation has issued several reports and has filed comments with the FCC in response to the white spaces NPRM. (See "Web links.") And several influential information technology companies have formed the White Spaces Coalition, promoting the unlicensed use of the white spaces and developing the prototype devices that the FCC is testing. Members of the coalition include Dell, Earthlink, Google, HP, Intel, Microsoft and Samsung.

These organizations counter the assertions of the NAB, the MSTV and other companies that oppose the unlicensed use of the TV bands, claiming that it is imperative that the commission consider the enormous social and economic opportunity costs of

the market for telephone devices was a monopoly for AT&T and its manufacturing subsidiaries.

The greatest effect of the breakup came from the regulations that allowed any company to manufacture and sell devices to connect to the telephone systems operated by the seven Baby Bells. This not only caused the price of a telephone to become extremely competitive, it also enabled a period of innovation, bringing a wide range of new telephones and services to market. Perhaps the most relevant parallel to the white spaces debate is the birth and proliferation of wireless telephone handsets using unlicensed spectrum.

The inbreeding of the Baby Bells inevitably led to their getting back together again, after consumers fell in love with cellular phones they can use anywhere. Unfortunately, not only did the Bells renew their matrimonial vows, they managed to create a new oligopoly in the image of Ma Bell.

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long-term contracts that subsidize wireless phones, which only work with one carrier. Service portability is virtually nonexistent, and the business model offered by all of the cellular carriers is based on controlling everything you do on their networks.

Preventing attachment

Google and others in the IT industry asked the FCC to impose restrictions on some of the 700MHz spectrum that is currently being auctioned. They asked for, and the FCC approved, regulations that allow any device to be attached to the networks that operate in the large C block of the spectrum auction. They also asked for, but did not get, the ability to force the successful bidders for the C block to sell bandwidth on their networks wholesale to potential competitors.

Google put up the performance bonds required to bid in the current spectrum auction. However, it appears that it dropped out of the bidding wars after it was clear that the FCC

minimums were met. Apparently, what Google and the other White Space Coalition members really want is the ability to create a new marketplace for unlicensed devices in the TV band white spaces.

Moving targets

To be honest, the real value of the TV bands no longer lies in the ability

broadcasters, but the cellular phone system operators have had little luck selling subscription TV packages to their customers.

What is needed is a new business model that delivers bits to things that move — not another ISP that provides two-way Internet connectivity, but a system that pushes all kinds of services to mobile devices.

It appears that broadcasters are rekindling their romance with devices that use an antenna to pick up their DTV signals.

to deliver TV to fixed receivers in the home. Its value is tightly coupled to legislation and regulations that allow broadcasters to seek compensation for their signals from the multichannel cable and DBS systems. Retransmission consent payments are becoming a significant contributor to bottom-line profits for TV broadcasters.

As a result, it appears that broadcasters are rekindling their romance with devices that use an antenna to pick up their DTV signals. The ATSC is currently evaluating technologies that will support mobile and handheld devices that require a more robust modulation standard than 8-VSB, which was designed and tested using the same methodology used by the FCC for the NTSC standard — an outside antenna on a 30ft mast.

The mobile standard is expected to be finalized this year, with the potential that mobile services could begin after the end of the DTV transition next year. The questions: What will these services be? And how can broadcasters create new revenue streams from them?

What we need

Duplication of the legacy free-to-air TV broadcast model for mobile devices does not appear to be a compelling application. Attempts to create a subscription multichannel service hold great interest among

The ability to determine what services are available and to teach devices to capture bits of interest may depend on limited two-way connectivity. If the device is a cell phone or a Wi-Fi connected notebook computer or handheld, that back channel may already exist.

It would be far more desirable, however, to use the white spaces for this back channel. Fixed point-to-multipoint ISPs could provide cheap broadband links to the TV in the family room. Unlicensed portable devices could use the white spaces for the back channel and the mobile standard to deliver services, all in the same TV bands using a common tuner.

Perhaps the time has come for broadcasters to think differently the second time around. Broadcaster support for unlicensed devices that use the white spaces could lead to a whole new consumer love affair with broadcast TV. **BE**

Craig Birkmaier is a technology consultant at Pcube Labs.

? Send questions and comments to: craig.birkmaier@penton.com

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Web links

- FCC 06-156 FCC Report and Order and FNPRM on white spaces http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-06-156A1.pdf
- "IEEE 802.22: An Introduction to the First Wireless Standard based on Cognitive Radios" www.ececs.uc.edu/~cordeicm/papers/jcm06.pdf
- NAB Interference Zones Web site www.interferencezones.com
- MSTV, "Why unlicensed use of vacant TV spectrum will cause interference to DTV viewers" www.mstv.org/docs/NAFrebuttal.pdf
- New America Foundation, "Technical Reply Comments to FCC on TV White Spaces NPRM" www.newamerica.net/publications/resources/2007/technical_reply_comments_to_fcc_on_tv_white_spaces_nprm

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New must-carry rules

The rules are meant to protect analog viewers.

BY HARRY C. MARTIN

With the Feb. 17, 2009, digital TV transition date approaching, the FCC recently adopted rules designed to ensure that cable subscribers who receive analog-only service can continue to view the signals of must-carry local broadcast stations after the transition. These new rules do not apply to broadcast stations carried pursuant to retransmission consent.

Viewability provision

The Communications Act requires cable operators to transmit the signals of must-carry stations without material degradation. In its new rules, the FCC interprets this viewability provision to require cable operators to either:

- continue providing an analog tier, but downconvert the digital signal of must-carry stations into analog format, or

- only provide digital service, transmit the signal of must-carry stations in the digital format, but ensure that all subscribers (including those with analog TVs) have the necessary equipment to view the broadcast content.

After the DTV transition next year, cable operators will be responsible for the costs of any downconversion of DTV must-carry broadcast signals, though they may charge subscribers for the purchase or rental of set-top boxes necessary for analog TV sets to receive digital signals. The FCC also retained the current requirement that

ability requirements.

Other issues on the FCC's plate

The commission is also seeking comment in a further notice of proposed rulemaking on several issues, including:

- how channel positioning rules should apply to operators carrying both the analog and digital versions of a station's signal;
- how to properly adjust downconverted signals to different aspect ratios (16:9 to 4:3);

The FCC is requiring cable operators to notify subscribers if they switch to an all-digital system.

HD must-carry broadcast signals be carried in HD, along with the current requirement that such broadcast signals not be materially degraded by the cable operator.

While the commission did not define such prohibited material degradation, it specifically declined to require cable operators to pass all digital data in the broadcast signal.

The intent is to give cable operators the flexibility to use digital compression, as long as the average viewer experiences the picture quality at least as good as the quality of any other programming carried on the system. In addition, the FCC is requiring cable operators to notify subscribers if they switch to an all-digital system.

These viewability requirements extend to Feb. 17, 2012, and the commission will review them during the last year of this period in light of the state of technology and the marketplace. During this transition, small cable systems with an activated channel capacity of 552MHz or less may request a waiver of the view-

- whether material degradation rules should apply to stations carried pursuant to retransmission consent as well as must-carry; and
- additional ways to minimize any economic impact on small cable operators while still complying with the statutory requirements for carriage of local TV stations.

The viewability requirements are being perceived as a dual-carriage requirement by many in the cable industry, and some cable programmers have already filed suit in federal court seeking to overturn the new rules. **BE**

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

? Send questions and comments to: harry.martin@penton.com

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- In the following jurisdictions, June 2 also is the deadline for TV, Class A and LPTV stations that originate programming to place their annual EEO reports in their public files and place them on their Web sites: Arizona, Idaho, Maryland, Michigan, Nevada, New Mexico, Ohio, Utah, Virginia, Washington, D.C., West Virginia and Wyoming.
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ATSC enhancements

Changes include standards for mobile transmission and more.

BY ALDO CUGNINI

Now that ATSC is about to embark on its status as the primary TV transmission method in the United States, let's take a look at a number of changes to the original standard, both implemented and under development.

E-VSB provides for enhanced transmission

A new version of 8-VSB called Enhanced 8-VSB (E-VSB) enables optional enhanced services, designed to have higher immunity to certain channel impairments than the main service. E-VSB adds FEC coding layers to the data in the form of Reed-Solomon coding and trellis coding. The enhanced data is delivered at a reduced information rate selected by the broadcaster from a set of specified options, including half-rate and quarter-rate coding.

As with any transmission system, there is a trade-off between data rate

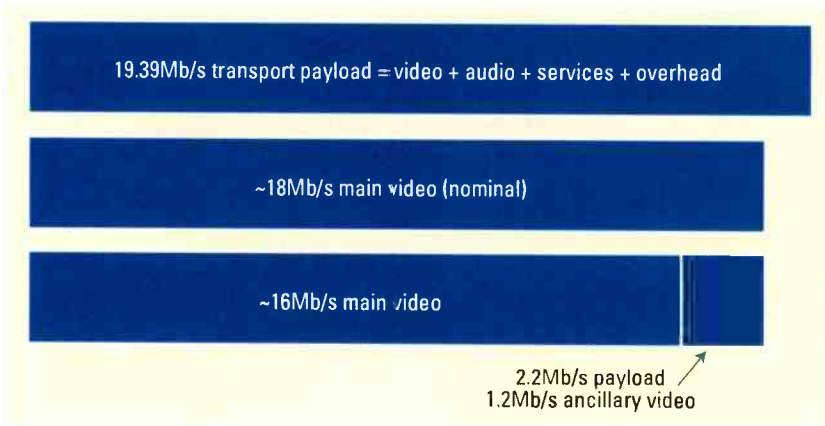


Figure 1. An example of how ancillary video can be added to the overall ATSC transport

and noise margin. For example, a half-rate system requires $2n$ bits of channel space to deliver n bits of data. Thus, the addition of enhanced services will subtract from the total data rate by an amount that includes additional overhead — a factor not unique to any particular enhancement method. (See Figure 1.)

In the fall of 2005, tests conducted

in real-world conditions confirmed that the E-VSB bit stream delivers an expected 6dB margin improvement compared with the normal stream. Additionally, the tests confirmed that the presence of E-VSB did not adversely affect the normal stream reception of legacy receivers.

ATSC-M/H allows vehicular TV reception

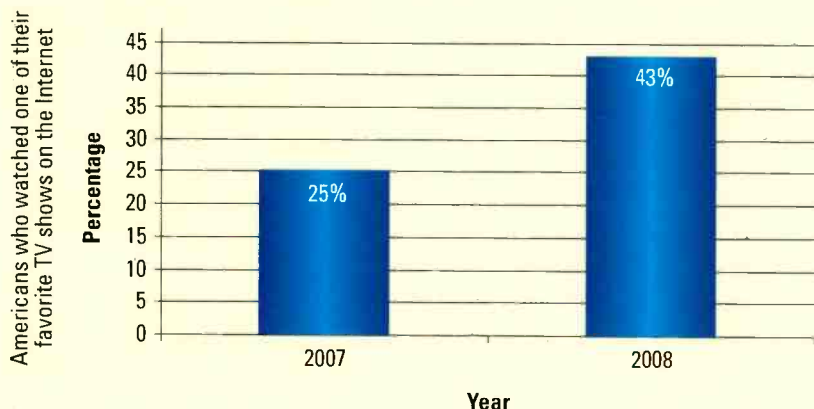
E-VSB, however, did not improve performance under severe multipath conditions, such as in moving vehicles. For that, a change to the equalizer training sequence would be needed, and with that, an addition to the standard would be required. Last year, ATSC launched a process to develop a standard that will enable broadcasters to deliver television content and data to mobile and handheld devices via their DTV broadcast signal. Designed to facilitate the use of the DTV broadcast channels to provide new services directly to small receivers moving at a high rate of speed, broadcasters will be able to allocate a portion of their 19.39Mb/s signal to mobile and handheld while continuing to transmit primary video services in the main channel.

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A request for protocol (RFP) was issued last year outlining the new service and its intended applications. The requirements for the ATSC-M/H standard include service area and reliability comparable to 8-VSB, and reliability comparable to, or exceeding, cell phones and similar devices. In addition, the system must support mobile reception up to at least 75mph. Both

real-time and non-real-time modes (NRT), e.g., offline downloading, must be supported, and video resolutions should include 480p for mobile and common intermediate format (CIF, 352 x 288) for handheld applications.

The ATSC is discussing a layered approach that includes conditional-access system (CAS) and digital rights management (DRM) elements. The

system must also be backward compatible with existing ATSC receivers. (See Figure 2.)

Several proposals were received by ATSC, including solutions for specific elements of the system, as well as three integrated proposals from Samsung and Rohde & Schwarz, LG and Harris, and Thomson and Micronas. The first two of these systems (A-VSB and MPH respectively) have already garnered considerable industry attention, having been demonstrated at NAB2007 and CES 2008. In-vehicle demonstrations of VSB and both A-VSB and MPH provided ample evidence of the viability of the new service.

The A-VSB proposal incorporates three new independent elements: a supplementary reference signal (SRS), a Scalable Turbo Stream (STS) and support for SFNs. The SRS adds an equalizer training sequence to the transport stream adaptation field so

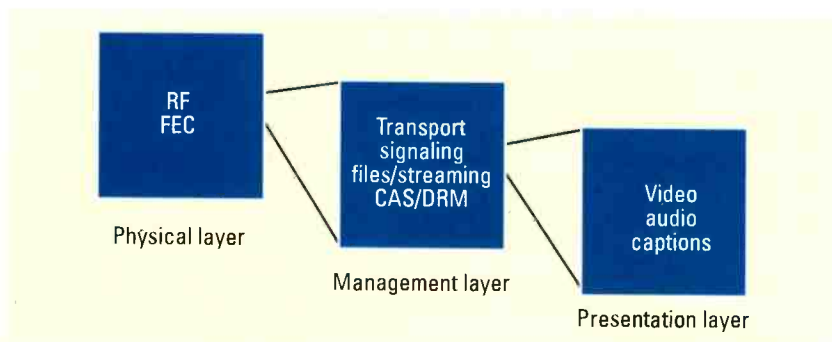
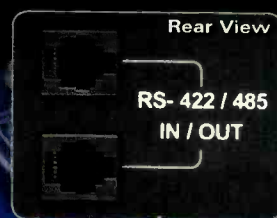


Figure 2. Current ATSC-M/H work includes this proposed concept for service layering.

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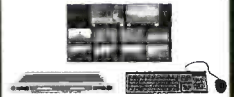
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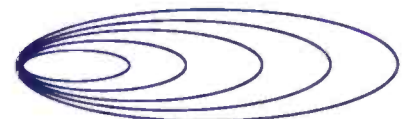
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that a receiver equipped with this new equalizer can track rapid multipath fading. The STS provides additional protection for the video.

Public details of the MPH system are still sketchy, with most information confidential within ATSC. Company materials, however, describe scenarios using 1.1Mb/s of payload in a 4.4Mb/s channel (i.e. 1/4-rate coding), as well as service with a total allocated bandwidth of no more than 3Mb/s. This would provide "one quality mobile channel and one secondary channel of slightly less quality," according to company materials. Again, it is believed that an additional equalizer training sequence is key to successful mobile reception.

An Independent Demonstration of Viability (IDOV) process has been established by ATSC to show that the three integrated systems under consideration can reliably progress toward

implementation. IDOV, a Design for Six Sigma (DFSS) discipline to ensure the optimal function of products and services, was endorsed by the Open Mobile Video Coalition (OMVC), a new consortium formed with the intent of accelerating the development of mobile digital broadcast television. The OMVC alliance encompasses U.S. commercial and public broadcasters operating more than 420 commercial television stations.

The first phase of the IDOV activity took place in February in San Francisco, and an interim report was expected the first week of April. Given the not-coincidental timing with the analog cutoff, a standards war is somewhat unlikely, so OMVC will likely endorse one proponent or suggest a merging if there's a close call. The OMVC is hoping to launch mobile digital television services by 2009, and officials at ATSC say they

are shooting for a candidate standard by first quarter 2009.

FCC updates its rules

It is not currently known whether the ATSC-M/H standard will require FCC rules changes; however, revisions to the ATSC standards have often resulted in updates to FCC Part 73, usually as incorporation by reference.

Last December, the FCC incorporated into its rules the latest version of the DTV transmission standard. This version, known as ATSC A/53:2007, differs from the previously used standard, A/53-B, in several respects.

First, A/53:2007 includes the specifications for E-VSB for terrestrial broadcast. It further describes the coding constraints that apply to the use of the MPEG-2 systems specification in the DTV system, including mandatory main and optional enhanced services.

A/53:2007 also improves the AFD

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specifications by revising and clarifying the relevant standards. AFD enables DTV receivers to automatically switch aspect ratios as signaled in the bit stream. Currently, broadcasters are not required to carry AFD, but these clarifications are hoped to encourage its use.

ATSC features under discussion

The ATSC Advanced Common Application Platform (ACAP) is an interactive TV (iTV) standard for terrestrial broadcast, published in 2005. Using Java and JavaTV middleware, ACAP (ATSC A/101) provides a single method of delivering interactive applications to terrestrial and cable set-top boxes by harmonizing the ATSC DTV Application Software Environment (DASE) standard and the CableLabs OpenCable Applications Platform (OCAP) specification.

Enhanced AC-3 (E-AC-3) was in-

corporated into the ATSC A/52-B audio standard in 2005. Developed to add capabilities to multichannel audio playback, the standard allows for up to 7.1 channels, increased compression quality and extra sample rates. Although not backward compatible with existing AC-3 decoders, an E-AC-3 decoder is required to be able to down-convert the output to an AC-3 stream.

NRT video delivery is a method of delivering content to viewers that is gaining appeal to content owners and providers. Essentially a method for streaming video to viewer storage platforms, businesses can be built that transfer content automatically and efficiently. NRT could be deployed today, with mostly off-the-shelf standards and existing ATSC services, or with ATSC-M/H when it is approved.

The ATSC Planning Committee is also in the process of developing requirements for ATSC 2.0, which

is envisioned as a complete suite of next-generation services for the conventional fixed DTV receiver viewing environment. ATSC 2.0 might include interactive services (ACAP), NRT and enhancements for fixed indoor reception, such as new codecs. All services, however, are planned to have backward compatibility with current ATSC receivers.

There are also other video modes being discussed by the ATSC. The possibility of 1080p60 video is gaining more interest, as are methods for delivery of 3-D video to the home. It's hard to believe that the ATSC as a committee is 25 years old this year. Given the rate of technological development, there's every indication that the group will continue to make possible new television businesses far into the future.

BE

Aldo Cugnini is a consultant in the digital television industry.

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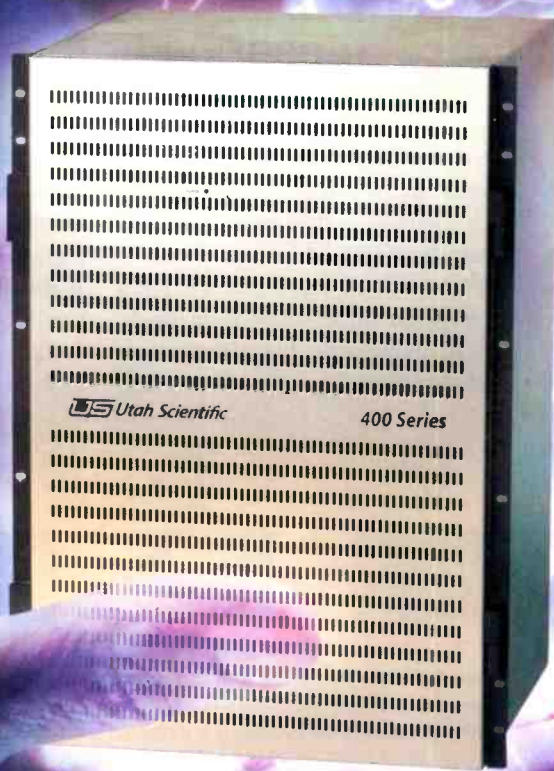
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Buying a new server?

Ask yourself these questions before you do.

BY BRAD GILMER

Servers have been used in the broadcast industry for a long time. From the earliest frame stores and audio workstations to the latest 3-D effects rendering farms, they play an important role. In most cases, the configuration of the server is set by the manufacturer. But increasingly, end users are purchasing and configuring their own servers as the capabilities of off-the-shelf equipment continue to improve. Here are some things you should consider when purchasing and installing your own server.

What is the purpose of the server?

This is the first question you should ask. Generally, I find two kinds of servers in broadcast facilities.

The first type is a server dedicated to a task. This server may be deployed as video/audio storage system or graphics rendering farm, or it may be dedicated to more general networking tasks such as e-mail gateway or a firewall.

The second type of server is a catch-all server, handling several tasks simultaneously. For example, it may be an e-mail server, a shared storage system and run a couple of databases. Whether a server is dedicated to a single task or it is performing several different tasks, it is important that you understand what the server is going to do so you can configure it properly.

Who will maintain the server?

Maintaining a server is sometimes difficult. Bear in mind that not everyone in a broadcast facility has the same depth of knowledge as the resident computer technology expert. What happens if that person is on vacation, sick or otherwise unavailable? What about the hardware? If

there is a hardware failure, can the system be repaired using off-the-shelf parts available from the local computer store?

If the system can be down for a while, then there won't be a problem. If, on the other hand, the system needs to remain operational, you may

network connection (called teaming), you should carefully study the overall network. Make sure that its infrastructure and your clients can make use of the network bandwidth provided from the server. As Figure 1 shows, it wouldn't make sense, for example, to team four 100Mb/s ports

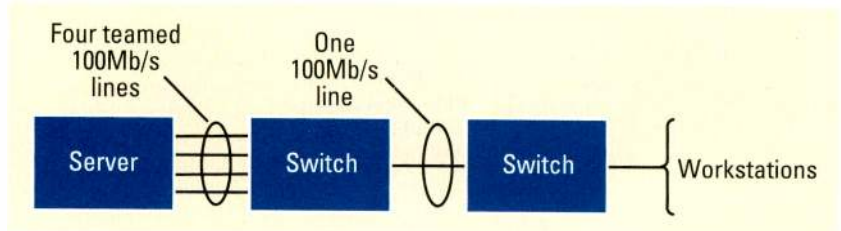


Figure 1. Before investing in a high-speed server to switch connectivity, be sure it makes sense. Here, 400Mb/s is available between the server and switch, but only 100Mb/s is available between a different switch and workstations downstream.

want to consider a server with a warranty that includes software support and on-site hardware support. (Be sure that you understand how long it will take to get a technician on-site.)

What networking demands are put on the server?

Some servers in broadcast applications will need to handle heavy network traffic. Servers handling high-resolution video are clearly in this category. Servers that run centralized applications for several clients may

on your server and switch, when the connection between the switch and most of your clients flows through a single 100Mb/s port.

What are the storage requirements for the server?

I have been involved in many projects where I needed to specify the size of storage required for a centralized server. In the past, I would have invested a significant amount of time

It is important that you understand what the server is going to do so you can configure it properly.

also be in this category depending on how the application is written. Well-written centralized applications can reduce network traffic.

But before you order a high-performance network card or invest time and money in combining multiple Ethernet ports into a single, virtual

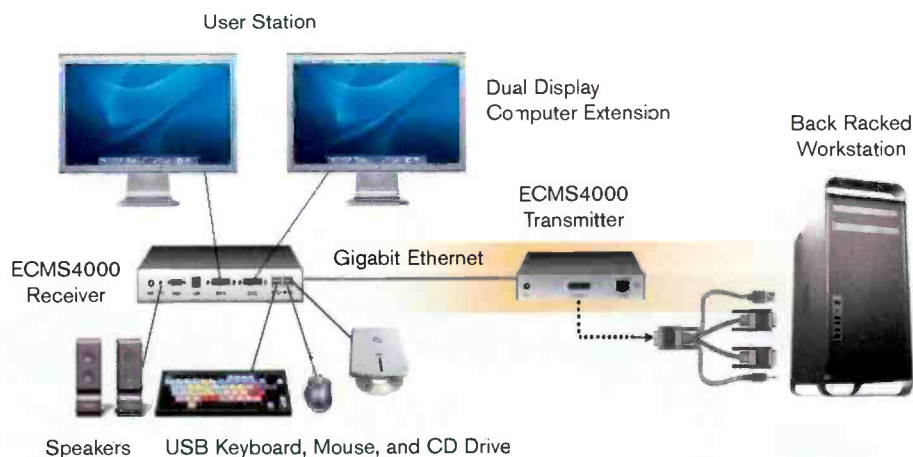
to understand the storage requirements of the server and to estimate future growth. Storage prices have dropped precipitously over the last few years — so precipitously in fact, that it is no longer worth the time to do detailed storage requirements studies. While I still encourage you

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to think about storage requirements, do not put too much thought into it. Storage is too inexpensive to justify the time it takes to accurately estimate your needs. Ultimately, many of these estimates end up being educated guesses anyway, and it is a relatively inexpensive proposition to add storage when needed or to replace the entire server with a new one having substantially more storage after a few years have passed. This does not mean that you should not think carefully about storage, as the next point illustrates.

How critical is the server to your operation?

If the server supports an on-air operation, then you should pay for options that will increase the robustness of the server. Relatively low-cost servers are now available with dual power supplies, RAID or other redundant storage mechanisms, and redundant cooling fans. All of these options will increase the chances of your new server remaining online after a component failure. Of course, you should have a solid backup plan for these servers as well. Depending on your operation, it may also be necessary to

deploy remote monitoring and diagnostics in the servers. (What happens if one drive in the RAID fails, no one notices and then you lose a second drive?)

In some implementations, an entirely separate diagnostics computer, with its own power supply,

through which you can monitor the server and perform basic operations such as rebooting the server remotely. Depending on the size of your operation, this may be an extremely beneficial tool. But configuring these systems can take some thinking, and designing the system so that the di-

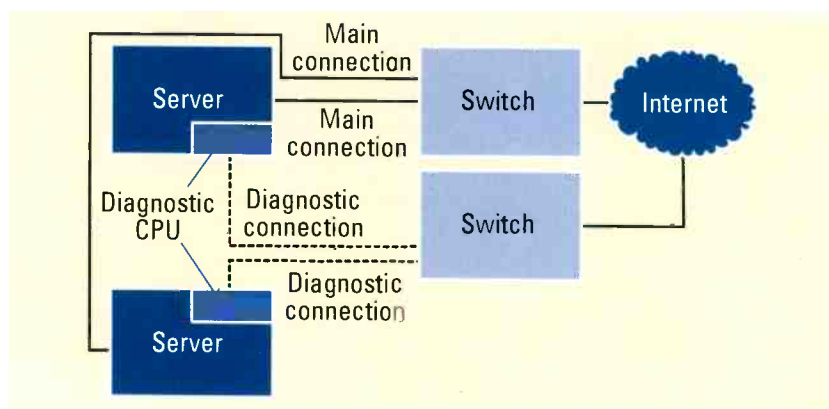


Figure 2. Commercial servers may include a diagnostics computer built into the server itself. This computer monitors the health of the server and notifies you of any failures. Having a separate network and connection to the Internet can allow you to access these diagnostics, even when your main network is down.

is mounted inside the server. This diagnostics computer monitors the health of the server and notifies you by e-mail or telephone if it detects a problem. Usually these cards also contain an on-board Web server

agnostics computer is still available even in the event of a network failure may require that you install a completely separate network. As Figure 2 shows, this may be as simple as installing a small dedicated switch.

Continued on page 41

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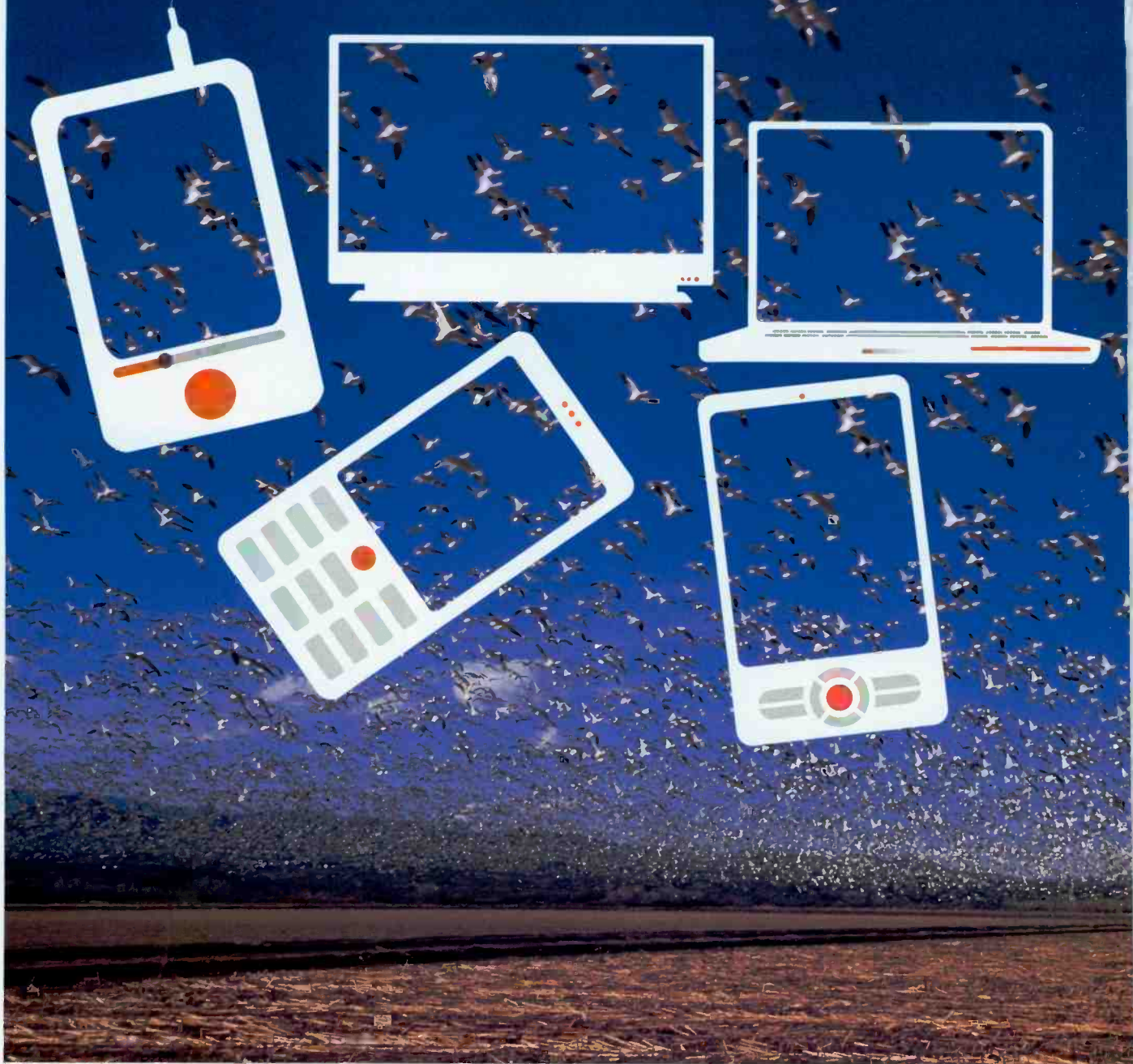
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Continued from page 34

What operating system will you use on the server?

I know that for many of you, the topic of server operating systems (OS) borders on a religious discussion. For that reason, I am not going to get into any specific recommendations. That said, for most applications there are three choices: Microsoft, UNIX or Linux variants (*nixes), and Mac. The choice may be driven by server applications or manufacturers' requirements. But in many cases, the choice really comes down to what you are comfortable with.

If you know Microsoft products and this is your first server, then go with a Microsoft server. You can use a lot of what you know about desktop platforms. If you prefer *nix, I recom-

For almost all other applications, yesterday's processors — still blindingly fast — will work just fine.

mend Red Hat Enterprise Linux if you are new to servers and will need support. If you are comfortable in the *nix environment and want a full-featured, solid, free server, I recommend FreeBSD. If you are a Mac person, then a Mac server is the way to go. If you are used to working at the command prompt level, Apple's *nix OS makes a transition to Linux or FreeBSD relatively straightforward.

What is the amount of processing required for the server applications?

In today's computer market, manufacturers are always promoting their newest, fastest, most expensive server. But spending a few minutes thinking about your server and the applications it will support may save you hundreds (or thousands) of dollars by purchasing yesterday's technology. Only the most demanding applications require top-of-the-line processing power. Generally, these are 3-D rendering and compression platforms, and in

almost all cases, the computer platform for these broadcast applications are carefully selected by the manufacturer. For almost all other applications, yesterday's processors — still blindingly fast — will work just fine.

Think about it. Will the server be used primarily as a storage platform? If so, it may have high I/O requirements. But unless all the video must run through the processor (which is not the case in most file servers), a high-speed processor isn't required.

How about streaming video on the Internet? Again, look at the whole picture, both from a processor and a network bandwidth standpoint. If you have a typical Internet connection, for example a T1 line, the connection is limited to 1.5Mb/s.

Even with five T1 lines dedicated to streaming, only 7.5Mb/s will come out of the server to the Internet. At 750Kb/s per stream, you could source 10 simultaneous streams and still not exceed the capacity of even a single 10BASE-T network connection. Just about any commercial server manufactured in the last three years could support the processing requirements of this application. So think about the applications running on your server before spending a lot of money to get the fastest processor available.

Specifying, installing and maintaining a server in a broadcast facility is within the capabilities of most broadcast engineers. Just pay attention to details, and the installation will be successful. **BE**

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

? Send questions and comments to: brad.gilmer@penton.com

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2GHz transition

What still needs to be done?

BY JIM BOSTON AND ROLAND HOFFMANN

This is the year broadcasters and Sprint have vowed to accomplish several key milestones. In response to the current plans to complete the relocation of all BAS users by August 2009, the FCC has allowed an extension to March 2009, and may consider a further extension to August 2009.

Some DMA clusters, including top 30 markets, have relocated in March 2008. This means broadcasters must be ready for the cutover or risk mobile satellite system interference. In a worst-case scenario, a station could end up paying for the relocation itself.

Midpoint status

Most stations are halfway through the eight-phase process, which includes:

- *Phase 1.* Market kickoff — 100 percent complete.
- *Phase 2.* Inventory submission — 100 percent complete.
- *Phase 3.* Inventory verification — 100 percent complete.
- *Phase 4 (halfway point).* Quote submission — 95 percent complete. Broadcasters select vendors, obtain quotes and develop estimates.
- *Phase 5.* Frequency relocation agreement (FRA) — 65 percent complete. The relocation contract includes the agreed to quote package. Creating the FRA can take from two to more than eight weeks.
- *Phase 6.* Purchase orders and vendor fulfillment — beginning stages. Many broadcasters negotiate dock swapping at this stage. This is a process to exchange FRA equipment on the vendor's dock for something else. Here, stations can trade spare or portable equipment.
- *Phase 7.* Equipment installation — beginning stages. Stations install the equipment, perform tower work and system commissioning and complete their staff's training. Stations can go

live with digital narrow in place sometimes long before the DMA cutover.

- *Phase 8.* Retune and market closeout — beginning stages. Stations in a DMA cluster retune to the new BAS channel plan. If a station has problems, the DMA cluster reverts to the old channel plan and reschedules the cutover. Stations send the old equipment to Sprint for destruction and settle the final financial aspects of the FRA.

Checklist

Let's look at some ways to ensure a positive project outcome. The following sections will cover antenna and tower studies, filters, LNAs, transmission control and cables, transmitters, receivers, remove slaves and antenna controllers, spectrum monitoring, central controllers, IFB, fixed links, portable equipment, cutover and implementation, and dock swapping.

Antennas and tower studies

Sprint generally does not pay for replacement antennas. The company only pays for antennas when filter or remote control issues make it necessary. Stations often need to replace remote antenna controllers (slaves) to facilitate spectrum monitoring back at the station or central control point along with standard telemetry. These slaves often are incompatible with existing antenna pan/tilt units. In these cases, Sprint may agree to cover a complete replacement.

Most antennas are slated only for feed upgrades where the LNA is replaced with a new phase-stable unit and PCS/AWS filtering.

Some antenna vendors will not build filter switching as part of feed upgrades. This means you'll probably have to replace the antenna if you need filter switching. Filter switching is often needed for Ch 1 or Ch 2 to use during the transition phase. For those channels, you also may need pre- and

post-relocation filter switching. (See the "Filters" section below.)

If you are replacing the antenna, be sure the replacement feed horns have the same polarity as the original system. Also, consider the need for a tower study if other equipment will be added to the tower. Ask the tower manufacturer whether a study is required. If so, Sprint will pay for it.

A note on portable and spare antennas: Sprint will generally not pay to replace single golden rod antennas. However, the company will generally pay to replace dual golden rod antennas.

If you need a tower study, provide the information to your engineering firm early. The firm will require a lot of data, and it may take you a while to gather it. The engineering firm will assume that the tower is in proper plumb and alignment and has correct bolt tightness, without significant deterioration or damage to any components. If you know of any tower issues, be forthright and admit them.

Filters

Filters or switches located at ground level do not constitute a reason for an antenna replacement, because new filters and switching are installed in the same location. If this is the case, consider an up sell and pay the difference out of pocket. Then install filters and switches in front of the LNA. That way, the filters will prevent overloading and other linearity problems.

Digital modulation provides better rejection of unwanted adjacent signals, so channel filters may not be needed. However, if your site is close to a cell tower, then all bets are off. A cell transmitter can radiate 1500W to 2000W of power, and if close enough to your site, problems can develop. Consider mounting your equipment higher than the cell antennas to reduce the amount of cell RF reaching the antennas.

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Stations that use a Ch 1 and Ch 2 must install the new BAS filter only after their market cuts over. New users of the abandoned old Ch 1 and Ch 2 frequencies will most likely not occupy the frequencies immediately, so you will likely have time to schedule the necessary tower work.



Omni antennas mounted on ENG trucks use COFDM modulation that allows trucks to transmit while driving. Diversity receivers at the other end maximize the chance of recovering the signal of a vehicle in motion. Fortunately, COFDM receivers have increased ability to recover signals where the multi-path characteristics are changing with location.

Ch 10 users need a special BAS filter. The standard filter combines three parallel and cascaded filters: the Ch 1 to Ch 7 band pass filter, a stop band filter between Ch 7 and Ch 8, and a second Ch 8 to Ch 10 band pass filter. To simplify the filter design, the Ch 10 filter has a gentle roll off skirt, making that channel unusable. A special Ch 10 BAS filter adds a brick-wall filter for Ch 10.

LNAs

LNAs are commonly powered by the receiver, a standalone power supply or a power line from the remote control slave. A portable or spare LNA usually does not have a remote control slave. This requires that new radios be equipped with a diplex kit or that you provide a standalone bias-T power supply. Many portable and fixed link receivers include it, but some central receivers only provide this feature as an option.

Transmission and control cables

Antenna control cables have not changed much since the 1980s. Typi-

cally, this means you can reuse existing cables — unless you change antenna manufacturers. Keep in mind that some of the major vendors' OEM antennas are from the same manufacturers. However, even if you use the same manufacturer, the pin-out may change to support new features. Also, manufacturers sometimes use a serial control protocol to compensate for the need for more conductors.

If you use fiber on the tower, you will need new electrical-to-optical and optical-to-electrical interfaces. Sprint may agree to cover this if the overall cost is comparable.

Consider your path carefully. Digital LNAs have gains in the 20dB to



ENG receive antennas can be quite complicated devices, especially when filter switching and other bypass options. The authors have seen antennas that can have seven different configurations. Add local serial and parallel control and one or two LNAs, and the antenna can weigh several hundred pounds.

30dB range. The minimum signal required at the bottom of the cable run is 4dB to 5dB C/N. A 7/8in transmission line has a loss of about 1.86dB/100ft @ 2GHz, and a 1-5/8in line has a loss of about 1.13dB/100ft @ 2GHz. While the LNA sets the noise floor, the attenuation of the line determines the noise floor increase at the receiver.

Transmitters

A 10W+ analog transmitter will usually be replaced with a 5W digital one. A 10W or lower power analog transmitter will be replaced with a 1.5W digital transmitter. Digital 5W transmitters may require an external power amp and revert to lower power

without it. Some two-part transmitters optionally bypass the PA from the truck unit.

If you are replacing a multiband radio, Sprint may have allowed for a new 2GHz radio while disabling the analog 2GHz part of the old radio.

Receivers

Remote slaves may supply LNA power. However, if you need the receiver to power the LNA, ensure your quote includes that option. Another option in most radios is 2-VSB, 4-VSB or 8-VSB. COFDM is better at overcoming multipath effects, but VSB has as much as a 3dB lower C/N ratio requirement. If distance is important, VSB modulation is a plus.

If the receiver feeds a transmitter, use the ASI feed instead of the IF output. The IF output will have more errors, and ASI has a fixed 19.3Mb/s rate with more FEC.

Sprint allows you to upgrade to single-input diversity receivers. Manufacturers are likely to work with you to enable additional inputs at competi-



Most receivers provide for front panel telemetry, and some even overlay that information on a monitor video output.

tive prices. While diversity receivers have many advantages, by their nature they generally do not support VSB.

Remove slaves and antenna controllers

Antennas are lightning targets. Sprint will cover the cost of surge suppressors, even if they are considered an extra option.

Remote slaves use modems for two- or four-wire systems. Some are configurable on-site. Others need to

Organic workflow



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be specifically configured, and you need to spell that out in your request for quote (RFQ). Consider purchasing spare modems.



Remote slave units at the receive site talk to the central controller and control the receive antenna. These units need to be robust to drive antenna position, filter switching and provide LNA power. They are also used to accept receiver spectrum data and package it along with other receiver and antenna telemetry and send it back to the central controller.

Spectrum monitoring

Digital receivers require spectrum monitoring, so be sure your new equipment includes the necessary software and hardware. The receiver and remote controller protocol needs to be compatible to provide spectrum monitoring features. Also, be sure your link supports a fast enough refresh rate to maintain the spectrum display. This typically requires at least a 19.2Kbaud link.

If your receive site is at the station without a central controller, you are eligible for standalone spectrum viewing on a PC.

Central controllers

Central controllers manage multiple remote slaves. Sprint will allow one modem per remote slave line. Modems are housed either in the central controller or connected via USB or Ethernet. Stations with a single controller usually get



Central controllers can manage several receive sites at once, and they are generally touch-screen devices. They also display receive signal health characteristics, as the old method of looking for best video in the analog world doesn't necessarily result in the most reliable digital signal.

USB connectivity. Those with multiple controllers get Ethernet.

IFB

IFB for DENG remotes is like IFB for satellite remotes. You need mix-minus feeds between studio and talent, even over cell phone links.

Do not give up any two-way radio capability. In some cases, Sprint may pay for continuous duty two-way radios for IFB. Stations currently using Pro Channel are eligible for Pro Channel 3 receivers, which provide side-tone or secondary audio to eliminate backhaul delay issues.

Cell phone users, keep in mind that FCC rule 47 CFR 64.402 encourages wireless operators to provide priority access service (PAS) to emergency responders. This means that in the future, you might be covering the biggest stories without cell phones. If that happens, do you have a backup plan?

Fixed links

Many of these issues are also appropriate for fixed links. Work through each of the questions and issues for those links too.

Portable equipment

Many stations use portable equipment for stationary applications. If so, hopefully the expense to install the new equipment was included in your project as Sprint typically covers these costs.

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Cutover and implementation

You can move your fixed link to the new frequency immediately after you install the new equipment, as long as it does not cause interference. Otherwise, you will have to stay on the old channel until your DMA cluster cuts over.

Before starting installation, discuss your LAN topology, including IP address schema, with your vendors and integrator. Provide them with detailed information about any custom antenna mounts or other unique issues. Schedule the integrator only after you receive all equipment and hardware, and provide clear dock swap documentation to the installers.

If you install a BAS filter during the first tower climb, you must not use Ch 1 or Ch 2 until the cutover. However, you can continue using the existing PCS filter until after cutover. Then you can schedule the tower crew for a second climb. You will need to schedule the tower crew on cutover weekend to replace channel filters, if you agreed to operate non-switched channel filters in the current band plan.

Once you have a cutover date, coordinate site access, power reductions or off-air time with joint tenants and building managers. Remember to start the license modification process early. Otherwise, you may delay the cutover for the entire DMA cluster.

Dock swapping

Most manufacturers allow broadcasters to swap equipment in the vendor's quote for other equipment. Often the broadcaster will exchange extra spare and portable equipment for something now considered more desirable. The newly selected equipment is shipped in lieu of the gear originally quoted by the vendor to Sprint. As far as Sprint is concerned, it has agreed to give the vendor a certain amount of money based on a vendor's approved quote. Whatever agreement you and the vendor come to for exact equipment is between the two of you.

However, be careful. Some equipment vendors may prohibit this process or will charge you hefty restocking fees. The reason is that Sprint has already paid for some equipment to be built in advance of actual orders. Now some vendors want to minimize the amount of product left on the shelf when this project is completed.

Final thoughts

Many stations are now in a quiet period in their projects where the FRAs are still winding through Sprint's approval process. Don't waste this downtime. Recheck your plans, and be sure you haven't forgotten something. When it does come time to move, you don't want to discover that a key component has been overlooked. You will save yourself the embarrassment of holding up everyone in your DMA. **BE**

Jim Boston is a West Coast consultant, and Roland Hoffmann is a project management consultant and provides project governance services.



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Versus builds a unique HD studio

BY MICHAEL GROTTICELLI

For Paul Koopmann, director of engineering at Versus, a Comcast-owned cable network, the task of designing and building a high-definition (1080i) production studio in Stamford, CT, was a welcomed challenge. Versus nationally broadcasts sporting events such as the NHL, Tour de France and Professional Bull Riding.


Working with a leased space, his engineering team needed to install a set, lighting grid, control room, audio suite and machine room without making any major structural changes to the proposed studio space. Twelve short weeks later, as last-minute cable crimps ran through the facility, the engineering

team had accomplished what looked on paper to be an unattainable goal.

For the initial launch of Versus' NHL coverage in October 2005, the network broadcasted from a rented studio in an adjacent building provided and supported by Ascent Media Services. Upon the expiration of its lease two years later, the network found itself without a home for its "Hockey Central" studio show.

The proposed plan to reshape the potential building's bottom three floors presented the engineering staff with a risky, yet ironically ideal solu-

tion. Previously the home of IBM's Stamford-based administrative offices, the building's corporate façade actually boasted a few key structural features that worked to the team's advantage. The huge columnless glass atrium, for example, offered ample vertical clearance for the 18ft lighting grid, while the large, open rooms designed for cubicle space meant less demolition. Over-



The 750sq-ft production control room features five 46in Sharp monitors fed by an Evertz MVP. It comfortably seats 16 behind custom TBC consoles. Photos by Robert Wright.

looking the scenic Stamford Harbor, Versus now has a flexible working environment that's as groundbreaking as it is dynamic.

The challenge

Because of lease limitations imposed by the building's landlord, the

team devised a series of innovative solutions to work within the confines of the agreement. A giant freestanding box-truss was erected as a lighting grid and roof to avoid major structural alterations. The central machine room was positioned directly above the production control room and audio suite to allow for less invasive cable runs and core drills.

The passion project

After Comcast approved the engineering team's aggressive plan, it set out to transform the existing atrium into what is now a highly flexible HD production showcase.

Architectural plans were awarded to Jansen Design, while A&D Associates was tasked with full mechanical and electrical design for the new facility. Upon completion, all plans were handed off to Loft Development, a Stanford,

CT-based construction company.

One of the biggest obstacles presented to the architectural and construction crews was the removal of a fully operational glass-sided elevator located in the center of the atrium, which would have to be extracted to make room for the set. As part of the network's agreement with the landlord, it would be taken apart and stored. The I-beams were cut and the elevator car

UPS from MGE UPS Systems and a 500kW backup generator were among the many crucial pieces that made up the new studio's electrical backbone.

An elaborate Liebert air-conditioning system, responsible for cooling three stories of technical space, was installed by New England Mechanical.

Referred to internally as a "passion project," Versus engineers, along with HB Communications of North Haven,

chosen include three Sony HDC-1500L HD cameras with Canon HDxs compact-box-style 2/3in, 22X, 7.3 lenses; two Vinten pedestals; 21 Panasonic LCD HD monitors; and a Christie Digital 120in HD projection screen.

As if the team was not stretched thin enough given the narrow timeframe, it was also responsible for maintaining a 25,000sq-ft HD postproduction facility on the fourth floor. The Versus team



An SSL C100 HD broadcast console is the central piece in Versus' HD audio production.

lowered into the pit for safekeeping. The pit was capped, and a self-leveling floor was poured in the studio.

Soundproofing also provided a challenge, because the exterior atrium walls are only made of 8ft tempered glass panes. After installing heavy-duty sound deadening panels, trucks, cars and even boats operating just outside the glass wall cannot be heard inside the studio.

Power distribution was constructed from the ground up by Camsan Electric. A new 1200-amp main, 200kW

CT, routinely worked 20-hour days for more than six weeks to bring the project to life. Versus' own IT staff also labored around the clock to implement the studio's expansive IT infrastructure. From Aug. 16, the seven-man crew dedicated itself to bringing the HD studio online by Oct. 3, where a six-hour NHL premier show awaited.

Intent on outfitting the new studio with the best production gear on the market, the engineering team carefully selected products to suit its needs at NAB2007. Key studio components

had designed and built this facility two years prior. It features a wide array of equipment, such as a digital online editing suite, Avid AirSpeed servers, Avid Media Composer Adrenaline HD and Symphony Nitris HD editing systems, EVS XT[2] servers, and BOXX Technologies graphics workstations. All systems operate on a 100TB Avid Interplay and Unity ISIS storage network, working in tandem with SGL and a Spectra Logic archive robot.

This innovative design has allowed Versus to keep production, post and

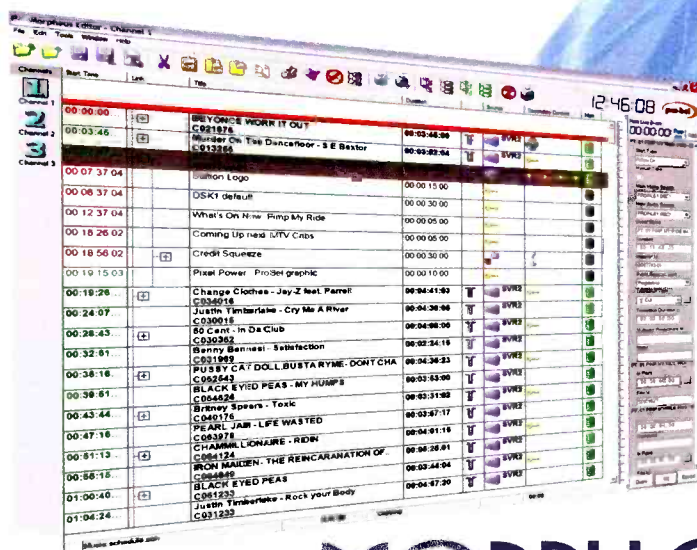
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transmission under the same roof, saving the company time and money while increasing productivity significantly. In addition to the NHL

season and the league's Stanley Cup Playoffs, the new studio will also be used throughout the year for other sports coverage.



By building a free-standing aluminum truss system, Versus was able to erect a lighting grid without making major modifications to the building.

Production control

Attached to the studio is a 750sq-ft control room, one of the largest Koopmann has ever built. The extra-wide consoles from TBC Consoles were designed for comfort and legroom.

At the heart of the control room is a Sony MVS-8000A HD switcher and five 46in Sharp PN-465U LCD monitors, which all feed off an Evertz MVP multidisplay system. JVC HD LCD panels were chosen as program/preset monitors for their clarity and native resolutions. The monitor wall itself is hung on an adjustable TRAC system, also designed by TBC Consoles. It allows for the monitors to be easily slid, pivoted and angled in almost any direction.

Every piece of equipment in both the new studio and pre-existing post-production space are connected via thousands of feet of Belden cabling onto AVP's HD 3GHz patchbays in the central machine room on the first

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floor. Harris X75 frame synchronizers, HD/SD Thomson Grass Valley Concerto routers, XT[2] servers, a Riedel Artist communication system and an

Evertz 7700 multiframe are just some of the technologies deployed in the new machine room.

A transmission monitoring room

was built within the central machine room. Its monitoring is connected to the same MVP multi-image display processor that feeds the monitor wall in the control room. This allows the transmission staff to monitor all available SD/HD feeds and in-house audio/video sources.



The central machine room houses 18 racks and space for personnel to work for studio productions, with ample room for expansion.

Embedded audio

All audio for the Versus live NHL production passes through a new Solid State Logic C100 HD console, which is easy to operate and versatile. The studio is currently mixing and distributing stereo audio, but will convert to full surround sound later this year. The broadcast console is capable of delivering 5.1 with a few keystrokes.

Audio signals remain as embedded HD-SDI throughout most of the production workflow, and are only demuxed via Evertz 7721AD4-HD

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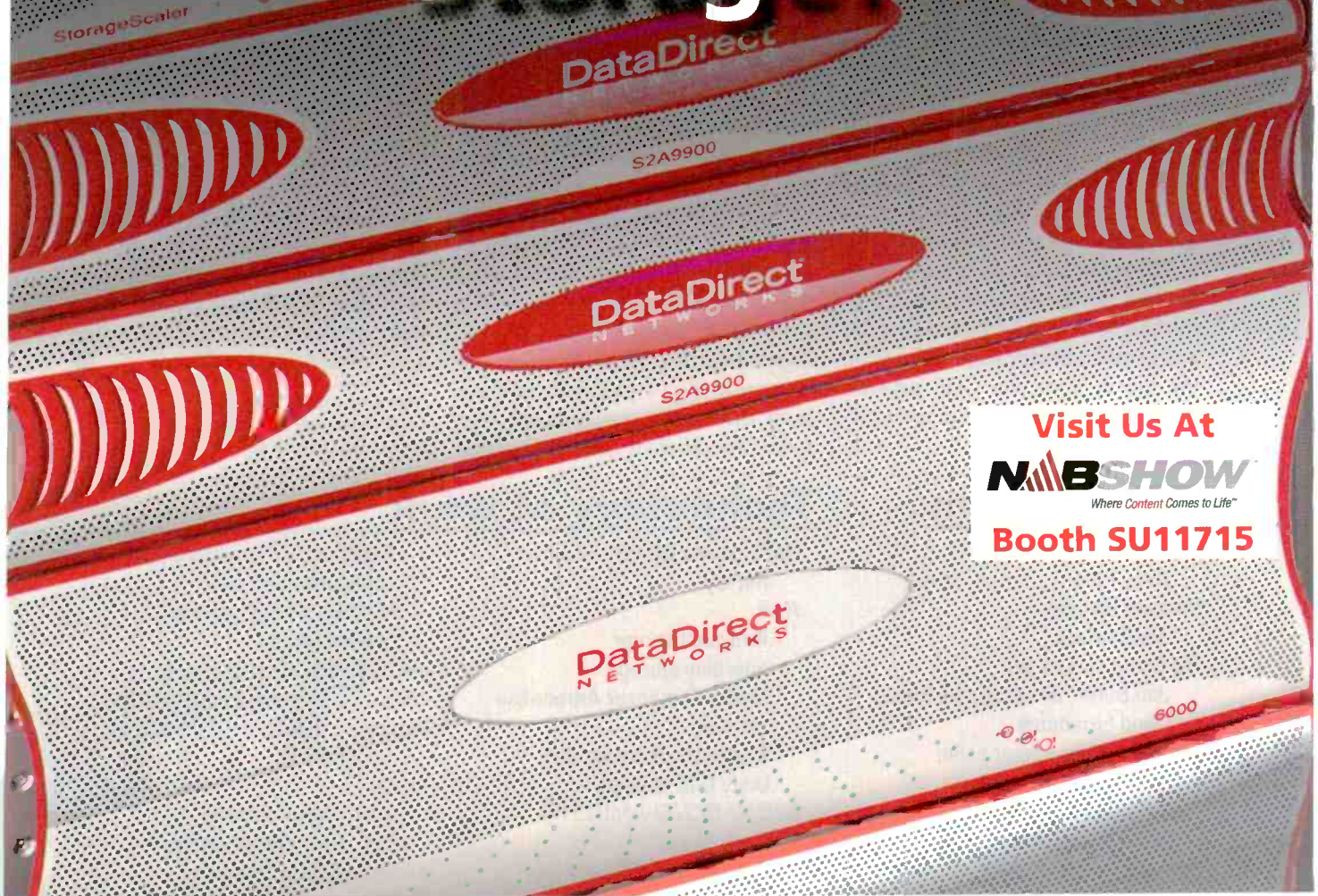


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modules before entering the console. To keep a handle on potential lip-sync issues, program audio from the console is then remixed using Evertz 7721AE4-HD modules.

While in live production mode, the audio console and switcher act as transmission routers in tandem passing the inbound feed through the facility and directly back out to air. This allows the production crew to continue cutting highlights without interfering with the live games.

The audio suite also features a 360 Systems Instant Replay for push-button audio cues. The system is tied into a large audio library server located on the fourth floor, via GigE network connectivity, with clips and sound effects recalled at will.

Design team

A&D Associates
Axay Patel
Camsan Electric
Joe Hurlock
HB Communications
Jim Burke, director, new media and broadcast
Tim Visgilio, senior sales representative
Gary Peck, broadcast engineer
Tim O'Rourke, broadcast video technician
Greg Kashuba, broadcast video technician
Teresa Aresco, video technician
Jansen Design
Joe Montalbano, partner, director of architecture
Loft Development
Beau Keen, president
Charlie Pavarini, vice president
Bob Marrone, GC
Versus
Paul Koopmann, director, engineering
David Coulombe, broadcast engineer
Jasper Veldhuis, broadcast technician
Bill Kunz Director, information technologies
Steve Nikiforow, IT analyst

Wider signal traffic

Bringing the bandwidth-intensive HD signals into and out of the building was also a challenge, as the town of Stamford is not equipped to handle wideband transmission. New trenches were dug from the building at Harbor Plaza to the local fiber-optics transmission provider, Level 3 Communications, which is about a half mile away, to accommodate multiple dedicated OC-3 and OC-48 lines for unlimited HD capacity. There's also a 48-jack fiber panel installed outside the building on a telephone pole to allow Versus to bring in a satellite uplink truck if necessary. This provides bandwidth to capture live or prescheduled feeds from around the world. Signals also come in on fiber via Level 3's VenuNet

service and Intelsat circuits.

To this day, Koopmann said he's still awed by what the engineering team has accomplished. It completed a project of major proportions, within an almost impossible timeframe, overcoming obstacles of every nature along the way. The network now has an HD production infrastructure to rival any in the industry — where edited video pieces, created within seconds of air, are shuffled between the four floors during the live shows with ease. The tapeless environment it designed and built gives the "Hockey Central" team more flexibility and better production values than it ever had before. **BE**

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

Technology at work

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HJ11e x 4.7BENG lenses
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Evertz
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EVS
XT[2] HD server
XFile
Harris Leitch
FR-3901 1RU frame for Neo
DVR-3901 digital video recorder
X75HD-AV-2PS multiple path converter and sync
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Panasonic TH-42PWD8UK LCD HD monitors
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Better Tapeless HD

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Workflow Innovation

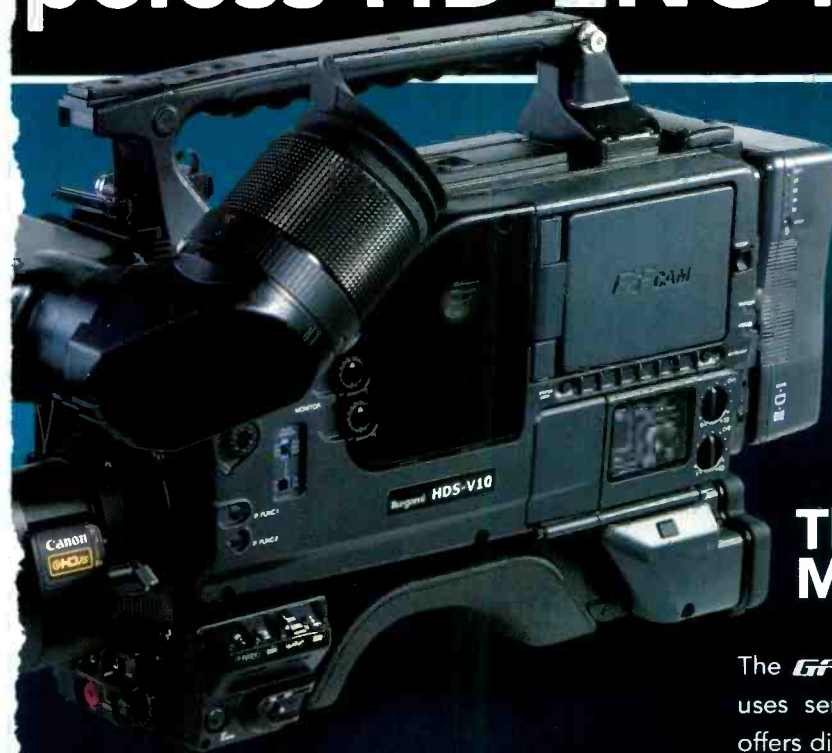
Multitasking with GF STATION

The **GF STATION** is a multi-task platform built around high-capacity internal Flash memory. It is the home for video sources transferred via a network to a non-linear editor, an import terminal for uploads from external sources, and an IN/OUT editor supporting instant direct editing during file transfer from a **GF PAK**. IN/OUT editing is also possible during recording, via the **GF STATION**'s front-panel or its universal controller interface.

Meta Data and Proxy Data Solutions

As the **GF CAM** records the full-resolution image and sound data, it can also simultaneously record proxy video and meta data. Proxy video, a low-

Ikegami Team Up For Tapeless HD ENG Package.



The Flash Memory Solution

The *GF CAM's* tapeless *GF PAK* storage medium uses semiconductor-based Flash memory, which offers distinct advantages over optical disc-based storage. *GF PAK* has no moving parts, is rugged, highly impact- and vibration-resistant, and

maintenance is easier and much cheaper than with other media.

The *GF PAK* is also a long-life medium, supporting tens of thousands of rewrite cycles, another significant factor in reducing running costs.

A single *GF PAK* can store up to 128 minutes of HD images, affording ample field recording time.



resolution MPEG4 mirror of the full-resolution image and sound, has the same time code as the original and can be quickly delivered over a network or accessed on location for initial viewing and to support scripting and editing. Meta data recorded during acquisition supports workflow efficiency by logging key facts on the shoot, including the date, location, program name, and equipment used.



GF CAM

Key System Specifications

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- MXF file recording
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- Freeze Mix function
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- Playlist delivery



Removable Media **GF PAK**

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- Mini-USB connector for external interface for editing, copying, etc.
- Remaining capacity gauge
- Manufactured by Toshiba



DTV combined approach

Pairing a broadband panel array with RF combining technology is a successful DTV solution.

BY MICK BENNETT

Real-world digital television (DTV) deployment solutions aim to make the best use of existing broadcast site RF hardware, such as towers, antennas and buildings. This ensures that the new DTV services can be overlaid with existing analog services in the timeliest and most cost-efficient manner.

An important tool that can help achieve this is the RF combiner. The balanced combiner has wide applications because of its modular construction and minimal interaction between inputs. (See Figure 1.) Its purpose is to combine multiple transmitter signals into a single antenna system, while keeping the transmitter isolated and properly matched. Forming an operational duo with the broadband panel array, RF combining technology has taken center stage in realizing such combined DTV solutions.

For North American DTV deployment, combiners fall into one of three

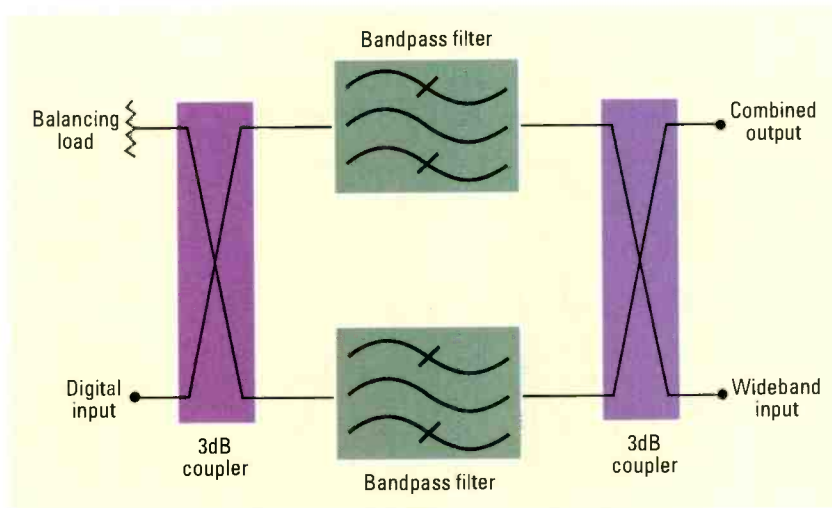


Figure 1. The balanced combiner module

site power-based categories:

- high-power sites (2kW to 100kW), which provide coverage to cities and larger centers;
- medium-power sites (20W to 5kW), which address regional center coverage, gap-filling and transposer applications; and

- lower power sites (less than 250W), which are used for small area coverage, gap-filling and translator applications.

Adjacent channel challenge

Many of the advanced performance characteristics required of DTV combiners directly result from the allocation of adjacent channels for DTV broadcast. Located between existing analog channels, these gaps are the channels preferred by spectrum authorities around the world for DTV, in a quest to optimize spectrum use. In conventional analog broadcast applications, interference problems previously rendered these adjacent channels unusable. The advent of digital broadcast has liberated adjacent channels, but at a price. To realize contiguous channels, complex masking filters — essentially brick wall filters — are required to minimize out-of-band products.

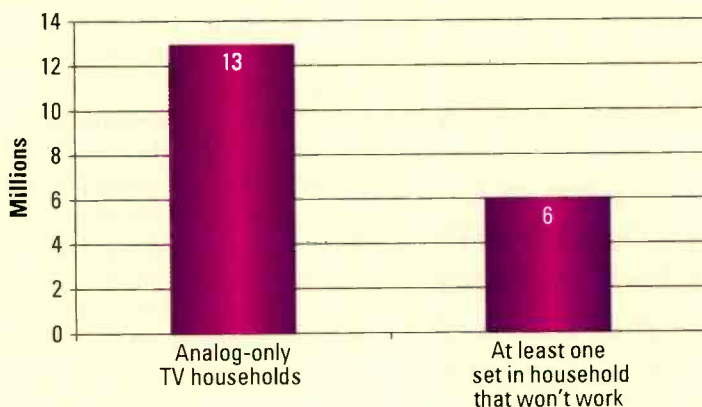
The issue of site space constraints, particularly in high-density urban areas, is another practical problem confronting broadcasters in many parts of the world. Most DTV retrofits aim to

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A look at the consumer side of DTV

Thirteen million households unprepared for DTV transition

Six million homes own a TV set that won't work after the transition.



Households that will not have TV after analog transmission is shut off in February 2009

Source: Nielsen

www.nielsenmedia.com

realize the extra channels within the space constraints of existing building leases. The pace of the worldwide DTV rollout demands higher levels of flexibility and modularity in filter/combiner application. Combiner filters that are tunable — ideally across the entire UHF band — have proven to be a major step in this direction.

Early work focused on the high-power areas (2kW to 100kW). Waveguide coupling technology was ob-

vert the directional waveguide combiner for UHF use, and many of these are patent-protected. In this arrangement, the two perfectly matched filters in a balanced combiner are effectively realized in a single circular waveguide assembly. Similarly, careful design of the wideband waveguide path (the spine) has provided dramatic improvements in frequency span.

Cross-coupling between cavities has helped realize eight-pole perfor-

This compact waveguide filter/combiner technology is now being used across North America, Europe and Australia, where larger power broadcast sites are more common. The most notable application of this technology is the combining of 14 high-power channels for three antenna systems on the Sears Tower in Chicago. Using directional waveguide combiners, this was achieved in a room with a footprint of 23ft x 23ft.

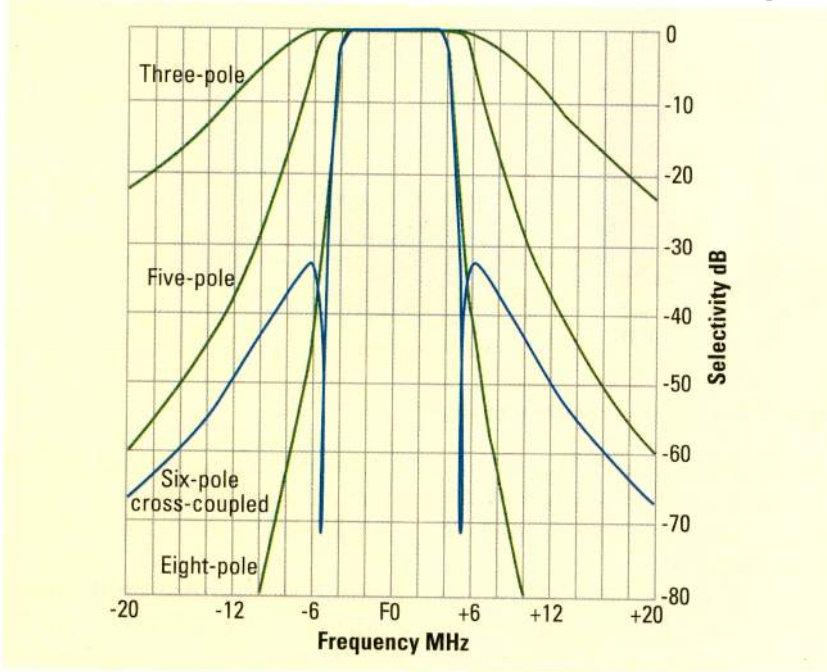


Figure 2. Typical filter responses

viously the preferred method to accommodate such power levels. Conventional waveguide UHF combiner systems posed limitations because they were large and bulky, and capable of handling less than 20 percent frequency span, which limited the scope for future channel additions outside this span.

Also, adjacent channel combining demanded waveguide filters as complex as eight-cavity (eight-pole). These could be as tall as 13ft, which is often too large for many rooms. To overcome these problems, a directional waveguide combiner — a waveguide filter technology often used in multichannel multipoint distribution systems (MMDS) — can be used. Several innovations were required to con-

mance while using the shorter six-pole assembly. The result is a particularly compact waveguide filter/combiner, which is about half the size of conventional waveguide combiners, yet offers a frequency span of around 46 percent. This allows two models of the directional waveguide filter to accommodate the entire UHF frequency range.

The pace of the worldwide DTV rollout demands higher levels of flexibility and modularity.



This photo shows the long, slender filter assemblies used in RFS' all-coaxial solution.

Medium-power focus

The medium power (20W to 5kW) combining applications have been an area of important development. Such powers are the regime of the more compact all-coaxial filter solution. As with the waveguide combiner, the challenge is to realize a higher order coaxial filter in the most compact total package.

External cross-coupling is an important design element. By applying a network of cross-coupling paths, it is possible to create an elliptical function filter in six- and eight-pole options for adjacent channel applications, plus three- and five-pole Chebyshev variants for conventional wide and semiajacent channel combining.

The cross-coupling paths are carefully tuned to produce notches or cross-coupling zeros in the filter

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characteristic. (See Figure 2 on page 62.) These provide the sharp masking filter response required for DTV semiadjacent and adjacent channel applications.

External cross-coupling is preferred over conventional folded configuration. This permits the development of a purely in-line configura-

tion, comprising long slender filter assemblies, with the input coupler at the base and the output coupler at the top. This in-line configuration permits a single 34in x 43in rack (see photo on page 62), to accommodate up to six channels, in a mix of three-, five-, six- and eight-poles. Today, filters are often ordered in ad-

vance of final frequency assignments. This allows channels to be added in after design completion. Filters are retired at one site and redeployed at another.

Combining for LPTV

Recent advances have grown out of the need for innovative combining solutions for low-power site applications (less than 250W). At such sites, the combining equipment must be much smaller and correspondingly lower in

Solutions addressing the technical, economic and practical limits of DTV are evolving quickly.

cost, while still retaining maximum performance. These technologies will play an important role in the imminent LPTV digital conversions.

By applying advanced manufacturing techniques, founded on an integrated coupler architecture, a new generation of highly compact low-power combiner systems are now available. Tuneable across the entire UHF band, these low-power combiners offer cost-effective and readily-customized products optimized for the 20W to 250W power range. They typically have a footprint of 5in x 12in and allow up to 12 channels to be accommodated in a single 19in rack. They come in a range of mounting options, including rack, wall and ceiling mounts.

Solutions addressing the technical, economic and practical limits of DTV are evolving quickly and will continue to challenge the bounds of RF combining know-how. These developments will be driven by broadcasters' demands for higher performance, more compact and lower cost combining technology. **BE**

Mick Bennett is the global product manager, broadcast and defense systems, for Radio Frequency Systems (RFS).



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Multi-image displays

Control rooms are turning toward multi-image displays to replace traditional monitoring.

BY AUGUSTO VILLASEÑOR

In the early 2000s, companies that provide multi-image display technology started to offer several new improved variants to the broadcast industry. Their primary targets were control rooms and presentation suites in master control facilities for the display of multiple windows of video, audio and data on unified screen monitors. Previously, because of concern about reliability and unstable pictures, many broadcast engineers shunned the idea of multi-image displays.

But, the new generation of high-speed Field-Programmable Gate Array (FPGA) logic solved most of those problems. Instead of many small CRT monitors populating a control room, the sight of plasmas and LCDs are becoming a de facto standard for displaying audio, video and data signals in broadcast centers.

Processing

Multi-image display processing envisions the entire area of the screen as a graphical canvas. This canvas is the design working area where windows can be created to tie the audio/video images coming as signal sources to the processor.

Figure 1 shows the logical representation of how a screen is being treated by a display processor. The canvas size is equivalent to the display screen's total resolution and congruent to the processor's supported output. Making a window on the canvas pertains to creating one logical video monitor. The size and shape of it determines the proportionate image to be rendered and presented.

It is imperative that the screen's — or combination of screens, such as LCD, plasmas, projection cubes, etc. — native resolution must be able

to support the highest capacity of the processor's output. When a signal has a resolution that exceeds the display panel's supported resolution range, a simplified image will be presented. For example, if the processor supports up to an SXGA output, the display screen must at least be able to display 1280 x 1024 resolution within its range. Otherwise, the screen canvas will be a mismatch of the screen representation. Some display screens will not allow presentation of out-of-range resolution.

As illustrated in Figure 1, the processor drives the single screen with multiple windows created on the canvas. In fact, given that there are multiple windows sharing the XGA (1024 x 768) canvas, the resulting window occupies less lines and pixels on the display screen. The processor retains the aspect ratio of the original signal,

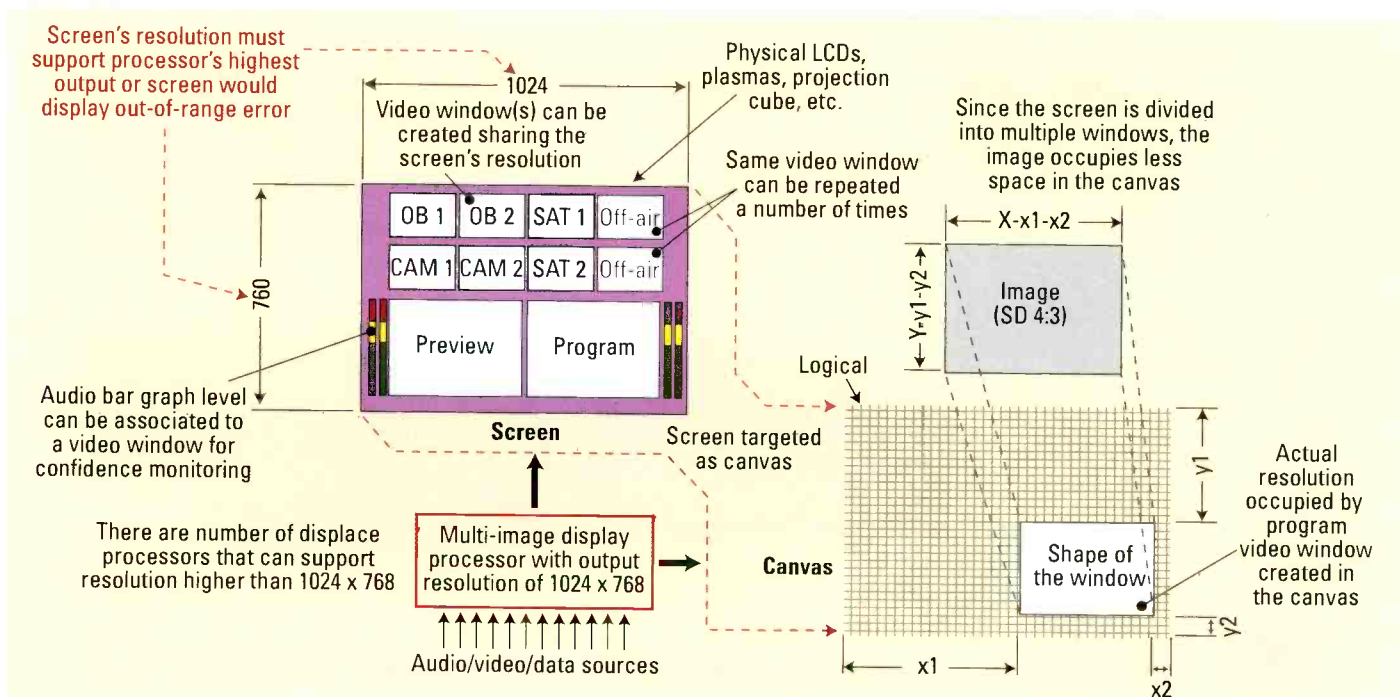


Figure 1. Working canvas area equivalent to the screen XGA resolution with multiple windows created to present audio/video sources

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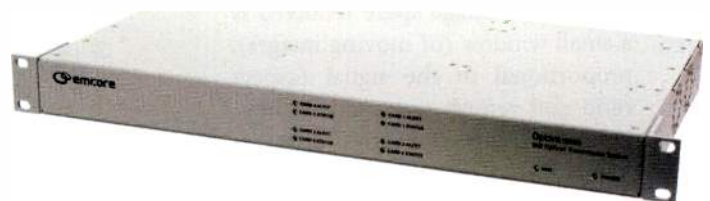
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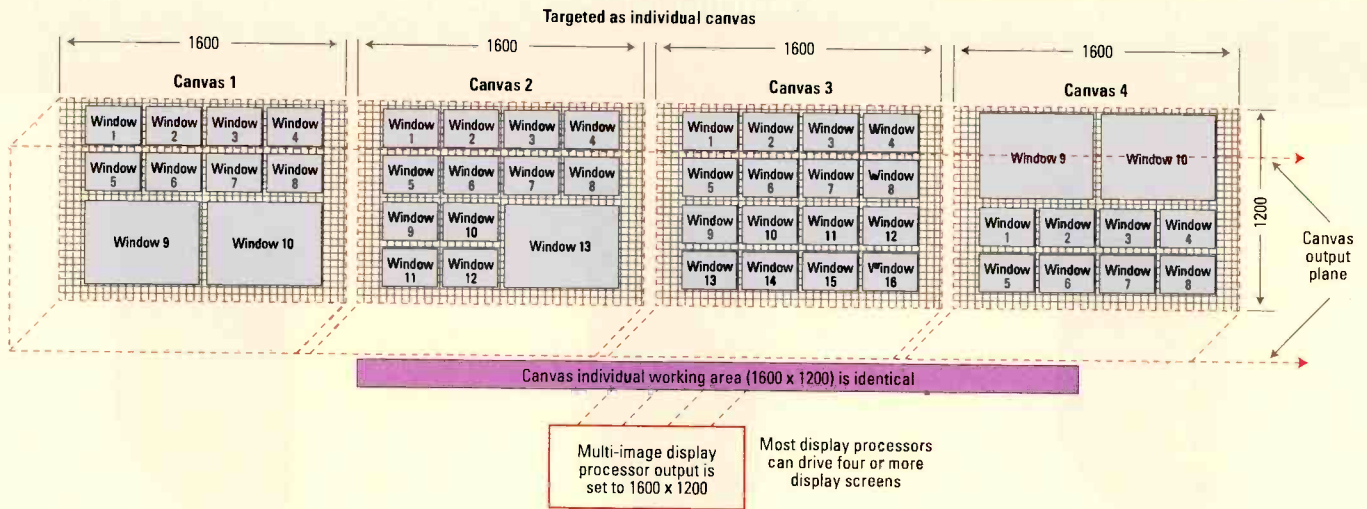


Figure 2. Single processor driving four independent display screens

but the processor will deliver the image based on the available graphical space shaped. When the signal program window is presented on the screen, the actual canvas it occupies gives the resolution:

$$X=1024-x1-x2$$

$$Y=1024-y1-y2$$

The SD signal corresponds to the X- and Y-axis of the canvas. If X starts from line 472 and terminates on line 15 at the bottom, then it occupies 282 lines. Knowing the Y value, then X can be computed as 376, which results in a picture ratio of 1.33. If the program video is encoded at 704 x 480, the processor presents it on a simplified 376 x 282 form. The artifacts of less resolution are concealed to the user because the image space rendered is a small window (of moving images), proportional to the signal (aspect ratio and refresh rate) and occupying less than the real canvas area (required for full-screen display).

Typically, a processor supports one canvas per screen. In a linear output configuration, the screens are autonomous of each other. The processor can conceive the target screens as a multiple of solo canvases. (See Figure 2.) It represents four independent canvases driven by a single processor. Windows drawn in one canvas area will not affect the other. The highest 1600 x 1200 canvas-working area is maintained along individual canvases, assuming

the display screens can carry on UXGA depth. Different symmetrical shapes can be designed on an individual canvas for the same source(s) because all canvases have access to the processors' frame inputs. When additional screens are added, it can be envisioned as another canvas space.

Most multi-image display processors support multiple outputs. Although each output is physically separate, they can be threaded as one logical output in the processor. Figure 3 depicts the higher degree of design canvas to operate on multiple screens integrated as one logical presentation

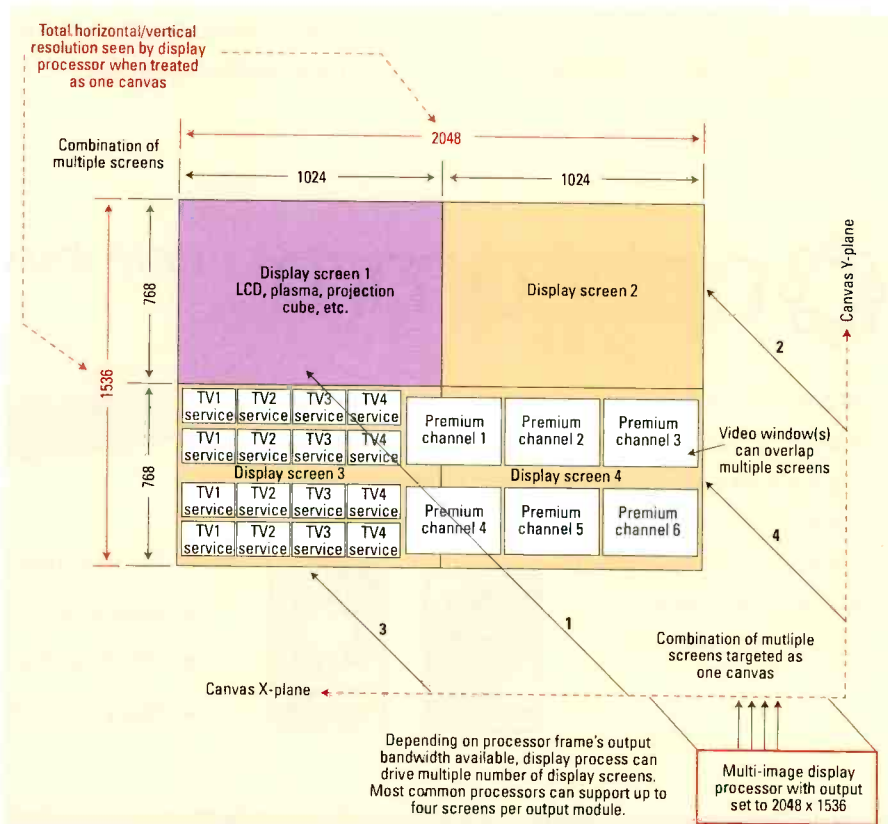


Figure 3. A 2 x 2 display block forms one unified display conceived as one target canvas.

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display. Multiple display panels are unified to form a larger design working area. This 2 x 2 screen arrangement results in wider horizontal and vertical depth. Note that the processor pooled the horizontal and vertical axis resolution to obtain the total of 2048 x 1536 into one array (doubling the XGA). The Y-axis plane (768+768) corresponds to the increasing number of screens vertically (for warp orientation), while the H-axis relates to extra panoramic view (1024+1024).

The resulting rectangular area is the design canvas working space. For

face on their auto-sensing wideband input. (See Figure 4.) The processor uses specialized hardware to detect a bit pattern known as Timing Reference Signal (TRS) framing to recognize the SDI data stream. Framing is the process determining where in a serial data stream characters begin and end. For SDI, the TRS consists of a three-character sequence of 0x3FFh, 0x3FFh and 0x000h in 10-bit hex, respectively. TRS for HD-SDI has embedded additional 0x00h, 0x000h and 0x000h for a six-word sequence. This TRS can still have SD-SDI TRS

SD signal, regardless of analog or digital in 4:3 modes. Any windows created for SD occupies 1.33 aspect when presented on-screen. For HD, the default panel is always 16:9 types. It is possible to create an unsymmetrical aspect ratio in the canvas. However, the result may be a misrepresentation of the actual proportion because the processor will attempt to fill the window with a picture image when it is formed.

For audio inputs, the multi-image processor can accept SDI embedded audio as inputs. The input module extracts SDI's ancillary blanking lines

A single 10-bit data stream serialized to a single HD-SDI per SMPTE 259M and 292M

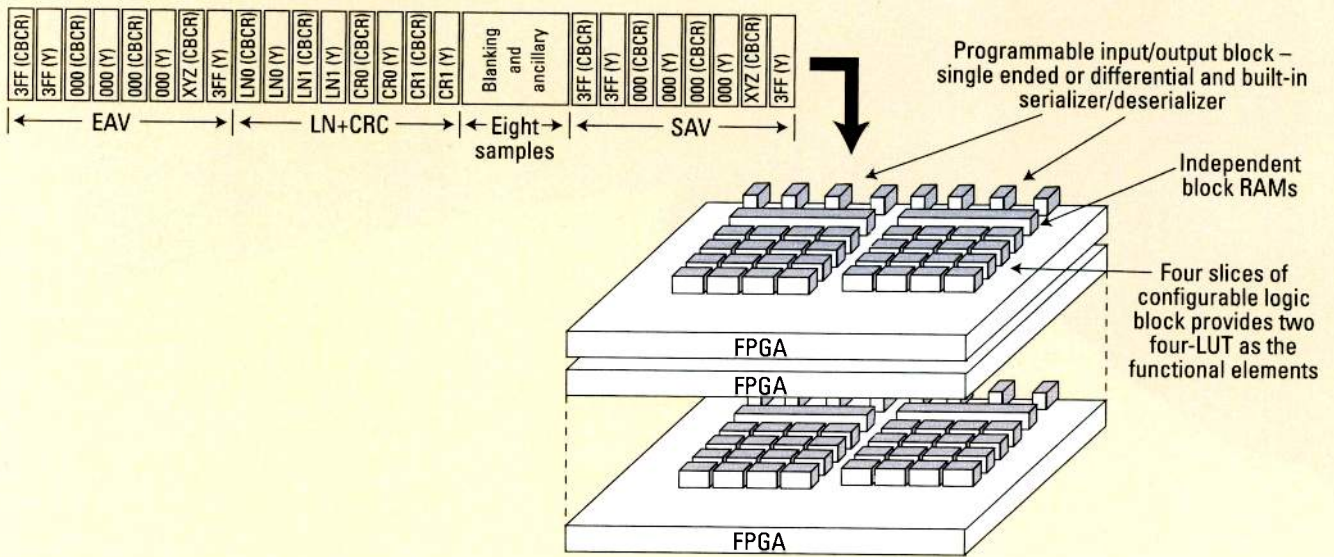


Figure 4. Multi-image processor using Field-Programmable Gate Arrays

this setting, a single picture window can overlap on multiple screens. The drawing canvas assumed (logically) that the spaces allocated for windows creation are presented on one display screen. In combining multiple screens to form arrays, the processor resolution oftentimes has a limitation of a maximum logical space (canvas size) it can support. It is necessary to check the best resolution the processor output can handle before forming screen arrays.

Sources

Multi-image processors can support the SD/HD multiformat inter-

face in the same order, as it would occur in HD-SDI. Hence, video sources can be processed by auto-detecting character boundaries based on pattern 0x3FFh, 0x000h, 0x000h, 0x000h, 0x000h and 0x000h that is embedded between the EAV and SAV of the horizontal line. The processor's wideband input module flags the character arrangements to identify the source.

Differentiating between SD and HD sources in the canvas requires the processor to determine aspect ratios appropriately. The processor logical canvas has predefined templates or patterns available for both SD and HD. Normally, the processor treats the

for audio data. For discrete analog sources such as analog stereos and AES digital audio, processors have daughter cards to associate audio received to any video input. Up to eight channels of audio can be married to any sources, and a bar graph for level metering can be made on the canvas.

Presentation

Multi-image display technology offers the highest level of signal presentation flexibility. The number of windows that can be created on the canvas depends on the available space. Once the target canvas is ready, windows of video, audio bar graph and other static

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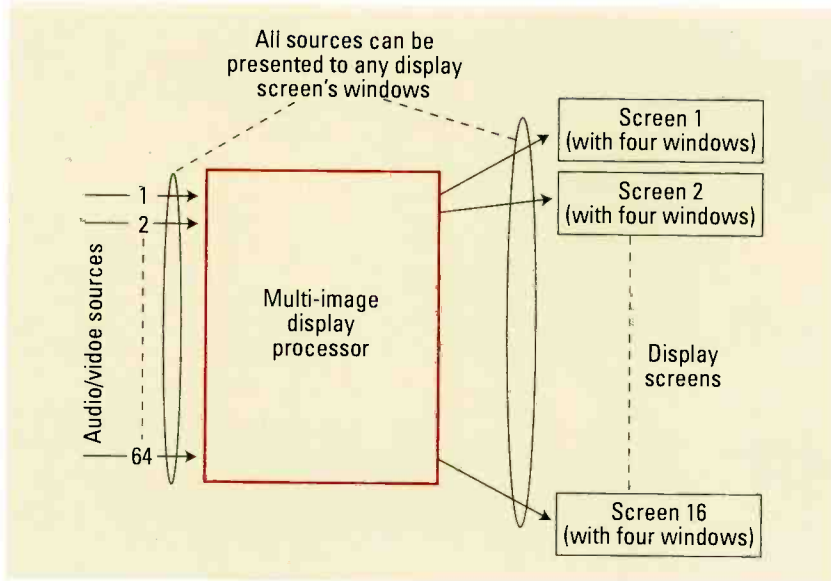


Figure 5. Unified architecture

text metadata, such as channel name labels and UMDs, can be inserted.

Dynamic metadata such as Closed Caption (CC), eXtended Data Service (XDS), Teletext service (for PAL), source ID, program rating and audio types can be automatically detected and presented. Any input sources coming into the processor can be assigned to any window created. The processor can display HD, SD or analog inputs any number of times, in any size, across multiple displays of supported resolution and orientation.

Alarms

For confidence monitoring ap-

plications where signal presence is a must to maintain service level, multi-image displays provide the necessary tools to monitor and check baseband status at all times. Processors have the ability to recognize alarms from individual input sources. They use loss of carrier in the SDI data stream to indicate loss of video.

For CC fault detection, the processor buffer lines 21 and 22 for loss of CC waveform to report CC error. Audio silence was based on the lowest input threshold level set (say -80dB) to trigger loss of audio alarm. Other alarm detections are EDH errors, active picture levels, frozen video, black

video, motion detection, video format detection, loss of audio channels, mono audio detection, phase reversal detection, audio too loud, audio too quiet, loss of CC channels, loss of text channels, loss of program rating, source program ID missing and more.

Although multi-image processors have the capability to detect indication of faults at system level and provide a snapshot of the status of the signal by notification, they do not lend themselves to analyzing the signal problem in detail. It is a common misconception to treat multi-image processors as test-and-measurement devices.

Topologies

The following are sample deployment architectures for multi-image display processors. First is the centralized topology, where all input sources are processed and displayed using a single frame. (See Figure 5.) The frame can be fitted with minimal input modules to handle the required number of sources initially. To accommodate more sources, the frame is populated with additional modules to the maximum capacity. When adding a display becomes necessary, an output module can be inserted into the frame to drive more screens.

One important feature of this architecture is that all input sources can be

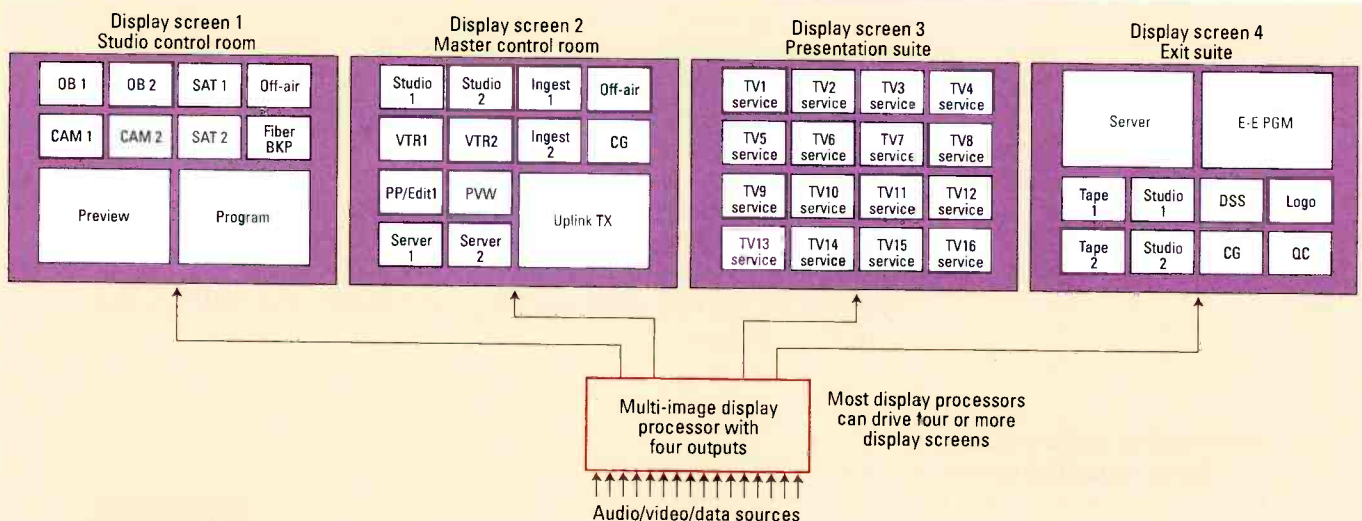


Figure 6. Multi-room monitoring on a single processor

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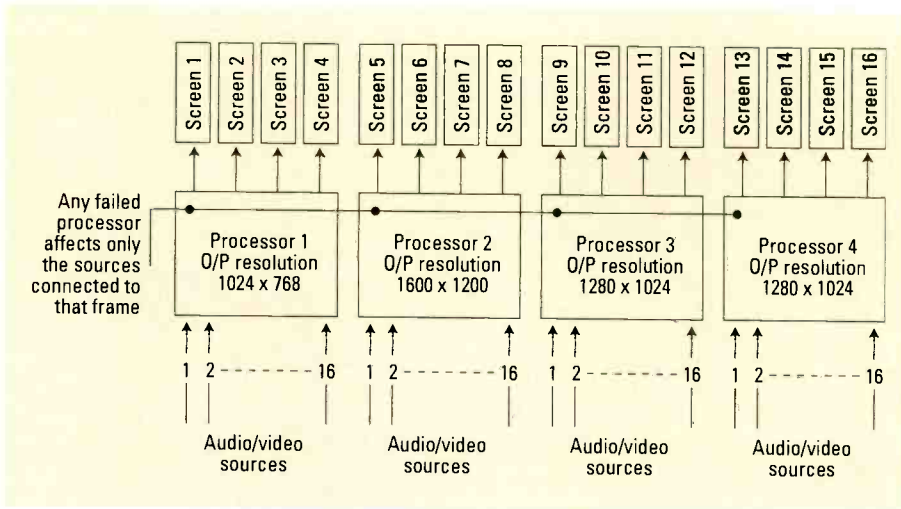


Figure 7. Autonomous architecture

assigned to any output screens. This setting also simplifies deployment and is fairly easy to manage. All cabling infrastructure terminates in one place. An added benefit of this scheme is related to the question of screen reliability. Display screens can fail without affecting the operation of the remaining screens. This allows the operator to use the remaining displays while a faulty screen is being repaired or replaced. This is often preferred for multiroom applications, where monitoring per functional area is required. (See Figure 6 on page 72.)

A single processor is good for a small implementation where the number of sources is static and expansion is fixed to the maximum slot capacity of the

frame. Once the maximum modules in the frame are inserted, there will be no more room for any future increase of input sources or output screens. Another problem is that having one frame means a single point of failure. In the event of a failure, the entire monitor is completely down.

Distributed architecture employing multiple processors to drive independent multiple screens provides high reliability. A failed processor does not affect other frames in the system. Each processor acts autonomously, thus providing complete isolation of screens connected to it. Distributed processing can operate without resolution dependencies to other screens in the system because their drawing

canvases can be set individually per processor. (See Figure 7.) Distributed systems can increase input sources and screens without interfering with the other processors' operation.

One major disadvantage of a distributed topology is the source assignment. Because they are not linked together, sources from one processor cannot be assigned to the other, thus preventing the screen access to those sources.

In designing for full-size NOC monitoring, the hybrid scheme architecture of linking multi-image processors is best suited for more display screens and more input sources, yet allows an easy to understand method of expansion. The hybrid follows the X and Y plane to allow expansion of both input (sources) and outputs (screens).

Figure 8 illustrates an example of a hybrid system married to support an unlimited number of sources, and capable of expanding display sources as the need arises. The processors in the vertical column thread can be expanded to an additional number of frames to accommodate more input without increasing the screen panels. Extending the horizontal plane increases the number of displays that can be driven if more screens are desired to render larger window images.

The cascaded-tree has the highest system reliability. For monitoring

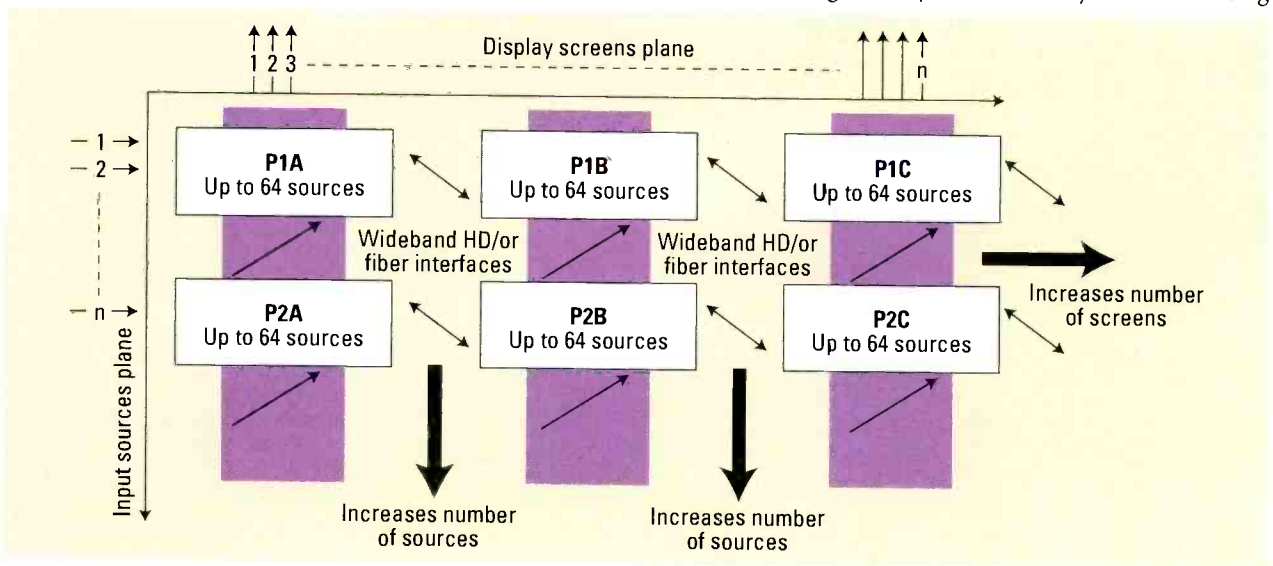


Figure 8. Hybrid architecture



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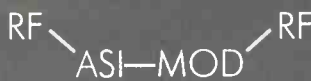
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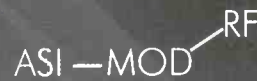
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- Integrated TC/IP Protocol, GBE, SNMP



that requires more input sources, a multi-image processor can be operated in cascaded manner. In this scenario, there will be more input sources available for expansion without increasing the number of screens. All sources can be assigned to any screens. Any failed processor, other than the primary and backup, affects only the signal sources physically connected to that frame.

become too small. It does not have the capability to expand the number of screens.

Summary

To effectively implement multi-image display monitoring, there are several technical baselines that must be taken into consideration. First, it starts with outlining the functional requirements. Determine the locations, rooms

rooms are turning toward implementing multi-image display to replace traditional monitoring. Fortunately, advances in display screen technology and use of high-speed FPGA in display processors allow presentation of stable and high quality images.

The key advantage of using multi-image display over conventional monitors is that it has proven value-added features such as alarm noti-

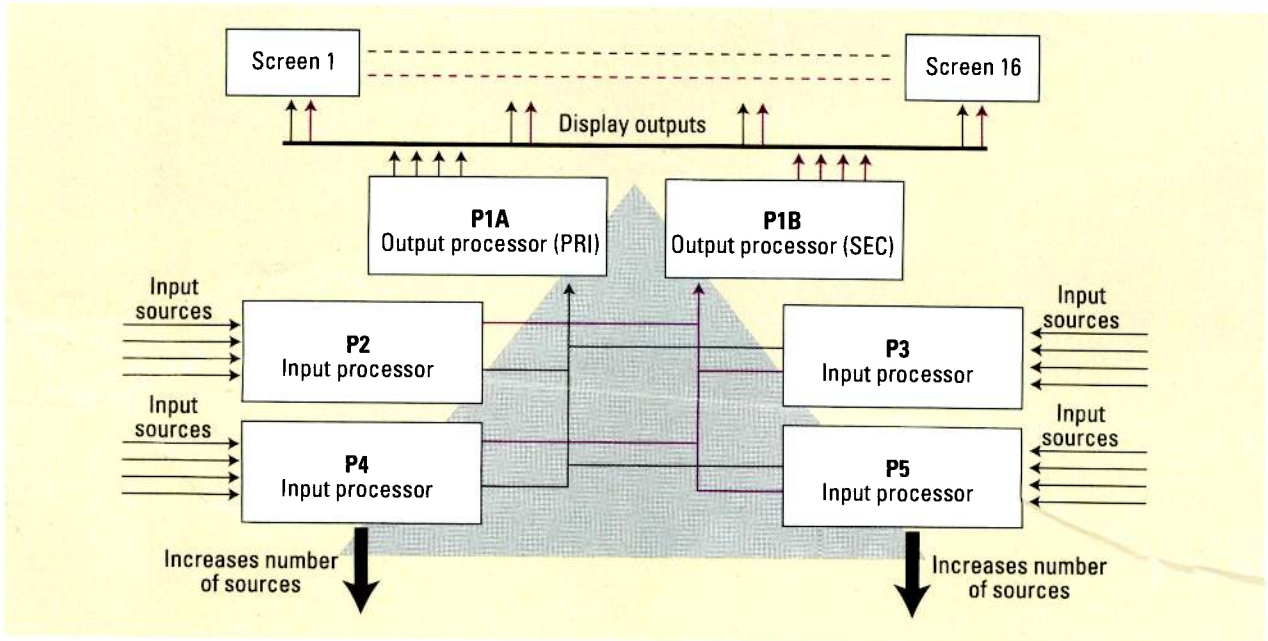


Figure 9. Cascaded architecture

Figure 9 shows an example of multi-image processor design in cascaded-tree fashion. The frame P1A and P1B are allocated as output processors in 1:1 redundancy. All display panels are connected to these two frames. P2, P3, P4 and P5 are both designated as input processors handling input sources only. If P2 becomes faulty, the only signals affected are sources connected to that frame. When additional input is required in the future, additional processor can be added to the tree.

The biggest drawback in this design is the limitation on the number of screens that can be driven. Most processors can only handle a maximum of 16 output screens. When signal sources have populated the screen with so many windows as the input expands, the visible images rendered

and areas where monitoring will be needed. Decide the type of monitoring required on each functional area.

Second, differentiate input sources and formats. Segregate SD and HD signals sources respectively. Although the image processor is capable of accepting both, it is helpful to know the canvas space a particular signal will require. Third, envision the common design canvas for all screens. Imagine how the picture will be presented per display (or forming arrays), including orientation. The next step is to choose deployment topology following the input formats, type, number of sources and screens, expansions, and reliability. Finally, choose the right multi-image display processor.

As supply of traditional CRT monitors continues to dry up, control

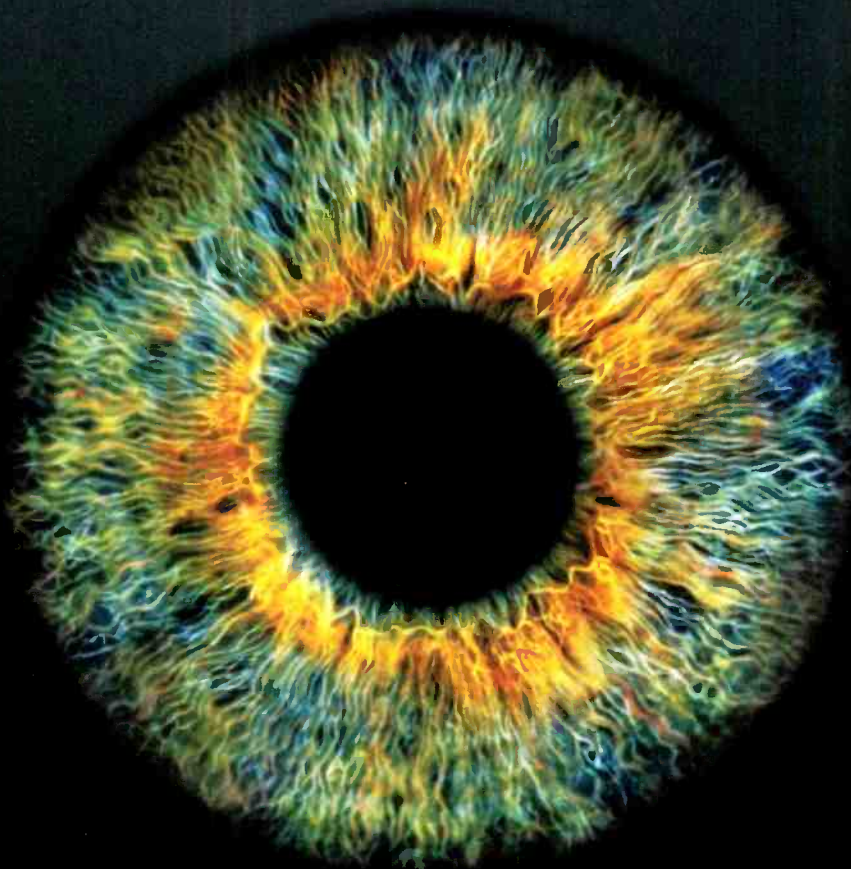
and faults triggering using the Simple Network Management Protocol (SNMP) interface. Most display processors' control software applications can report to a higher-level SNMP manager or third-party Network Management Systems (NMS), thereby improving overall monitoring and control workflow.

For instance, when a multi-image processor detects alarms and errors on its input, it can relay traps to the NMS manager about the faulty source. In turn, this can run routines to poll all connected devices to pinpoint defective component(s) along the chain. This gives the operators wide coverage of the system status plus visibility at quick glance. **BE**

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ADVANCED

jitter analysis for HD signals

BY MICHAEL L. RICHARDSON



Serial transmission of data representing video and audio signals has become standard practice across the broadcast industry. There are many advantages, including high data rate capability, self-clocking encoding schemes and acceptance by standards-making bodies. Yet, with these advantages comes a new set of parameters that must be monitored and controlled to ensure proper data transmission. Certainly the attributes of the data waveform itself have a major impact on transmission accuracy — commonly referred to as monitoring of the signal's eye pattern.

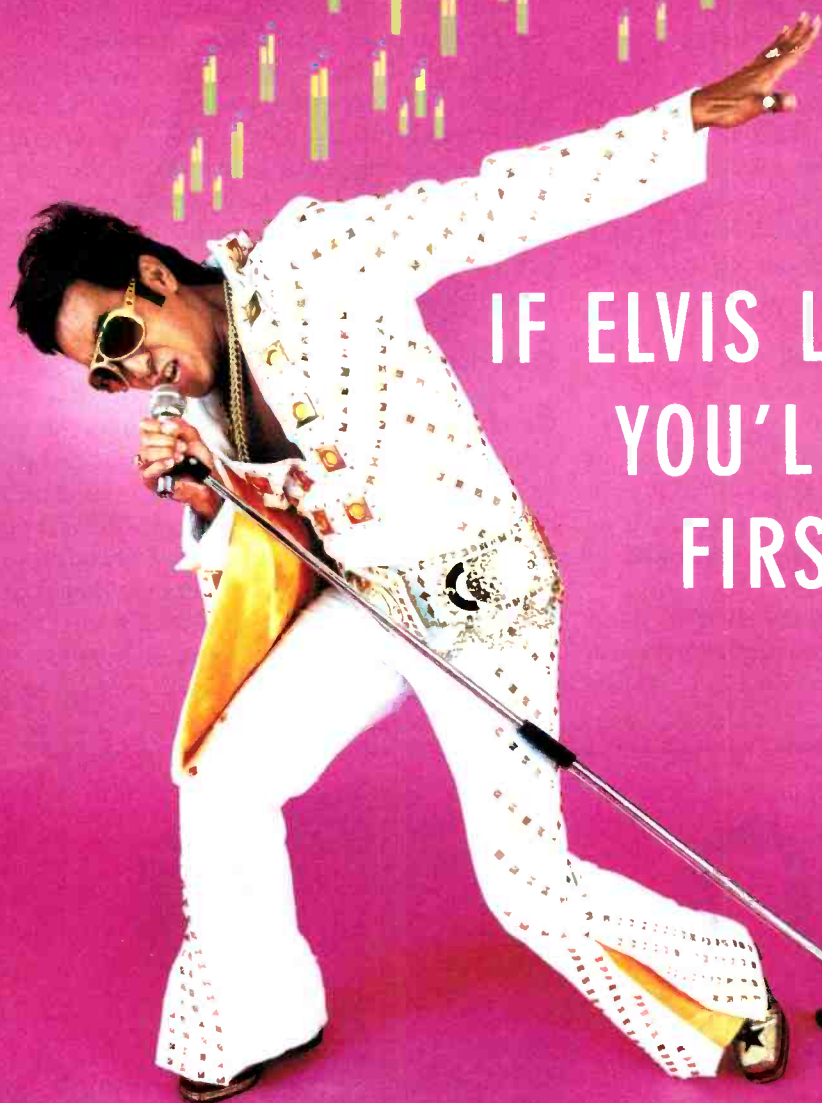
However, time-domain monitoring of the eye pattern can only give partial information about one of the most important serial transmission parameters: jitter. Other, more advanced testing means are required for full jitter analysis.

Serial video transmission

The Society of Motion Picture and Television Engineers (SMPTE) has codified the encoding and serial transmission specifications used in the broadcast industry. These are now universally accepted by equipment manufacturers, broadcasters and all the intermediate contributors. Serial data transmission involves taking the stream of 10-bit parallel words used in uncompressed component video schemes and converting that stream to serial.

Non-Return to Zero Inverted (NRZI) is the basic encoding scheme used in video transmission. Using NRZI, any

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binary "1" produces a transition in the serial data stream. A binary "0" does not cause a transition. This technique is advantageous since it lowers the average transition frequency and makes the resulting data stream polarity-independent.

Further encoding is performed using a scrambling polynomial to more evenly distribute transitions in the final serial stream. A side effect of this process is that certain flat signals (often a gray or single color image) cause relatively long periods without transitions in the serial data stream. These signals, referred to as pathological, can cause up to 20-bit periods without a transition.

Parameters influencing serial transmission integrity

As effective as these techniques are, there are still numerous challenges in transmitting data at 270Mb/s or 360Mb/s. Bandwidth is even more crucial for HD serial data transmission, where the data rate is 1.485Gb/s. These links require approximately 2.1GHz of bandwidth to maintain the data waveform integrity.

Long cable lengths will attenuate the electrical signal amplitude, which can indirectly cause frequency domain effects. Every piece of equipment involved in serial data

transmission uses a cable equalizer component to automatically restore the received signal to nominal amplitude. Unfortunately, these devices introduce noise, which appears as jitter in the equalized data waveform.

While overall jitter amplitude is a crucial factor in assessing a serial video transmission system, it is meaningless without knowledge of what jitter frequencies are present. Jitter of a particular amplitude will cause different system effects as its frequency varies. The two jitter quantities — amplitude and frequency — cannot be separated when analyzing a system; knowledge of one parameter is meaningless without knowledge of the other.

Common measurement techniques

Any amplitude vs. time display — such as that produced on an oscilloscope — will supply information about the amplitude parameters of a serial data electrical signal. However, using an oscilloscope to view an eye pattern is difficult for a variety of reasons. The first reason is bandwidth. For proper evaluation of HD signals, an oscilloscope with at least a 10GHz response should be used. Waveform storage is another concern; many data points need to be accumulated in order to view a proper eye pattern, and this requires substantial memory. Accurate

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triggering is also a critical concern; the jitter high-pass (HP) filters required by SMPTE specs will not be available in an oscilloscope.

For these and other reasons, eye patterns are typically viewed on video-specific test equipment. Many waveform monitors designed for the serial data interface (SDI) also have

While an eye pattern display can tell us the amount of jitter, it gives no indication of jitter frequency or variances over time.

the ability to display eye patterns. The display is still essentially that of an oscilloscope — a voltage vs. time analog waveform. However, being a video-specific device, the waveform monitor controls are already optimized for eye pattern display.

Advanced measurement features

Some test equipment can exhibit anomalies that yield incomplete or even misleading measurements. One such area is in the most basic display — the eye pattern itself. Most existing test instruments perform adequately with basic test patterns, such as color bars. However, many of these same instruments do not display some of the serial data stream characteristics that are unique to the SDI check field (often colloquially referred to as a pathological signal).

The receiver equalizer test portion of the SDI check field is defined for HD signals in SMPTE RP178. It produces 19 consecutive bit times without level transitions, followed by one bit time of the opposite polarity. (Either starting level can occur.) This pattern produces a high DC level in the serial stream. It also produces an asymmetrical eye waveform because of this DC offset. Many instruments lack the sample rate and display persistence to properly see this asymmetrical result. An example of a properly displayed test is shown in Figure 1 on page 84.

Two things are apparent from this display. First, the single period leading to the high DC offset can clearly be seen. Second, the effect of this offset produces middle logic levels while the input coupling capacitors are charging and discharging.

As useful as eye waveform analysis is, it has numerous weaknesses when analyzing jitter. While an eye pattern display can tell us the total amount of jitter, it gives no indication of jitter frequency or jitter variances over time. Other measurement techniques are required for these analyses.

The output of the jitter demodulator



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gives an accurate view of jitter vs. time. This output is usually plotted as jitter amplitude (as the Y axis) and time (as the X axis) at typical video sweep rates — one or two lines or fields. This yields a plot of jitter that shows any pattern dependencies, such as jitter steps during vertical interval or due to video content. Certain test patterns (particularly the SDI check field) can show appreciable jitter steps at the point in the field where the pattern changes. Examining

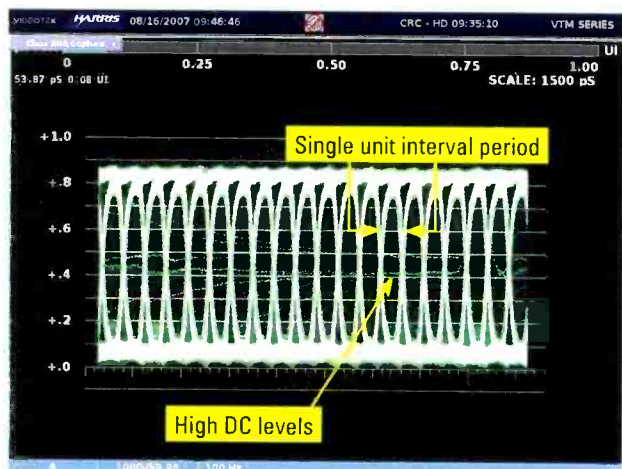


Figure 1. Eye pattern of SDI check field

only the eye waveform cannot reveal this change of jitter with time.

Figure 2 shows a jitter waveform at a two video line rate. Note the large change in jitter amplitude from the active portion of the line to horizontal blanking. Similar changes can often be seen at field rates with the changes in jitter amplitude occurring at vertical blanking.

Further analysis of this waveform can yield information

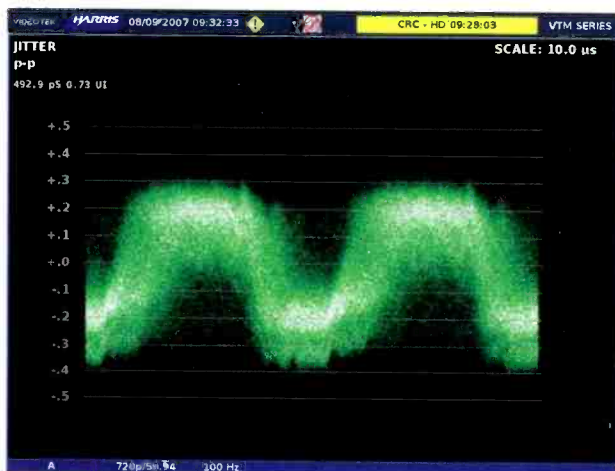


Figure 2. A jitter waveform at a two video line rate

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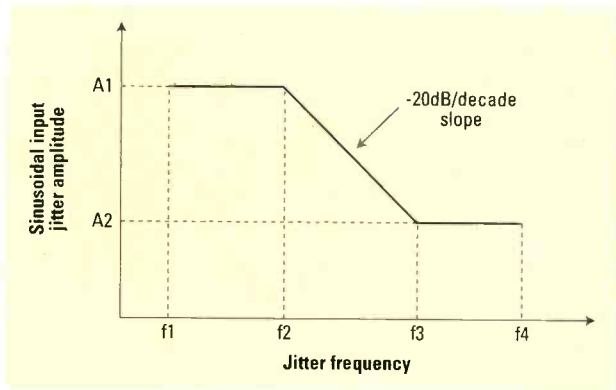


Figure 3. SMPTE jitter template

about the frequency content of the jitter. With additional processing of the jitter waveform, different jitter frequencies present in the jitter can be calculated and plotted as a histogram. Like a dedicated spectrum analyzer, both the total bandwidth and the resolution bandwidth can be adjusted, allowing anything from a coarse overview to a narrow and specific frequency range to be analyzed.

Analyzing jitter frequency is essential, because it is a critical part of a system's jitter tolerance. The total amount

of jitter that any system can process with acceptable performance is frequency dependent. Systems can usually tolerate more absolute jitter at very low frequencies. Jitter tolerance decreases at midband frequencies (roughly 100Hz to 1kHz) before starting to decrease again at high frequencies outside the response range of the serial receiving circuitry. So, knowing the absolute jitter value is not

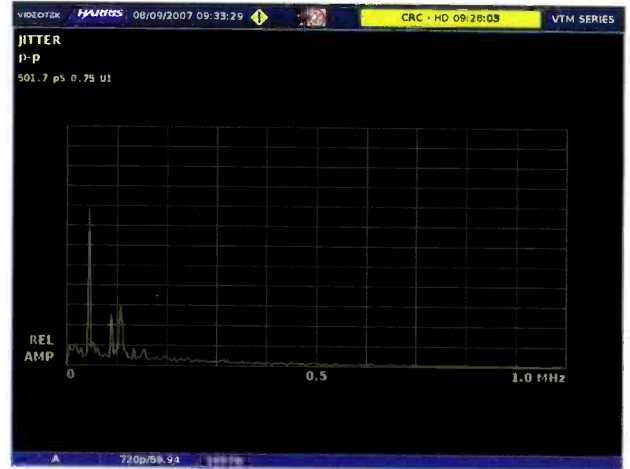


Figure 4. Jitter spectrum display

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enough to predict the response of the system; the frequency must be known as well.

The relationship between jitter amplitude and frequency in HD systems is well-defined in SMPTE RP 184 and S 292. (See Figure 3.) These specifications define a lower frequency for jitter of any type. In HD systems, this frequency is 10Hz. Frequencies below this are defined as wander. These relationships also show the overall system jitter tolerance decreasing as jitter frequencies increase.

Measuring these amplitude and frequency relationships is critical in determining system performance. Simple jitter amplitude values are meaningless without knowing the

Measuring these amplitude and frequency relationships is critical in determining system performance.

frequencies comprising that jitter. Any other measuring or monitoring means — such as alarms based on jitter values — are similarly limited without knowing the frequency of the jitter being measured. Figure 4 shows one method of examining the relationship between jitter amplitude and frequency.

Conclusion

A set of SMPTE Recommended Practices and an Engineering Guide provides detail on the definition and measurement of jitter in bit serial systems. One of the key points in these documents is the relationship of jitter frequencies to system tolerance. Yet this aspect is often overlooked in system analysis.

Advanced jitter analysis requires not only accurate jitter values, but knowing what frequencies comprise the jitter present in any system. The

ability to actually see jitter frequencies is key in determining system performance.

However, advanced signal analysis is not limited to frequency studies. There are other key tests that need to be made to ensure a properly-operating digital system. Keep in mind that many of these tests require specialized

test equipment. While a waveform monitor may show some important aspects of an SDI signal, good engineering practice dictates that further tests be conducted. **BE**

Michael L. Richardson is director of product development, Videotek test and measurement, for Harris Broadcast Communications.

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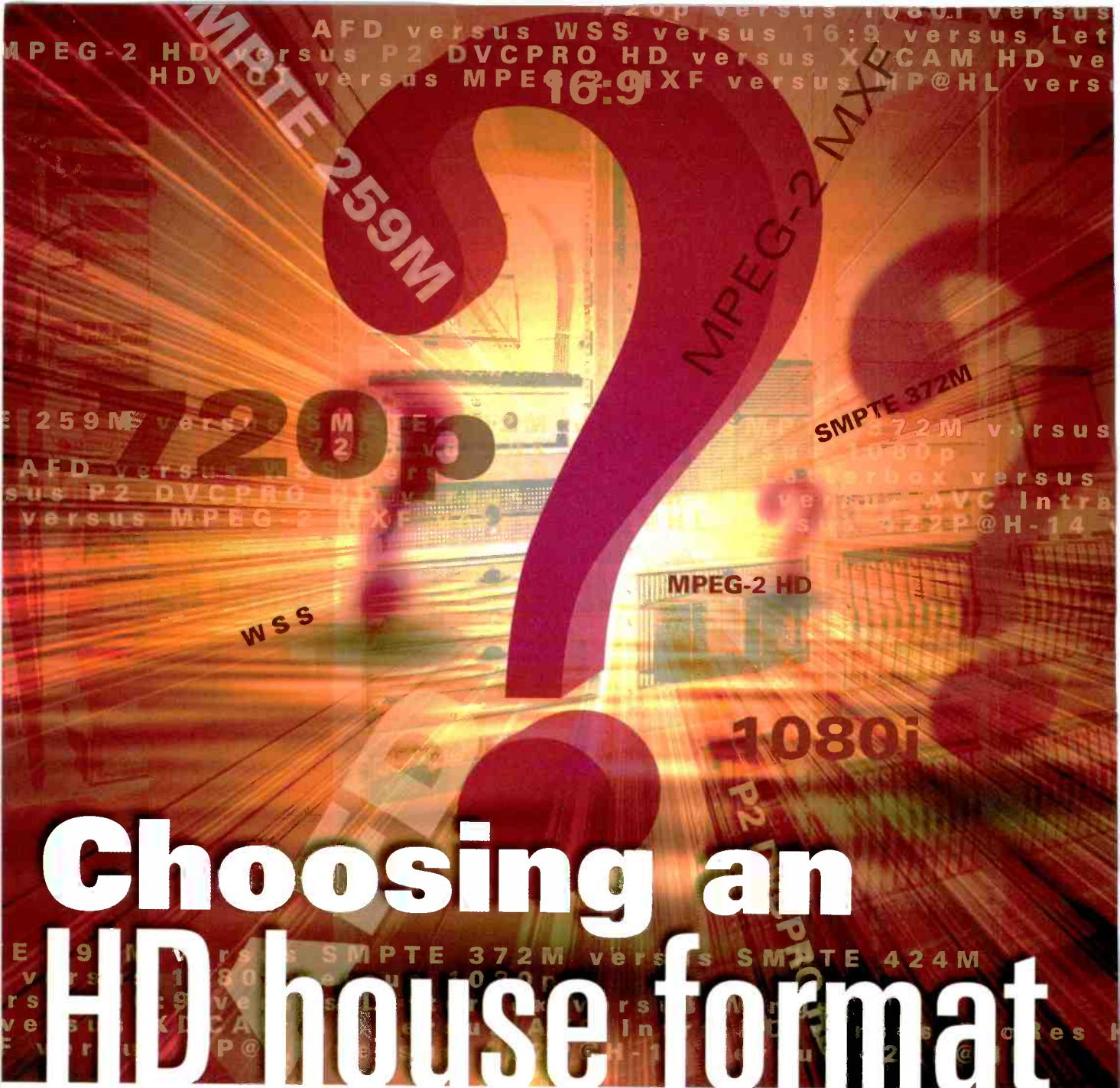


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Choosing an HD house format

BY JOSEF MARC

Selecting an in-house HD format can sometimes be an easy decision. However, for one network (which has asked to remain anonymous), making the correct technical decision proved to be more difficult than the engineering staff expected.

What finally led to the solution was a simple, yet effective, document: a written test plan. This test plan gave manufacturers something to commit to (or not). It gave operators, producers, talent and crafts people a way to participate. The document provided

engineers with technical work to sink their teeth into. Perhaps most importantly, it gave management a tool for evaluating how the selection and implementation process was progressing while under the gun of an immovable HD launch date. The following is the story of how that network successfully established an HD house format.

HD streams vs. files

It wasn't difficult to select an in-house streaming video format. That was settled early in the project because decisions had to be based primar-

ily on hardware availability. Given the timeframe and the need to support a wide variety of operations, there was not enough equipment available that could provide interconnects to either the SMPTE 372M or 424M 3Gb/s SDI interfaces. This led to the selection of SMPTE 292M 1.5Gb/s for routing and distribution of 1080i video with embedded audio. One downside of the requirement for a quick decision is that it effectively eliminated using 1080p. Today, 372M and 424M are widely supported, so 1080p is a candidate for an HD infrastructure.

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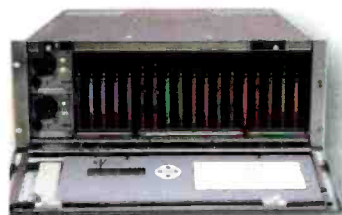
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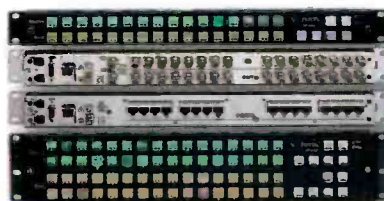


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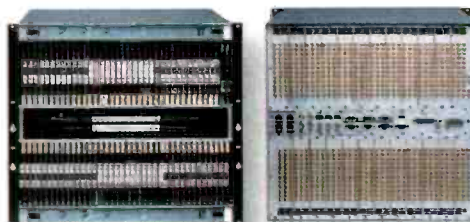
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FEATURE

CHOOSING AN HD HOUSE FORMAT

The design process

The broadcast infrastructure was designed around SMPTE 292M. Without minimizing the complexities involved, the work was straightforward. The network followed manufacturers' recommendations for things like Dolby E audio subrouting, up/downconversion to local confidence monitoring, and sync and delays.

Unfortunately, when it was time to choose input and output ports for the facility's video servers, which was a seemingly trivial technical selection, the team hit an impenetrable wall. It seemed impossible to select a compressed HD file format that would meet the facility's needs.

By the time the network went live with HD satellite feeds, it was still unfeasible to order those pesky video server ports. This posed a schedule risk worthy of escalation to the executive level. (See Figure 1.)

Compressed HD files

This schedule risk existed for a few months. It was difficult for the network to resolve the trade-offs. Some compression formats are better for editing, while others are better for transmission. Some file wrappers are more suited for news systems, while others are better for archive restoration and long-form production. Certain software applications and workflows are

better for human interaction, whereas others are better for automated control and message-passing.

The network documented its workflows and mapped them to new equipment and improvements. New workflows were planned to include digital asset management versus tape dub orders, and browse proxies versus tape carts from the library. Everything worked out on paper except for

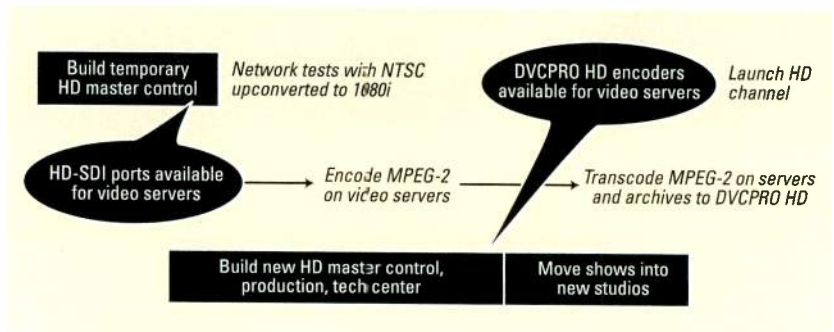


Figure 1. Project deadlines forced the possibility of changing HD formats midproject. This was obviously not an optimum solution.

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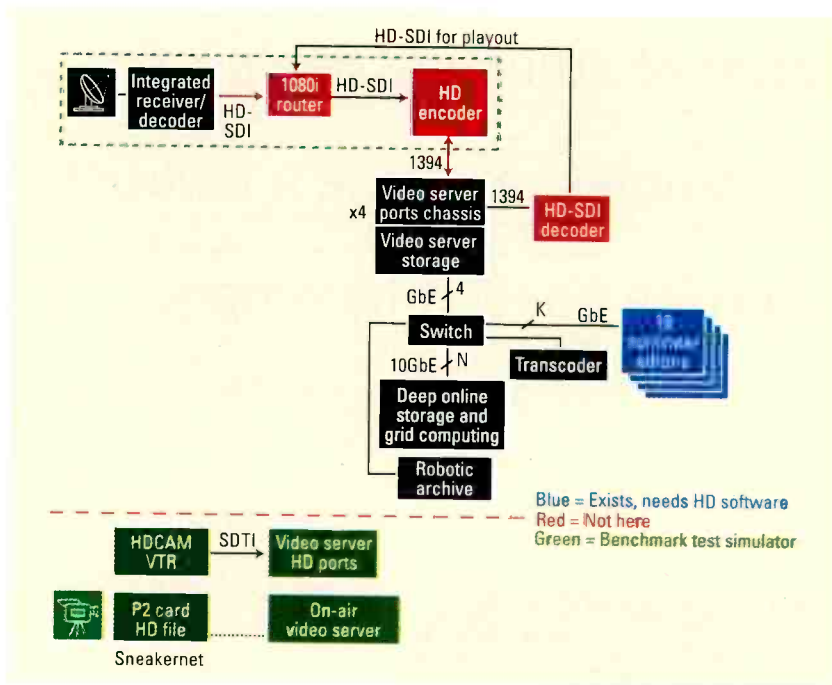


Figure 2. To design a simple edit-in-place benchmark test platform, HD formats were a major variable. Different codecs would produce different workflow durations, as well as diverse quality results.

those video server ports. The ports themselves weren't the problem per se. Server manufacturers offered a variety of compressed HD formats and SMPTE 292M compatibility. The problem was making a network commitment to a compressed HD file format so the right ports could be ordered in the accurate quantities.

Navigating the trade-offs

P2 cards from the network's field cameras familiarized craft people with using DVCPRO HD at 100Mb/s. But video server manufacturers weren't planning to support that format until after the network's studios switched to HD cameras. The network would, therefore, have to transcode months of video from an interim format to DVCPRO HD for permanent archive and workflows. And 100Mb/s is a lot of bandwidth even over Gigabit Ethernet.

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bit rates between 50Mb/s and 140Mb/s, wrapped as MXF in some workflows and as QuickTime in others. Engineering calculated that it could transfer 50Mb/s to 80Mb/s files across Ethernet quickly enough, and could install dual network cards into workstations. Local traffic congestion could be relieved with a Fibre Channel SAN for day-of-air storage and collaboration. But how would the network's editing computers perform with large files and high bit rates if they also had to calculate through long GOPs?

Editing HD MPEG-2 works better with all I-frames, but would the video from the new HD studio cameras look good enough for all of the network's needs? The network also had to weigh the options of either using MP@HL and losing those two color bits (4:2:0) versus 422P@ML and losing the 1080 raster size (from 720).

Editing and graphics departments naturally had differing points of view. Some manufacturers offered 422P@H-14 or 422P@HL equipment within the network's timeframe, but these were not yet demonstrable when integrated at a comparable operational scale with enough proxy generation. Because of HD file sizes, many network workflows have to rely on proxy video at least part of the time.

Web, graphics and promo workflows suggested HDV in a QuickTime wrapper for easy interchange between software applications. The broadcast side of the house supports the network's Web site with timely video elements and a rapid workflow. The national marketing and advertising operation demands the highest resolutions, so YUV and RGB color space transforms had to be minimized. But for broadcasting, HDV QuickTime required major changes to the network's graphics systems, transmission elements and automation-assisted master control.

To complicate matters, AVC-Intra was looming on the horizon, and

transcoders were turning in faster benchmark performance times.

Birth of a test plan

The test plan started as a simple question during rack layout discussions. Could the news operation count on editing-in-place in HD? If not, SD and HD VTRs would have to remain in the satellite feeds area and edit suites. The network brought in hardware HD codecs to see if edit-in-place in HD was practical. (See Figure 2 on page 92 and Figure 3.)

While brainstorming a benchmark test platform to measure edit-in-place-in-HD durations, the network realized

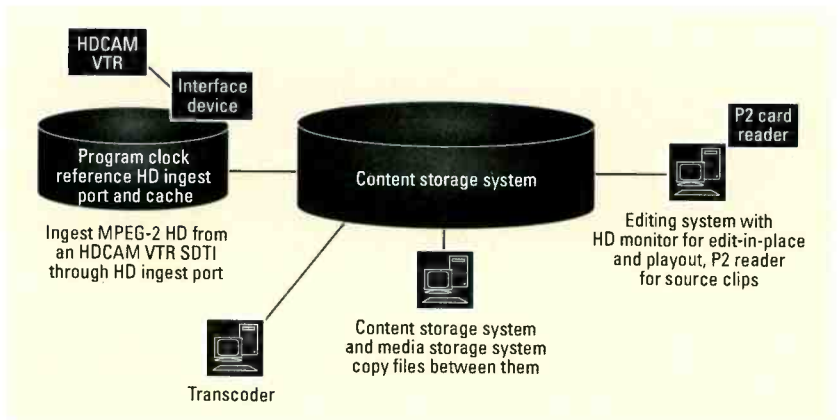
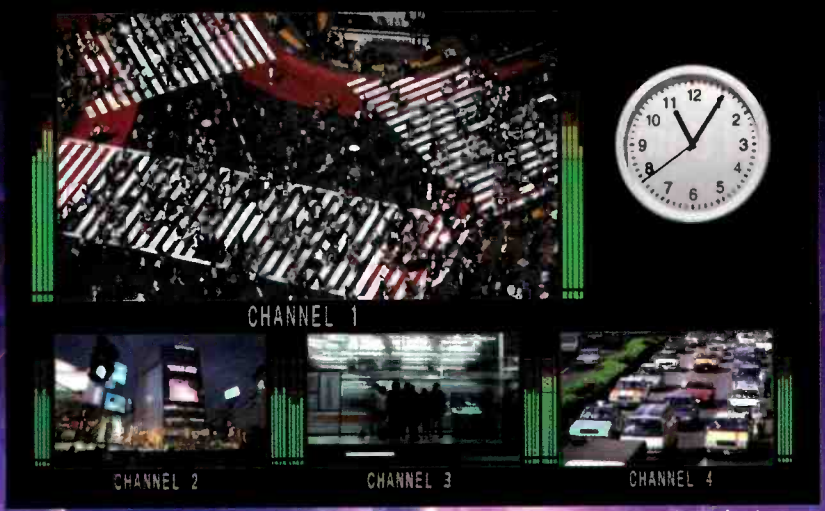


Figure 3. The benchmark platform itself was relatively straightforward. News feeds would be made simultaneously available to on-air studios as well as to edit workstations, transcoding faster-than-real-time.

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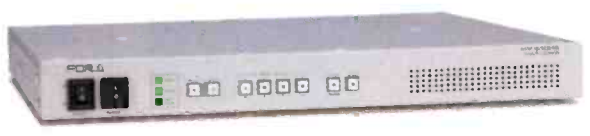
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FEATURE

CHOOSING AN HD HOUSE FORMAT

it could collect video quality evaluations from producers at the same time. The combination could help select an in-house HD file format that would work for everyone. Building a benchmark platform was routine, but the network realized immediate value from its documentation package. (See Figure 4.)

When the simple edit-in-place test area was asked to also serve as a place where video producers could evaluate video quality, that larger group of stakeholders required more coordination and therefore more documentation. The following is a list of that documentation and its effects:

and directories.

- *Test sequences.* These defined where, when and how video quality could be, and needed to be, evaluated. Screenshots were taken and published, and this brought to light any software that was not ready for testing.

- *Test results.* This included an executive summary, recommendations and detailed compilation.

Conclusion

Although the selection process was arduous, the network relied on a time-proven test plan process that worked. Surprisingly, it never had to turn on

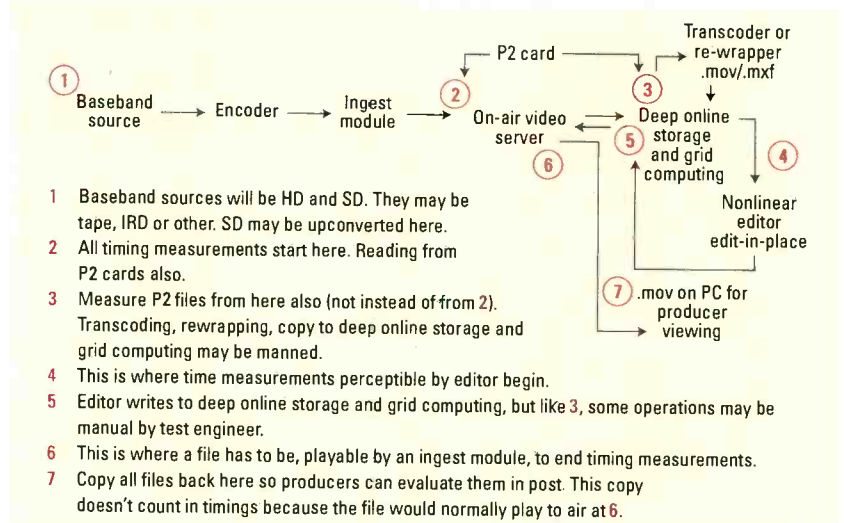


Figure 4. Aiming to evoke various producers' evaluation of video quality as well as the feasibility of HD edit-in-place for news, a dual-purpose benchmark platform gradually evolved into a test plan.

- *List of participants and schedule.* This engaged production, operations, engineering, IT and management.

- *Executive summary: objectives and methodology.* The process of defining these proved controversial, and as each dispute was resolved, the network removed another technical variable from consideration.

- *Drawing and bill of materials.* These illustrated exactly what could be obtained and when. Since they included known specific model numbers, they cleared up ambiguities and greatly simplified the choices to select from.

- *Pretest checklist.* This isolated the effects of the broadcast network infrastructure, such as pings, permissions

the benchmark system. Once the test plan was clearly documented, all the stakeholders made their choices and commitments without seeing a single frame of video. They just needed a clear model that defined what and where the trade-offs were. **BE**

Josef Marc is vice president of media systems and operations for tps Consulting and consulting director of systems and partner integration for SAMMA Systems.

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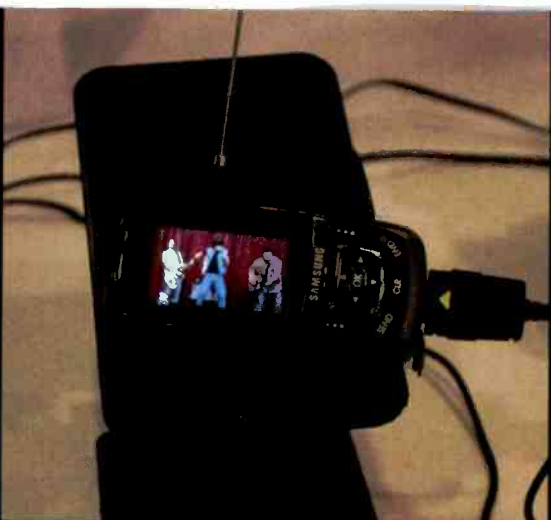
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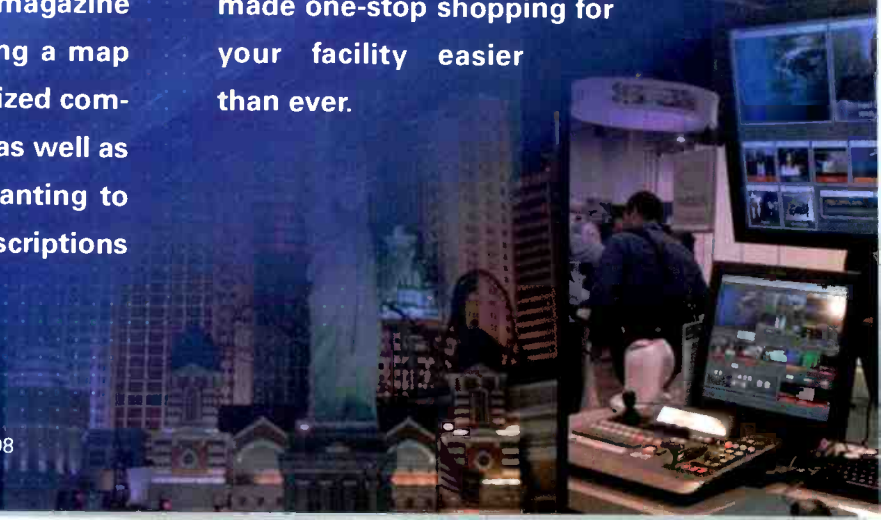
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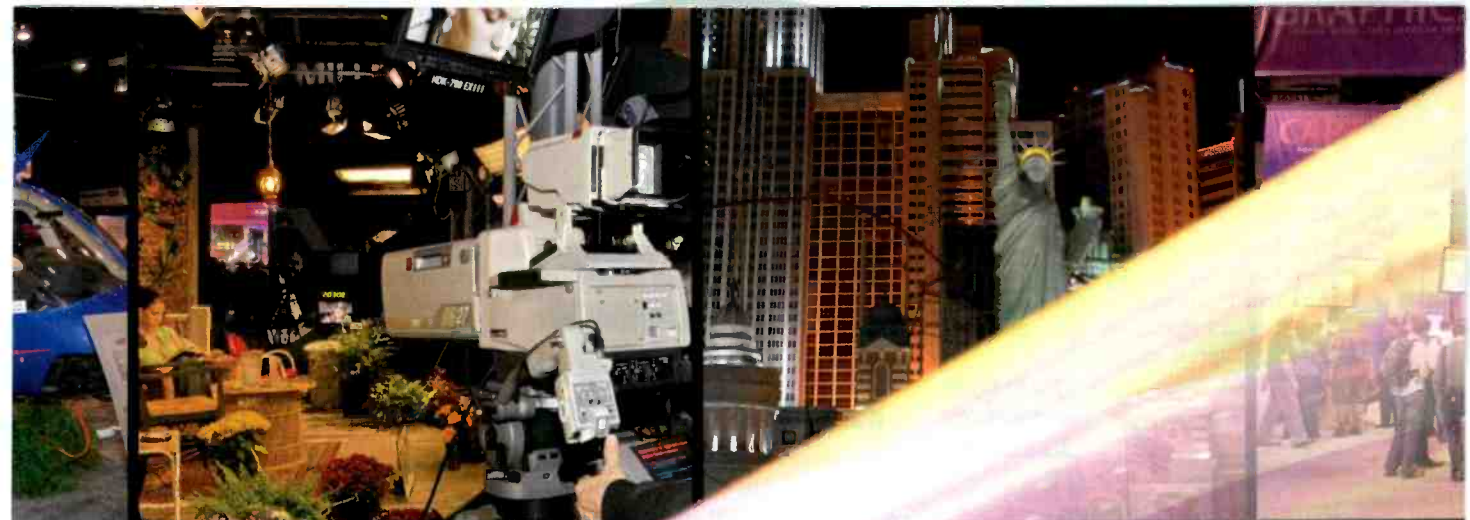
As always, *Broadcast Engineering* is here to help guide you through the products and new technologies that will be on display at the 2008 NAB Show. Our goal is to assist you in finding the perfect new solution for your facility.

Last month, we packed the magazine with NAB survival tools, including a map of the exhibit halls and a categorized company listing. For NAB attendees, as well as those not attending NAB but wanting to stay in the know, we included descriptions

of products that will be on display.

Still looking for more great new products? You're in luck. This month's issue has more than 300 additional products. So, read on, and hunt for the latest technology you can get at NAB2008! We've made one-stop shopping for your facility easier than ever.



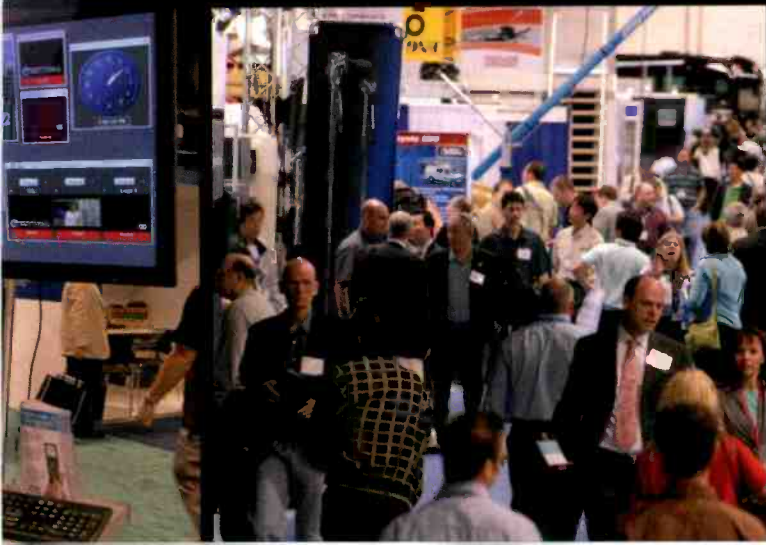


HIGHLIGHTS

For even more coverage, check out our live, NAB video technology demos on the *Broadcast Engineering* Web site. And after you've exhausted yourself

on the NAB show floor, we'll be at work on our June issue, which will include an NAB wrap-up written by our experts who attended the show.

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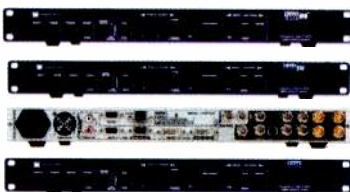
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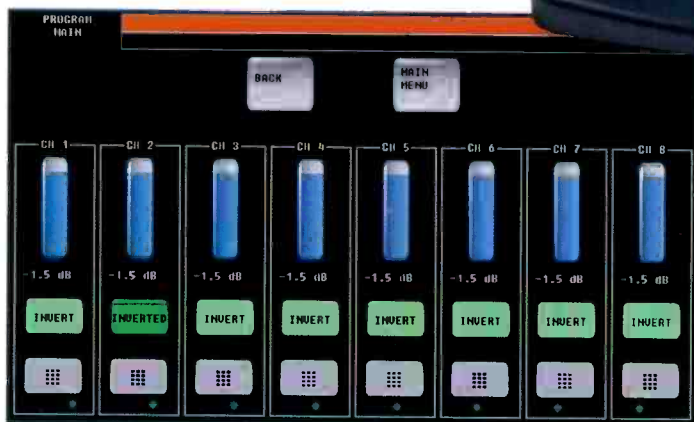
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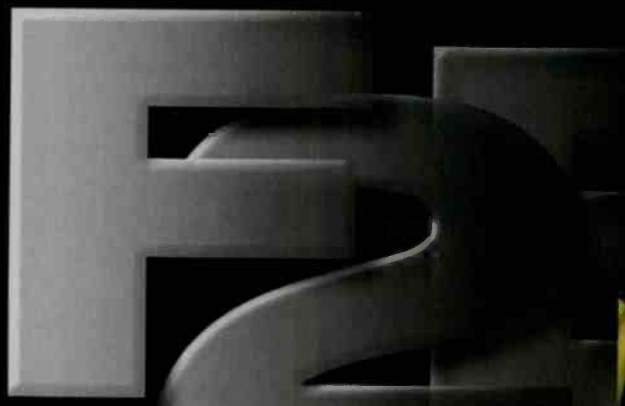


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- High-density large matrices maximize available rack space and simplify engineering.
- Linear expandability, in the field, enhances system signal integrity by eliminating external splitters and combiners.
- Superior performance over coaxial cable or optical fiber lets you fully exploit cost-effective coaxial cable for shorter runs, while optical fiber connectivity supports your demanding plenum requirements and long signal runs.

New NV8576: The large matrix, multi-format router for a no-compromise future

As the first in the new series of multi-format digital video and audio matrices, the NV8576 offers:

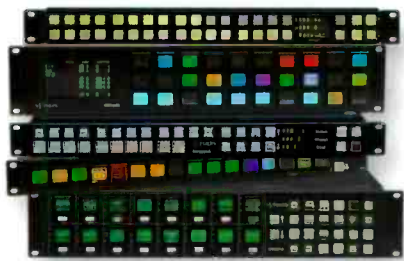
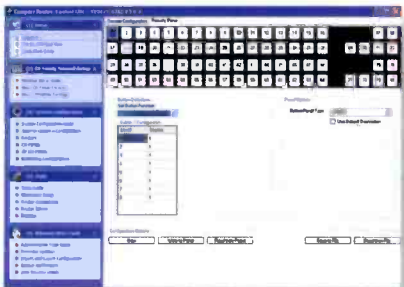
- Full support of 3Gb/s signals rigorously tested and retested with high bit-rate equipment to ensure error-free operation
- Patented N-on-1 crosspoint redundancy provides back-up for the largest possible impact block in the router
- Scaleable expandable architecture supports high-density matrices from 144x144 to 1152 x 1152 in two 32 RU frames.
- Multi-format routing includes support for 3Gb/s, HD/SDI, SD/SDI, AES audio and video within the same router frame
- Multiple points of control
- Interchangeable input and output modules including optical fiber connectivity to provide integrated fiber optic O/E (Optical to Electrical) and E/O (Electrical to Optical) conversion
- Front accessible, hot swappable cards
- Exceptional cooling design for longest, quietest operation even in harsh environments



Compact Routers
New system functionality optimizes facility performance.

The newly expanded Compact Router Series is a line of highly configurable hardware and software products that allows you to build a custom-tailored, scaleable, and cost effective routing system to optimize the performance of your facility. Scaleable with NVISION's entire product line, easily add system functionality as your needs grow. Capitalizing on NVISION's award winning, field proven large router technology these routers protect your investment and guarantee customer satisfaction. Formats include 3Gb/s, HD-SDI, SD-SDI, AES, AV, AA, and Data in sizes 16x2 to 32x32. Big system performance in a 1RU or 2RU packages for:

- Local TV stations
- News edit rooms
- Broadcast production trucks
- Post production
- Fly-packs



NV9000
Best-in-class router control for mission-critical operations.

Field-proven with millions of hours of continuous operation in the most demanding installations, the NV9000 leads the industry in robust router control. Full-featured and scaleable, it lets you create a router control system exactly suited to your needs, building in a high-level of system redundancy. From the smallest to the largest facility, we accommodate your growth and changing needs.

- Full line of control panels including the most advanced LCD re-legendable control panels on the market and more GUI control panels than any other manufacturer
- Third-party automation, production switcher or facility control systems may be interfaced with the NV9000 system using a wide range of supported protocols



Synapse
The complete, modular solution for signal processing.

Synapse is a flexible, modular systems solution that addresses your entire range of signal processing requirements. More than 130 different modules range from A-D converters to high-end up/down/cross converters. The system also has powerful embedding and de-embedding modules encompassing a full range of Dolby-compliant products. Unique Synapse system advantages include:

- **Introducing the NEW multi-viewer, logo inserter, and text inserter.**
- More than 130 modular functions
- 3Gb/s, HD, SD, audio, video, analog, & enhanced fiber connectivity
- Embed, de-embed, up/down/cross conversion, monitoring, & low latency
- Dolby/Dolby E encoding, decoding
- SNMP software capabilities
- SD and all HD disc plines in same frame

NVISION
125 Crown Point Court
Grass Valley, CA 95945
U.S. 800-860-HDTV (4388)
International: +1-530-265-1000
www.nvision.tv

#1 means no compromises

NVISION®

Moving pictures and sound around,
perfectly.

Why choose NVISION router, router control, master control, and modular broadcast systems?

NVISION's forward-looking designs leverage your current and future system investment, and help you avoid costly ground-up installation, "fork lift" replacements, or recabling. NVISION-engineered products and systems are error-free, interoperable, future-proofed and cost-effective.

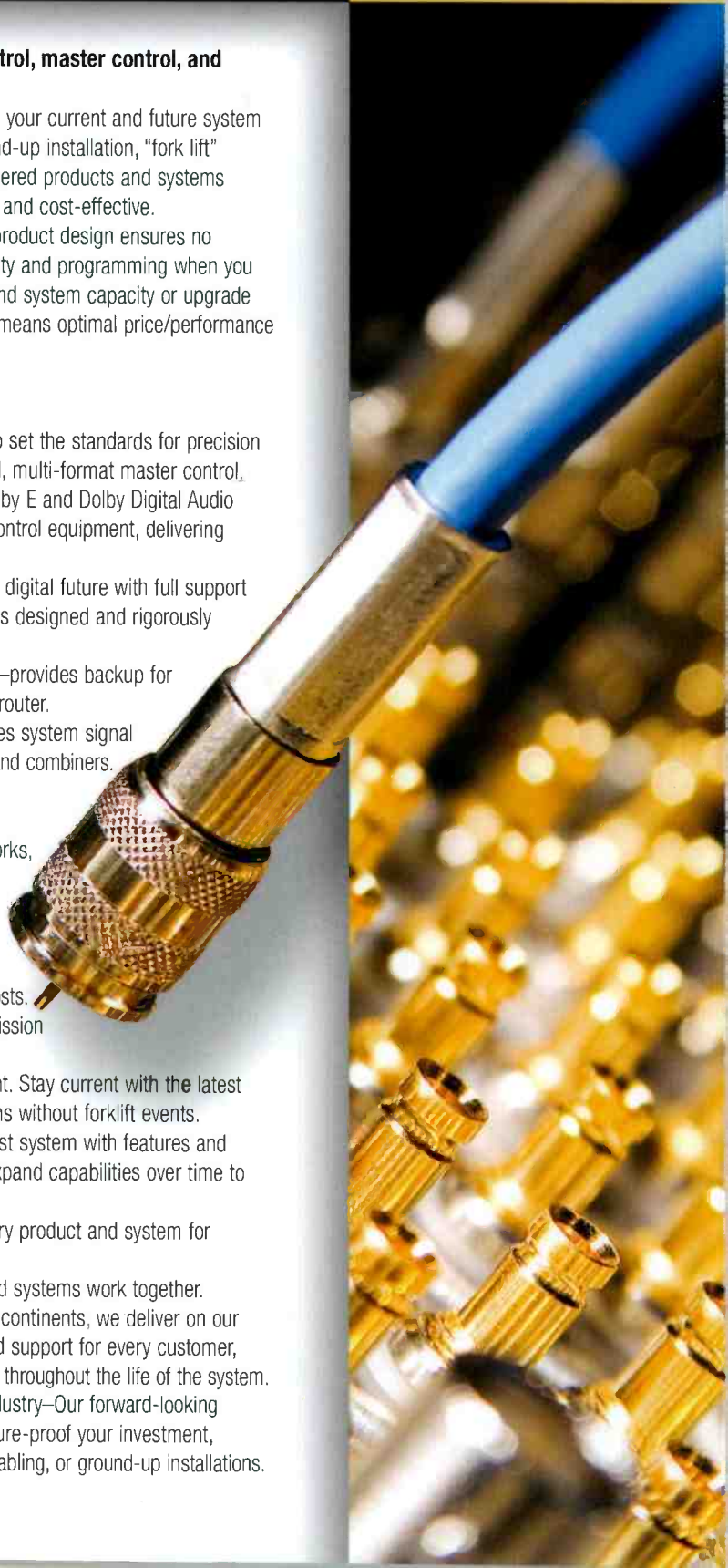
NVISION's platform-driven approach to product design ensures no compromises in quality, features, functionality and programming when you design your broadcast facilities. Easily expand system capacity or upgrade capability at any time. For your facility, this means optimal price/performance and lowest total cost of ownership.

NVISION is #1 in technology

- HD—NVISION pioneered and continues to set the standards for precision digital HD-SDI routing and multi-channel, multi-format master control.
- Dolby E—Only NVISION fully supports Dolby E and Dolby Digital Audio content in router, modular and master control equipment, delivering robust and low-cost video play out.
- 3Gb/s signals—Move confidently into the digital future with full support for 3Gb/s signals. System performance is designed and rigorously tested to guarantee error-free operation.
- Patented N-on-1 crosspoint redundancy—provides backup for the largest possible impact block in the router.
- Linear expandability in the field—enhances system signal integrity by eliminating external splitters and combiners.

NVISION is #1 in price/performance

- Design & Performance—Broadcast networks, stations, and post-production facilities depend on NVISION's best-in-class solutions for error-free video and audio signal processing and distribution, with faster installations and lower operation costs.
- Reliability—On-air, 24/7, error-free transmission of signals brings true peace of mind.
- Scalability—Future proof your investment. Stay current with the latest technology and quickly expand operations without forklift events.
- Upgradeability—Custom tailor a broadcast system with features and functionality for today's requirements; expand capabilities over time to meet your growth and budget needs.
- Quality—NVISION designs and builds every product and system for long-term, demanding use.
- Interoperability—All NVISION products and systems work together.
- Customer service—Located across three continents, we deliver on our commitment to excellence in service and support for every customer, beginning with installation and continuing throughout the life of the system.
- Lowest total cost of ownership in the industry—Our forward-looking platforms and scaleable architecture future-proof your investment, helping you avoid costly replacement, recabling, or ground-up installations.



Continues from page 100

SWITCHER/SCALER
TV One CORIOflex



Lets the system integrator decide the number and type of video inputs, outputs and features; designed so that one C2 video processor acts as a base unit and a variety of S2 Expansion units may be added to make a custom switcher/scaler; units are interconnected via the rear panel options connectors to become fully integrated from a video/audio flow and control standpoint.

800-721-4044
www.tvone.com
 Booth: N1725

FIXED HD/SD QUAD-SPLIT MULTIVIEWER

Avitech International MCC-8004Q

Includes four auto-detecting HD-SDI or SD-SDI video inputs with eight channels of embedded audio per source; offers output resolutions up to 1920 x 1200; includes borders, labels (up to 32 characters) and tally as well as monitoring of alarms; supports TSL protocol for dynamic labels and tally management.

425-885-3863
www.avitechvideo.com
 Booth: SU13215

VGA SCALER
Avocent VSS1000P

Provides conversion from composite and S-video formats to computer or HDTV signals, as well as bidirectional conversion between computer graphics and HDTV signals.

954-746-9000
www.avocent.com
 Booth: SL13016

AUDIO SYSTEM
AVT MAGIC E1

Consists of a MAGIC E1 MUX Multiplexers and up to 10 MAGIC AC1 XIP RM audio codecs or MAGIC AD1 XIP RM audio decoders; can transmit up to 10 stereo audio signals via 2Mb/s (E1) interface; can be used for the transmission of audio signals from one studio to several transmitter sites; enables the monitoring of the complete audio network via SNMP.

+49 911 527 10
www.avt-nbg.de
 Booth: C9619B

DTV FORMAT CONVERTER
Teranex mini

Converts SD video to and from HD in real time; its small form factor enables applications such as HD field monitoring and conversion of SD camera and graphics sources to HD; processing includes aspect ration conversion, deinterlace and noise reduction.

407-858-6000
www.teranex.com
 Booth: SU10924

SMALL DUAL-CHANNEL UHF RECEIVER

Azden 320PR

Features discrete two-channel UHF receiver with stereo output, 240 user-selectable frequencies for each channel, dual digital LCD displays with multifunction readout and separate power on-off switch for each channel; comes with both dual-plug XLR and stereo mini-plug output cables, flexible high-gain antennas and a dual-function DC jack for charging batteries in-camera or to power from an external source.

800-247-4501
www.azdencorp.com
 Booth: N4924

HD CAMERA LENSES
 Band Pro Film & Digital
 Carl Zeiss DigiPrime



Carl Zeiss DigiPrime 135mm T1.9 and 52mm T1.6 lenses are built for 2/3in 3CCD HD cinematography cameras; feature standard-pitch zoom, focus and iris gears, brightly marked oversized windowed cine scales, and highly-accurate, individually calibrated focus scales.

818-841-9655
www.bandpro.com
 Booth: SU1320

MULTICHANNEL VIDEO MONITOR
Wohler Technologies
Touch-it Digital



Offers multichannel video monitoring functionality in a smart 3RU; features dual 7in high-resolution color LCD displays; the left monitor is a touch screen that displays four to 16 thumbnail images; when one of these images is touched, that video source appears on the right monitor at full size and its HD/SD-SDI source signal is sent to an unbalanced output and to a VGA output for monitoring on an external display; accepts and switches eight standard SD-SDI video inputs, passing along any embedded audio.

510-870-0810
www.wohler.com
 Booth: N1314

SYSTEM CARD OPTION
Barco NGS105

Part of the Networked Broadcast Monitor System; captures high-resolution computer imagery, encodes them in JPEG-2000 and streams them out over a Gigabit Ethernet network; encodes up to eight input signals; supports both single-link and dual-link digital DVI connections with encoding frame rates up to 60fps; allows integration of computer-generated content onto the NBMS displays, providing operators with an integrated view of process and content, leading to higher efficiency and faster response in case of calamities.

678-475-8000
www.barco.com/broadcasting
 Booth: SL3213

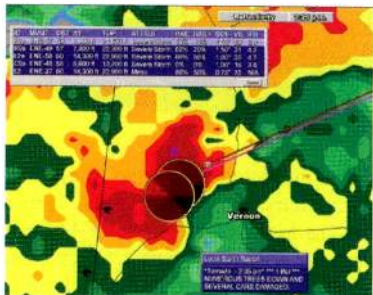
MICROPHONE
Sony Electronics C-800G

Consists of DWT-B01 transmitter, DWR-S01D receiver and DWA-01D adapter; transmits 24-bit/48KHz digital audio in a specific frequency bandwidth; delivers a wide dynamic range of more than 106dB and a wide frequency response of 20Hz to 20KHz; transmits digitally modulated, encrypted data to minimize the risk of interception; enables a significant increase in the number of simultaneous operations compared with current analog wireless systems.

201-930-7330
www.sony.com/professional
 Booth: SU906

TORNADO DETECTION TECHNOLOGY

Baron Services Baron Tornado Index (BTI)



Provides a ranking on a scale of 0-10 used to gauge the likelihood of a tornado in any given storm; as the BTI increases, the potential for a tornado within that storm goes up; available to existing customers subscribed to the Advanced Data Service Package at no additional charge; included in the VIPIR 5.0 release and will soon be available in FasTrac.

256-881-8811
www.baronservices.com
Booth: C9422

MULTICHANNEL COMBINER
Bird Technologies Group Control Station Combiner

Provides frequency-agile operation across entire frequency range; reduces the number of antennas required on any communications site; ensures radio-to-radio isolation; features analog and digital compatibility; available for 132MHz to 150MHz, 150MHz to 174MHz, 380MHz to 450MHz, and 450MHz to 520MHz.

866-695-4569
www.bird-technologies.com
Booth: N6138

EDITING SYSTEM
Blackmagic Design Multibridge Pro

Advanced editing system connects to SDI, HDMI, component analog, NTSC/PAL and S-video for capture and playback, with instant switching among SD, HD and 2K; features eight channels of XLR AES/EBU audio in/out and two channels of XLR analog audio in/out; uses 3Gb/s SDI for twice the SDI data rate than normal HD-SDI; supports real-time effects in Apple Final Cut Pro and Adobe Premiere Pro; includes Blackmagic Deck Control.

408-954-0500
www.blackmagic-design.com
Booth: SL10920

FILE-BASED NEWSROOM SOLUTION
Bitcentral Precis



Delivers a fully integrated, end-to-end, open architecture solution that eliminates videotape; enables users to edit stories on location using notebooks and submit them over broadband or microwave; produces, manages and distributes stories across multiple platforms; provides a single interface for national and local stories; integrates with most newsroom systems.

949-417-4126
www.bitcentral.com
Booth: SL7720

STORAGE AND DELIVERY SYSTEMS
Blackwave 8100 Systems



Designed to meet the unique requirements of SD and HD Internet video distribution; integrates intelligent software with standard industry hardware; eliminates the complexity of proprietary or in-sourced storage and delivery infrastructure and reduces needed rack space by 50 percent to 90 percent; provides the ability to rapidly achieve scale levels necessary for rich media delivery from 5Gb/s to many terabytes per second of performance and from 48TB to many petabytes of content library capacity.

978-215-9998
www.blackwave.tv
Booth: C2858

UP/CROSS CONVERTER
Brick House Video Syntax

Offers upconversion and crossconversion with SDI I/O, noise reduction and ARC facilities; compact 1RU unit incorporates comprehensive audio facilities; based on advanced super-resolution bandlet technology; brings the performance advantages of motion-compensated processing without the associated disadvantages of high cost and occasionally severe artifacts.

+44 1962 777733
www.brickhousevideo.com
Booth: SU10811

COLOR CHANGING LIGHTS
Brightline CycSeries

Energy-efficient color changing light fixtures; dimmable to 3 percent through standard protocols including DMX-512 and DALI; saturate cyclorama walls as wide as 16ft with consistently rich, even color values; durable enough to handle the rigors of studio operations; available in six- or 12-lamp models that use 28W or 54W, red/green/blue, single-phosphor T5 lamps with color sleeves; lamps can last up to 10,000 hours.

412-206-0106
www.brightlines.com
Booth: SU5027

DIGITAL/ANALOG ENG/OB VAN TRANSMIT SYSTEM
Broadcast Microwave Services Truck-Coder II

Meets rugged environmental needs of ENG/OB operations; provides 100 presets that can be entered through front-panel controls or downloaded through a front-panel Ethernet port; includes a 2RU controller and antenna-mounted RF unit configured to operate in the 2GHz frequency band; features 6MHz RF bandwidth capability for simultaneous transmission of two signals within a 12MHz channel.

800-669-9667
www.bms-inc.com
Booth: C2329

AUDIO MUXER
Ward-Beck Systems M6204A

Accepts an SD or HD digital video signal and embeds up to eight AES/EBU signals at its output; available in 75Ω and 110Ω versions; housed in openGear frame; controllable using the dashboard remote control and monitoring software application.

416-335-5999
www.ward-beck.com
Booth: SU7420

Communication without limits.

Whether your production crew is centralized in one facility, roaming from floor to floor or spread halfway across the globe, Clear-Com understands that communication accessibility is essential. At all times. To all locations. For all users.

Clear-Com expands your communication capabilities with intercom solutions:

- Wireless beltpacks seamlessly integrated with digital matrix systems
- Intuitive and robust user control panels, stations and software panels
- Reliable communication network through fiber-networking, IP connectivity, wireless and system interfaces

We've made the connection.

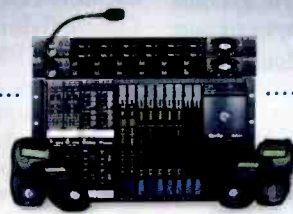
Come see our full line of products at NAB: Booth # C6410



Clear-Com Concert
Intercom Software



Clear-Com Encore
Party-line System



Eclipse
Digital Matrix System



CellCom
Digital Wireless

www.clearcom.com

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 **Clear-Com**
RAISING PERFORMANCE

HD PRODUCTION SWITCHERS
Broadcast Pix Slate series



File-based architecture streamlines live production workflow; new models include the Slate 100 HD for a cost-effective live HD video production studio, the Slate 1000 HD with a professional switcher panel, the Slate 3000 HD with a router that provides up to 18 live inputs and more redundancy; each model includes a switcher with up to six keyers and DVEs, multiview monitoring, a Harris Inscribe CG, and a clip store; seamlessly networks with content from edit bays; new software includes alpha wipes with audio, support for four LCD multiview monitors, play-out of MPEG-2 clips, and control of Harris NEXIO video servers.

866-914-9484
www.broadcastpix.com
 Booth: SU10605

BUSINESS INTELLIGENCE SYSTEM

Broadway Systems Analytics

Gives users the ability to analyze data from Broadway Systems or to identify, integrate and analyze data across multiple business systems; brings data warehousing, interactive reporting, analytic, scorecard and dashboard capabilities to deal, inventory and revenue analysis; enables users to move directly from monitoring a scorecard or reading a report into an analysis of that same information.

616-454-4400
www.broadwaysystems.com
 Booth: N3135

WIRING SYSTEM

BTX Technologies ProBlox



Combines 16 coax and 26 audio/data/control contacts in one multiconnector; allows fast and simple setup and teardown in broadcast and A/V applications; custom configurable; offers 75Ω video contacts for HD signal; reduces the number of individual cables.

914-593-1800
www.btx.com
 Booth: C3548

OFFLINE EDITOR
Calrec Audio Offline Editor

Provides operators with an emulation of the Calrec console PC application on any other PC, such as a laptop; allows remote configuration of any Calrec console, saving time on-site; enables the desk to be preconfigured while it is still in use; useful for operators who are working on a tight schedule, such as freelance operators planning for a specific outside broadcast.

+44 1422 842159
www.calrec.com
 Booth: N8723

CAMERA

Camera Corps HD MiniZoom



A miniature broadcast-quality 720p/1080i 50/59.94Hz HD camera with integral remotely controllable zoom lens; measures just 96mm x 49mm x 45mm; incorporates a 1/3in 2-megapixel CMOS sensor with 10X zoom lens (5.1mm to 51mm) in a weatherproofed aluminium housing; total weight is just 285g; has very low power consumption (3.8W power at 6V to 12V DC); can be used in full auto mode with the lens at wide angle.

+44 1932 592 299
www.cameracorps.co.uk
 Booth: C8137

CAMERA CONNECTOR PANELS
Canare Hybrid Fiber-Optic Camera Connector Panels

HFO camera connectors with integrated splice enclosures, installable in terminal boards or racks; ideal for configuring HD camera-to-broadcast van transmissions; distinct connector units and mounting frames offer the flexibility needed to meet the layout needs of a variety of system configurations; support five-directional wiring: left, right, top, bottom and beneath; connection unit can be detached from main unit for comfortable workability; accommodates male and female HFO receptacles with built-in splice box and tension member support.

973-837-0070
www.canare.com
 Booth: SU4805

HDTV STUDIO LENS
Canon DIGISUPER 27

Has a focal length of 6.5mm to 180mm; offers optional BWA-271 0.9x wide-angle attachment; features a servo-zoom speed of 0.5 seconds; a new optional remote-controllable macro-focus feature allows the camera operator to perform macro focusing from the pan bar; incorporates the second-generation Digital Servo System, designed to make zoom and focus controls precise and repeatable.

800-321-4388
www.usa.canon.com
 Booth: SU3020

PLENUM-GRADE AUDIO SNAKE
Clark Wire & Cable 712-PLEN

Features company's quick-strip method where the foil shield is bonded to the jacket, individually color-coded pairs and 12 channels; can be purchased in bulk cut to length.

847-949-9944
www.clarkwire.com
 Booth: C7519

MODULE FOR ARCHIVE SYSTEM
cinegy convert



Module for the cinegy workflow archive system is designed to enable easy export to Avid with new batch job functionality; increases workflow automation by allowing users to drag and drop clips to job folders to be automatically exported to predefined formats (AAF/MXF or WMV).

202-742-2736
www.cinegy.com
 Booth: SU3113

KVM EXTENDER
Opticomm RGB-4000 series

Offers RGB H/V (VGA), stereo audio, keyboard and mouse, as well as RS-232 serial data, all over one fiber; ideal for high-resolution video applications; simplifies cabling infrastructures and provides LED indication for optical link status, signal status and power monitoring; features multi- or single-mode operation; reduces fiber count from five to one fiber.

858-450-0143
www.opticomm.com
 Booth: N3718

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FUJINON

ZA SELECT

Inspiring images...remarkable value.



ZA22X7.6BERM

HD lenses for every production...every budget.

- Optimized optics
- Value priced
- Full feature control
- Two times extender
- Widest angle
- RS-232 Interface

HD
DIGITAL

DIGIPOWER

See us at
NAB Booth
C4210



ZA17X7.6BERM



ZA12X4.5BERM

Broadcast and Communications Products Division

FUJINON INC. 10 High Point Dr., Wayne, NJ 07470-7434 Phone: (973) 633-5600, FAX: (973) 633-5216
FUJINON CORPORATION 1-324 Uetake, Kita-Ku, Saitama City, Saitama 331-9624 Japan Phone: 81-48-668-2152

www.fujinon.com

**SD/HD MULTIFORMAT
 PRODUCTION SWITCHER**
Snell & Wilcox Kahuna



New DVE capabilities include a Fluid Effects capability that allows operators to wrap live video around animated models for a highly sophisticated look in live production; rather than render video and the 3-D model on a separate system, Kahuna operators can select any real-time source and apply it to any 3-D model that has been preloaded onto the switcher.

818-556-2616
www.snellwilcox.com
Booth: SU4220

INTERCOM SYSTEM
Clear-Com Concert

PC-based multiuser conferencing and intercom system; based on voice-over-IP technology; drag and drop functionality make ad-hoc communications possible; supports a wide variety of codecs including wideband and ultra wideband for audio quality; offers high-quality audio over a standard Internet or intranet between local and remote users; enables users to monitor the availability of participants.

510-337-6600
www.clearcom.com
Booth: C5908

**CONVERTER WITH AUDIO
 EMBEDDER**
Cobalt Digital COMPASS 9061

An up-, down- and crossconverter with universal for installation into the openGear frame; features a high-quality 12-bit analog to 10-bit serial digital converter, an HD/SD-SDI input, analog and digital audio inputs, audio embedding, audio de-embedding, frame sync and user audio/video level controls; new addition offers HD/SD-SDI closed-captioning conversion.

800-669-1691
www.cobaltdigital.com
Booth: N2819

ROUTERS
Codan Broadcast NK series



Supports multidefinition (HD and SD), SD-SDI, analogue video, AES/EBU, stereo analog audio and data (RS422 Machine Control) levels; series components are linked with the RS-485 multidrop T-Bus Control System, using standard Cat 5 cable; additional system components include the Phoenix Control Surface, a broad range of fully programmable control panels, a virtual routing core, a network bridge, a GPI interface, automation interfaces and other protocol converters, plus rack-mount redundant power supplies.

703-334-0396
www.codanbroadcast.com
Booth: N2914

ROUTER CONTROL PANEL
NVISION NV9640

The X-Y/multidestination control panel provides extensive control and status display capabilities in a 2RU package that is less than 2.5in deep; features next-generation LCD buttons capable of showing three lines of display with up to eight character mnemonics on each line; flexible panel configuration allows the user to choose from many button colors.

530-265-1000
www.nvision.tv
Booth: SU11620

COMPLIANCE RECORDER
PlayBox Technology
CaptureBox V2.0

Offers high-quality capturing in a variety of compression codecs, including MPEG-1, MPEG-2, DV and AVC/H.264; allows an ASI input to be rebroadcasted as an IP stream, permitting remote compliance monitoring; allows compliance recording of not only video and audio but also any accompanying data services (PIDs) associated with the channel.

404-424-9283
www.playbox.tv
Booth: SU11308

VIDEO CAMERA
Iconix Video HD-2K CCU

4:4:4 CCU produces 2048 x 1080p images from 23.98Hz to 30Hz; outputs NTSC, PAL, 720p, 1080i, 1080PsF and 1080p from 24fps to 60fps.

805-690-3650
www.iconixvideo.com
Booth: SU6426

**FIBER-OPTIC TRANSMISSION
 SYSTEM**
**Communications Specialties Pure
 Digital Fiberlink 7500 series**



Now available in both single mode and multimode versions for fiber-optic transmission for DVI and stereo audio over one fiber; supports DVI-I single-link resolutions up to 1920 x 1200 at 165MHz pixel clock and HDTV resolutions of 480p, 1080i and 1080p (DVI format); new addition provides multimode support up to 750m and features a unique triple EDID function, with loop through, internal generation or capture and storage.

631-273-0404
www.commspecial.com
Booth: SL8025

DISASTER RECOVERY SYSTEM
**Digital Broadcast MediaBank
 Safety Net**

Provides complete on-air functions off-site in the event the station is unable to maintain on-air operations.

352-377-8344
www.digitalbcast.com
Booth: SU6205

**C- OR KU-BAND BLOCK
 UPCONVERTER**
Comtech Media LPOD

Designed to eliminate the traditional requirement for the modem to supply a DC power source and a 10MHz reference to the BUCs and LNBs; the optional internal reference and LNB bias T greatly simplify multicarrier operation and provide cost-effective redundant solutions.

480-333-2200
www.comtechefdata.com
Booth: C5942

UHF ANTENNA
**Dielectric Communications
 TU series Antenna**

A vertically polarized, high-power, broadband UHF panel antenna; offers the same versatile and reliable features as the proven Deltawing design, with the added benefit of vertical polarization.

800-341-9678
www.dielectric.com
Booth: C1918

You want it all?



No problem.

Meet the FS1—a 1RU Universal HD/SD Audio/Video Frame Synchronizer and Converter.

It's a multiformat world, and the new FS1 brings it all together...at a breakthrough price.

Turn SD into HD, HD into SD, or HD 1080 into 720 (and vice versa), with FS1's hardware-based 10-bit up/down/cross-conversion.

Embed and disembed audio.

Mate analog and digital. Video. Audio. HD captioning. Whatever.

FS1 not only interfaces to all of your equipment, but also with your facility via its LAN-based web-server and SNMP monitoring. Push a button, or talk to it from across the web.

Put FS1 in the middle of your facility, and see how it makes nice with your gear, your multiformat needs, your engineers...and your budget.



FS1 rear panel

Check out our website, or give us a call to find an Authorized AJA Converter Dealer near you.

www.aja.com
800.251.4224

AJA
VIDEO SYSTEMS

TRANSCODER
NTT Electronics HVT9100



Enables real-time conversion of MPEG-2 video to AVC/H.264 with low latency and maintains outstanding image quality; a perfect match for HDTV transmission by IPTV, CATV, and satellite TV services with limited bandwidth; high quality and low latency transcoding is possible with newly developed build-in original LSI (supports 4:2:2 and 4:2:0).

+81 45 4533 685
www.nel-world.com
Booth: SU10220

NEWS CATALOGING SYSTEM
Crispin NewsCat

Digitally archives stories after airing and provides a method to easily locate material at a later date; archived video clips are linked to a database containing all script information from the newsroom computer system; database functionality includes an extensive search function, allowing producers and editors to search for a story using traditional parameters such as date, slug, script information or key words.

919-845-7744
www.crispincorp.com
Booth: SU5408

CLIP AND STING STORE
Crystal Vision Clip N Key



Allows a special clip or sting with optional associated key signal and audio to be played repeatedly; can store 25 seconds of moving HD video or six times that in SD; can be used by a live operator in conjunction with a video switcher, with the switcher providing the keying if necessary; supports industry-standard software protocols on the board.

+44 1223 497049
www.crystalvision.tv
Booth: N1311

HD/SD CAMERA SYSTEM
Panasonic AW-HE100



Supports 1080i, 720p and 480i formats; can simultaneously output both HD and SD signals; features three progressive 1/3in IT CCDs, a 14-bit A/D converter and a 19-bit digital signal processor to produce clean, high-res images in a wide range of lighting conditions and environments; incorporates an HD 13X auto/manual focus zoom lens with a fast f1.6 maximum aperture, and a wide-angle focal length of 4.2mm.

201-392-4127
www.panasonic.com/broadcast
Booth: C3512

**DIGITAL TRANSPOSER WITH
 AUTOMATIC ECHO-CANCELLING**
**Screen Service
 Broadcasting Technologies**

Use regenerative and nonregenerative techniques; includes latest generation of digital automatic echo-cancelling device for iso-frequency repeaters (gap-fillers), allowing complete coverage of dark areas in urban and hillside applications.

888-522-0012
www.screen.it
Booth: C1324

STORAGE SYSTEM
**DataDirect Networks S2A9900
 StorageScaler**

The eighth-generation Silicon Storage Architecture (S2A) appliance and storage system; delivers sustained bandwidth of up to 6GB/s per appliance and enabling storage systems that will scale beyond 250GB/s in total throughput between host computers and the disk drives; allows for more complex and detailed computer simulations to be run; supports 8Gb/s Fibre Channel as well as 20Gb/s Infiniband DDR host connections; leverages the latest serial attached SCSI (SAS) protocol to communicate to the drives it manages, providing a future-proof roadmap to the latest disk drive technologies, speeds and capacities.

800-837-2298
www.datadirectnet.com
Booth: SU11715

MEDIA ENCODER
Digital Rapids StreamZ Live



Designed for applications from live IPTV channels to webcasting; available with a choice of encoding format (including H.264/AVC, VC-1/WMV, On2 VP6 for Adobe Flash, 3GPP/Mobile and MPEG-2); available with a choice of analog and digital input connectivity options.

905-946-9666
www.digital-rapids.com
Booth: SL8724

**SATELLITE-TO-TERRESTRIAL
 TRANSCODER**
DMT USA NABLA

Can deliver up to 100W RMS with a modular and versatile structure, featuring a built-in satellite receiver and advanced control systems; interface connections, power supply and cooling air circulation have been designed to comply with the operational requirements and constraints typical of telecom stations.

888-912-8326
www.dmtonline.com/usa
Booth: C2628

TRIAx CONNECTORS
Fischer Connectors 1052 series

Compatible with 3/8in (0.95cm) and 1/2in (1.27cm) in 75 cables; protect sensitive signals from RFI interference with integral shielding within the connector body; route signals through contacts plated with a minimum of 1µm of gold.

800-551-0121
www.fischerconnectors.com
Booth: N3837

XT[2] SERVER SOFTWARE
EVS Multicam 9.00



Offers significant improvements in media file transfer with new file architecture and GigE connectivity as well as additional improvements to multiformat media exchange with third-party systems including storage, MAMs and craft editors.

973-575-7811
www.evs.tv
Booth: C4911

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HITACHI Inspire the Next



Hitachi Digital



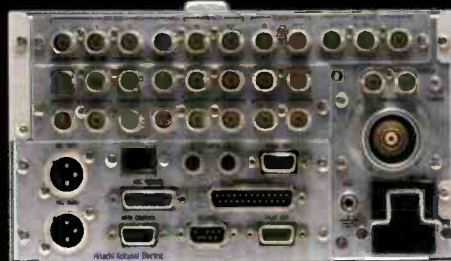
INTRODUCING the SK-HD1000 series ...

An HDTV production camera system that truly is the definition of "Technological Advancement".

- ◆ A new, sleek, modern, dockable camera chassis design expands your options for Studio/ OB, wired and wireless HDTV production configurations.
- ◆ The world's first TRULY DIGITAL High-Definition triax cable transmission system. Also available with digital hybrid fiber-optic cable system.
- ◆ High F11-sensitivity is achieved by its 3-CCD Super-IT 2/3-inch sensors.
- ◆ Hitachi's Latest Digital advances that include 14-bit ADCs and powerful 38-bit Digital Signal Processors.
- ◆ An outstanding HDTV Signal to Noise ratio specification of 60dB.
- ◆ Multi-format video outputs for TV program production. Digital HDTV interlaced and progressive, SDTV analog and digital.

If you appreciate how the above could improve your HDTV programs' picture quality, you'll need to "Compromise NO MORE" when it comes to your next choice of HDTV Production Cameras.

Ask your local Hitachi representative for a quote and demonstration today. The SK-HD1000 camera system is more affordable than you think!



Our NEW CCU design can use standard Triax or hybrid Fiber-optic cable via plug-in module.

With Triax, you are assured a pristine and transparent image due to HITACHI's patented HS-TDM Digital Transmission.

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Tel. (516) 921-7200, Fax (516) 682-4464
General Information Email: info@hitachikokusai.us
URL: <http://www.hitachikokusai.us>



Hitachi Kokusai Electric Canada, Inc.
Tel. (416) 299-5900 Fax (416) 299-0450
General Information Email: info@hitachikokusai.ca
URL: <http://www.hitachikokusai.ca/>

AUTOMATIC LOUDNESS CORRECTION

Dolby DP600 Program Optimizer

For file-based content; automatically analyzes and normalizes loudness levels in a standardized, repeatable way — in faster than real time; ensures that archived and newly ingested programming plays out at a consistent loudness level.

415-558-0200
www.dolby.com
 Booth: N713

CONVERTER AND SYNCHRONIZER

Harris X3G

The 1RU, all-in-one converter and synchronizer is the latest addition to the Harris 3Gb/s family of products; features optional frame rate conversion or program delay to remove profanity; offers eight AES input and output with 32 channels of internal audio processing.

513-459-3400
www.harrisbroadcast.com
 Booth: N2502

NTP REFERENCED MASTER CLOCK/TIME CODE GENERATOR ESE ES-188

Displays nine digits of time as received via user-selected NTP server; generates several types of time code including ESE-TC89, ESE-TC90, USB, RS-232C/ASCII, SMPTE/EBU and IRIG-B; interfaces with new or existing computers, automation systems and third-party clock systems; features rugged construction, automatic correction for Daylight Savings Time and four-hour battery backup.

310-322-2136
www.esweb.com
 Booth: N3121

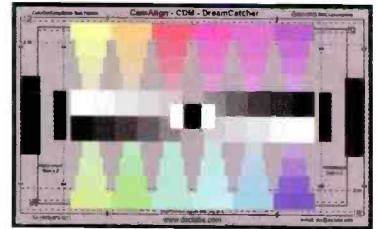
DIGITAL VIDEO CONVERTER Thomson Grass Valley ADVC-HD50

Converts the uncompressed HDMI HD video and audio to the HDV format and outputs the signal via FireWire (IEEE 1394) for use in any HDV-compatible nonlinear editor; can be used with both Mac- and PC-based editors.

800-547-8949
www.thomsongrassvalley.com
 Booth: N1313

CAMERA COLOR CHIP CHART

DSC Laboratories
 ChromaDuMonde 48



A new addition to the ChromaDuMondes series; the 48-color plus crossed greyscales DreamCatcher generates precise hexagonal vectorscope displays in unique spoke patterns with 12 primary and intermediary colors in the boxes; this chart helps purists who want to know what happens to colors of the same hue as they become less saturated.

905-673-3211
www.dsclabs.com
 Booth: C5512

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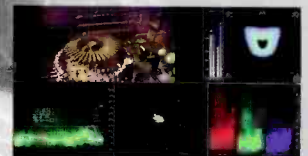


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Low-cost appliance allows users to deliver their compressed HD content over fiber on copper IP networks; sends and receives both single- and multi-program MPEG-2 transport streams; features Web-based remote management and Pro-MPEG Code of Practice #3 Forward Error Correction.

858-613-1818
www.dveo.com
Booth: SU4928

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SINGLE-PAIR ANALOG CABLE**
Gepco XB40FB

Features conductors made from 24AWG oxygen-free copper for maximum conductivity and corrosion resistance, a 95-percent TC braid and a 100-percent foil shield for exceptional RF/EMI noise rejection, and an extra flexible, easy to strip outer jacket.

800-966-0069
www.gepco.com
Booth: C6918

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SYSTEM**
Opticomm Optiva

Features customizable, multioriented video, audio and data input configurations; supports most signals deriving from commercially available video, audio and data equipment in any configuration; the system can be configured online; also features daisy-chained time division multiplexing.

858-450-0143
www.opticomm.com
Booth: N3718

AUDIO ROUTERS
Studer Route 6000

Standalone audio routers based on the Score Live DSP core and D21m I/O system; multiple I/O formats; capable of routing up to 1728 inputs and outputs; can be controlled by Studer Vista or OnAir 3000 consoles, Studer's Route 1000 software or via external third-party systems.

818-920-3285
www.studer.ch
Booth: N8229

HANDS-FREE INTERCOM
Eartec TD904-2vs

A full duplex wireless; provides hands-free, two-way voice communications; includes a Monarch headset fitted with a shell-mounted switch, quick disconnect connector and camera interconnect cable; has a range up to 100m.

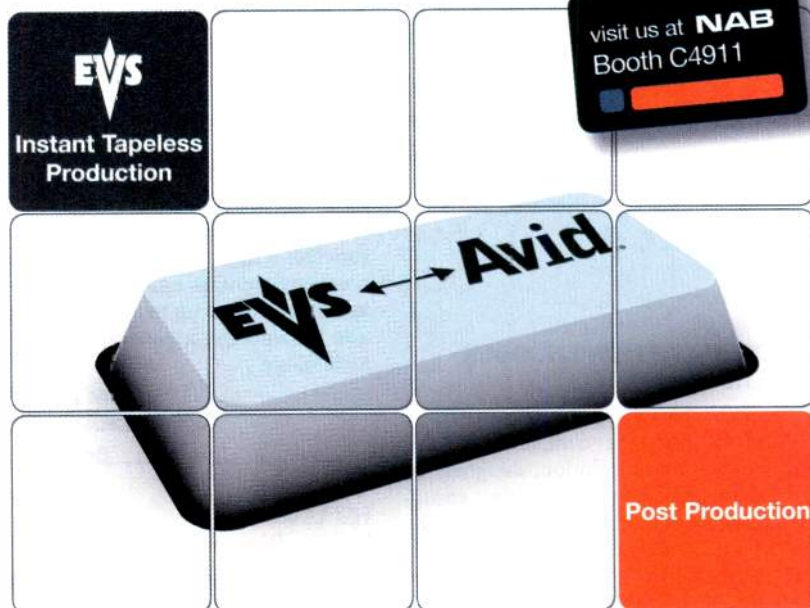
800-399-5994
www.eartec.com
Booth: C4046

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EVS Broadcast Equipment Inc - Tel: +1 973 575 7811 - Fax: +1 973 575 781 - E-mail: usa@evs.tv

CONTROL INTEGRATION SYSTEM
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Touch-screen computer automates complex tasks and program elements to support fast, accurate and creative production of the best programs possible; in pre-production mode, allows the operator to configure the switcher, create complex sequences and assign functions such as M/E presets to soft buttons; in on-air mode, becomes an extension of the control panel — a touch-screen interface with soft buttons that can execute sequences, recall M/E presets and control third-party devices.

978-715-1020
www.echolab.com
 Booth: SU9607

DIGITAL AUDIO MIXER
 Edirol M-16DX

A digital production console with 18 inputs, mixing, 24/96 processing, a three-band sweepable EQ and pro-quality effects; the system's design enables the main breakout box to be housed away from the control surface for maximum ease of use; now features version 2 software, adding DAW controller functionality to the unit's existing abilities; software includes Cakewalk Sonar and Apple Logic modes that enable the DAW to be controlled out of the box, with M-16DX knobs being assigned to their equivalent software controllers at the touch of a button.

800-380-2580
www.rolandsystemsgroup.com
 Booth: SL10520

CLOSED-CAPTION ENCODER
 EEG HD485

The 1RU chassis incorporates Microsoft Windows with the company's HD/SD closed-captioning solution; designed for the demands of post-production encoding; incorporates HD and SD video paths, a time code reader and a network-ready PC with software; specifically designed for the EEG CCPlay software suite; puts an end to cabling and interoperability problems; offers a seamless and intuitive workflow for file-based captioning jobs.

516-293-7472
www.eegent.com
 Booth: SL11215

CONTENT MANAGEMENT SYSTEM
 EMC EFDm

Combines content management software, content transport systems, content storage systems and best practices to help manage content securely and safely across an entire business model; facilitates communications between hardware, software and partners; ingests, manages, stores and transform any type of rich media for distribution to any type of venue, including IPTV, mobile and the Internet.

508-249-6207
www.emc.com
 Booth: SU7820

VIDEO GRAPHICS SYSTEM
 e-mediavision.com POINT-HD
 Version 4v0



Features new functionality that allows live Internet Web pages to be displayed in HD 720p/1080i/1080p in real time; allows the presenter to navigate the Web live in HD without using scan converters.

+44 20 8755 2014
www.e-mediavision.com
 Booth: SL11005

STANDARDS CONVERTER
 eMotion Engines Transformer

A file-based standards converter that provides a high picture quality using the company's motion estimation technology at any resolution up to and including 2K; also incorporates aspect ratio conversion technology.

+44 1488 657282
www.emotionengines.tv
 Booth: SU9206

HD LENSES
 Fujinon Digipower

The studio lenses feature a wide angle of 7mm, precision zoom/focus and minimum focus breathing; the lenses are light-weight, weighing only 13.2lbs; include a robotic interface and removable hood.

973-633-5600
www.fujinonbroadcast.com
 Booth: C4210

NETWORK MONITORING SYSTEM
 ENENSYS CastXplorer-C

A compact network probe designed to combine continuous monitoring of both critical RF and MPEG-2-TS parameters to provide cable carriers with a constant view of their network health and status with cost-efficiency; can continuously log all statistics values and sending of SNMP traps if parameter values get out of the defined range; can monitor multiple channels on a round-robin basis.

949-226-8056
www.enensys.com
 Booth: SU11111

HD UP-/DOWN-/CROSS CONVERTER
 Ensemble Designs 7900

For use in broadcast and post; can process SD signals into HD, downconvert HD signals into standard definition, and perform format and aspect ratio conversion on both SD and HD signals; accepts asynchronous signals; automatically adjusts between SD/HD color space and gamma; features edge and motion adaptive noise reduction, picture detail enhancement and anti-alias filter.

530-478-1830
www.ensembledesigns.com
 Booth: SU2326

DIGITAL AUDIO MIXER
 Euphonix System 5-B

Comprises a control surface, digital processing core, digital and analog interfaces, and a system management software application called eMix; designed for high-quality sound, with full support for 24-bit I/O and internal processing at 40-bit floating point; 96kHz sample rate operation is available.

650-855-0400
www.euphonix.com
 Booth: N5217

HD VIDEO SERVER
 Doremi Labs V1-HD-2K



Records and plays SD and HD-SDI video; features high-quality JPEG2000 video compression; hot-swap drive provides up to six hours of storage; can function as a Sony 9pin device via its RS-422 port; also compatible with Odetics and VDCP (Louth).

818-562-1101
www.doremilabs.com
 Booth: SU6026

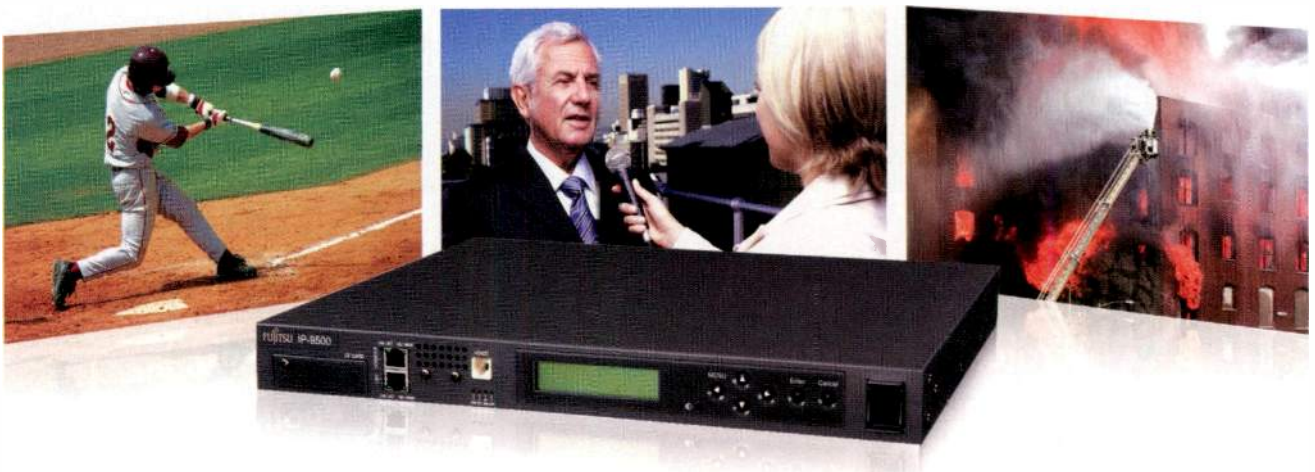
Best-of-Class video quality in contribution **MPEG-4 AVC HD** encoders.

Introducing the Fujitsu IP-9500. Advanced technology for the broadcast industry.

With Fujitsu's advanced H.264 compression technology, the IP-9500 produces amazing HD video quality at bit rates from 4Mbps to 27Mbps; less than half those of comparable MPEG-2 technology. That conserves satellite and network bandwidth – which cuts costs and allows high-quality HD feeds to use existing SD satellite channels.

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- ▶ Compatibility with Industry Standard Decoders

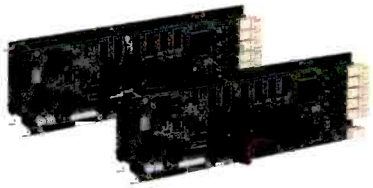
For more information visit us at
<http://us.fujitsu.com/broadcastvideo>



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AUDIO MODULE
Evertz 7720AD8-DD-HD



Autosenses an HD or SD input signal and de-embeds eight AES signals; detects and decodes Dolby E or AC3; provides handles for video and audio delay, then re-embeds the decoded 5.1 audio into the video VANC signal; two-slot module improves workflow efficiency and supports embedded and discrete audio inputs; provides audio mixing options, as well as offers a serial metadata output; SNMP-enabled for monitoring and configuration control.

905-335-3700
www.evertz.com
 Booth: N1602

PRODUCTION SOFTWARE
EVS IPDirector

Offers a comprehensive suite of software applications to control production workflows from ingest to playout; includes a new production playlist and a new series of tools offering intuitive control of media between XT[2] servers or between the XT[2] and third-party craft editors.

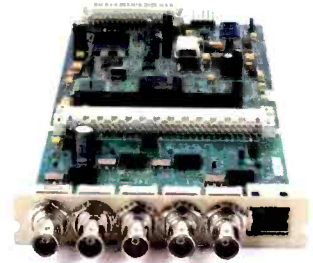
973-575-7811
www.evs.tv
 Booth: C4911

DVR
Fast Forward Video Recon DVR

An ultra-compact, board-level DVR; offers the ultimate flexibility to manufacturers of OEM products that can work in standalone or portable applications without sacrificing performance or quality; based on the same architecture as the professional DigiDeck DVR; provides outstanding 720 x 486 pixel image resolution and scalable compression with high quality video inputs and outputs to maximize image quality.

800-755-8463
www.ffv.com
 Booth: N2519

4:4:4 SAFE-AREA GRATICULE GENERATOR
Eyeheight SA-2U



Generates safe action graticules, safe title and center markers (short and full screen) for all common TV and film formats; designed for SD, HD-SDI multidefinition and for SD, HD-SDI and 2K ultraDef post-production applications; additional features include three safe-area cursor generators with full user control of cursor color, transparency and type, as well as specialized functions for text height and aspect ratio measurement.

866-469-2729
www.eyehight.com
 Booth: SU5905

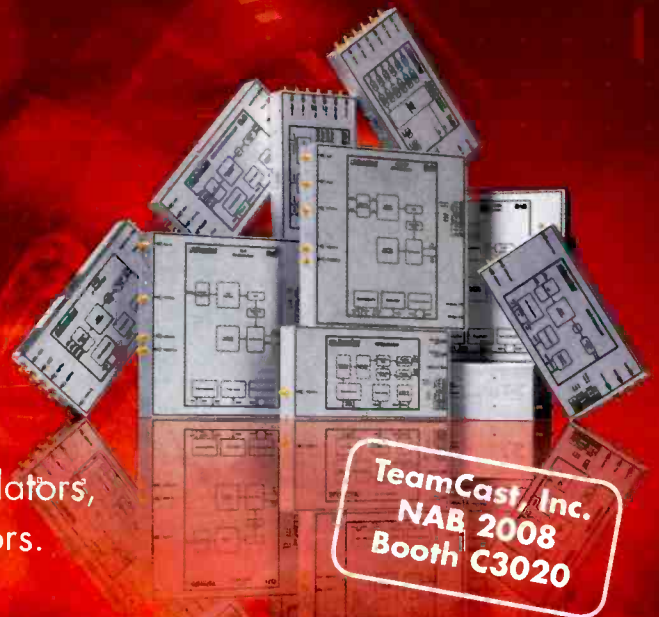
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978-671-5700
www.mrcbroadcast.com
Booth: C1807

TRIAx CONNECTORS
Fischer Connectors 1051 series

A new design of the 1051 plug and cable receptacle facilitates quicker assembly, maintenance and cable installation; made of new material, the series is now lighter but still retains its high strength; the parts that make up the connector have been optimized and their number reduced, so that the assembly process is simplified and requires no specific tools; when cabled, the new connector is more versatile; contact blocks are interchangeable, which simplifies maintenance.

800-551-0121
www.fischerconnectors.com
Booth: N3837

AUDIO FUNCTION CARD
FOR-A FRC-70DA16



An optional audio function card for FRC-7000 HD frame rate converter; supports 16 channels for digital audio input and output; can perform delay compensation for all audio channels; can be equipped with Dolby E encoding and decoding as an option.

714-894-3311
www.for-a.com
Booth: SU5220

PANEL ANTENNA
Dielectric Communications TUM Antenna

A high-power, broadband UHF elliptically polarized panel antenna; offers variable polarization ratio from 0 percent to 100 percent while maintaining an excellent axial ratio.

800-341-9678
www.dielectric.com
Booth: C1918

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800-735-2070
www.forecast-consoles.com
Booth: SU2723

HD STANDARDS CONVERTER
Snell & Wilcox Alchemist Ph.C



Offers simultaneous SD and HD upconversion in a compact 3RU mainframe; one-box approach delivers HD frame-rate conversion between 50Hz and 60Hz HD standards for both 1080i and 720p formats, as well as SD frame-rate conversion between 50Hz and 60Hz material; provides motion-compensated HDTV upconversion, downconversion and crossconversion.

818-556-2616
www.snellwilcox.com
Booth: SU4220

MOUNTING BRACKET
Frezzi Energy Systems Model FLPM



Low-profile mounting bracket enables HD cameras to have the newest dimmer controlled Frezzi Micro-Fill light positioned over the camera lens and in line with the camera's carrying handle; designed for camera and lighting usage in space-tight environments to provide a synergistic use configuration of light and camera.

800-345-1030
www.frezzi.com
Booth: C5023

8-VSB MODULATOR
TeamCast MUS-1000/2000

Designed for ATSC terrestrial transmitters and repeater stations, integrated test systems and exiters and R&D experimentation; features ATSC compliance, high modulation performance, optional on-board GPS, linear and nonlinear digital precorrection circuits; versatile stream inputs (SMPTE, DVB-ASI), compact size for easy OEM integration and a single 12V power supply.

312-263-0033
www.teamcast.com
Booth: C3020

AUTOMATED QUALITY ASSESSMENT TOOL
Front Porch Digital DIVAnalyze

A hardware- and software-based automated quality assessment tool; presented to users through the DIVAdirector Web-based interface; enables improvement of efficiency, reliability and repeatability of video and audio quality control, particularly in situations involving batch content ingest; the analysis step in the content lifecycle can be dynamically defined in DIVArchive, leveraging the company's Storage Plan Manager.

303-440-7930
www.fpdigital.com
Booth: N1830

ZOOM LENS
Fujinon D32x10R4D-V41



A compact surveillance zoom lens designed with several new features that offer increased performance for day and night operations; features such as megapixel-compatible high-res, long telephoto zoom capability, pre-set functionality and remote iris control make this lens well suited for a variety of security, surveillance and long-distance applications; specialized optics use an extremely low longitudinal chromatic aberration lens, which minimize color fringing and provides crisp color images in daylight.

973-633-5600
www.fujinonbroadcast.com
Booth: C4210

MPEG-4 AVC HD ENCODER
Fujitsu IP-9500

Designed for broadcasters wishing to transmit remote HD content through existing satellite configurations; can minimize costs by using a single satellite channel to carry 1080i or 720p format HD content at data rates ranging from 4Mb/s to 20Mb/s with encoding-decoding latency of less than 300ms; well suited for satellite newsgathering because it allows HD news content to be transmitted in the same satellite bandwidth needed today for SD contribution.

408-746-7000
www.fujitsu.com
Booth: SU10928

SCALER
Gefen DVI to HD-SDI Scaler Plus



Incorporates the ability to further refine the video output in the HD-SDI format to enable the sharpest image possible; features genlock control, color and gamma corrections, noise reductions, detail enhancements and pattern generators to test performance.

800-545-6900
www.gefen.com
Booth: SL2312

X-BAND UNBALANCED INSTRUMENT CABLE
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Features a heavy gage (20AWG) oxygen-free copper conductor for maximum conductivity and corrosion resistance, two densely stranded 95-percent copper braid shields combined with a semiconductive PVC layer to provide exceptional EMI/RF rejection and low triboelectric handling noise, and a flexible, easy to strip, abrasion-resistant outer jacket.

800-966-0069; www.gepco.com
Booth: C6918

CAMERA STABILIZATION SYSTEM
Glidecam Industries Glidecam X-10

Designed for cameras weighing up to 6lbs when used with the Glidecam 2000 Pro or 4lbs-10lbs when used with the Glidecam 4000 Pro; isolates body's motion from the camera while the camera is balanced in an isolated state; features support arm that can move vertically, horizontally and pivoted in and out.

781-585-7900
www.glidecam.com
Booth: C10315

TRANSMITTER

Global Microwave Systems
 Messenger 2 Transmitter



Features a built-in AVC/H.264 encoder; supports SD and HD formats up to 1080p; offers low system latency (one frame) and low power consumption (13W); allows for up to four audio channels with embedded audio, user data support, AES 128-bit security, COFDM modulation with local control, an output frequency of 1GHz to 7GHz and a high throughput option for maximum link performance.

760-496-0055
www.gmsinc.com
 Booth: C3318

STORAGE

Globalstor ExtremeStor-DI Tower



Optimum for uncompressed HD/2K capture and playback; the dual Quad Core tower-based workstation is built for easy installation and equipped with 10 fault-tolerant, hot-swappable SATA drives that can support a wide range of RAID levels including RAID 5; capacities range from 2.5TB to 10TB; integrates Dual Intel Xeon or AMD Opteron Quad Core processors for maximized computing power that can deliver up to 600Mb/s of sustained data throughput in RAID 5.

818-701-7771
www.globalstor.com
 Booth: N/A

HD/SD 3-D GRAPHICS SYSTEM

Harris Inscribe G7

A key option is the Inscribe MOS v5 newsroom graphics management system, which allows journalists to create customized, template-based graphics from within any newsroom computer system (NRCS) and automatically insert them into their newsroom rundown; centralized playout allows all changes to the NRCS playlist generated from the G-Series graphics systems to be automatically updated across multiple channels.

513-459-3400
www.harrisbroadcast.com
 Booth: N2502

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866-442-6538
www.hamlet.us.com

Booth: N1531

HD CAMERA

Hitachi Kokusai Electric America HV-HD30



Incorporates three HDTV 1/3in, 1.3-megapixel CMOS sensors; provides both 1080i and 720p camera outputs; the camera is a compact box-type head, weighing 600g; a wide range of adjustments can be made remotely, providing versatility that makes the camera usable as a studio sub-camera, in remote observation applications, as a point-of-view camera and in industrial applications.

516-921-7200
www.hitachikokusai.us

Booth: C5018

LOGGING SOFTWARE UPDATE

Horita PC-LOG

An SMPTE time-code-based video production logging program; new features include wireless operation using the Bluetooth interface and convenient hands-free logging using voice recognition technology; Bluetooth capability provides a simple and reliable way of performing wireless on the set logging using a laptop PC in conjunction with the Hortia TCBTx SMPTE to Bluetooth time code converter/transmitter; voice recognition allows SMPTE time code values to be captured and associated text data entered hands free.

949-489-0240
www.horita.com

Booth: C7311

GSM NETWORK SOLUTION

ADC UltraWAVE

Consists of softswitch MSC, IP-based RAN and value-added services; optimized for microcellular and specialized mobile applications such as rural coverage, maritime, private networks, military and government; features a compact, scalable configuration.

952-917-0279
www.adc.com

Booth: N4124

ROBOTIC CAMERA CONTROL SOFTWARE

Hybrid MC MERCURY

Simultaneously controls up to six titanium and/or silver robotic cameras; runs on Linux PCs; provides a convenient, easy-to-use control solution for multiple cameras in any application.

+33 1 46 73 00 66
www.hybrid-mc.com

Booth: SL13216

TAPE DRIVE

IBM System Storage TS1129

Designed for applications that need high capacity, fast access to data or long-term data retention; is supported in IBM tape libraries, IBM frames that support stand-alone installation and in an IBM 3592 C20 frame attached to a Sun StorageTek 9310 library; uses IBM 3592 cartridges, which are available in limited capacity (100GB) for fast access to data, and standard capacity (500GB) or extended capacity (700GB) that help to reduce resources to lower total cost.

919-517-0411
www.ibm.com/media

Booth: SU3614

CAMERA REMOTE CONTROL

Iconix Video RCP-160

Designed for use with Iconix cameras; controls up to six cameras from a single RCP; features a touch-screen LCD GUI for full menu and control access, as well as two dedicated and assignable encoder knobs; offers permit lens motor control, including zoom, focus and iris; other features include a three-in-one memory card interface for scene and setup storage, full camera paint and feature control, and user-definable buttons.

805-690-3650
www.iconixvideo.com

Booth: SU6426

SD/HD/AES SYNC GENERATOR

AJA Video Systems GEN10



Features seven outputs, including two groups of independently controlled SD/HD sync outputs and one AES-11 output; SD outputs can be switched between color black or color bars; HD trilevel sync can be switched between 19 different HD formats; AES-11 output can be switched between silence and tone; includes external dip switch configuration.

530-274-2048
www.aja.com

Booth: SU7105, SL1413

LED CAMERA LIGHT

IDX System Technology X3-Lite

Offers the advantages of LEDs in an ENG camera light body; features a long LED life; system is cool running; offers high luminance and no color change over the battery voltage variation.

310-891-2800
www.idx.tv

Booth: C8032

MULTIPURPOSE COMPACT HDTV CAMERA

Ikegami HDL-45

Records in native format using either 1080i CCDs or 720p CCDs; features 14-bit A/D conversion, remotely controllable four-position optical filter, low-noise feedback-type amplifier circuit to eliminate noticeable noise, SDTV BBS signal that can be used as an external sync signal for genlock and full remote control capability.

201-368-9171
www.ikegami.com

Booth: C4228

NEW OUTPUT OPTION

Image Video VxV-4HD

A new option for the VxV-4HD quad split processor; provides an HD-SDI output module, as well as a DVI input module, which allows multiple units to be cascaded together.

416-750-8872
www.imagevideo.com

Booth: SU3305

Prepare for Your Migration to DVB-S2

Modulators • **Demodulators**
IP Encapsulators
Receivers • **Converters**



As a long-time supplier of satellite communications infrastructure equipment, our products are installed in 160+ countries. The addition of the Digicast products has enhanced our IP-based broadcast solutions, now encompassing a full product suite to support your DVB-S2 migration.

- CDM-710 Broadcast Satellite Modem – Based on DVB-S2 and tailored to HDTV, DTH, DSNG, Contribution or Distribution; Supporting legacy and green field video production
- MENCAP IP Encapsulators – Operating up to 73 Mbps, these devices encapsulate IP data into MPE format for distribution over DVB-S, DVB-S2, DVB-C, DVB-T and ATSC networks
- Receivers – Enabling DVB-S and DVB-S2 transport stream and IP-based multimedia content to be delivered over satellite or ASI links and distributed to remote devices; Supporting MPE & MPEG-2 TS, standard data broadcasts and the transport of MPEG-2 video service over IP are facilitated

Compliant with DVB-S2 and DVB-S, our products interoperate with major satellite service providers and key encoding device vendors. Leveraging the bandwidth efficiencies of DVB-S2, the Comtech solution can increase throughput by up to 30%. Contact us today to learn how operating expenses to deliver your IP-based broadcast connectivity can be significantly reduced.



+1 480 333 2200
www.comtechefdata.com

MULTIFORMAT COMBINER
ARG ElectroDesign 1900

Allows users to optimize bandwidth by transmitting multiple signals over E3 or DS3 links, connect up to eight data inputs (ASI, SPI or unframed E1 or T1) and limit usage on each input channel; features 1RU design, dual auto-ranging AC power supplies, optional dual 48V DC power supplies, front-panel control, LED indicators, optional Web server module for remote control, RS-232 for setup and relay contacts for control and monitoring.

+44 128565 8501
www.arg.co.uk
Booth: SU9008

SD/HD MASTER CONTROL SYSTEM

Pro-Bel Masterpiece

Features up to four DSKs, a preview bath, 16-level audio mixing, AES voice-overs, Dolby E mixing, DVE, bug inserter and frame delay; offers tight integration with Pro-Bel control panels, Morpheus control and Monitoring and Morpheus Automation; housed in a single 2U frame.

631-549-5150
www.pro-bel.com
Booth: SU12712

SCALABLE SERVER SOLUTION

Avid MediaStream 8000 v3.31

Comes with native HD/SD storage and playout capabilities as well as built-in up-and downconversion; can be configured from a few channels using a standalone server to up to 100 simultaneous channels using a SAN; supports interoperability with Avid products as well as a large number of third-party broadcast solutions; new version offers support for XDCAM HD and long GOP MPEG-2 playout.

978-640-6789
www.avid.com
Booth: N/A

OPTICAL BEAM TRANSCIVER
Canon DT-150 HD Canonbeam

Provides bidirectional, uncompressed 1.5Gb/s transmission of embedded digital video, audio and camera control signals on a single HD-SDI or SD-SDI stream without delay; can relay embedded HD-SDI and SD-SDI video from multiple cameras or other HD/SD video sources, along with embedded return video and audio to the camera operator, camera control signals and robotic camera-control data.

800-321-4388
www.usa.canon.com
Booth: SU3020

LIVE SLOW-MOTION SOLUTION
I-Movix SprintCam Live



Supports rates up to 8000fps with instant replay at SD and HD (720p and 1080i); comprises a camera, CCU, an operator control panel and a slow-motion remote control; provides real-time control of image quality settings, including gamma, knee and white/black balance; features a new sensor that provides increased dynamic range and image quality.

+32 65 321535
www.i-movix.com
Booth: C11819E

MULTI-IMAGE DISPLAY PROCESSORS

Avitech International Rainier

Feature a small form factor; can auto-detect up to 32 different computer and video inputs; offer up to 20 different selectable output resolutions; integrated on-screen display provides labels, borders and tally information.

425-885-3863
www.avitechvideo.com
Booth: SU13215

WIRELESS INTERCOM SYSTEM

IntraCom Systems VCOM Wireless Intercom

Supports virtually an unlimited number of channels configurable for point-to-points, group calls or party lines; interfaces with other communication systems, has no frequency constraints and runs on Wi-Fi and/or data cellular-enabled handsets running Windows Mobile 5.0 and higher; offers the power of multichannel ProComm matrix intercoms in a handheld.

424-288-4184
www.intracomsystem.com
Booth: C9512

NEWS PRODUCTION SYSTEM

JustEdit vsnautorec

Ingest system that enables simultaneous manual or automatic recordings from tapes, satellite and or studio feeds; enables users to program regular recordings into a reel list and generate DV25 MPEG2@50Mb/s and MXF files.

+34 93 734 99 70
www.vsn-tv.com
Booth: N3714

PROTECTION SWITCH

Ensemble Designs 7460

Fail-safe protection switch for critical digital paths for broadcast or satellite applications; supports SD-SDI, HD-SDI and DVB-ASI signals; detects TRS, black, silence and freeze for HD and SD signals; detects signal presence, program packets, PMT, PAT and PIDs for ASI signals; detection specifics are user-programmable.

530-478-1830
www.ensembledesigns.com
Booth: SU2326

RGBHV ROUTING SWITCHERS

The ISIS Group INNOVATION



Easy to install where long cable runs make the HD15 connectors less desirable; designed specifically for multimedia applications; uses the latest crosspoint technology to extend bandwidth and slow-rate performance, allowing it to work with the most demanding resolutions; features hot-swappable, front-loading modules, a redundant power supply option, and a choice of local, remote, or GUI controls to ensure professional performance in any venue.

888-622-4747
www.isis-group.com
Booth: N1302

HDMI VIDEO SCALER

Avocent VSS1000H

Accepts HDMI signals, DVI signals (via DVI to HDMI cable), PC-generated RGB signals (up to WUXGA), HD component signals (YPbPr/YCbCr, 480i up to 1080i), S-video and composite video signals as valid inputs.

954-746-9000
www.avocent.com
Booth: SL13016

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Broadcast

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Fiber Optic HD Camera Connectors
Tri-Loc® Triaxial Camera Connectors
75 Ohm BNC Connectors
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ELECTRONICS

62 Barnes Industrial Road North
Wallingford, CT 06492
Phone: 203-741-5400
www.winchesterelectronics.com

HARDWARE/SOFTWARE SUITE
Barco Networked Broadcast
Monitoring System V2.1

Enables operators to monitor the broadcast process more efficiently and visualize real-time video content on rear-screen projection modules or LCD panels; includes standalone display controller and three hot-swappable modules that are front-accessible; NGP-001 Display Controller allows users to display as many as 64 video sources on two high-res screens; eight-channel NGS-103 input module captures SDI and composite video signals, encodes them in JPEG2000 and streams them over a GigE network; NGS-104 Communication and Interface Module and NGS-107 General Purpose IO Module provide connectivity to legacy and third-party equipment.

678-475-8000
www.barco.com/broadcasting
Booth: SL3213

BROADBAND UHF
SLOT ANTENNA
Jampro Prostar

Provides a high-performance antenna design for either analog or DTV broadband applications; eliminates the need for multiple antennas; provides a single, compact solution that conserves tower space and minimizes wind load.

916-383-1177
www.jampro.com
Booth: C2607

MPEG VIDEO PROBE
JDSU DTS MVP-200



A video monitoring tool that uses MPEG analysis capabilities; comes in a rack-mount form with an added rapid channel scan capability; allows operators to validate the performance of video across IP, ASI and QAM signals; performs tests for digital program insertion, ad splicing, rate shaping, grooming, MPEG remuxing, encryption and modulation; conducts automated channel scanning to test each MPEG program across and entire RF or GigE input signal.

866-228-3762
www.jdsu.com
Booth: SU7226

CONTENT MANAGER
JustEdit vsnnetsharer and
vsnmacsharer

Enable journalist PCs, editors and/or post-production teams to easily and quickly locate materials stored in video servers; allow searches by keywords in the SQL database; create copies in low-resolution in WM9 for searches or editing; from the timeline, the editor registers and copies news in the news video server playlist vsnairnews and vsnmatic in the master control room.

+34 93 734 99 70
www.vsn-tv.com
Booth: N3714

HD CAMCORDER
JVC Professional GY-HD200



Supports multiple frame rate recording in 720/24p, 25p, 30p, 50p and 60p; features compact shoulder professional form factor, wide choice of lenses and accessories, optional HZ-CA13U prime lens adapter, built-in image flip recording when using prime lenses, built-in 14.4V battery mount, dual-media (tape +HDD) recording with DTE, MPEG-2 encoding, advanced 14-bit A/D converter and BNC connectors.

973-317-5000
www.jvc.com/pro
Booth: C4218, N111LMR

CONNECTORS
Kings-Winchester Electronics
Quick Connect SMA

Push/pull connection system allows for quicker mating; when mated, the connectors can rotate 360 degrees; provides electrical performance up to 6GHz when compared with a standard SMA; compact design uses SMA standard spacing down to 0.500 centers; designs are available for both flexible and semi-rigid type cables.

203-741-5400
www.winchesterelectronics.com
Booth: C6908

DOLBY E ENCODER
Dolby DP571

Enables the distribution of up to eight channels of high-quality audio plus Dolby Digital metadata via a single AES3 pair on two audio tracks of a digital videotape, digital audiotape, video server or two-channel distribution systems; performs Dolby E audio encoding, developed specifically for the production, contribution and distribution of multichannel audio.

415-558-0200
www.dolby.com
Booth: N713

DMX LIGHTING
Kino Flo Mega 4Bank DMX

Can harmonize light levels in a fixture array or switch tubes independently of one another from a DMX control board; the system includes a fixture, mounting plate, extension cable and Mega4Bank DMX Ballast; the Ballast operates 4Bank fixtures, double fixtures, single fixtures and the company's Blanket-Lite; the lighting is designed to run on high output 8ft and 6ft True Match lamps.

818-767-6528
www.kinoflo.com
Booth: C9419

WORKFLOW MODULE
Klotz Digital VADIS Shared
Control Management



Manages the use of sharing resources through a LAN infrastructure, such as central playout systems, freely assignable announcer booths, remotely controlled mic preamps, pool of telephone hybrids and codecs, central devices, and devices in other studios or areas; provides access to all device-specific parameters, functions and attributes to allow a quick operation.

678-966-9900
www.klotzdigital.com
Booth: N5925

How come the world's leading audio company has the fastest news video production system?



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FULL DUPLEX TRANSCEIVER
Eartec Simultalk 24G

Designed for hands-free, short-range communications; sends and receives messages on different frequencies, allowing users to communicate at the same time; features volume control, talk/standby switch, molded belt clip and miniature stubby antenna; weighs 4.5oz.

800-399-5994
www.eartec.com
Booth: C4046

8-VSB/QAM TO GIGE CONVERTER

KTech Telecom DVM-3300

Performs quad 8-VSB/QAM RF to GigE conversion; takes in the 8-VSB RF input or 64/256QAM RF input (four channel max) and converts the MPEG-2 TS from each of the RF channels into MPTS in GigE output; supports SNMP, FTP, HTTP and multiple MPTS/UPD/SPTS.

818-773-0333
www.ktechtelecom.com
Booth: SU11608

DIGITAL FORMAT CONVERTERS
Kramer Electronics FC-47/FC-48



FC-47 accepts an HDMI signal and outputs a digital DVI signal, on a DVI-I connector, and S/PDIF audio signal, on an RCA connector; FC-48 outputs an HDMI signal by combining a digital DVI signal on a DVI-I connector and an S/PDIF audio signal on an RCA connector; support 20 PC resolutions from VGA at 60Hz to UXGA at 60Hz.

908-735-0018
www.kramerus.com
Booth: SL4305

MONITOR EXPOSURE OPTION
Leader CINELITE

Enables users to determine optimal camera exposure settings by detecting the actual signal levels captured during pre-shoot lineup, and define a dual-link SDI/HD-SDI signal analyzer; allows for upgrades; allows simultaneous viewing of four SDI or HD-SDI sources; outputs to any compatible XGA monitor; features twin auto-detecting inputs.

800-645-5104
www.leaderusa.com
Booth: C4932

A/V QUALITY MONITORING
K-Will QuMax-2000



New additions include field-by-field accuracy for video quality assessment and millisecond measurement of lip sync errors and enhanced remote monitoring capabilities with AC-3 audio measurement; compression noise detection and an HD component input is also available; now capable of 720p and 1080p/24 monitoring in addition to the already released 1080i format.

818-961-2401
www.kwillcorporation.com
Booth: N918

LOW-POWER UHF TRANSMITTER
Larcan MXi series

Provides digital progress with any standard from 10W to 350W digital; supports worldwide analog, digital and mobile broadcast standards; offers frequency agile broadband design and integrated system diagnostics with extensive monitoring and control capabilities; designed to address the needs of DVB-T/DVB-H markets and single frequency networks.

303-665-8000
www.larcan.com
Booth: C2618

AUDIO ROUTER
Lawo North America Nova73 HD

Scalable up to 8192 mono channels; synchronous system has defined latency of few samples; features a variety of interfaces and direct ATM link; 96KHz and Dolby E compatible with integrated signal processing; features STAR2 architecture and redundancy options; operation during servicing or refitting is not interrupted; hot-plugging is no longer restricted.

416-292-0078
www.lawo.ca
Booth: N8720

MULTICHANNEL WIRING SYSTEM
Otari LWB-16M

The I/O configuration can be changed by inserting the required modules into the five slots; can route audio channels on a one- or two-channel basis in addition to the four-channel basis of previous versions; Key Lock function prevents unintentional changes; other features include a level indicator clips hold and LED dimmer.

+81 424 818612
www.otari.com
Booth: N3938

HANDHELD TRANSMITTER
Lectronsonics UTPR20

Combines the capsule from Heil Sound's PR20 dynamic microphone with Lectronsonics UT series digital hybrid wireless transmitters; features 100mW RF power and 256 synthesized frequencies; designed to ensure compander-free audio for wide dynamic range and neutral frequency response; employs Heil's grill basket and capsule identifier ring.

505-892-4501
www.lectronsonics.com
Booth: N5223

CG AND PAYOUT SOFTWARE
Magicsoft UltraRed

SD and HD CG software that can handle simultaneous previewing, creating, displaying and controlling of projects for logos, tickers, crawls, image sequences, analog and digital clocks, and playback of AVI DV clips; runs on Windows XP and uses an nVidia video card for real-time GPU rendering; 24-bit (TrueColor) with an 8-bit alpha channel (256 transparency levels); keying can be internal or external.

702-275-6353
www.magicsoft.tv
Booth:

DIGITAL AUDIO AND METADATA MONITOR
Linear Acoustic LAMBDA

Designed to enable audio and metadata monitoring throughout the entire broadcast chain; displays and reproduces up to 16 audio channels from AES or embedded HD-SDI input; accepts audio metadata via nine-pin serial input or extracts it from the VANC space of an applied HD-SDI input; displays audio and metadata in combination to allow for accurate monitoring.

717-735-3611
www.linearacoustic.com
Booth: C2151

LI-ION V-MOUNT BATTERY SYSTEM
IDX System Technology Endura Elite

Designed for ENG/EFP productions features a 142Wh capacity, a twin power cartridge design that doubles its shooting capability for operation of up to 3.5 hours using a 40W HD ENG/EFP camera and replaceable cartridges; complies with RoHS and aircraft security regulations; works with existing Endura V-Mount chargers.

310-891-2800
www.idx.tv
Booth: C8032

Inter BEE

International Broadcast Equipment Exhibition
Period: Nov. 19th (Wed.) to Nov. 21st (Fri.), 2008
at Makuhari Messe, Tokyo



Audio



Visual



Creation



Delivery



Professional

2008

Professional Show for Audio, Video and Communications

In the broadcasting industry and among its wide-ranging clients, the Inter BEE exhibition has earned a solid reputation as a venue to unveil some of the world's most advanced technologies. Typically visited by creators and engineers at the forefront of fields involving visual, audio and broadcast media, the exhibition serves as both an international technology exchange and an opportunity to cultivate business over a broad spectrum of needs. Inter BEE is an excellent business opportunity for **manufacturers of audio, visual and broadcast equipment**. We hope you will take full advantage of this exhibition by becoming an exhibitor.

Organizer:

JEITA

Japan Electronics and Information Technology Industries Association

Applications to Exhibit Now Accepted
Primary application deadline: Friday, May 30

For Video, Audio, and Communications Professionals

InterBEE online
www.inter-bee.com

Inter BEE online is a website that provides news and information year-round on the broadcast-related industry throughout both Japan and overseas. In addition to providing information on Inter BEE 2007, the website is a handy source for guidelines and exhibitor information or the upcoming event in 2008.

What's more, reports from other broadcast and industry-related tradeshows held around the world are also readily available. Please access and make use of the Inter BEE online website to support your business operations and find out everything you need to know about Inter BEE!



Management/Contact: Japan Electronics Show Association

5F, Sumitomo Shiba-daimon Building No.2, 1-12-16,

Shiba-daimon Minato-ku, Tokyo 105-0012, Japan

Tel: +81-3-5402-7601 FAX: +81-3-5402-7605 E-mail: contact@inter-bee.com

**TIME CODE READER/
 GENERATOR/INSERTER
 ESE SD-488**



Reads and generates SD serial digital video linear time code and digital vertical interval time code; accepts 4:2:2 (525- and 625-line) digital video signals; superimposes time and/or user bits onto video with as many as 30 alphanumeric characters; features front-panel controls, a rear-mounted USB port, rear-mounted BNC connectors and XLR time code input and output connectors.

310-322-2136
www.esweb.com
Booth: N3121

**TRANSMITTER
 Link Research XPu**

A tiny, lightweight, ruggedized transmitter measuring 100mm x 100mm x 30mm; can be used with the company's new active car-mounted antennas for motor racing applications or with its own remote amplifier unit.

+44 1923 474060
www.linkres.co.uk
Booth: C1807B

**FLAT-PANEL DISPLAYS
 Listec Video Spectra-Lite**

Available in 15in and 12in sizes; encompasses a range of active matrix LCD panels with composite video inputs.

631-273-3029
www.listec.com
Booth: C6533

**AUDIO CONSOLE
 ENHANCEMENT
 Logitek vTrans**



An enhancement to the company's Artisan console; the flexible protocol translator allows third-party devices to communicate with the company's Audio Engine and Artisan control surface; can be adapted to various protocols as needed; currently available for two specific protocols: vTrans - Jupiter (for the Thomson Grass Valley router control protocol) and vTrans - D/ESAM (Graham-Patten Systems).

800-231-5870
www.logitekaudio.com
Booth: N7124

**HD MONITOR
 Marshall Electronics V-R201P-AFHD**



HD monitor features a completely digital TFT-MegaPixel active matrix LCD platform; digital signal processing features 10-bit A/D conversion of all analog signals, with 4X oversampling and five-line super-adaptive 2-D comb filtering of composite signals; multifunction compatibility accommodates virtually all video formats; advanced features include aspect ratio settings, a variety of screen markers and H/V delay.

800-800-6608
www.marshall-usa.com
Booth: SU1926

**FIBER-OPTIC TRANCEIVER
 Telecast Fiber CopperHead DLV3X1**

Camera-mounted fiber-optic HD dual-link video system; converts electrical signals to fiber to move uncompressed 4:4:4 and 4:2:2 signals between the camera head and a recording device over one lightweight, battle-rated fiber-optic cable; by replacing three or four coax cables, it reduces the bulk and weight of camera cabling, and increases signal transmission distances from several hundred feet to as far as 9mi.

508-754-4858
www.telecast-fiber.com
Booth: SU4227

**PLAYOUT APPLICATION
 Masstech MassChannel DR**

An automated solution for business continuity, providing for video replication, storage and playback; maintains exact placement of commercial content and a consistent signal to air in the event of a failure; integrates seamlessly into an existing broadcast operation; does not require any operator interaction.

905-886-1833
www.masstech.com
Booth: SU13813

**ELECTRONICALLY HEIGHT
 ADJUSTABLE DESK
 Martin & Ziegler Ergo Mesa**



Single-surface, 84in x 33.5in desk provides ample work space for applications requiring multiple monitors; features mounts for up to 12 monitors as well as anti-collision option, which will stop the adjustment of the desk if it senses a collision in upward/downward travel.

503-293-9499
www.mzfurniture.com
Booth: SL7407

**BIDIRECTIONAL IP GATEWAY
 Microwave Radio
 Communications AMG2000**

Provides IP connectivity over multiple WAN pathways to support file transfer and remote van management; works in conjunction with the MTX5000 to provide an extension of the newsroom network out into the field; has full Ethernet router functionality with VPN tunneling and eight Ethernet switch ports; allows a Wi-Fi connection to be activated to provide seamless local WLAN connectivity; EVDO and GSM interfaces are also available.

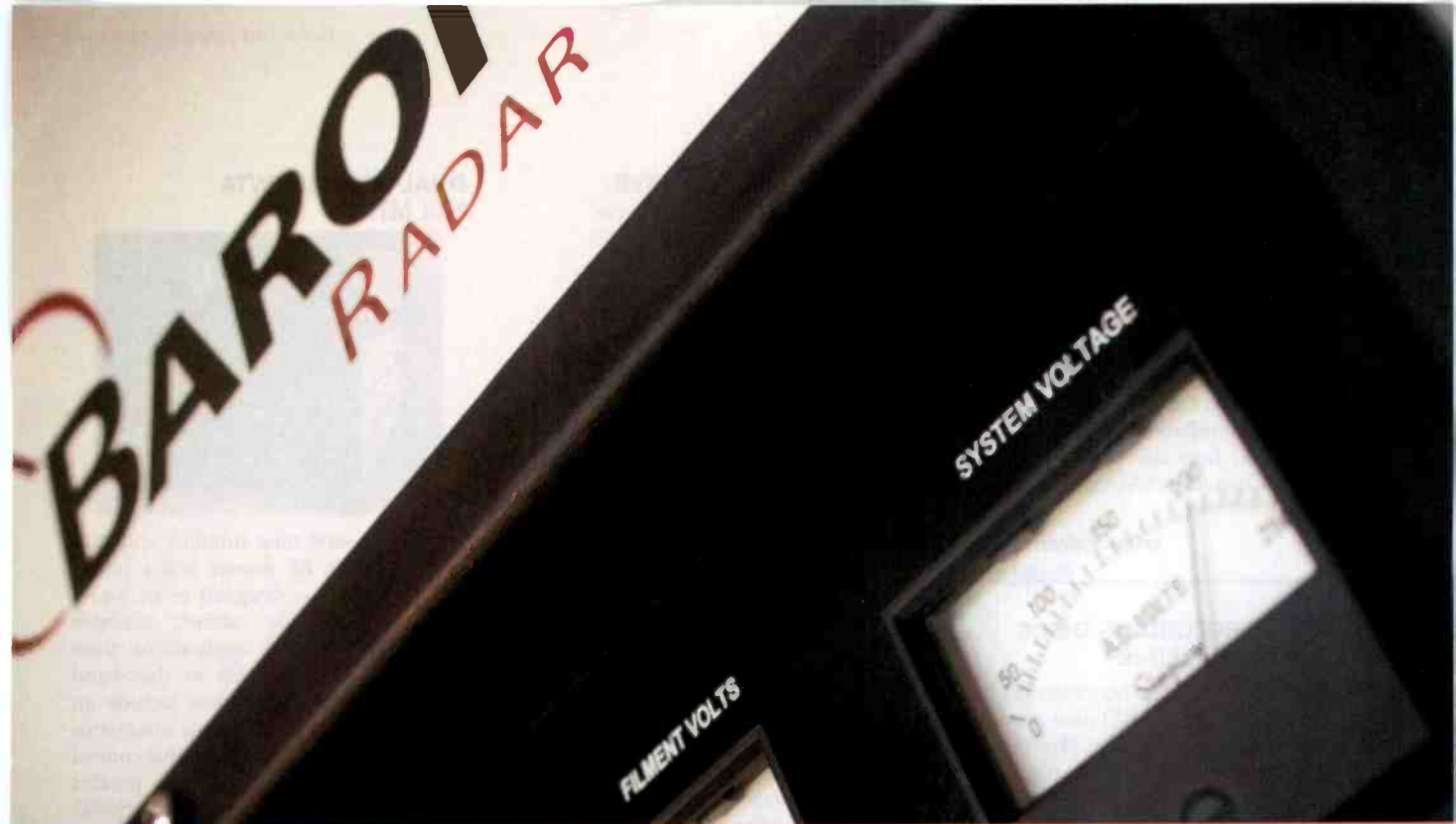
978-671-5700
www.mrcbroadcast.com
Booth: C1807

**10-CHANNEL TV AUDIO
 PROCESSOR
 Linear Acoustic AEROMAX 5.1-XL**



Features built-in Dolby Digital (AC-3) encoding; enables broadcasters to deliver compelling 5.1 channel surround sound while saving them time, money and space; equipped with a loudness controller, upmixer and metadata manager, as well as full-time, two-channel downmixing to support legacy analog paths; includes built-in AutoMAX processing that fixes two-channel audio that is broadcast wrongly signaled as 5.1 channels.

717-735-3611
www.linearacoustic.com
Booth: C2151



PASSION ENGINEERED

When Baron engineers design a new radar, our passion for weather is always in the blueprints. No wonder Baron has installed every broadcast dual-polarization radar in the world. For one thing, viewers receive incredibly accurate forewarning of heavy rain, snowfall and hail. For another, Baron radars are built with the most robust components, ensuring long-lasting dependability and high-powered performance. So viewers get information that matters, when it matters. Not just any weather vendor can build this level of meteorological integrity into an instrument as sophisticated as polarimetric radar. But for us, it was all part of the plan.

▶ Visit us at NAB Booth C9422 for a closer look.

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Upgrade for 171
NEXRAD Radars



STORAGE CONTROLLER
DataDirect Networks S2A9550

Designed for high-performance, high-capacity network storage applications; delivers 3GB/s and 560TB in one storage system; provides optimal block level and file system performance for highly scalable, open-system computing environments; offers eight plug-and-play FC-4 and/or InfiniBadn 4X DDR (SCSI RDMA protocol) host side connections and 20 Fibre Channel or SATA disk drives.

800-837-2298
www.datadirectnet.com
 Booth: SU11715

VIDEO RECORDING DISCS
Maxell BD-R/BD-RE

Single-layer 8cm Blu-ray write-once (BD-R) and rewritable (BD-RE) discs provide a recording capacity of 7.5GB, allowing the disc to store one hour of full HD picture quality at 1920 x 1080; feature a hard coat layer to protect the recording surface from scratches, dust and fingerprints.

800-533-2836
www.maxell.com
 Booth: C8428

BOLT-ON HEIGHT DRIVE
Vinten Radamec FBH175



Provides robotic height control of most lightweight Vinten and Sachtler pedestals, without compromising on the manual function of the pedestal; provides the added dimension of pedestal height control to static robotic camera installations; can be adapted to work with a wide range of studio pedestals without any on-site or factory modification; provides smooth, quiet and quick operation around the studio.

845-268-0100
www.vintenradamec.com
 Booth: C6414

DUAL-DRAWER TWTA
MCL MT7100



A traveling wave tube amplifier with two drawers — an RF drawer and a power supply drawer — designed to fit into a standard 19in-wide cabinet; available for C- and X-band applications from 2.2W to 2.5kW, as well as dual-band (C/X) applications; features include an event log screen, continuous attenuator adjustment in dB, and an internal control bus consisting of high priority parallel signals and lower priority serial (RS485) bus communications.

630-759-9500
www.mcl.com
 Booth: C9737

HD Microwave Solutions



Compact Size
High Performance HD
Next Generation COFDM Tech

With over 10 years of COFDM experience, BMS offers a complete robust line of cutting edge SD/HD microwave solutions. BMS receivers use an advanced implementation of FastFT-M/RC diversity technology that assures superior signal reliability and quality.

Visit BMS at NAB - Booth C2329

DR2200USB



2-Way Diversity Receivers

DR2400LD



DR6000HD



6-Way Diversity Receiver

CT2200HDV
 HDV Transmitter



CT2020HD
 SD/HD Transmitter



CT2430LD-S
 SD Transmitter

BMS, Inc
www.bms-inc.com

SEMI-RIGID CARRIER**Petrol Mini Camera Accessory Bag**

Offers a convenient and comfortable way to transport essential accessories like batteries, chargers and spare connectors; the top lid's dual directional run-around zippers open quickly for easy access; features inside layers of bright orange padded fabric that safeguard sensitive equipment, as well as two removable dividers that can be custom configured to provide extra security and protection; includes a second base-ment compartment underneath the main chamber for additional cushioned space; constructed of heavy duty waterproof blue and black Cordura.

845-268-0100
www.petrolbags.com
Booth: C6416

FRAME SYNC**Evertz 7746FS-EAES8-DD-AC3E-HD**

Two-slot module; handles either HD- or SD-SDI video signals and eight AES audio inputs (embedded or discrete); de-embeds the audio; provides frame synchronization with audio and video proc controls; with handles for audio and video delay, this module performs Dolby decoding and Dolby Digital (AC3) encoding; also provides audio mixing options, as well as a serial metadata output; SNMP-enabled for monitoring and configuration control.

905-335-3700
www.evertz.com
Booth: N1602

VIDEO, AUDIO AND DATA TRANSPORT**Media Links MD8000**

Offers high-performance video, audio and data transport over a wide variety of core network infrastructures; offers 480 Gigabits of redundant switching capacity on a single shelf; provides direct interfaces to dark fiber, metro/long-haul CWDM and DWDM systems, SONET/SDH rates from 155Mb/s to 10Gb/s, and Ethernet rates from 10Mb/s to 10Gb/s.

619-437-1699
www.medialinks.com
Booth: C3313

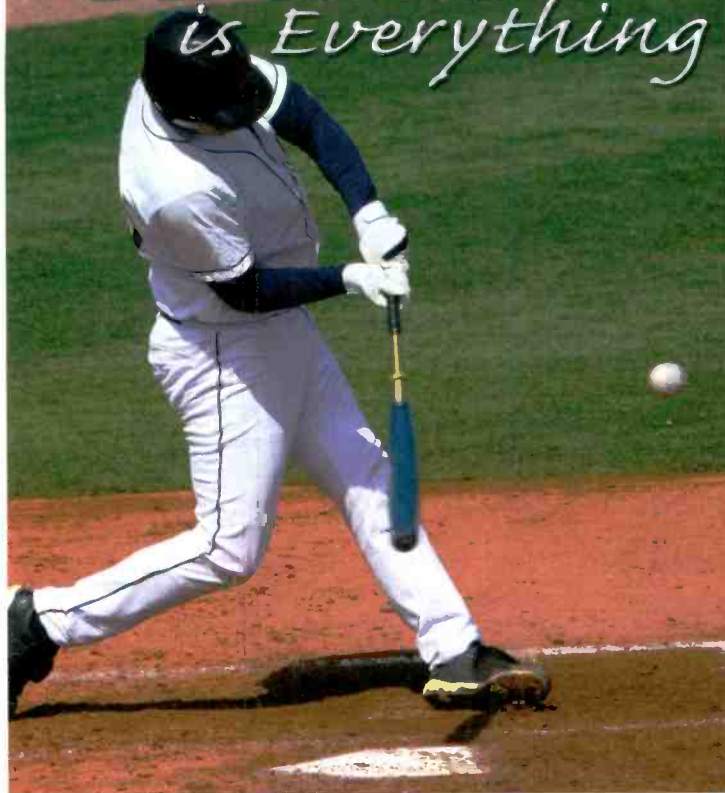
FIBER ACCESS TERMINAL**ADC OmniReach 4x3 MST**

Enables carriers to optimize installation and customer expenses in the deployment of FTTP services; incorporates hardened connector technology, providing a durable, reliable and cost-effective plug-and-play service connection in the outside plant/drop segment of the network.

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Booth: N4124

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is Everything



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MONITORING AND LOGGING SOLUTION

mediaproxy Enigma LogServer 7

Includes Web browser interface to review, stream, configure and monitor all logging resources; supports IPTV/ASI transport stream sources; features searchable caption logging and notification of keywords; supports multiple caption and text channels (e.g. English/Spanish/private data); six-channel SDI or analog server in 2RU with up to 150 days of storage at 512kb/s per channel.

+61 3 9549 1122
www.mediaproxy.com
 Booth: N3536

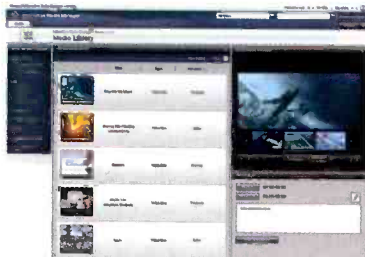
ROUTER CONTROL SYSTEM
NVISION NV915

Offers a flexible and easy-to-use Java-based configuration editor and scaleable architecture; ideal system for entry-level control of the company's NV5128 HD/SD multiformat router and compact router series; designed for limited space.

530-265-1000
www.nvision.tv
 Booth: SU11620

MEDIA MANAGEMENT SOFTWARE

Microsoft Interactive Media Manager



A collaborative media management solution that extends Microsoft Office SharePoint Server 2007 for media and entertainment companies; builds on existing technology investments, and helps companies create an end-to-end content production system accessible by everyone; easily integrates with Microsoft business intelligence tools, giving management insight into production details.

800-642-7676
www.microsoft.com
 Booth: SL5520

DVB-S2 PLATFORM

Comtech Media Router S2 Receiver 5975

Enables the reception of DVB-S and DVB-S2 IP-based multimedia content to be delivered and distributed to remote devices connected to the unit via an Ethernet LAN; includes improvements, such as enhanced LBN power circuit, support for redundancy, full RoHs compliances and support for 2Mbps to 32Mbps in DVB-S2 mode via firmware.

480-333-2200
www.comtechefdata.com
 Booth: C5942

HD VIDEO PATCHBAY
Switchcraft MVP series

Features two rows of 34 jacks (rated to 3GHz and for 30,000 mate/unmate cycles) in a 1RU patch panel; options include normalised or nonnormalised with 75µ termination or nontermination.

773-792-2700
www.switchcraft.com
 Booth: C7508

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 Diversity Receive
 Monitor & Control
 Seamless SNG

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 at booth
 # C1807

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a Vislink company

PCI EXPRESS PLAYBACK AND CAPTURE**Blackmagic Design
Multibridge Eclipse**

Features built-in 3Gb/s SDI connections, enabling twice the SDI data range than normal HD-SDI; connects to SDI, HDMI, component analog, NTSC/PAL and S-video for capture and playback, with instant switching between SD, HD and 2K; offers 12 channels of XLR AES/EBU audio in and out, as well as four channels of XLR professional analog audio in and out; includes color management via built-in 3-D lookup tables.

408-954-0500

www.blackmagic-design.com

Booth: SL10920

DIGITAL MEDIA VALIDATION TOOL**MiraVid AutoCheck**

Features faster-than-real time HD/SD conformance checking; H.264, MPEG-4 Part 2, MPEG-2, MPEG-1 and VC-1 video bit stream conformance; content validation for loss of signal, black, freeze frames, audio silence or clipping; and metadata checking including VChip, closed-captioning and CGMS-A.

905-927-7724

www.miravid.com

Booth: SU6906

**HD-SDI VIDEO
INPUT/OUTPUT CARD
NEC Display Solutions**

Installs internally versus an external converter device, which would require additional cables and power source; fits into the option slot, reducing setup time; compatible with NEC's large-screen Information Display 20 series, Muleos series and MultiSync SC series products.

630-467-3000

www.necdisplay.com

Booth: N1725

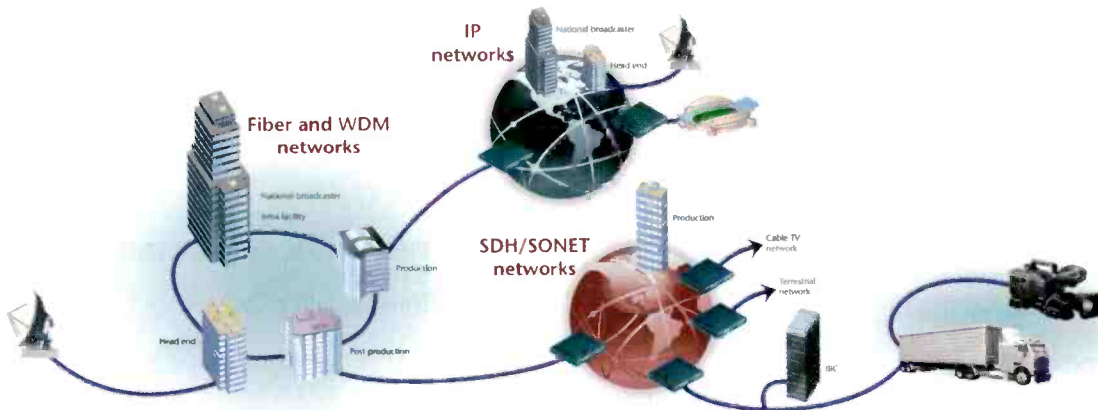
**MC SWITCHING AND
GRAPHICS PROCESSOR****Miranda Technologies
Imagestore 750**

New capabilities include Dolby E/AC-3 encoding/decoding; features an integral audio mixer for advanced audio processing with 16 audio channels, de-embedded from each of four video inputs, together with up to 32 channels of AES; allows audio channels to be mixed, shuffled and modified before being embedded into the video output, or being made available as discrete AES.

514-333-1772

www.miranda.com

Booth: SU6811

**A global video transport leader****Flashlink**

- Fiber optics
- Optical multiplexing; CWDM and DWDM
- Time division multiplexing
- Signal processing and distribution
- Highly cost-efficient
- Very compact and low-power

**Ventura**

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- JPEG 2000 and MPEG-2 encoders and decoders
- Optical multiplexing; CWDM and DWDM
- Multi-format metropolitan transport
- Carrier class specifications and features (NEBS)

www.network-electronics.com • www.vpginc.com**VikinX Routing**

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 - Ethernet control
 - 3Gbps single link support for 1080p HDTV
 - Ultra low power consumption
 - Sizes from 8x8 to 64x64
- VikinX Modular
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 - Configuration up to 256x256 with increments of 32x32

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1600 Emerson Avenue, Oxnard, CA 93033, USA

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FREQUENCY CONVERTERS
MITEQ 9900 Series



Designed for up- and downconverters that are offered in extended C- and Ku-band; the C-band models cover 5.725GHz to 6.725GHz and 3.4GHz to 4.2GHz, while the Ku-band models cover 13.75GHz to 14.8GHz and 10.7GHz to 12.75GHz; feature optimized phase noise, amplitude and spurious performance to provide a transparent frequency conversion for all video and data applications.

631-436-7400
www.miteq.com
Booth: C9737

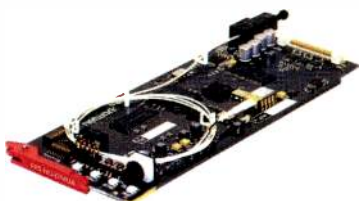
TRANSPORT SYSTEM
MultiDyne DVI-5000 series



DVI single and dual link, single fiber, transport system with stereo audio and data; provides a long haul, transport solution for high-quality, up to WQXGA 2560 x 1600, DVI single link and dual link video sources via one fiber; supports stereo audio and bidirectional data for monitor control; doesn't use compression; user adjustments or calibration are not needed; supports fully uncompressed, 100 percent transparent video transport.

800-488-8378
www.multidyne.com
Booth: SU3411

ELECTRICAL/OPTICAL FRAME SYNCHRONIZER
Network Electronics FRS-HD-DMUX



Features SD-SDI and HD-SDI frame synchronization, one optical and one electrical input, four electrical outputs and sync input with unbuffered loop through; options include stereo audio out and AES out, and stereo out and de-embedding of RS-422.

800-420-5909
www.network-electronics.com
Booth: SU10814

TRANSPORT SYSTEM
ELECTROMAGNETIC FIELD METER
Narda NBM-520



A lightweight, handheld meter for broadband measurement of electromagnetic energy; typical applications include measurement of fields generated at transmission sites; uses a small, custom LCD to display important field strength information; software allows users to preconfigure the meter for the specific survey task, keeping the meter smaller and lighter, while at the same time being powerful; can be controlled by the larger NBM-550 as far as 40m away.

631-231-1700, ext. 434
www.narda-sts.us
Booth: C8741

TRANSPORT STREAM MONITORS
Evertz 7780TSM

Complete embedded hardware-based solutions for compressed network monitoring; by monitoring the MPEG transport stream at strategic points within the distribution network, in conjunction with VistaLINK PRO NMS (Network Management System), it offers service providers the tools to continuously and effectively have the confidence that their MPEG-2/H.264 signals within any IPTV, satellite, terrestrial or cable network are being delivered properly.

905-335-3573
www.evertz.com
Booth: N1602

CHANNEL BRANDING DEVICE
Pixel Power LogoVision

Available with SD/HD support; inserts a wide range of branding and graphical elements including multiple clocks, multi-layer static and animated logos as well as text crawls; supports most graphics formats; designed with flexible interfaces for seamless integration.

818-333-5055
www.pixelpower.com
Booth: SU10920

VIDEO RECORDER MODULE
NETIA Manreo module



Acquires and digitizes videos from tape; functionality includes start, stop, forward, rewind, etc.; controls the VTR and launches the acquisition and digitization (MPEG-2 with MainConcept) process; enables migration to lossless and more secure digital storage; uses the RS-232 and RS-422 protocol to control external VTRs; allows users to connect a jog/shuttle control via USB port for easy navigation, watch video as the media is being digitized, and mark in and out points to create a clip or even a new video, produced automatically from a series of marked segments.

888-207-2480
www.netia.com/us
Booth: N5433

FIBER-OPTIC CONNECTOR SYSTEM
Neutrik OpticalCon



Solid, ruggedized-protected fiber-optic connector system extends the outdoor capabilities of the system, sealing the connector against dust and water while retaining its IP65 connection; increases the reliability and maximizes the uptime for fiber-optic connection systems; enables up to four copper wires to run power or data signals through.

732-901-9488
www.neutrik.com
Booth: N9029

01
10

News production with

NO BARRIERS.

Seamless Multi-Format Ingest-to-Air Workflow Without Transcoding

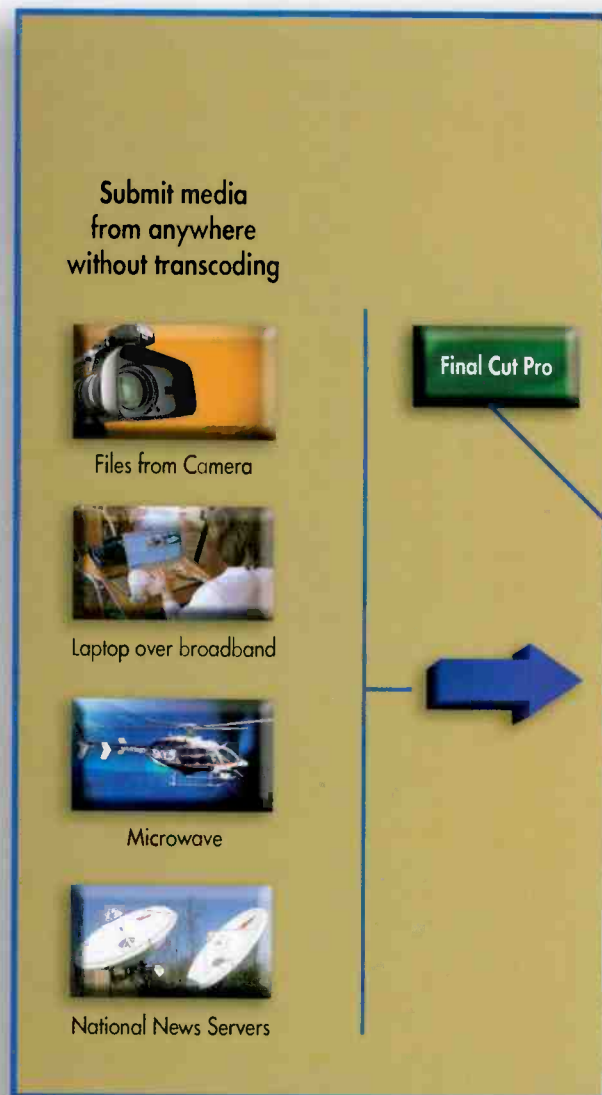
Bitcentral's Precis open news production system and the Oasis news sharing and archiving system allows you to handle your multi-format media assets from ingest-to-air effortlessly, without transcoding. Both systems support common formats from cameras, national news servers, .MOV files from creative services as well as formats sent in by viewers. Precis allows you to choose the editing software best suited for your workflow and supports direct editing from common high-speed NAS storage. Our 4-channel HD or SD playout servers support native playout of all the common broadcast formats. Mix and match any format HD or SD in the rundown, and they can play out back to back. The Precis playout also includes an off-rundown clip store for HD and SD video and graphics.

No Barriers NAS vs. Closed SAN

Precis uses the fastest NAS for the money—Sledgehammer® from Maximum Throughput. Compared with a similar priced SAN, Sledgehammer is four times faster. More importantly, all users in the station can enjoy fast access to any media without expensive fibre channel connectivity or gateways. So with Precis, you can edit the same media from common storage with Mac or PC over Gigabit Ethernet faster than a dedicated SAN.

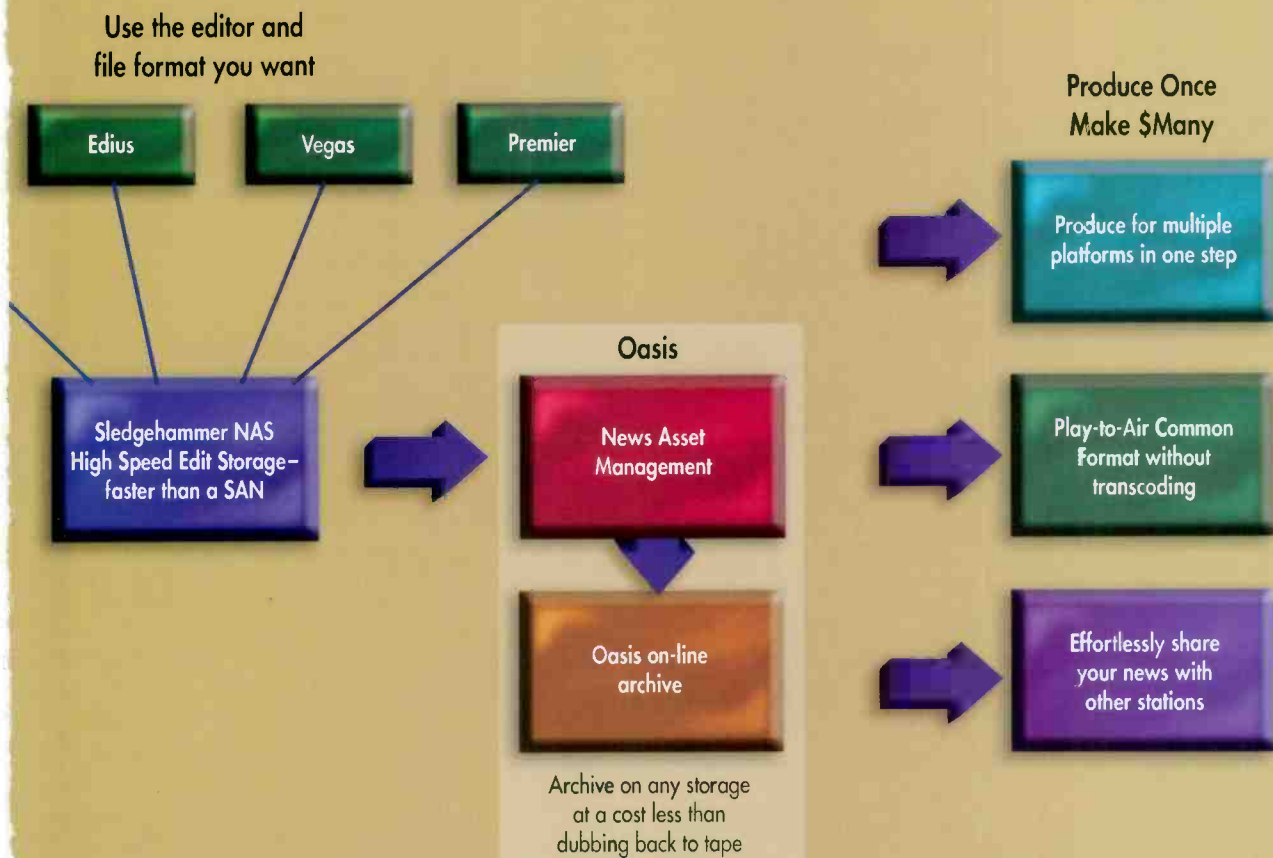
No Barriers News Asset Management

Stories and camera files submitted electronically or physically are all managed as MOS objects and tied into the ENPS or iNews assignment function. Rundowns are integrated into popular edit software so editors can save their work directly to the story. The user-intuitive, browser-based news management application has extremely fast search, categorization and retrieval of archived media. Because it can utilize any network storage device (such as spinning disk) to archive video digitally, the Bitcentral Oasis asset management system is about *half the cost of* dubbing back to tape.



- Capture and Play any media
- Acquire news from anywhere; produce to anywhere, to multiple platforms
- Integral online archive
- Share news effortlessly with Oasis – Get the most value from your assets by leveraging news across your group
- Open systems, standards and architecture
- 100% fully supported – Single point of contact for support of all hardware and software

NO BARRIERS NEWS WORKFLOW WITH PRECIS



Effortlessly Share Your News

For the first time, stations can easily see news at other stations in their group without effort. Oasis provides a central browser-based directory of all news with other stations authorized to see yours. You can preview a proxy video, request any story with two clicks and receive it over the public internet. Oasis provides a whole new way to share news across groups, regions or the world.

Fast Remote Contribution and Production for Multiple Platforms

Specialized UDP software allows submissions from journalists or viewers over the public internet 2-3 times faster than FTP. With just two clicks any story can be output to multiple platforms simultaneously.

The Precis and Oasis products are built on open architecture and standards-based technology which dramatically simplifies the news production process, reducing cost, complexity and time. Bitcentral utilizes HP hardware to ensure a highly reliable and supportable platform. What's more, Bitcentral installs the complete system, trains users and fully supports 24x7 all components of our system.

See why more than 70 stations in the last three years have chosen Bitcentral to manage their news production and catapult them ahead of their competition. Call Bitcentral today to learn more about Precis for cost-effective news production, and Oasis for news archiving and sharing. **1.800.214.2828**

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Producing vs. Repurposing for Multiple Platforms
by Peter Sockett, Chief Engineer, WRAL and WILM

Viewer Contribution – Dealing with Massive Media
by Fred Fourcher, President & CEO, Bitcentral Inc.

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- Material is industry targeted and thus useful in preparing for SBE certification (though not designed for any specific SBE certification test).
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COST, IT PAYS!**

Continues from page 138

MEDIA MANAGEMENT SYSTEM
FOR-A MediaConcierge

Converts between common file and digital video formats, facilitating search, browse, and file delivery; interfaces to third-party media content databases and archives; performs the unified management of different media files, such as media ingest and format conversion, so that each media asset can be repurposed for delivery via a variety of outlets, including broadcast, the Internet and packaged media; includes the MBP-100SX baseband converter and MXF file conversion software.

714-894-3311
www.for-a.com
 Booth: SU5220

VIRTUAL STUDIO SYSTEM
NewTek TriCaster PRO FX

Designed to enable users to produce presentations that have the impact of live television; allows simultaneous distribution to video, Internet and projectors; offers more than 20 hours of video storage capacity and full support for both 4:3 and 16:9 aspect ratios; features LiveSet live virtual set technology, improved overlay, a full-featured character generator and a new on-screen preview monitor display mode.

210-370-8000
www.newtek.com
 Booth: SL8614

HDTV/SDTV ENCODER/DECODER
NTT Electronics HV9100 series



Provides outstanding flexibility through its support of both the MPEG-2 and AVC/H.264 video compression formats; fits any situation in this period of transition between any formats; an ASIC solution enables an extremely fast boot up time of only 15 seconds; features newly developed built-in LSI which supports HD High 4:2:2 Profile; high image quality and low delay (less than 850ms).

+81 45 4533 685
www.nel-world.com
 Booth: SU10220

HD ENG/OB TRANSMITTERS/RECEIVERS
Nucomm 7 series



Capable of HD operation using built-in encoding/decoding technology; can be delivered as SD and field upgraded to HD via software key; features multiple modulation modes (VSB, COFDM, DVB-S, FM) and dual/tri-band RF outputs; consists of Channel Master TX7 portable transmitter, Channel Master RX7 portable receiver, Newscaster VT7 ENG/OB van transmitter and Newscaster CR7 central receiver.

908-852-3700
www.nucomm.com
 Booth: C6622A, OE432, C3007

INTERCOM
Clear-Com CellCom10 V1.5.7

Brings broad wireless connectivity to the company's Party-line and Digital Matrix intercom systems and allows for beltpack-to-beltpack conversations or small group conferences; the new Version 1.5.7 wireless beltpack and headset system offers new features and functionality including vibration alert for incoming calls and a battery remote display on the base station as well as remote microphone kill control from base station.

510-337-6600
www.clearcom.com
 Booth: C5908

ASSET AND WORKFLOW MANAGEMENT
Obor Digital Zeus

For physical asset management, tracks equipment using identifiers such as name, description and location; for technical workflow management, provides ticket generation and management, automatic routine ticket generation, interdepartmental communications, shift notes and service scheduling; for workforce management, offers personnel scheduling, assignment of duties, time card management and safety integration; for overall management, offers budgeting tools, key performance indicators, safety reports and training overviews.

407-352-6501
www.obordigital.com
 Booth: SU14605

HDTV CONVERTER
Harris XHD-3903



Features built-in 3Gb/s 1080p 50/59.94 processing and conversion capabilities, I-WINGS sidebar content fill, and eight AES input and output with 32 channels of internal audio processing; integrated Dolby decoding and encoding handles compressed Dolby streams.

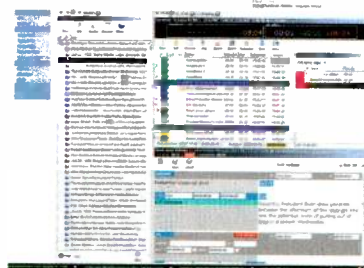
513-459-3400
www.harrisbroadcast.com
 Booth: N2502

FLUID HEAD
OConnor Ultimate 2575C

For cameras up to 90lbs; features OConnor's stepless, smooth pan-and-tilt fluid drag specifically designed for film-style shooting, as well as its patented sinusoidal counterbalance system for accurate balance at any point in the tilt range; a collapsible counterbalance crank handle and numerical readout are designed to make repeatable counterbalance easy.

818-847-8666
www.ocon.com
 Booth: C6418

NEWSROOM COMPUTER SYSTEM
OCTOPUS News OCTOPUS6



Runs on Windows, Mac and Linux OS; features single-tap search that allows users to search for wires and stories by typing the search phrase directly in the list, double-column scripting with spellchecker, mouse-free approach and live script preview, time markers to divide rundowns into segments for show planning and time stamps to keep directors aware of the footage deficiency/surplus and whether stories need to be cut or added.

+420 221 181 511
www.octopus-news.com
 Booth: N2838

TRANSCODING SYSTEM
Omneon ProExchange v.1.1

Now supports Windows Media VC-1 and Flash Video; runs on MediaGrid active storage system; provides a scalable and efficient grid-based transcoding platform; handles a wide variety of audio and video formats including H.264; conversion and rewrapping between wrapper formats supported with preservation and accurate placement of all metadata through all conversion operations.

408-585-5140
www.omneon.com
 Booth: SU9620

OPTICAL SWITCHING PLATFORM
Opticomm Optilinx OLX-3000

Switches digital signals up to 4.25Gb/s with any of its 144 ports, all housed in a compact 4RU chassis; also available in a 288-port version in an 8RU chassis; provides high-speed switching between ports with minimal effect on overall network latency.

858-450-0143
www.opticomm.com
 Booth: N3718

REMOTE CONTROL INTERFACE
Calrec Audio Remote Audio Protocol

Developed with Ross Video; allows remote control of fader modules on any Calrec console; enables a vision mixer to take control over the serial interface to autofades on the Calrec desk; provides individual control of faders, cuts and pfl of up to 192 faders on the Calrec console directly from the Ross OverDrive Automated Production Control system.

+44 1422 842159
www.calrec.com
 Booth: N8723

VERIFICATION RECORDER
Digital Broadcast MediaView

Provides ongoing verification of off-air feeds and search capability by date and time, scrubbing and burning material to CD or DVD; stores up to a year's worth of off-air feeds per station; simultaneously compares off-air feeds of multiple stations.

352-377-8344
www.digitalbroadcast.com
 Booth: SU6205

DISASTER RECOVERY
OmniBus Systems iTX Business Continuity Process

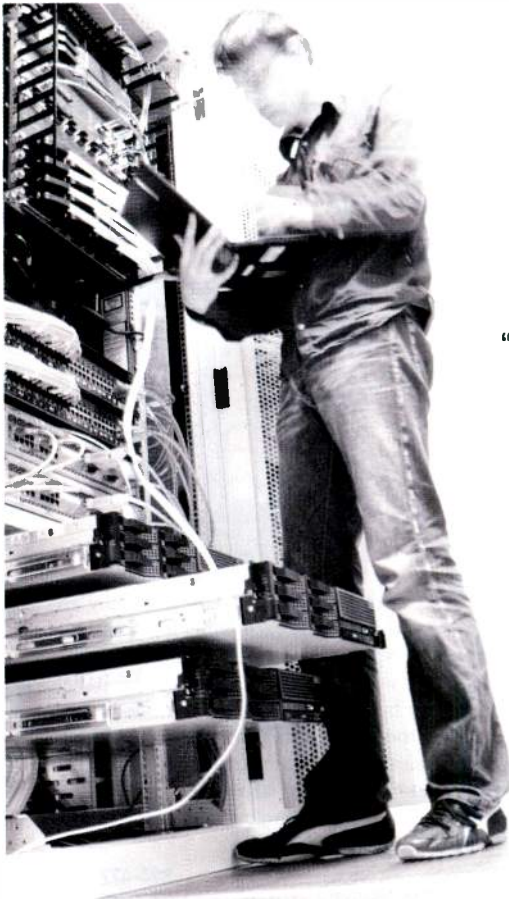
Designed for business continuity applications; includes media replication, fully redundant mirroring and remote operation after evacuation; sources content automatically from existing video servers, transferring content as required to a remote location, where and iTX playback engine interprets the transmission schedules to provide a parallel service.

303-237-4868
www.omnibus.tv
 Booth: SU4205

AGGREGATED SERVICE PLATFORM
StreamGuys

Includes various hardware and software to support a mix and match of audio and video streaming formats, with advanced services for server clustering, load balancing and performance monitoring.

707-667-9479
www.streamguys.com
 Booth: C1848



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MULTIUSER KVM SWITCH

Fujitsu FS-8000

Allows up to eight remote users to access up to 32 servers over Cat 5 UTP cabling between the main unit and the user console unit; enables remote users to access servers up to 300m away while maintaining support for XGA and SXGA monitors, and from 200m away for UXGA monitors; supports PS/2, USB, SUN MD8 and SUN USB server interfaces, as well as keyboard hot-key switching and on-screen display.

408-746-7000
www.fujitsu.com
Booth: SU10928

CHANNEL BRANDING SOLUTION

Orad Hi-Tec Systems 3DPlay



Enables broadcasters to differentiate themselves by strengthening their channel identity and increasing viewer loyalty; provides a solution for in-program advertisements, multiple tickers, promos over credits, coming up next and any other type of channel branding.

201-332-3900
www.orad.tv
Booth: SU1920

SHOULDER-MOUNT CAMCORDER

Panasonic AG-HMC70

Features a 12X 38.5mm to 462mm Leica Dicomar wide-angle zoom lens, one-push Auto Focus and integrated Optical Image Stabilization, ensuring stable images; users can capture 2.1 megapixel still images with the camcorder, even during video recording; offers three recording modes — 6Mb/s, 9Mb/s or 13Mb/s; can record more than 2.6 hours at 13Mb/s or up to six hours at 6Mb/s on just one 16GB SDHC memory card.

201-392-4127
www.panasonic.com/broadcast
Booth: C3512

CAMERA CARRIER

Petrol Dr. Petrol

Available in six sizes; semi-hard equipment bag is designed to hold a camera and accessories comfortably and securely and to offer fast and easy access to its contents; detachable padded dividers help secure contents and can be custom-configured for accessories such as batteries and a camera light; contents are cradled on all sides by layers of cushioned orange fabric; upper panels of shockproof, cold-molded laminate safeguard equipment and provide extra protection.

845-268-0100
www.petrolbags.com
Booth: C6416

GRAPHICS PREP

PlayBox Technology TitleBox

Now accepts dynamic data and features preview capabilities; TitleBox Preparation is designed for facilities that require extensive graphics design and WYSIWYG editing preview, operating with desktop preview only or with broadcast-quality video output; TitleBox Dedicated Graphics Preview is a new line of TitleBox on-air graphics servers that simultaneously supports both graphics creation and replay on two separate outputs; servers can directly extract dynamically changing data from databases through the ODBC standard.

404-424-9283
www.playbox.tv
Booth: SU11308

FIREWIRE COMPUTER INTERFACE

Prism Sound Orpheus

The 192kHz-capable unit offers eight simultaneous balanced analog inputs, four line-level jack ins and four auto-sensing mic/line Neutrik combi jacks that will accept either jack or XLR connectors; high-quality mic preamps allows the signal at the mic-level inputs to be boosted by up to 60dB (in 1dB increments); each analog input has its own adjustable patented Prism Sound Overkiller built-in to prevent signal overloads before the A/D conversion stage.

973-983-9577
www.prismsound.com
Booth: N5935

AUTOMATION SYSTEM

Pro-Bel Morpheus

New integration capabilities include support for Thomson Grass Valley's AMP protocol, Orad's 3D Play graphics device control and the Tektronix Certify Quality Control system; a new generic XML interface allows third parties to develop device drivers using RS-232, RS-422 and TCP/IP; Morpheus Panoplay feature delivers configurable channel synchronization across multiple redundant systems for both main and regional opt-outs; Morpheus Event Time Linking feature allows multiple channels to be triggered in time from a nominated event within another channel.

631-549-5150
www.pro-bel.com
Booth: SU12712

FREQUENCY CONVERTER

Quintech Electronics and Communications PULA00702150SZB000

Features phase noise and stability performance that exceeds the IESS 308/309 standard and selectable L-band frequency and frequency sense via front-panel keypad and LCD display; capable of translating 70MHz IF signals to L-band signals (950MHz-2150MHz) in 125KHz steps.

724-349-1412
www.quintechelectronics.com
Booth: C8737

ANTENNA

Propagation Systems, Inc. (PSI) Broadcast UHF Broadband Panel



Consists of high gain panels in fully enclosed radomes; each panel has four half-wave spaced dipoles and is approximately two wavelengths in length; the panels may be configured in combinations for a custom horizontal pattern or stacked to achieve power gains; can be side-mounted to an existing structure or configured about an independent support structure for top mounting.

814-472-5540
www.psbroadcast.com
Booth: C2324

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PROMPTERS

QTV Starter series

Designed to meet the requirements of smaller and nontraditional broadcast segments; the range comprises 10in and 17in prompters; bundled with Autocue's new entry-level software, QStart, which is part of the QNxt product suite; uses the same hood, mounting and bracket systems as QTV's Professional and Master series prompters; when customers decide to upgrade, they need only pay for a replacement monitor, rather than a complete new system.

203-406-1400
www.qtv.com
 Booth: C5333

TEST TRANSMITTER

Rohde & Schwarz R&S SFE100

Single-standard test transmitter is available in several models for all common TV standards and many sound broadcasting standards; uses real-time coding or operates as an arbitrary waveform generator; features an integrated power amplifier, making it suitable for use in production test systems; designed to be an easy-to-use, cost-efficient broadcast signal source.

410-910-7800
www.rohde-schwarz.com
 Booth: C1933

GROUP WORKFLOW

Quantel Genetic Engineering



Allows facilities efficient collaborative teamwork for post and DI; gives eQ, iQ and Pablo systems access to the same media and allows each to work completely independently; allows multiple users to access the same clips at the same time without copying or moving media; allows all resolutions for playback in real time without creating any new media.

+44 1635 48222
www.quantel.com
 Booth: SL720

MADI CARD

**Riedel Communications
 MADI-108 G2**

Provides a MADI interface that allows the integration of the Artist intercom platform with digital audio router systems; facilitates the connection of the intercom panels to the audio router using the router's infrastructure for panel distribution; card is cascadable, with each card adding eight channels to the MADI signal for up to a maximum of 64 channels.

914-592-0220
www.riedel.net
 Booth: C7511

ROUTERS

QuStream Cheetah

Includes four new video interface modules; the CH-ADSDI-IN is a video input card with composite A/D decoder input and features include genlock synchronization of all inputs to external reference, proc amp control of each individual input and high-quality A/D conversion with Quadracomb technology; the CH-INPUT-3GB-BNC is video input card with 16 individual source channels accepting up to 3Gb/s in a standard input card slot; the CH-OUTPUT-3GB-BNC is a multi-bit rate video output card operating at up to 3Gb/s and can deliver up to 16 individual outputs from a standard output card slot; the CH-HDSDI-OUT-BNC is a video output card with integral HD to SD downconversion.

416-385-2323
www.qustream.com
 Booth: N3421

**SURROUND SOUND CONTROL/
 MONITOR/ANALYZER**

RTW SurroundControl 31900/31960

Uses RTW's Surround Sound Analyzer technology; 31900 designed for studios and fits in 19in 1RU case; 31960 designed for waveform monitors in video studios in half 19in 3RU rack-mountable module with 19in installation racks; feature an HD/SD-capable SDI de-embedder interface and analog/digital audio I/O; can access all 16 (4 x 4) audio channels implemented in SDI streams and use them for visual display and audio monitoring.

+49 221 70913 0
www.rtw.de
 Booth: N3223

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RF Central RFX-RMR-II



Operates in 2GHz frequency band and receives SD/HD signals, outputting composite video, HD-SDI or DVB-ASI; features analog, digital and fully embedded audio outputs and a fully upgradeable COFDM decoder; demodulation modes include OPSK, 16-QAM and 64-QAM with auto detection.

717-249-4900
www.rfcentral.com
 Booth: C6622

**PRODUCTION SWITCHER
 CONTROL PANELS**

**Ross Video Vision 1M,
 Vision 2M and Vision 2X**

The Vision 1M and Vision 2M panels offer 24 crosspoint buttons, while the Vision 2X offers 32 crosspoint buttons; all of the control panels can control up to four M/Es of video processing and connect to the Ross MD and MD-X live production engine chassis; RGB buttons allows personalization of the control panel; a DualDisplay color touch-screen allows the operator to view and control two menus simultaneously.

613-652-4886
www.rossvideo.com
 Booth: SU6010

SENSOR FEEDBACK SYSTEM

**SAMMA Systems Automated Media
 Condition Rating technology**

Automatically rates the physical condition of tapes during the initial stage of the migration process; gives immediate feedback to the tape cleaning operator, thus slashing time and increasing efficiency; eliminates guess work and removes human error; will be added to the company's Eye software.

646-240-4045
www.sammasystems.com
 Booth: SU2720

STUDIO LIGHTING

Kino Flo VistaBeam 600 and 300

Large area studio soft lighting fixtures; feature DMX control systems and ability to produce daylight or tungsten balanced light from the same fixture and flicker-free, remote operation; VistaBeam 600 delivers the equivalent of a 6000W space-light, but uses only 10 amps of power.

818-767-6528
www.kinoflo.com
 Booth: C9419

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 Sachtler Reporter 8LED Light



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845-268-0100
www.sachtler.us
 Booth: C6410

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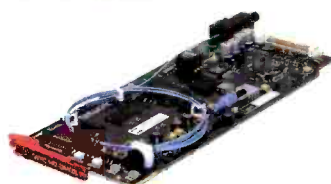
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www.tsl.co.uk
 Booth: SU14615

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954-334-5406
www.scheduall.com
 Booth: SI2308

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800-420-5909
www.network-electronics.com
 Booth: SU10814

LENS ACCESSORIES
 Schneider Optics Century Pro Series HD lens



A new line of Century HD lens accessories created to complement Sony's new PMW-EX1 camcorder; provide unprecedented image clarity, while enabling the camera to go wider, reach further and move in closer than the lens alone will allow; the new lens accessories include the .6X HD Wide Angle Adapter (#0HD-06WA-EX1), .75X HD Wide Angle Converter (#0HD-75CV-EX1), 1.6X HD Tele-Converter (#0HD-16TC-EX1), Super Fisheye HD Adapter (#0HD-FESU-EX1), and the Extreme Fisheye HD Adapter (#0HD-FEWA-EX1).

818-766-3715
www.schneideroptics.com
 Booth: C6233

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Screen Service Broadcasting Technologies MAGNUM series

Designed for SFN and MFN networks; features a built-in SFN adapter and advanced technology, which allows implementation of all modulation patterns for either digital or analog in the same hardware; firmware allows zero error signal processing due to an internal 32-bit architecture.

888-522-0012
www.screen.it
 Booth: C1324

MOBILE TV ENCODER

Scopus Video Networks UE-9610



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609-987-8090
www.scopus.net
 Booth: SU11228

HANDHELD HD CAMCORDER

Panasonic AG-HMC150



New addition to the AVCHD product line; features three native 16:9 progressive 1/3in CCD imagers with an optical image stabilization function to ensure stable shooting and a 28mm Leica Dicomar wide-angle zoom lens; offers 1080i and 720p recording at 13Mb/s; additional features include professional XLR audio input connections and a wide range of data and signal interfaces.

201-392-4127
www.panasonic.com/broadcast
 Booth: C3512

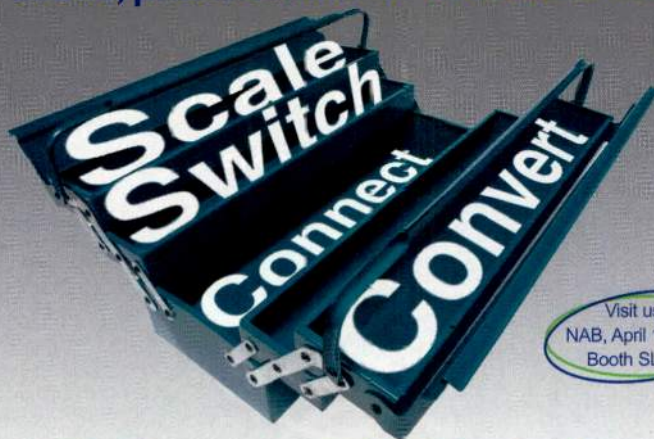
PORTABLE MICROWAVE

Microwave Radio Communications OB5000

Designed to address the need for high-capacity data throughput in portable microwave links that support outside broadcast with split systems (two-box) applications; compatible with the company's existing RF heads and supplies the control and baseband feature set expansion necessary to support the next generation of digital and data applications; allows simultaneous distribution of HD and SD high data rate signals for contribution applications from the field.

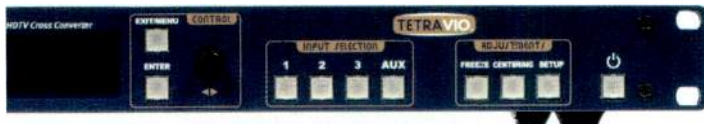
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954-334-5406

www.scheduall.com

Booth: SL2308

MEDIA REPURPOSING

Screen Subtitling Systems MediaMate

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www.screen.subtitling.com

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www.sencore.com

Booth: SU12108, N1122

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Sennheiser MKE 400



Features directional super-cardioid/lobar pattern, a control key on the permanently polarized condenser mic, a switchable wind filter, foam windshield, battery and microphone shock mount; increases the range of the mini-shotgun mic; permits the recording of low-level sound sources; delivers more than 300 hours of professional sound on a single AAA battery.

860-434-9190

www.sennheiserusa.com

Booth: N8207

ROBOTIC PEDESTAL

Shotoku Broadcast Systems TRP-100



Allows full X, Y and height camera movement as well as pan and tilt; navigation can be calibrated easily with a target tile placed anywhere on the studio floor; features pneumatically balanced, three-stage height mechanism; supports any camera configuration up to 220lbs while gliding through 2.5ft of elevation at up to 1ft/s.

310-782-8491
www.shotoku.tv
Booth: C7515

MULTIFORMAT ROUTING SWITCHER

Sierra Video Ponderosa

Includes I/O sizes up to 128 x 128, digital to analog conversion boards and analog and digital audio options; can pass standard serial digital video signals including SMPTE 310M, 259M, 344M and DVB-ASI along with HD signals conforming to SMPTE 292M; features hot-swappable video I/O boards, optional redundant control processors and power supplies, an RS-232/422 serial interface as well as a standard TCP/IP port for Ethernet control.

530-478-1000
www.sierravideo.com
Booth: S14305

MANAGEMENT SYSTEM

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www.sintecmedia.com
Booth: N3138

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Enables browse copies of archive material to be stored outside of an Avid ISIS Media Network, providing a fast, cost-effective solution for post-production facilities and broadcasters; provides an interface, independent of Avid's Interplay nonlinear workflow engine, allowing material to be searched, viewed and then automatically restored back into the Avid ISIS Media Network.

615-324-3613
www.sgluk.com
Booth: SU11926

AUDIO RECORDING SOFTWARE
Sound Devices Wave
Agent Software

Compatible with both Mac and PC platforms; provides comprehensive metadata editing tools and file playback for sound files recorded with the company's 7-Series digital recorders; can be downloaded for free at the company's Web site; helps users manage and edit Broadcast Wave file metadata (BEXT) and iXML metadata and allows for batch editing of large file libraries; generates sound reports and standard .ALE (AvidLogExchange) files.

800-505-0625
www.sounddevices.com
Booth: N7235

TRANSLATION APPLICATION
Solid State Logic Pro-Convert

Enables DAW users to convert session files from one format to another; can handle many commonly used formats, including the latest versions from AES31, Audition, Cubase, Final Cut Pro, Nuendo, OMF, Open TL, ProTools, SADiE, Sequoia, Sonic Studio, Soundscape, Tascam BU and Vegas.

212-315-1111
www.solid-state-logic.com
Booth: N4031

PORTABLE STORAGE SYSTEM
Sonnet Technologies Fusion F2



Provides 640GB of storage with two individually shock isolated 320GB/5400rpm 2.5in drives mounted side-by-side in rugged aluminum 5.9in x 6.2in x 0.72in enclosure; features two eSATA data connections and a FireWire 400 port; designed for use with the Sonnet Tempo SATA ExpressCard/34 host adapter for MacBook Pro and PC notebooks; supports professional content capture in conjunction with AJA Video Systems' Io HD.

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www.sonnettech.com
Booth: SL13808

MICROPHONE
Sony Electronics C-800G

Vacuum tube condenser mic uses a vacuum tube selected for optimum sonic quality at high frequencies and with low noise levels; features a sensitivity of -28dB; incorporates a built-in thermoelectric cooling system employing a semiconductor device, heat pipe and heat sink, as well as a two-part aluminum body that helps to prevent acoustic vibration from reaching the mic capsule; provides electronically selectable directivity, either omni- or unidirectional.

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818-771-1850
www.spencer-tech.com
Booth: N3836

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Staco FirstLine



Available for 10kVA, 15kVA and 20kVA applications; allow users to network this UPS with their manufacturing and management systems; features SNMP capabilities; offers Web browser-based visual readings, alarm notification, a 48-hour system history, as well as client shutdown software for operating systems.

866-261-1191
www.staco-news.com
Booth: N4218

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 Mediagroup) NEXUS**

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888-782-4391
www.stageteq.com
Booth: N2835

ENCODER
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Software Encoder



Designed as software-based solution ported to a variety of mobile devices; transports broadcast video over Wi-Fi and 3G networks for real-time and store-and-forward news coverage; provides mobility without sacrificing performance, reliability, or quality; features the ACT-L3, providing video compression and error correction and bandwidth shaping, for managing, controlling and recovering lost packets and correcting irregularities common to video delivery over Wi-Fi and 3G networks.

206-956-0544
www.streambox.com
 Booth: SU15515

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www.studer.ch
 Booth: N8229

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201-368-9171
www.ikegami.com
 Booth: C4228

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+49 2408 9596-100
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EDITING SYSTEM FEATURE

Sundance Digital Publish to Sundance (P2S)

New feature available within Avid editing systems enables the seamless migration of finished content directly to the broadcast facility's play-to-air server, complete with its metadata; incorporates the functions of Sundance Digital Titan and FastBreak NXT, Avid Interplay and its Media Services Engine, and Avid ProEncode using the Telestream or Agility Anystream transcoding engines.

972-444-8442
www.sundancedigital.com
 Booth: N/A

CAPTION PREPARATION SYSTEM
SysMedia WinCAPS

Integrates audio, video and text processing to deliver a workflow that saves time, money and effort for any show — live or recorded TV programs, DVD or digital cinema movies; captions and subtitles can be delivered in multiple formats using the InVISION open caption generator, Line 21 data inserters and the DVD asset builder, or embedded into media files for file-based workflows using InFILE.

+44 1293 814 200
www.sysmedia.com
 Booth: SU14317

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800-833-9200
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 Booth: N2520

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Enables ultra-low bandwidth video broadcasting to mobile devices such as cell phones, media players, in-car systems and laptops; supports the required encoding and content scrambling for broadcast DVB-H, 3G MBMS and unicast 3G streaming; sits at the core of an end-to-end system for mobile TV that offers picture quality at bandwidths of 200kb/s to 300kb/s, with up to eight channels per rack unit.

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 Booth: SU4210

WALL MONITOR SYSTEM
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www.tbconsoles.com
 Booth: SU2729, SL6709

GAP-FILLER ENGINE
TeamCast GFX-0300

Features input tuner and optimized on-channel repeater technology; available for VHF and UHF bands in 6MHz and 8MHz channels; can be used for mobile TV applications meeting the DVB-H and FLO standards and digital TV applications meeting the DVB-T and ATSC standards.

312-263-0033
www.teamcast.com
 Booth: C3020

HD NEWS PRODUCTION
Video Technics HDX NewsFlow

Provides end-to-end news production of HD content; includes a new VT Studio Pro RTX.2 HD nonlinear editor, supporting native HDV 1080i, HDV 1080p, HDV 720p (JVC ProHD), Panasonic P2 MXF 720p and MPEG-2 4:2:2 I-frame HD editing; also includes the new Apella HDX video server.

404-327-8300
www.videotechnics.com
 Booth: SU9227

FIBER-OPTIC MODULES
Telecast Fiber openGear fiber-optic modules

Support openGear terminal equipment platform from Ross Video; based on an open architecture, 2RU modular frame, designed to accommodate up to 10 cards; allows facilities the freedom and flexibility to choose the best technology for their particular applications; customers are no longer locked into one manufacturer's frame standard and modules for their terminal equipment solutions; also provides the platform with a control system that allows quick and easy monitoring and control of frames and modules on the network.

508-754-4858
www.telecast-fiber.com
 Booth: SU4227

BELT-DRIVEN TRACK SYSTEM
Telemetrics BT-X/Z3-VS

Offers both vertical and horizontal positioning to pan-and-tilt camera movement; controllable using the various control panels and computer software with position, preset and motion control capability; allows track lengths and configuration specified by the user; includes wall, ceiling or floor mounting brackets, floor leveling feet, cable track and P/T mount, including the motor drive panels and motors.

800-424-9626
www.telemetricsinc.com
 Booth: C6933

DUAL QUAD-SPLIT PROCESSOR
Miranda Technologies Kaleido-Quad-Dual



Combines two independent, high-quality quad-split processors in an 1RU frame; designed for applications such as mobile truck monitoring, which typically demands high density monitoring across multiple, high-quality but inexpensive LCD monitors; provides full flexibility with respect to the sizing and positioning of the HD/SD/analog video windows; features 2 x 4 auto-sensing HD-SDI/SDI/analog composite video inputs, and two high quality DVI outputs with up to 1920 x 1200 pixels.

514-333-1772
www.miranda.com
 Booth: SU6811

LCD TELEPROMPTER

Telescript FPS200R



A 20in LCD teleprompter combined with a 20in confidence monitor set above the camera lens; delivers professional quality performance and operation; ideal for use with the company's TeleScript line of prompting software; offers a cost-efficient teleprompting solution for the wide range of broadcast and professional applications now being fulfilled with robotic pan and tilt systems; features an above the lens mounting system for the confidence monitor that enhances weight distribution and spreads load balance.

201-767-6733
www.telescript.com
 Booth: C5933

MEDIA ENCODER

Telestream Episode Podcast

Developed specifically for Apple's Leopard Server Podcast Producer; extends Apple workflows to include high-volume encoding to virtually any video or audio file format or platform; enables anytime, anywhere access to podcasts for PC and Mac users as well as a greater number of mobile phones and portable devices.

530-470-2057
www.telestream.net
 Booth: S15405

WIRELESS INTERCOM

Telex RadioCom

Supports two to 10 users for full duplex operation and an unlimited number of listen-only users; features easy setup and expansion, as well as 64-bit audio encryption; option of three audio channels selectable at each TR-24 belt pack; base station automatically scans and selects best RF channel for communication.

952-884-4051
www.telexintercoms.com
 Booth: C5928

EFP/ENG LENSES

Thales Angenieux 19 x 7.3 lenses



The 19 x 7.3 AIF general purpose ENG/EFP lenses are available in SD, HD and economically priced HD-E versions; features an ergonomic, lightweight design and extended focal range of 7.3mm to 139mm; weighs only 4lbs with 2X extender and 3.7lbs in the HD-E; sturdy construction is resistant to condensation, dust and rain; offer digital features including memorized focus and zoom positions, an anti-backlash system and auto cruise zoom function.

973-812-3858
www.angenieux.com
 Booth: C5323

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DUAL-CHANNEL FRAME SYNCHRONIZER

Teranex VC100

Single-channel unit upgrades to dual channels; features flexible video and audio I/O, AES/analog I/O, FlexView aspect ratio, SD 608 and HD 708 closed captioning, integrated video and tone test signal generator, and redundant power supplies; front-panel LCD serves as video I/O monitor and menu display.

407-858-6000
www.teranex.com
Booth: SU10924

VIDEO/KVM EXTENDERS

Thinklogical Enhanced Visualization Solution (EVS)



Allow IT engineers to simplify and centralize the control of broadcast devices and critical computing resources by back racking them away from the broadcast studios; gives operators the access they need to generate and manipulate video and audio content; digital signage harnesses EVS video extension technology to power large LED signs, LCD and plasma display panels, and kiosks.

203-647-8700
www.thinklogical.com
Booth: SL2009

EAS NETWORK RECEIVER

Trilithic EasyIP

For the receipt and delivery of EAS messages in video delivery networks; extends the area of message reception for a cable TV or IPTV network, while improving the reliability of the message delivery; receives messages from monitored EAS radio stations, and then logs and queues the EAS message for delivery to the EAS encoder/decoder; when the encoder/decoder is ready for the message, it is handled and distributed to viewers, eliminating the potential for lost messages.

800-344-2412
www.trilithic.com
Booth: C3346

HD/SD DIGITAL CAMERA

Thomson Grass Valley Infinity



Captures using three 2/3in CMOS imagers and records to integrated REV PRO and CompactFlash media or external devices; supports DV25, Infinity JPEG2000 and MPEG-2 compression schemes; features USB and FireWire ports to connect standard IT peripherals and a GigE port allowing file transfers into a storage and post-production network while the camera is recording.

800-547-8949
www.thomsongrassvalley.com
Booth: N1313

CONVERTERS

TV One CORIO2 C2-2000 series

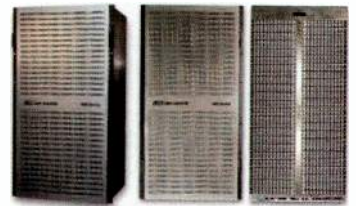


The C2-2355A features HD-SDI up-, down- and crossconversion; the C2-2205A and C2-2255A offer up- and crossconversion; the C2-2105A and C2-2155A provide downconversion; series includes automatic incoming resolution detection and support of multiple worldwide television standards; can handle a maximum input PC resolution of 2048 x 2048 and HDTV resolutions up to 1080p; feature variable zoom up to 10X, allowing enlargement of any part of the computer screen while variable shrink can go down to 10 percent.

800-721-4044
www.tvone.com
Booth: N1725

ROUTERS

Utah Scientific UTAH-400



The series of digital routing switchers includes a new frame for large routers up to 528 x 528 with fully automatic internal crosspoint redundancy, and a second new frame that extends the UTAH-400 family's functionality to even larger matrix sizes; the new UTAH-400/528R frame allows users to install a full 528 x 528 router in just 20RU using standard 75Ω BNC coaxial connectors; frame offers the option of a redundant crosspoint module for service reliability in mission-critical applications for large routing systems.

801-575-8801
www.utahscientific.com
Booth: N3531

AUTOMATION SYSTEM

VCI Solutions autoXe MC

Enables automated content lifecycle management; enables operator to manage one, 15, 50 or more channels with one workstation, in one screen using monitor by exception; houses all metadata in one database allowing multiple users simultaneous access without the need for a dedicated workstation.

413-272-7200
www.vcisolutions.com
Booth: SU727

ACTIVE STORAGE SYSTEM

Omneon Media Grid v. 2.1

Now includes a smaller, more affordable, entry level system suitable for a wider range of facilities, such as local broadcast stations, post-production facilities, and corporate A/V departments; uses multiple intelligent, interconnected-yet-independent storage servers to combine grid storage and grid computing to retrieve digital media quickly; scalable in capacity, bandwidth and processing power; new features include the ability to create storage reservations so that individual users are guaranteed a minimum amount of storage, tail-mode FTP to support active workflows in conjunctions with non-Omneon servers, and more robust system monitoring and reporting.

408-585-5140
www.omneon.com
Booth: SU9620

GRAPHICS CREATOR
 Video Design Software Twister
 PaintStation HD



Combines full feature graphic design tools with custom browser utilities to address workflow issues that broadcasters face; features a browser that allows the movement of content and use files between practically any related broadcast device, regardless whether it is open or proprietary in nature, or if it is local or remote.

631-249-4399
www.videodesignsoftware.com
 Booth: SL124

STUDIO LIGHTING
 Videssence P110-255BX Power Key

Provides 110W coverage using two 55W Bi-x lamps; features a simple adjustment mechanism that moves the lamp within the fixture for 60-degree, 70-degree or 90-degree spread, and an adjustable rotating mounting yoke; available in dim and non-dim configurations; UL/CUL/CE approved.

626-579-0943
www.videssence.tv
 Booth: C9508

**VIDEO CAPTURE
 CARD SOFTWARE**
 ViewCast Niagara SCX

Gives users streamlined control and monitoring of multiple encoders from a single interface; offers live streaming encoding abilities for Windows Media and RealVideo formats (Pro version adds encoding for MPEG-4, H.264 and H.263 formats); features data reporting, remote management and optional Live Flash streaming capability.

972-488-7200
www.viewcast.com
 Booth: SL13109, SL14900MR

HD/SD-SDI EMBEDDER
 Cobalt Digital COMPASS 9323

Offers sample rate conversion, audio level, channel phase inversion, channel mapping and video level controls; features audio processing at 24-bit with 16 AES inputs, eight analog audio inputs, 16 AES outputs with 16 channels of audio de-embedding and embedding, with 16 channels of SRC, allowing retiming of the audio; designed to be installed in openGear frame.

800-669-1691
www.cobaltdigital.com
 Booth: N2819

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Main Features

- Based on NTT Electronics' state of the art LSI
- H.264/AVC and MPEG-2 support
- 4:2:2 and 4:2:0 support
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- Greatly enhanced audio features
- Zero Lipsync error
- Built-in Ethernet interface (optional)
- Built-in SNMP functionality and FTTP menu
- Built-in BISS-1/E functionality (optional)

Markets and Applications

- Broadcast contribution
- Satellite, cable, terrestrial distribution
- Video over IP
- Storage, and server applications

MPEG-2 to H.264/AVC
HD/SD Transcoder

HVT9100 **NEW**

Main Features

- Based on NTT Electronics' state of the art LSI
- Converting MPEG-2 content to H.264/AVC without quality loss
- Cross carriage and re-syncing of audio or metadata services such as closed captions

Markets and Applications

- IPTV headend solution
- DTH satellite service
- Video over IP
- Storage, and server applications

"Visit our booth at NAB Stand # SU10220"

To see NTT Electronics solutions, visit <http://www.nel-world.com/products/video>

NEL America, Inc.
 E-mail: na@nel-america.com
<http://www.nel-america.com/>

NTT Electronics Corporation
 E-mail: mm_t@yoko.nel.co.jp
<http://www.nel-world.com>

FLUID HEAD/TELEPROMPTER

Vinten iScript

Compact and portable; fits in one custom-built rolling case; smart fluid head and teleprompter combination is designed to work with the mains or battery-powered GoPrompt 12 system from Autoscript; can be combined with a Vision Ped Plus pedestal or Pozi-loc tripod; ideal for studio applications or remote, rugged location work.

845-268-0100
www.vinten.com
Booth: C6412

A/V DELAY MEASUREMENT OPTION

Tektronix WVR7120/WFM7120

Intended for out-of-service use as part of a normal installation or maintenance process; gives the installer an added dimension of testing to ensure complete system integrity; the combined graphic and numeric readout accommodates a variety of needs for ease of use, speed and precision; the graphical display visually shows when the system under test is either advanced or delayed with respect to the zero reference.

800-833-9200
www.tektronix.com
Booth: N2520

CLIP AND STILL STORE

Vizrt Viz Quattro

Allows operator to access and create fully integrated graphics and videos directly from newsroom systems; extends the HD and SD channel branding with an intuitive solution for browsing and adding videos by putting video content on top of the current images and 3-D elements when integrated in a graphic workflows, such as as Viz Content Pilot, with video asset management solutions, such as Viz Video Hub.

212-560-0708
www.vizrt.com
Booth: S14805, R129

AUDIO DEMUXER

Ward-Beck Systems M6202A

Accepts an SD or HD digital video signal and extracts up to six AES/EBU signals; available in 75Ω and 110Ω versions with optional integrated Dolby E/AC3 decoder; housed in openGear frame; controllable using the dashboard remote control and monitoring software application.

416-335-5999
www.ward-beck.com
Booth: SU7420

VIDEO MONITORING SOLUTION

Volicon Observer Quality Assurance Module

Automatically detects a wide variety of audio and video errors including macro-blocking, or pixelization of the image due to video stream errors or overcompression; also performs quality checks for such errors as black or frozen screen, low volume or missing audio and missing closed captions; the Quality Assurance Module provides an automated method for analyzing a video image to detect macro-blocking, which has traditionally required human intervention to spot the on-screen anomalies.

781-221-7400
www.volicon.com
Booth: N2514

ALL-DIGITAL FIBER-OPTIC SYSTEM

Communications Specialties Pure Digital Fiberlink 3150 series



Provides broadcast-quality transmission for HD/SD-SDI over one single mode or multimode fiber; allows transmission of HD or SD-SDI as per SMPTE 292 and 259, with or without embedded audio and data, as well as DVB-ASI; equalizes and reclocks signals prior to fiber-optic transmission; features a reclocked and equalized SDI loop through, and the 3151 receiver features two reclocked and equalized SDI outputs.

631-273-0404
www.commspecial.com
Booth: S18025

HD VIDEO RECORDER

Wafian HR-2

The 10-bit 4:4:4 dual-link HD-SDI recorder for digital film workflows records into the CineForm 444 format at 360Mb/s; records to both AVI and MOV formats; a built-in touch-screen LCD panel allows users to easily change recording settings and to review their footage immediately after shooting with the speed of nonlinear access; records full-resolution from HD-SDI and HD component feeds from most HD cameras.

858-863-4166
www.wafian.com
Booth: C11016

RECEIVER/UPLINK NETWORK CONTROLLER

WEGENER COMPEL Network Control

Issues commands that are synchronized with audio and video programming; enables users to create up to 6400 groups that can be commanded to perform specific functions simultaneously; optional software modules allows users to access the system via the Internet, transmit multimedia content using DVB's IP data multicapsulation protocol and enable secure conditional access.

770-814-4000
www.wegener.com
Booth: SU7911

CONSOLE

Wheatstone Air 1

Ultra-compact console is designed to meet the needs of on-air, production, news applications, remotes and the podcasting markets; the low-profile frame comes equipped with a rugged tabletop mount with direct access TRS rear connectors.

252-638-7000
www.wheatstone.com
Booth: N7612

COAX CABLE TEST KIT

White Sands Engineering Coaxial Cable Test Kit

Designed to simplify the testing and remote identification of coaxial cable assemblies; adapter cables enable the tester to be used with a variety of A/V connectors, including F, BNC, RCA and SMB; includes a TSTL-3A cable tester, seven adapter cables, one F-female adapter, one AAA battery and a carrying case.

800-586-7377
www.whitesandsengineering.com
Booth: C1736

CONSOLE

Winsted Prestige

Features include recessed viewing angles, proper monitor distances and adjustable flat-panel screens, which eliminate eye-strain and reduce fatigue; have welded end frames with anti-tip legs and adjustable leg levelers; have proper air circulation for electronics, cable and wire management troughs with EZ hinge door access, and front- and rear-locking spring latch doors with CPU/storage shelves.

952-944-9050
www.winsted.com
Booth: SU5616

CUSTOM PANELS AND PLATES
 Wireworks LumaVue



Can be rear-illuminated for instant identification, making them ideal for use in low-light truck interfaces; UV-stabilized for outdoor use; feature nonmetallic cell cast acrylic for maximum durability and efficiency; panels will not rust or tarnish, even under sustained extreme weather conditions; panels are rear-engraved, so their markings cannot be marred or destroyed.

800-642-9473
www.wireworks.com
 Booth: C7924

AUDIO PROCESSING
 Wohler Technologies Wohler Plus



Provides a variety of DSP options so that each unit can be configured for the specific functions required by a facility; a modular system that features flexible inputs (16 channels or eight AES pairs) and outputs, alarms, monitoring and metering, as well as multiple channel synchronizing and shuffling of channels for 5.1 or 7.1 signal confidence; includes optional inputs for AES and multirate serial digital embedded audio with Dolby encoding.

510-870-0810
www.wohler.com
 Booth: N1314

DIGITAL AUDIO MIXER
 Euphonix S5 Fusion



Features DSP SuperCore, which powers the mixer's signal processing and routing, providing full multiformat channels with EQ, filters and dynamics together with mix, aux and group busses with bus processing; EuCon Hybrid, which incorporates the EuCon high-speed Ethernet protocol, extends the control capabilities of the console beyond the DSP SuperCore to bring Mac and PC DAW tracks onto the console surface for mixing.

650-855-0400
www.euphonix.com
 Booth: N5217



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XOrbit ProofPositive

Deploys systems directly in consumer homes that can automatically capture aired programs in their entirety; server installed in the master broadcasting facility uses an algorithm to compare the stream for the consumer's location with the master broadcast stream; identifies anomalies that drop below the predefined threshold and automatically alerts the broadcaster.

301-362-9500
www.xorbit.com
 Booth: SL6226

**WORKFLOW MANAGEMENT
 SYSTEM**

Xytech Systems
 Enterprise Version 11

Provides a complete, end-to-end solution for the creation, management, scheduling, tracking and delivery of physical and digital media assets; automates and streamlines media business operations, including business workflow, resource scheduling and media asset management; additions include a new Web-based service request module, which allows users to remotely browse through media assets, preview, select and order media assets, as well as request related services, such as delivery or shipments, dubbing, conversion, rental and resources; requests are then converted into work orders and media orders while scheduling the appropriate resources.

818-303-7800
www.xytechsystems.com
 Booth: SL4326

AUDIO RECORDER/MIXER

Zaxcom Fusion



Can mix 16 inputs to eight output busses for recording up to eight tracks; records to two CompactFlash cards simultaneously; features four balanced AES inputs with sample rate conversion to allow eight channels of audio to come from four different devices with varying sample rates or unlocked sample rate clocks; provides an effects package.

973-835-5000
www.zaxcom.com
 Booth: N4533

DIGITAL MIXING SYSTEM

Yamaha Commercial Audio
 Systems DSP5D

Rack-mountable unit can be seamlessly controlled from a PM5D console; offers 48 mono and four stereo inputs, 24 mix buses and eight matrix buses, 24 omni outputs, eight effect processors and 12 graphic equalizers, full compatibility with DSP5D Editor computer software, and full channel functionality — gain, EQ and filters, dynamics and sends.

714-522-9063
www.yamahaca.com
 Booth: SL5710

SIGNAL PROCESSORS

QuStream Integrity 600



Based on the FRM603 high-speed chassis; offers high component density and high-level redundancy; features include redundant power supply and optional redundant control plus reference board for two power busses, two Ethernet busses and two reference signals to every card in the system, as well as two sets of fans with individual tachometers for early warning of potential fan failure.

416-385-2323
www.qustream.com
 Booth: N3421

MONITORING SYSTEMS

Newpoint Technologies Mercury
 RSM and EM

Element managers that interface with equipment and automating service restorations at unmanned remote sites around the globe; send data to a network management system; data can be transmitted back to the NOC using a WAN, dial up, satellite overhead or by using the Iridium service; allows end users to define primary and multiple backup paths to remote sites; offered with options for a RAID hard drive arrangement and integrated battery backup to ensure that hard disk failures do not affect remote site operations until a technician can replace the failed hard disk.

603-898-1110 x211
www.newpointtech.com
 Booth: C9837

NEWS SYSTEM

Quantel Newsbox HD



Arrives ready to go on-air straight out of the box; available in both HD-now and HD-upgradable configurations, allowing broadcasters to manage their HD investments; works with all the latest HD acquisition formats; comes with all that is needed to ingest material, view rushes, choose shots, edit stories, review finished pieces and play them out to air; features new options that increase flexibility and applications.

+44 1635 48222
www.quantel.com
 Booth: SL720

MOBILE TV TRANSCODER

ENENSYS TransCaster

Directly converts existing TV content from satellite, terrestrial and IP networks into mobile TV content format; supports native MPEG-4 AVC/H.264 (video) and AAC-HE (audio) encoding at broadcast quality; integrates encoding and preprocessing engines; provides multichannel encoding in 1RU.

949-226-8056
www.enensys.com
 Booth: SU11111

HDV CAMERAS

Sony Electronics HVR-Z7U
 and HVR-S270U

Feature interchangeable lens systems, native progressive recording, increased sensitivity for low-light conditions and hybrid solid-state recording; the HVR-Z7U (handheld) and HVR-S270U (shoulder-mount) camcorders use the company's 1/3in three ClearVid CMOS Sensor system enhanced by Exmor technology, which features a unique column-parallel analog-to-digital conversion technique and dual noise canceling; offer sensitivity of 1.5lux.

201-930-7330
www.sony.com/professional
 Booth: SU906

FRAMEWORK

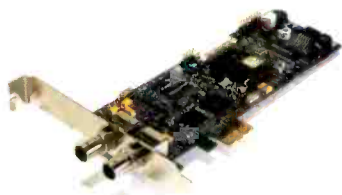
IBM Media Hub

Helps to solve critical issues in systems integration, process integration and connectivity; allows for processes to be analyzed, understood, streamlined, improved and changed dynamically to meet business needs.

919-517-0411
www.ibm.com/media
Booth: SU3614

VIDEO STREAMING CARD

ViewCast Osprey-700 Hde



Streams SD/HD content over IP video distribution and VOD applications; adapts to any incoming SD/HD standard without interrupting the encoding session; uses an array of Designed for Live features that give users greater reliability, logo bitmap overlays and automatic logo sizing and repositioning when switching between any supported SD/HD modes.

972-488-7200
www.viewcast.com
Booth: SL13109, SL14900MB

IP ROUTER

Utah Scientific UTAH-400 iP



A 24-port IP router; gives broadcasters real-time, on-the-fly control of port priority, security groups and port speed on Ethernet networks; increases workflow efficiency in broadcasting or any situation where large video files or high-bit-rate streaming video are transferred over an Ethernet network; allows IT and traditional broadcast technology to be integrated seamlessly.

801-575-8801
www.utahscientific.com
Booth: N3531

DIGITAL MIXING CONSOLES

Yamaha Commercial Audio Systems LS9 series

Consists of the 32-mic/line input 64-channel LS9-32, and the 16-mic/line input 32-channel LS9-16; compact and light enough for one person to move; offer easy setup; feature an extensive range of gating, compression and equalization capabilities, as well as a built-in USB memory recorder/player for recording or BGM playback.

714-522-9063
www.yamahaca.com
Booth: SL5710

ARE YOU ONE-OF-A-KIND, TOO?

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2.4GHZ WIRELESS INTERCOM
Telex BTR-24

Incorporates the option of three audio channels, selectable at each TR-24 belt-pack; upon startup, the BTR-24 base station automatically scans and selects the best RF channel for communication using a feature called ClearScan; has built-in Li-Ion battery pack to provide up to 10 hours of uninterrupted operation, or the unit can be operated with the included wall-mount AC power supply; includes rack-mount hardware.

952-884-4051
www.telexintercoms.com
Booth: C5928

CONSOLE FURNITURE
TBC Consoles IntelliTrac

Allows unlimited lateral positioning of critical monitors via front and rear device tracks; features easily upgradeable rack bay turrets and removable vented abs panels; includes a full range of articulating arms for distance, height and tilt control for mounting flat-panel monitors, speakers, phones and task lighting.

888-266-7653
www.tbconsoles.com
Booth: SU2729, SL6709

VIDEO HEADEND PLATFORM
TANDBERG Television iPlex

Includes MPEG-2 SD encoding, MPEG-4 AVC HD and SD encoding, MPEG-2-to-MPEG-4 AVC transcoding, MPEG-2 transrating and picture-in-picture (PIP) service generation; features a high-density, NEBS-certified, telco-designed chassis; offers improved motion estimation process, single-slice video processing architecture and dedicated processing for low-res encoding of PIP services.

678-812-6300
www.tandbergtv.com
Booth: SU4210

10GIGE PCIE CARDS
Small Tree Communciations

Designed for Intel-based Apple desktop and server systems running Mac OS X Server version 10.5 Leopard; available in single-port and dual-port configurations; connect Power Mac G5 servers with PCIe, Mac Pros and Intel Xserves to Edge-Core and Foundry switches with 10GigE.

866-782-4622
www.small-tree.com
Booth: N3937

VIDEO TRANSPORT SYSTEM
Streambox SBT3-5200

Uses the company's ACT-L3 codec and advanced proprietary compression technologies; features a smaller, lighter weight chassis; enables users to transmit broadcast video in real time over any IP- or satellite-based network for live news broadcasts or distribution to cable headends; measures 4.45cm x 48cm x 15.88cm; the encoder/decoder set makes it easier for broadcasters to integrate the video transport system into news trucks or other broadcast settings where space is scarce.

206-956-0544
www.streambox.com
Booth: SU15515

AUDIO MIXING CONSOLE
STAGETEC (Salzbrenner Stagetec Mediagroup) AURUS

Features dual encoders, analog user interface, multichannel processing, TFT color displays, sample rates of 44.1KHz, 48KHz and 96KHz, up to 300 audio channels, 128 buses, up to 32 full channels per DSP board, subsystems interconnection with fiber-optic cables, sample rate converters as optional or standard features and a modular structure for simple system expansion.

888-782-4391
www.stagetec.com
Booth: N2835

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Brightline T-Series

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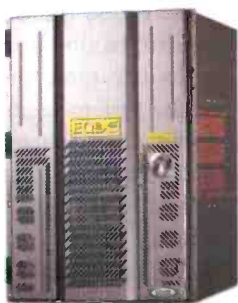
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The UTAH-400 iP

Utah Scientific's Ethernet switch connects real-time broadcast and the IT worlds.

BY JEFF LEVIE

During the last few years, there has been a continual increase in the use of IT-based equipment in the broadcast industry. More and more broadcast devices for storage, manipulation and transport are now actually computer file-based systems. The industry transformation to what is essentially a hybrid broadcast/IT infrastructure has presented some challenges. Most notable is the issue of how to realize real-time switching on an IT network that isn't necessarily real time.

In simple terms, the signal-specific routing equipment that has been used in the broadcast industry basically made a direct connection to a piece of equipment at point A with another

get the guaranteed bandwidth on the network when you absolutely need it?

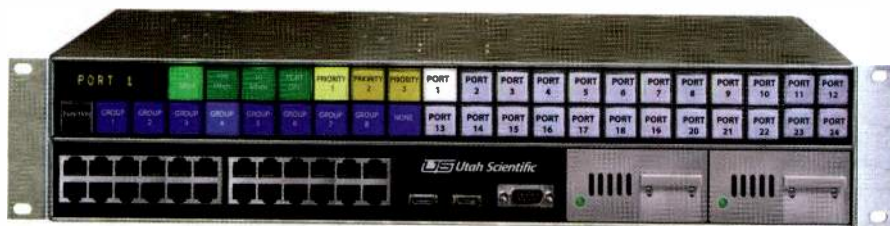
To solve the problem, Utah Scientific developed the UTAH-400 iP network switch, which allows for a managed Ethernet network with dynamic allocation of bandwidth, QoS and VLANs. The unit is designed to return real-time control of the switching fabric back to the broadcast engineer.

The problem with networks

An IP network is often viewed as an inflexible, unmanageable configuration that results in performance that is fixed and has to be "lived with" as it is. Of course, there are methods to control the behavior of the network, but periodic disruptions, such as one user on the network consuming a large

include the IP type of service (TOS) or DiffServ features to allocate traffic priority, VLAN segmentation to isolate network segments, and ingress/egress queue management to control bandwidth.

To date, these methods can be used at the system configuration level. In other words, once they are set up at the design and installation phase of the network, they are typically never altered, unless a portion of the network changes, and the video engineer in charge of day-to-day operation has little control of the system. To make changes, a system administrator would need to modify the setup parameters, and the system then continues on as before. It is a functional approach, but it is not dynamic. It relies on specialized IT personnel with extensive training to effect changes to the network. Some control parameters, such as IP TOS, can be made available, but they are not normally used because of the unwieldy nature of the management.



The UTAH-400 iP features a built-in control panel that enables an engineer to control switch parameters instantly, including allocating bandwidth, QoS, and VLANs in response to the constantly changing needs of the facility.

piece of equipment at point B (and C to D, E to F, etc.) without any worry of interference from anything else going on in the system. Now, with the use of the computer file-based equipment and Ethernet networks for the transport of digital video, files are transferred between devices using normal IP file transfer techniques, and all devices share the same pipe. Because of the extremely large size of these files, the time required for file transfers can be long and can be affected by the presence of other data traffic that is present on the network. The challenge is: How do you

amount of bandwidth that results in loss of or impaired use for other users, are considered normal occurrences.

Built into the hardware and software of industry standard IP switch products are various methods to control the behavior of the network. These are used in varying degrees in different installations to do things like provide for priority of certain types of data traffic (video or voice, for example), isolate critical network segments from noncritical ones, and limit available bandwidth for non-critical functions. These methods

A new management method

The UTAH-400 iP network switch can control an IP network in real time, allowing for much more flexibility in the use of a new or existing IP network. Users do not have to live with limitations designed into their network. Traffic prioritization becomes something that users are allowed to control. Network segmentation can be changed for daily maintenance or backup functions on an automated or manual basis.

Perhaps most importantly, critical functions can be granted priority immediately, without intervention from an IT professional. And, the administrator can grant how much

control each user has to assure integrity of the network.

With the network switch, network management can be implemented in a variety of forms, which have all been proven in real applications over the last 30 years. These range from industrial control panels to automation applications to inband, transfer-by-transfer controls.

Making IT networks work for broadcast

IP TOS identifiers that manage traffic priorities in a network have been in place since the inception of the TCP/IP protocol. These methods work well for prioritizing one type of traffic over another, but not at determining priority between two or more streams of the same type of traffic. So, for example, if two editing workstations are simultaneously trying to move video files to a server for play-out on the evening news, there is no way to distinguish between and give priority to the clip that has to go to air in 60 seconds and the one that's not needed until after the first commercial break.

The UTAH-400 iP allows users to prioritize traffic coming from any device to any one of eight tiers that they desire, in real time. This approach works well for situations where multiple data streams are competing for a given port's bandwidth. Even when a network is designed with a large backbone bandwidth, connections to individual devices or between network segments will have a finite bandwidth that can be overrun if it is not managed. With dynamic TOS management, the data stream with priority can be guaranteed to arrive at the destination port no matter what other devices on the network are attempting to do — so the clip that needs to go to air in 60 seconds is given network priority with a simple press of a button. And the priority can be changed at a moments notice based on user needs and the changing dynamic of the broadcast day, or

remain in a predefined configuration. (See Figure 1.)

Another management method available on the typical IT network is the control of VLANs. These are logically separated paths within the same physical network infrastructure. They allow users to segment a part of their network away from other parts. Dynamic control of VLANs with the UTAH-400 iP can allow users to segregate a network however they wish, and to change this as different needs arise. This management method is essentially the same concept as a traditional broadcast XY router in application.

in a noncritical activity, and then increase it to full bandwidth moments later when it is involved in a critical task. This brings another level of flexibility in the behavior of the network to the end user.

Conclusion

Monitoring and managing IT networks through the use of the UTAH-400 iP network switch brings a new flexibility to Ethernet networks that makes them much more functional and adaptable to the dynamic reality of the broadcast environment. The switch allows for time-critical reconfiguration of any preplanned network

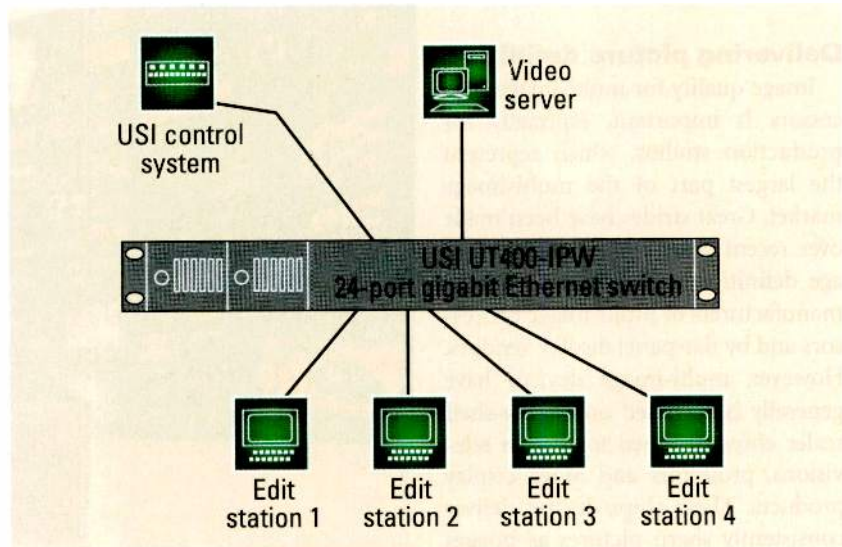


Figure 1. With the UTAH-400 iP, through control of the IP TOS values of the edit station ports, users can control which edit station has priority, and priorities can be changed through standard broadcast control systems and control panels. In time-critical applications, this can mean the difference between airing or missing content.

Bandwidth, the physical payload of any given network port, is typically represented as the speed of the interconnect, i.e., 10Mb/s, 100Mb/s or 1000Mb/s. While this accurately defines the maximum speed of the interconnect, the actual bandwidth can be modified by limiting the data capable of being passed over a specific port. Queues within the input and output sections of each Ethernet port on a switch can be dynamically bandwidth-limited at the discretion of a user. This allows a user to restrict data from a specific port that is involved

without compromising the functionality that users are used to now. The result is an environment where users can identify and correct bottlenecks before they cause problems. **BE**

Jeff Levie is CTO of Utah Scientific.

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Miranda's displays

The next-generation multi-image processors overcome prior limitations.

BY LOUIS CARON

Several key performance issues with multi-image processors have only recently been fully addressed with the latest generation of devices. These issues include delivering the highest level of picture definition across all image sizes and achieving full flexibility with layouts, without significantly compromising system scalability.

Delivering picture definition

Image quality for multi-image processors is important, especially for production studios, which represent the largest part of the multi-image market. Great strides have been made over recent years with respect to image definition and richness, both by manufacturers of multi-image processors and by flat-panel display vendors. However, multi-image devices have generally been based on off-the-shelf scaler chips designed for use in televisions, projectors and other display products. These chips do not deliver consistently sharp pictures as images are resized from partial to full frame.

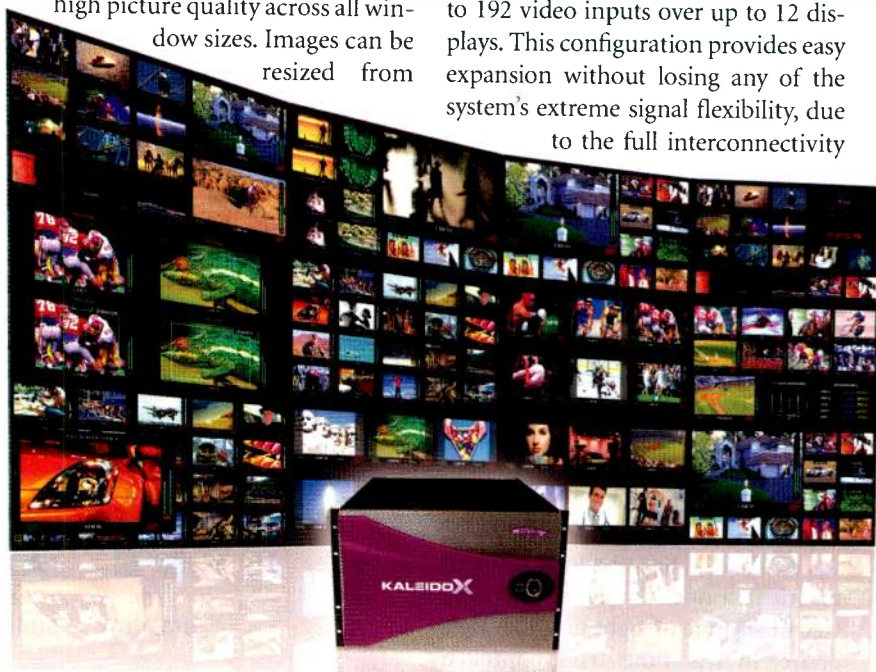
Display flexibility with respect to image positioning, repetition and sizing has also traditionally been limited, especially as systems increase in size. This has led to situations in larger monitoring environments where the operator compromises the layout presentation in order to address the system's inherent blocking capabilities. Multiroom operation brings additional demands, with the ideal requirement for full flexibility at each operator position as far as layouts and source selection are concerned.

To address these issues, Miranda Technologies developed the Kaleido-X multi-image display system, which is based on a 7RU frame with up to 96 inputs, eight multi-image outputs

and up to 48 HD/SD router outputs. A more compact, 4RU frame is also available for up to 32 inputs and four multi-image outputs. Both versions use the company's scaling technology, based on custom chips, to achieve a high picture quality across all window sizes. Images can be resized from

operator to design an ideal monitoring environment without worrying about the processor's bandwidth limitations.

By using the system's midplane expansion module, two frames can be connected to allow the display of up to 192 video inputs over up to 12 displays. This configuration provides easy expansion without losing any of the system's extreme signal flexibility, due to the full interconnectivity



Miranda Technologies' Kaleido-X multi-image display system is based on a 7RU frame with up to 96 inputs, eight multi-image outputs and up to 48 router outputs.

tiny windows to full-screen display, without the loss of definition that is commonly associated with multi-image processors. For operators used to previous generations of processors, the level of quality improvement is immediately evident.

Achieving flexibility

Kaleido-X addresses the layout flexibility issue with its unique modular design, which provides unmatched, high-bandwidth performance. Any of a frame's 96 inputs can be displayed any number of times, at any size, in any position and on any display, without layout restrictions. This enables the

operator to design an ideal monitoring environment without worrying about the processor's bandwidth limitations.

Multiple processors can be connected to create bigger systems by combining midplane expansion and router interconnects. This expansion path offers full scalability, while also offering a high level of signal flexibility. The processor also offers interfacing with third-party routers for greater system expansion so that the largest monitoring requirements can be addressed effectively.

This flexibility extends to multi-room and multioperator monitoring environments. Each room or pod can have fully independent display lay-

outs, with totally independent control using a dedicated remote panel. However, all sources can be shared across the operators to simplify any reconfiguration required, such as to handle more or fewer channels, as commonly happens during night shifts when there are reduced operator crews.

Another dimension to the processor's flexibility is its full multiformat operation, with video accepted using HD/SD/analog autosensing inputs, and optionally by DVI or MPEG inputs. The video can be presented in a range of aspect ratios, and the displays can be either horizontal or vertical.

Operators can make the most of this extreme flexibility, using either familiar mouse control or a compact remote panel. Simple-to-use, mouse-operated on-screen drop-down menus are contextual to speed operations and offer numerous functions, such as changing aspect ratios, checking the safe area, assigning an input and changing text in a UMD. Users can also instantly change layout configurations and dynamically zoom one source larger for quality control or audio monitoring of an on-screen source. Layout creation is also intuitive, even for complex multi-room setups.

Reliability

These advances in quality and flexibility are not at the expense of system reliability. The Kaleido-X system is based on a highly robust frame design, with multiple points of redundancy and without a single point of failure for continuous 24/7 operation. The 4RU and 7RU frames both use front-loading, hot-swappable modules and power supplies. All the modules are independent, and there is no single module that can cause the system to fail.

The processors also offer multiple failover scenarios, an easy upgrade process, and detailed system status and logging. They use a real-time Linux-based operating system, and data is distributed for redundancy. Each output module has its own processor, operating system and external connections. Therefore, when a new output module with a different software/firmware version, IP address or configuration is installed, it will be reconfigured automatically by the other cards in the system, without intervention from the operator. All these features mean that the design offers true resilience for the most critical monitoring applications.

BE

Louis Caron is product development manager, multi-image display, for Miranda Technologies.



Miranda's Kaleido-X multiroom, multi-image processor was recently installed in Télé-Québec's production control area.



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High-power attenuators

Coaxial Dynamics' solutions provide high average power and high peak power capability.

BY DAVE DISTLER

Most attenuators on the market rely on thick or thin film-resistive designs screen-printed or deposited on a flat ceramic, much of which is Beryllium Oxide (BeO). This has special handling, processing and disposal requirements. While the topology is suitable for lower power, extending attenuator performance to more than 1kW can be difficult and expensive.

There is another attenuator configuration option that provides high average power and high peak power capability at a cost-effective price, using standard, off-the-shelf products. This article explains how to configure a high-power attenuator system from 1kW to 200kW for use in high-power applications above 1kW with readily available components.

Selecting an RF dummy load

The first step is choosing an RF dummy load for the maximum rated peak and average power. (See Figure 1.) Oil dielectric loads are readily available for power levels up to 12.5kW. Alternatively, forced-air cooled loads, heat exchangers (self-contained water-cooled loads) or water-cooled loads achieve power levels of 125kW and more. This attenuation system will use standard dummy loads, and customization isn't required.

Specify the load's connector

The second step is to specify the load's connector as either 1-5/8in or 3-1/8in EIA flange. The attenuation system uses an intermediate rigid line section that is based on either a 1-5/8in or 3-1/8in line size. Choose the intermediate line size based on your power attenuation re-



Figure 1. This illustration shows the oil load vs. forced air. The relative sizes of an oil load with a 3-1/8in EIA flange connector are shown on the left, and a forced air load is shown on the right. The right panel contains the same oil load with an optional cooling fan and shroud to extend the power rating above 5kW.

quirements. A 1-5/8in EIA flange connector can be used on a load for up to about 30kW and the 3-1/8in EIA flange connector for up to 75kW.

Identifying the flanged rigid line section

The third step involves selecting either a 1-5/8in or 3-1/8in flanged rigid line section to attach to the load. Once the load's connector has been specified, it's time to attach what will become part of a coupler/sensor assembly: a coaxial rigid line section designed to mate to the dummy load. This line section can be supplied in a variety of configurations, such as single, dual or triple socket, but for simplicity, select a single socket rigid line section with EIA flange connectors. Between the rigid line and the dummy load connector a coupling assembly will be needed that includes all the bolts and mechanical hardware to mate the two flange connectors.

Choosing an RF sampling element

The fourth step is picking an RF



Shown here is a completed high-power attenuator assembly using a lower power 1-5/8in rigid line with EIA flanged connectors and coupling section. Not shown are the 1-5/8in to N, LC, HN, 7/16 or between series connector and adapter that can be added to the line section input. The attenuated output is available from the top of the element in the center of the line section. An optional BNC attenuator can be used to achieve higher attenuation values.

sampling element to plug into the line section. An RF sampling element is typically a nondirectional device that has a broadband coupling loop or plate that parallels the center conductor of the rigid line. To be broadband and have negligible ef-

fect on insertion loss and VSWR, its mechanical dimensions are held to a tight tolerance. Once inserted into the line section, this portion of the assembly becomes a 2MHz to 1GHz nondirectional coupler, capable of operating up to the power rating

rigid line section. The rigid line is ready to accept a 1-5/8in or 3-1/8in coupler and line section, but for convenience, the input to the rigid line section can be more of a standard coaxial type, such as an N, HN, LC or 7/16 type, or a larger between series

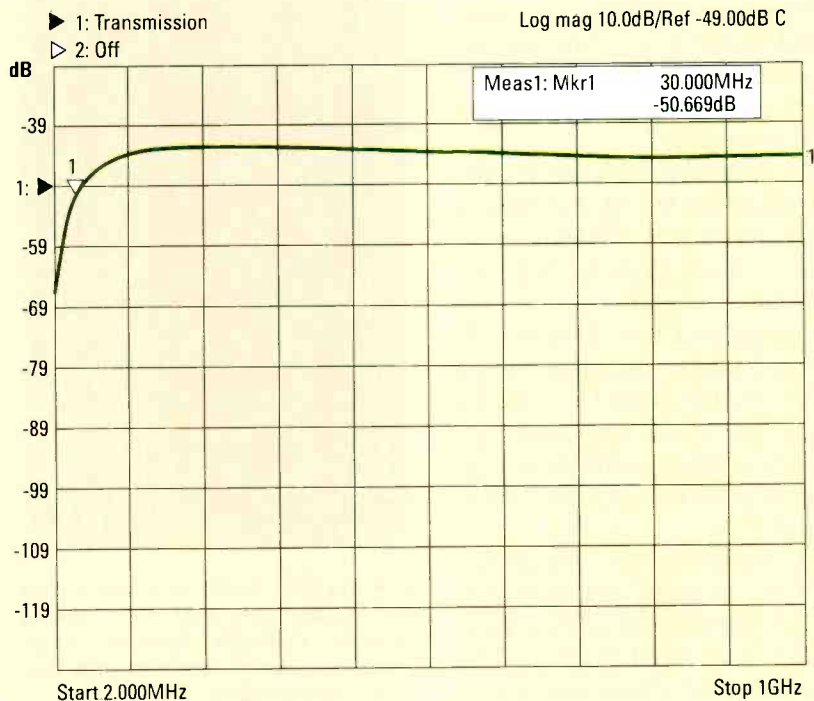


Figure 2. This drawing of a typical attenuator performance shows the typical flatness of the variable attenuator from 2MHz to 1GHz. The attenuator is better suited for broadband use above 50MHz, while single frequency or narrowband operation is recommended below 50MHz.

of the load. The elements, called X-Tractors, have a variable set screw to allow for minor adjustments of +/-8dB from their preset coupling value of 49dB for the 1-5/8in size and 56dB for the 3-1/8in line. (See Figure 2.) The attenuated signal output is via a BNC female connector on the top of the element. In theory, it is possible to further reduce the signal level by attaching a standard BNC fixed attenuator to the element. The attenuator should be rated for 2W.

Deciding on an input connector

The next step is an optional one: choosing an input connector for the

adapter can be specified up to 6-1/8in line size. Note that an additional adapter will be required for this portion of the assembly.

Summary

Specifying a cost-effective, high-power attenuator does not require custom products, long lead times, multiple vendors or nonrecurring engineering (NRE) costs. Standard, off-the-shelf products that are properly matched together can save project cost, time and space.

BE

Dave Distler is the sales and marketing manager for Coaxial Dynamics.

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Input/Output Chart

	OUTPUT FORMAT						
	HDV1080i	HDV720p	DVI	COMPONENT	DVI	HD-SDI	SD-SDI
HDV1080i	-	-	-	0	0	0	0
HDV720p	-	-	-	0	0	0	0
DVI	-	-	-	0	0	0	0
COMPONENT	0	0	0	0	0	0	0
HD-SDI	0	0	0	0	0	0	0
SD-SDI	0	0	0	0	0	0	0

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EDIROL
by Roland

The FS-4 recorder

Focus Enhancements' portable DTE recorder covers the Los Angeles Film Festival.

BY RYUN HOVIND

Anyone covering live events knows they typically entail long nights and tight schedules. Shooting the Los Angeles Film Festival was no different. Running from June 22 to July 2, the L.A. Film Fest attracts emerging filmmakers and film masters alike, screening more than 175 narrative features, documentaries and shorts.

The challenge

Our film crew was responsible for producing "FesTV," a daily one-hour program highlighting the day's events, as well as providing footage to local media outlets, such as the *Los Angeles Times* and on-site festival

By eliminating the intermediate steps like capturing and conversion, footage was ready for editing almost as soon as it was brought in.

venues, with film clips, footage from parties, and interviews with celebrities and filmmakers.

We captured all the action — often finishing at 10 p.m. The footage needed to be ready by the next morning, which meant our editors would face a long night. We looked at ways to cut down on production time and let our editors get some sleep.

The setup

We selected and equipped our team with FS-4 portable DTE recorders

from Focus Enhancements. With the units on hand, our film crew could record to disk via FireWire and then transfer it into Final Cut Pro. This meant no more capturing, file transfer or conversion.

For most of us, this was the first time recording to disk. I condensed the recorder's operations into a single-page quick guide to help ease everyone's transition into the new technology and new workflow. We still continued to use tape as backup. In one case, this allowed us to give the DV tape to a local news team right there on location, while we brought back the FS-4 for our own production needs.

By eliminating the intermediate steps like capturing and conversion, footage was ready for editing almost as soon as it was brought in. This alone saved us at least one hour in editing time per tape. It was amazing to shoot an event at 9 p.m. and then be editing minutes later. We'd start filming a red-carpet event at 8 p.m. or 9 p.m., and bring the tapes back at 10 p.m. With tapes, the footage wouldn't be in and ready for editing until midnight. With this recorder, we were ready to go by 10:20 p.m. Our editing team enjoyed a shorter night — leaving by 3 a.m. instead of watching the sun come up.

In addition, the quality of the finished product was far better because editors could focus on being creative instead of capturing tape. In my experience, it's essential to just get in there and start editing, especially with the evening shift. People tend to get lethargic when they need to wait around for several hours capturing tape. They can get out of the zone before they've even started to edit.

Direct-to-edit technology also let



With the FS-4, audio, video, time code and control information is passed through a single FireWire cable, allowing users to record to disk and tape simultaneously.

us make more effective use of our computer workstations. We were using powerful stations, but we still couldn't expect to edit and digitize at the same time. Using FS-4s freed up workstations, enabling more editors to work on different segments for "FesTV" at the same time, in addition to making footage available to the *Los Angeles Times*, producer Steven Spielberg and others. In the end, more people got the footage they wanted, and in the format they needed, because we had the FS-4s.

BE

Ryun Hovind is a freelance producer.

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COMING IN APRIL

VOD: Broadcasters using local cable VOD to extend their digital reach



Presented by **Jim Radmann**
April 8, 2008 – 2:00 pm EST

What at first appears as a cable competitive technology can provide unique and valuable benefits to OTA broadcasters. This cable expert shows TV stations how to integrate the features of VOD with over-the-air scheduling. Broadcasters can benefit from multiple playbacks and commercial exposures and viewers benefit from being able to personally schedule their favorite programs. This session will help operational personnel better understand cable VOD and how it can increase station visibility and improve viewer numbers.

COMING IN MAY

IT for engineers



Presented by **Al Kovalic**
May 13, 2008 – 2:00 pm EST

As IT-based equipment becomes increasingly common in broadcast and video equipment, engineers need a better understanding of its underlying technology. Central to that are networking and storage issues. Attend this webcast to learn more about how IT platforms can be leveraged for improved performance for broadcast and high-quality production environments. This course is taught by a world-class author with years of broadcast and IT experience. Don't miss this important learning experience on IT.

Lectrosonics' SMDa

The digital hybrid wireless transmitter captures on-field audio for the Baltimore Ravens.

BY DON BARTO JR.

Football is generally considered the hardest-hitting contact sport. With games played in all types of weather — from blazing heat to drenching rain to ice and snow — this environment is not conducive to temperamental electronics. The Baltimore Ravens are among a select group of NFL teams that operate their own broadcasting group. As the location audio and postproduction firm contracted to provide audio services to the team, Soundriven has been tasked with capturing on-field audio for use on the team's television shows.

The Baltimore Ravens Broadcasting Department (RAVE-TV) has two shows on the air. "Ravens Wired" offers television viewers a first-hand, on-the-field look at what takes place during a game, and it has two segments: "Wired," which follows an individual player or coach, and "Behind the Bench," which focuses on team activity from the sideline area. The second show, "Ravens Report," is a sports news program designed to give Ravens fans access to coach and player interviews, news about the Ravens and related information. For our involvement with these programs, wireless audio equipment plays an integral role.

"Wired"

For "Wired," the Ravens team player selected for any given program is outfitted with a Lectrosonics SMDa super-miniature digital hybrid wireless UHF belt-pack transmitter. To withstand the pounding the player will likely experience on the field, the transmitter, which is paired with a Countryman B6 microphone, is wrapped in plastic (to increase its tolerance to moisture) and mounted to

the rear of the shoulder pads using a combination of double stick tape and zip ties. An aluminum plate — tailored to protect the transmitter, microphone connection and antenna — is placed on top of the assembly. The setup is covered with adhesive-backed foam padding, making a package that is completely smooth, without protrusions or exposed weak points.

To help ensure trouble-free operation amidst a variety of unknown and unanticipated occurrences, we also deploy a Lectrosonics RM remote control with the SMDa transmitter on the wired player. Being able to modify audio gain, lock and unlock controls, or change frequency, has been tremendously important for us because asking a player for his pads, pulling everything off to expose the transmitter and then making adjustments is simply not an option. By using the remote control, we can manipulate multiple functions without any inconvenience. An NFL football field can be a hostile RF environment, and while the frequency coordinator does his best to assign clear, open frequencies, things don't always go according to plan.

The player's SMDa transmitter broadcasts to two Lectrosonics UCR411A digital hybrid wireless receivers. One receiver is for the cameraman, whose sole job is to follow the wired player, and the second receiver is used for charting. The person responsible for charting captures the audio and stamps it with time code. This enables the program directors to know exactly where any given segment occurred during the game so that it can be tied to other game footage.

"Behind the Bench"

For "Behind the Bench," an associ-



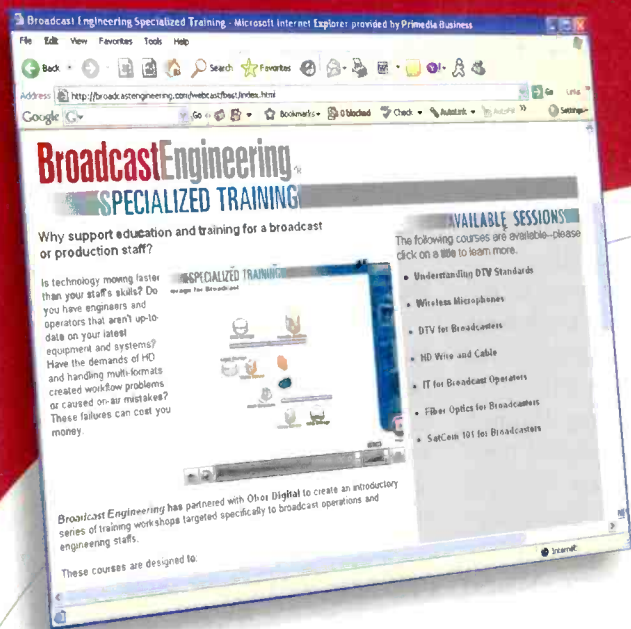
Don DiRaddo, director of broadcasting for Ravens Broadcasting, and Jeff Atkinson, DP for RAVE-TV, inspect the placement of a Lectrosonics SMDa.

ate cameraman and I follow the activity up and down the field from the sidelines, with most of the coverage coming from the team's bench area. For this, I use a boom mic and a Lectrosonics UM200 belt-pack transmitter, which feeds the cameraman's UCR201 compact diversity UHF receiver. As is the case with the wired player, a second 200 series receiver is used for charting. In addition to these two setups, we use another 200 series transmitter and receiver, which feed the radio announcer's microphone output to our "up top" game camera.

As is the case with any live broadcast project, there is only one opportunity to get it right. Hence, both the selection and deployment of the wireless equipment are critical. We've found the Lectrosonics equipment to be particularly compact and robust. The fact that a remote option is available has been a big plus. Without it, we may not have always been able to go forward with production. **BE**

Don Barto Jr. is co-owner of Soundriven.

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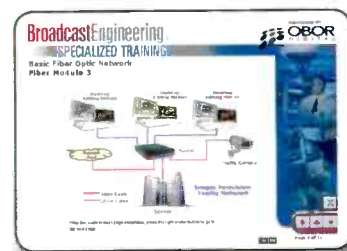
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Asset management

Increase the value of your future content.

BY JOHN LUFF

Bankers understand asset management. They have a legal and fiduciary duty to protect assets and be able to tell you at any moment just where they are and what they are worth. They can't abide by estimates nor can they lose track of them. You would be shocked to hear a banker say, "Your assets are in a merged account, we think, but trust me, we will somehow get them out for you."

It is not much different in many broadcast operations. A station in Pittsburgh, to remain unnamed, supposedly has archival news film footage of Franco Harris' "immaculate reception." This footage is rumored to be the only actual video that might prove if Harris really caught the ball before it hit the ground.

The content is located in a film can, spliced — as was the custom in that era — along with all of the news footage from that night. It's stored in the transmitter building, as was this station's custom. It's safe and secure, in

a location known to a rough degree, though checking to make certain would prove a challenge. It is possible the asset was lost 30 years ago.

If you asked a broadcaster to develop a system that could track news assets, he might have difficulty doing this. There is no way to search for an asset without rummaging through boxes of deteriorating original news film. Sometimes, it's even worse at modern tapeless plants. Recordings

In such a case, the lineage of the shots is lost, along with any other metadata that might make it searchable.

How to protect your assets

There are, of course, ways to protect the assets and make it possible to extract additional value from them in the future. In a modern plant, where servers are often the central repository and master ingest point, assets and their metadata exist in

In a modern plant, where servers are often the central repository and master ingest point, assets and their metadata exist in their most complete form.

made on nonvolatile memory are transferred to disk for edit (or edited directly from the memory card), and often the only permanent record is a melt reel made at the end of a newscast. The melt reel holds all of the edited stories for legal and archive use.

their most complete form. Metadata recorded in the field is (hopefully) transferred with the clips, and the edited material contains references to its heritage in the field footage. What needs to happen to fully protect the asset and its value? One might glibly say, "use digital asset management (DAM)" software. This is partly true, but not completely.

The asset needs to be available, which in the case of some systems means adding an archive or nearline storage system to clear space in the expensive online system for new content. A DAM software system performs several tasks. It can catalog the assets, making the best use of the metadata captured with the content and allowing additional metadata to be added to enhance the value of the content. It can also be coupled to an archive manager, which can use expert rules to move the content off the server automatically. In concert, the combination of DAM and archive manager represents key elements of a total workflow solution, but not the entire solution.

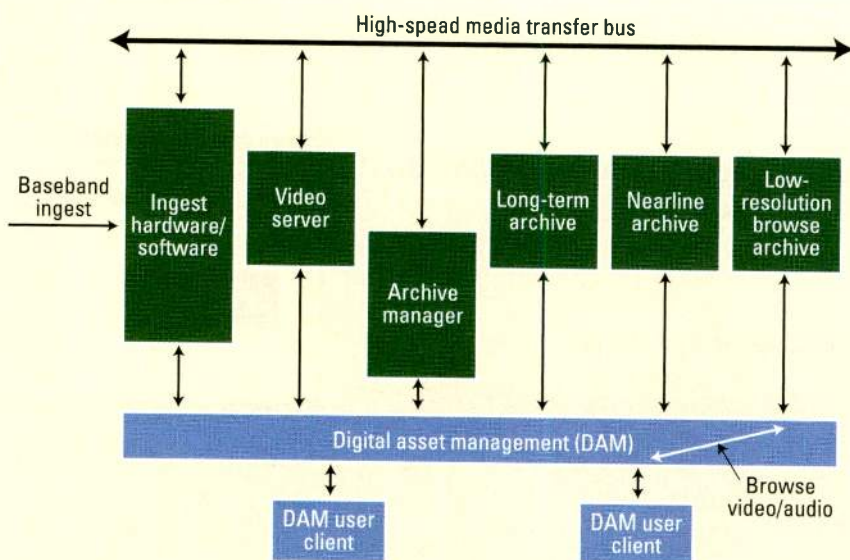


Figure 1. Each of the storage elements, as well as the ingest from baseband or files sources, is being monitored by the DAM system.

This is one of the most confusing parts of analyzing and implementing complex software systems. Some vendors take responsibility for the entire picture, providing all subsystems and ensuring that they interface successfully. In many instances where end users picked best-in-class applications from different vendors and attempted to get all parties to play nice, there are stories of delays and cost overruns. This results from the attempt to understand all of the variables involved and manage the complex software integration of the various packages.

Each of the storage elements, as well as ingest from baseband or file sources, are under the watchful eye and — in some respects — control of the DAM manager. (See Figure 1.) The figure shows a secondary path from the low-resolution browse subsystem, which carries browse video to DAM clients. Using that video,

users can input additional metadata or browse and preview content. Notice that the archive manager sits at a slightly different level, as it commands the movement of content among all of the storage silos. Each of the software and hardware subsystems is to a degree autonomous. The video server may also serve content to editing stations or play out to master control under automation control, which is not shown here for simplicity.

There could be multiple servers or archives attached to the system, but functionally, the DAM keeps track of the whereabouts of all content, both in the low-resolution browse and high-resolution instances. When it is appropriate to purge content from the high-resolution server, DAM can remove it from the low-resolution browse. Or if a copy has been stored in the archive system, DAM might instruct the browse system to retain its

copy to enable searching of content. If an application, such as an edit system, requests a piece of content that is on the archive, the DAM system would instruct the archive manager to move it to an online repository for use, always keeping track of each instance of the content in a detailed database.

Conclusion

Communication is needed among all applications to make DAM successful. An operation done without communication could leave the asset management system in the dark about either new or existing content, quickly making the system marginally useful. When this is done right, the complex systems are more manageable. **BE**

John Luff is a broadcast technology consultant.

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Viva Las Vegas!

Some companies are noticeably absent from NAB.

BY ANTHONY R. GARGANO

The premiere trade show event of our industry — NAB — may be happening as you read this. For manufacturers, trade shows represent two opportunities: the opportunity to spend money or the opportunity to spend more money. Well, perhaps there is actually a third option: the opportunity to save money by taking the imprudent action of not exhibiting.

The growth of NAB

This will be my fortieth NAB show. I have attended shows in Atlanta, Chicago, Dallas and Washington, D.C., but certainly Las Vegas is the premiere venue for this event. I, along with others I am sure, was delighted when the NAB decided in the 1990s to stop rotating the show and fixed Las Vegas as the permanent setting for the industry's annual confab.

Over the years, I mostly attended the show as a vendor but more recently as an attendee. From the vendor's perspective, I have had the unique opportunity of being one of the largest vendors to exhibit to being one of the smallest — from a multi-million-dollar show budget for Sony to a multithousand-dollar budget for AgileVision.

During my days as a senior executive at Sony, I oversaw a show exhibit that for years was the largest at NAB. We purchased exhibit space both on the floor and off the floor in a quantity that could be measured in acres. This trade show is by far the single largest fund generator for the NAB, and Sony's expenditures at the show were hefty enough that they didn't go unnoticed by Eddie Fritts, the then NAB president and CEO. Fritts would check with me during the trade show to ensure that all was satisfactory.

Later, I accepted a position as the CEO of a start-up called AgileVision.

Our first year at NAB was in a 10ft x 10ft booth, as I recall. Needless to say, AgileVision didn't receive personal attention from Eddie Fritts!

During the past 40 years, the show has grown from filling hotel ballrooms to now overflowing the 1.9 million sq ft of exhibit space at the Las Vegas

post-sale affirmation. When existing customers see you at the show, it provides that needed psychological confirmation that, yes, they made a good purchase decision. This in turn provides the subconscious, positive influence that motivates confidence and generates repeat business.

What's the value of a company's products and technology showcased to the largest gathering of broadcast industry decision makers in the world?

Convention Center. The number of attendees used to be in the low thousands and now exceeds 100,000.

"Prudent" fiscal management

This year, several major companies decided not to exhibit at NAB. One major company president who is exhibiting, and with whom I have recently spoken, said, "Wow! That's great news! I wish more of my competitors wouldn't show up." I am sure he was thinking about the increased opportunity for customer face time by his sales staff.

As a consummate marketer, I could not agree more. What's the value of a company's products and technology showcased to the largest gathering of broadcast industry decision makers in the world? It's worth a whole heck of a lot in my book. Those decision makers can examine a product in its native environment, and then walk a few steps and compare it with a competitor's offering. There's no better setting for a buyer.

When a vendor exhibits at NAB, for new sales, the opportunity for booth traffic, sales closure and new leads is demonstrable and measurable. But there's another aspect, and that is

We are in a somewhat depressed economic time (perhaps even more so by the time this article is in print), and such times always call for prudent fiscal management. But I am always astounded by those companies that think the initial prudent step in such times is to severely cut back or even eliminate advertising and trade shows. Presale customer support and post-sale customer affirmation are equally as critical, and such activities are essential to the ongoing sales process.

Reduced customer spending means reduced sales, and that requires appropriate cost reductions by manufacturers. The elimination of advertising and trade shows is the easy choice, and it's usually the first choice of a financial manager. But a customer-focused business manager who understands the selling challenges of high technology products realizes that reducing such activities is further down on his budget reduction priority list. For those who subscribe to the latter, I look forward to seeing you on the NAB show floor. **BE**

Anthony R. Gargano is a consultant and former industry executive.

? Send questions and comments to: anthony.gargano@penton.com

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