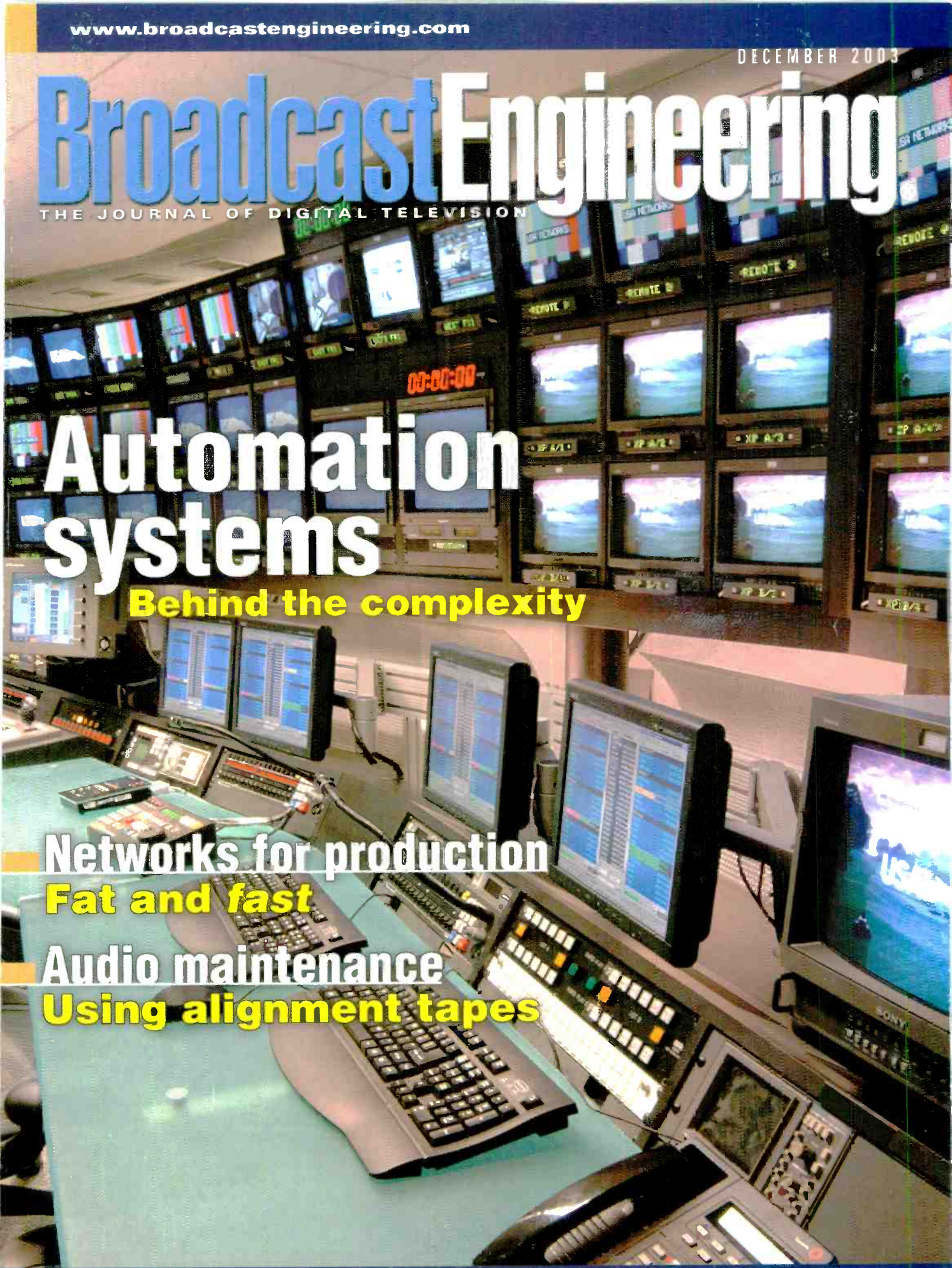
www.broadcastengineering.com

DECEMBER 2003

Broadcast Engineering

THE JOURNAL OF DIGITAL TELEVISION



Automation systems

Behind the complexity

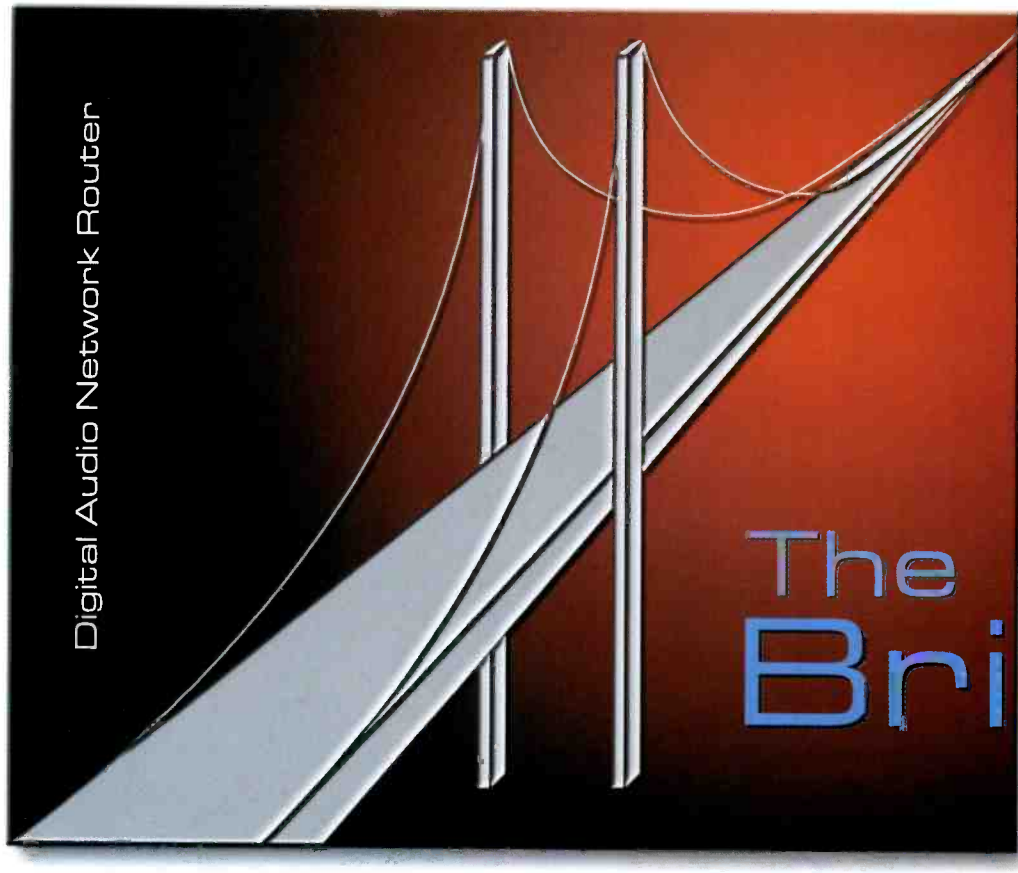
Networks for production

Fat and *fast*

Audio maintenance

Using alignment tapes

A PRIMEDIA PUBLICATION



The Bridge Router can hold all the electronics you'll need for a small console: I/O cards, mix engines, and DSP processors. Naturally it can also have automatic fail-over DSP and CPU cards to keep you on-air. You can expand the system with a simple cage-to-cage interconnect.

It's not just a Digital Console, It's an ENTIRE Audio Infrastructure

You Can Start with a simple AES router with analog and digital inputs and outputs. From there you can add logic I/O cards and scheduling software; you can link multiple master bridge cages together to achieve thousands and thousands of I/O ports; you can create a custom system that includes multiple smaller remote satellite cages— with everything interconnected via CAT5 or fiberoptic links.

But That's Just the Beginning: you can also add mix engine cards, interface to your automation system; you can choose from two different WHEATSTONE series control surfaces (D-5.1 or D-9), each specially configured for production room, on-air or remote truck applications. We also provide a full complement of Ethernet protocol remote router control panels, as well as a complete family of plug-in modules that interface the routing system to existing Wheatstone digital and analog standalone consoles.

The D-9 is Compact yet Powerful: It can route, generate and monitor 5.1 surround signals and produce simultaneous 5.1 and stereo master signals for your dual broadcast chain. The console also provides extensive, rapid communication paths throughout your entire Bridge system. Motorized faders and control setting storage and recall make show-to-show transitions fast, easy and accurate.

Wheatstone Knows Live Audio. The D-5.1 is loaded with MXMs, foldbacks, and clear easy-to-read displays. You'll have all the power you need when the news breaks! Its intuitive layout helps your operators work error-free, and it can handle and generate all the 5.1 content and simultaneous stereo capability any large or medium market station could need.

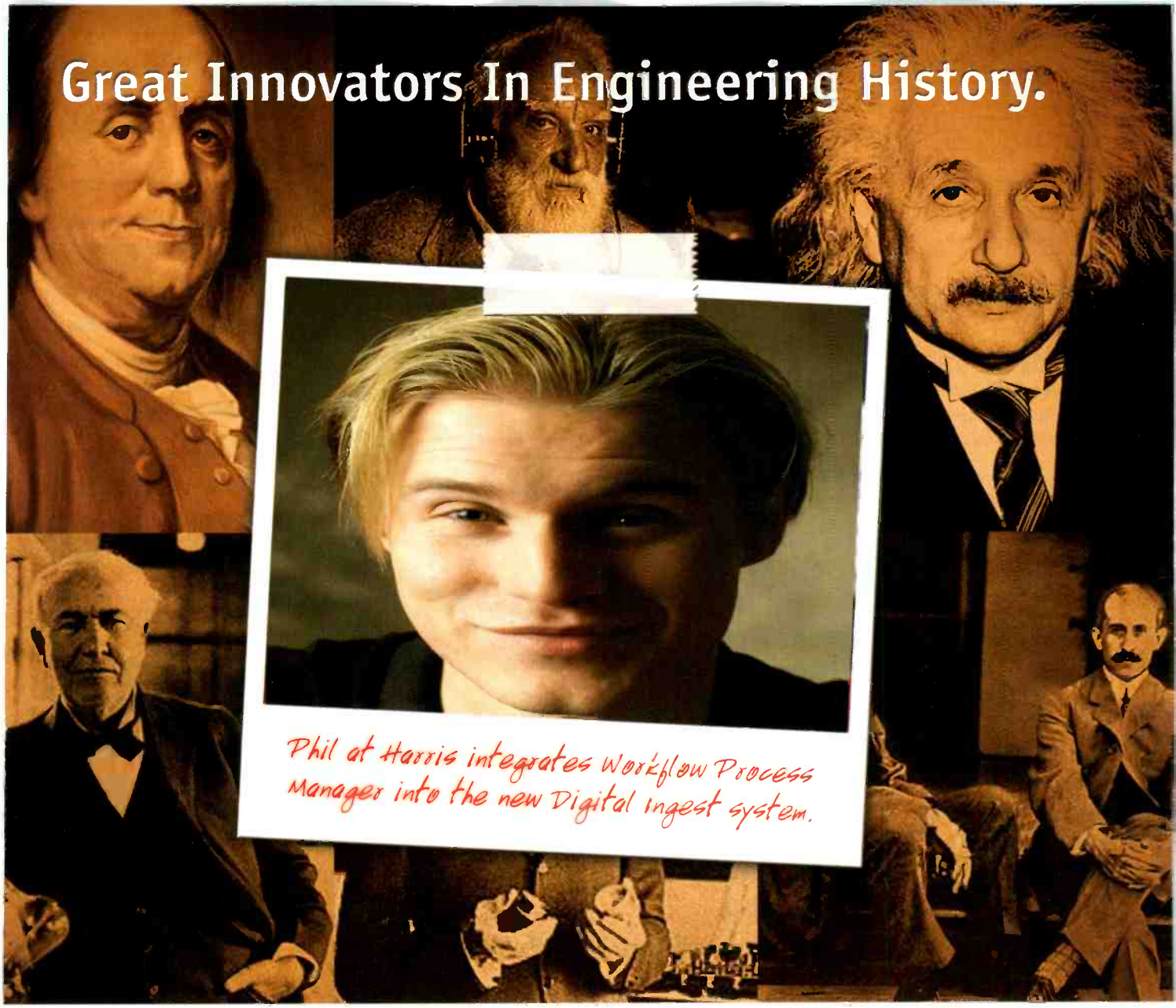
Wheatstone

the digital audio leaders

600 Industrial Drive, New Bern, North Carolina, USA 28562
tel 252-638-7000 / fax 252-635-4857 / sales@wheatstone.com

www.wheatstone.com

Made in USA



Announcing a breakthrough in media ingest and transfer: New Digital Ingest from Harris.

Yes, our guy Phil was pretty excited about the whole Digital Ingest thing. But now it's your turn to discover the latest innovation from Harris, the leader in broadcast technology. **Digital Ingest completely automates your front-end media ingest and transfer process,** whether you're talking about a single facility or a whole enterprise. Until now, when digital media was acquired from delivery services — such as Media DVX or DG Systems — distribution throughout the broadcast facility required manual transfer to tape and video file servers. All of that has changed. Now, with Digital Ingest — part of the Harris Resource Suite — you eliminate the error-prone busy work of manually entering metadata, give your operation virtual "real time" ingest-to-playout (great for those last-minute, gotta-get-this-on-the-air requests), and better allocate your engineering resources.

hrs harris resource suite
FOR INGEST-TO-BROADCAST WORKFLOW MANAGEMENT

Designed to integrate seamlessly with your Media Client station, Digital Ingest has intelligent and customizable "rules" to adapt workflow processes to your operation. Plus, (as Phil will proudly tell you), Digital Ingest includes Workflow Process Manager (WPM) — an integrated software module that allows the system to manage automated and manual tasks and processes. With Digital Ingest, you can even search, browse, and approve content from desktops anywhere in your enterprise (your Program Manager will love you). So go ahead. Make Phil happy. Call about Digital Ingest today.

For more information about Digital Ingest and the entire Harris Resource Suite of products, call **1-408-990-8200** or visit us online at **www.broadcast.harris.com/automation.**

www.broadcast.harris.com/automation

HARRIS

DECEMBER • VOLUME 45 • NUMBER 12 www.broadcastengineering.com

Broadcast Engineering
THE JOURNAL OF DIGITAL TELEVISION

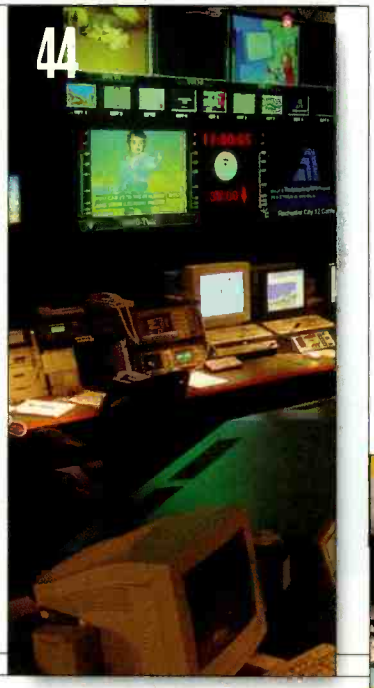
CONTENTS

FEATURES

44 Automation: The challenges
By Jim Boston
Automating a multi-channel DTV plant poses a number of challenges.

50 Inside AAF
By Ed McDermid
Discover how this authoring format bridges tape-based media archives with a new generation of tapeless broadcast systems.

54 Tapeless acquisition: The final frontier?
By Michael Grotticelli
Two new storage systems from Panasonic and Sony could be the last true innovations in ENG image capture.



BEYOND THE HEADLINES

Download
12 The interactive PDNE

FCC Update
18 Frequency coordination for broadcast auxiliaries

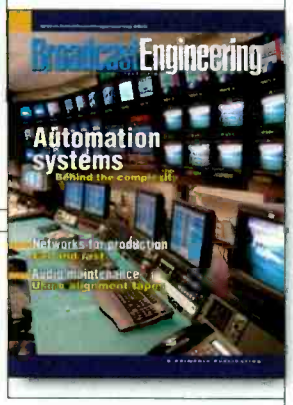
Business Models
20 The centralcast model

DIGITAL HANDBOOK

Transition to Digital
26 Format conversion

Computers and Networks
32 Post-production networks

Production Clips
36 Calibration tapes for analog audio recording

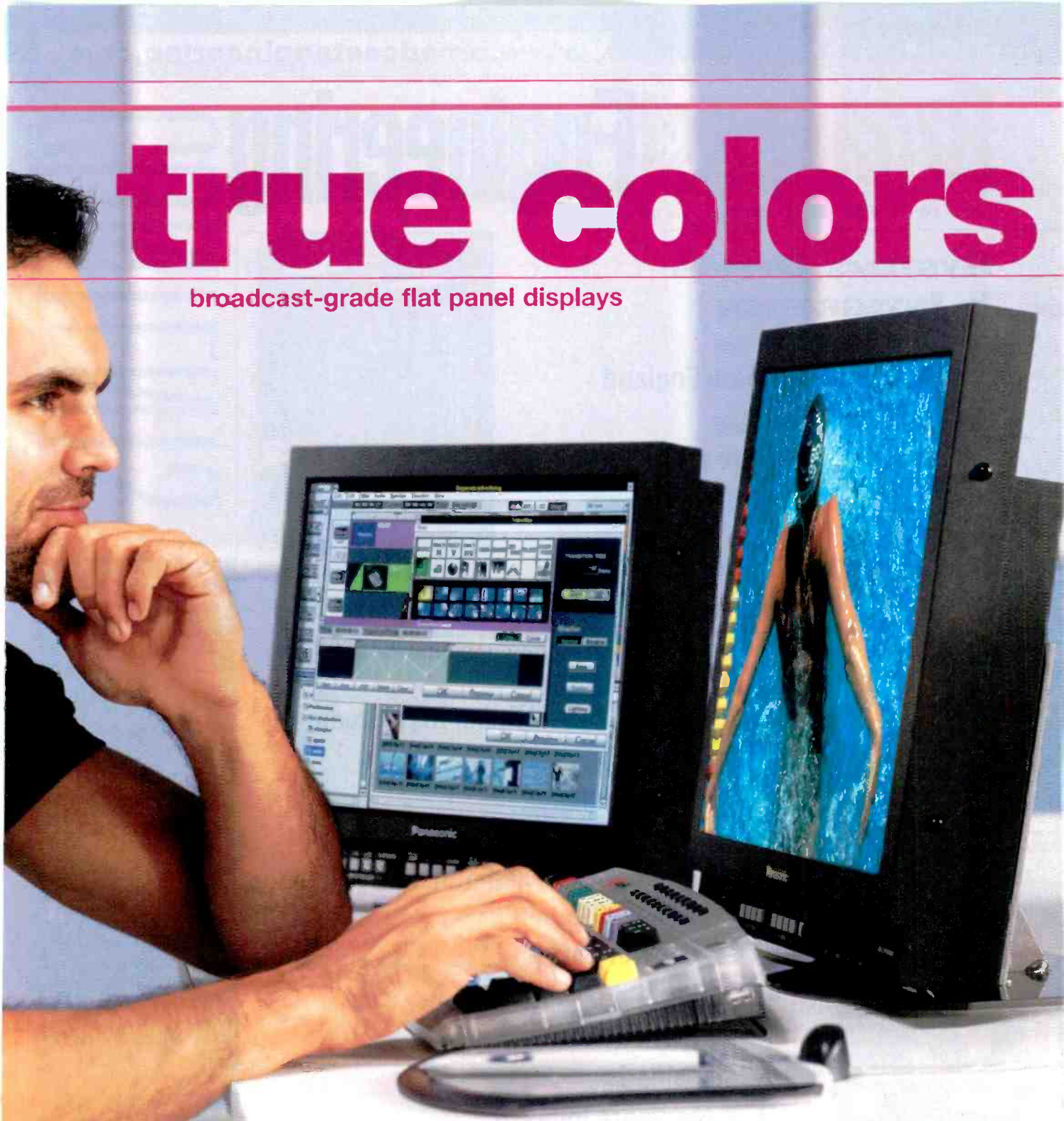


ON THE COVER: OmniBus software was used for automation and media management at Universal's USA Network and SCI FI channels. Photo courtesy Andy Washnik at Corpricom.

(continued on page 6)

true colors

broadcast-grade flat panel displays



Step into the light with Panasonic's new broadcast-quality flat panel displays. Outperforming traditional CRT technologies, these color-accurate, long-life LCD monitors are lightweight, space saving, energy efficient, and offer optional DC power for in-field use (BT-LH900). Panasonic continues to unlock the power of the desktop video revolution. For more details, visit us at **www.panasonic.com/broadcast** or call **1-800-528-8601.**

BT-LH900 BT-LS1430 BT-LH1700 BT-LH1800

Panasonic ideas for life

DECEMBER • VOLUME 45 • NUMBER 12 www.broadcastengineering.com

Broadcast Engineering
THE JOURNAL OF DIGITAL TELEVISION

CONTENTS

Systems Design & Integration

Systems Design Showcase
38 Fox Sports Net New England

Transmission & Distribution
42 Managing your site problems

New Products & Reviews

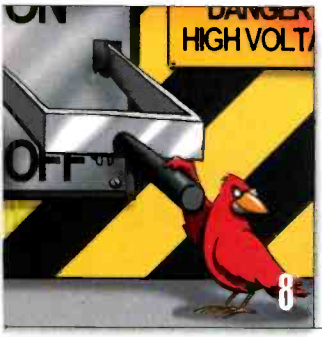
Applied Technology
58 Inscriber's Inca CG and Inca Studio

Technology in Transition
60 Lens technology

New Products
62 SeaChange ITV MediaCluster, plus other new products

Departments

8 Editorial
10 Reader Feedback
70 Classifieds
73 Advertisers Index
74 EOM



Name this feature

What unique feature was introduced on the Ikegami DNS-11 and DNS-101 cameras at the 1995 NAB convention? All correct entries will be eligible for a drawing of the new *Broadcast Engineering* T-shirts. Enter by e-mail. Title your entry "Freezeframe-December" in the subject field and send it to: bdick@primediabusiness.com. Correct answers received by Feb. 17, 2004, are eligible to win.

High Quality.
Higher Standards.
Highest Performance.

Crawford Communications' HD Hybrid Suite.

In the hi-tech world of post production, one media company is raising the bar across the board. At Maxell, we have created a comprehensive portfolio of technologically superior products that exceed all your media needs. From viewing dailies to video duplication and archiving, each and every Maxell tape and disc delivers the highest performance, durability and reliability possible. To learn more about Maxell Professional Media, call 800-533-2836 or visit www.maxell.com.

maxell

Expanding Memory & Mobility

Recordable Media Data Storage Portable Energy Technological Partnerships

Pregnant
piping plover plunges Philly into panic

After hours of research, I suggest to you that the real reason for the massive summer blackout in the Northeast was birds.

Yes readers, the complex series of events that transpired to spread complete darkness across tens of thousands of square miles in the United States and Canada, and affected millions of people was the result of migratory birds and the senseless federal regulations that protect the little crappers.

To fully appreciate the situation, you have to reach into the black hole of federal regulations that control the operation of many water-powered generators. The generators in these dams produce millions of kilowatts of power. Unfortunately, these dams are operated by the United States Army Corps of Engineers, which dances to the music of, you guessed it, federal regulations. These complex regulations were all promulgated by Congress — a body of idiots always focused on the desire for power and generally influenced by money, special interests and voters (in that order). The result, in the case of these 'dam regulations' (sic), is that special interests have been able to influence how these dams are operated — which means, common sense doesn't apply.

Now, getting back to the blackout. Normally there is more than 20 cubic miles of impounded water upstream from the dams along the upper Missouri river. However, on that fateful day, a hydraulic engineer working at the United States Army Corps of Engineers Reservoir control office in Omaha, NE, was told to cut back on the flow of water through the generators in the six mainstream dams along the Missouri River. I'll get to why in a minute. His actions reduced the amount of electrical power fed into the nation's power grid from these generators.

While initially a minor blip, other factors combined to create a cascading landslide of overloads, shortages and power trips. Within minutes, the Northeastern power grid was under unbearable stress. What started as a few megawatt decrease in power generation was multiplied into an unstoppable series of mammoth power generator trips as systems began disconnecting from the power grid in an attempt to avoid disaster.

So what caused the blackout? I suggest it was birds.

Yes, the distribution of millions of kilowatts of electricity to the Midwest depends every year on whether a baby piping plover or least tern has flown the nest. I kid you not! These birds nest on sand islands below dams in the Missouri River. The water flow through the dams is reduced to protect the birds until they return to Venezuela.

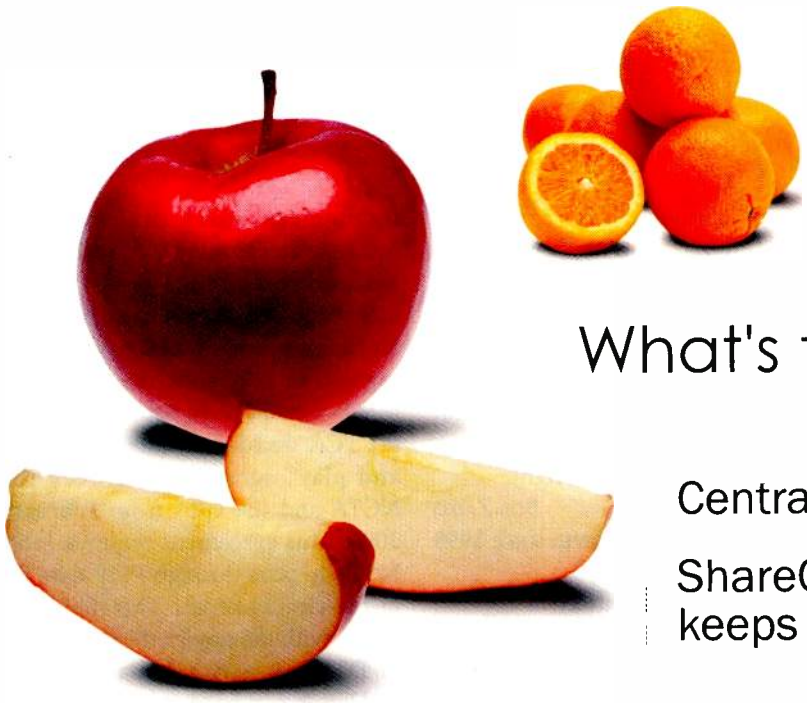
So, next time your power goes out, just remember, you're sitting in the dark because of illegal alien birds. And, until they go back to South America, you'll just have to endure the darkness because federal regulations require that the dams along the Missouri protect our feathery friends first. Human needs come second. **BE**

Brad Dick

editorial director

Editor's note: While the cause of the blackout is conjecture, the facts about the birds and dam operation are not. I couldn't make that up.

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



What's the difference....

Centralcasting cuts costs.

ShareCasting cuts costs and keeps advertisers happy.

ShareCasting provides more for profitability than what centralcasting alone can offer.

Centralcasting provides wonderful cost savings. It eliminates duplicated efforts in television station groups. But what about the ability to interact with the local community?

Sometimes the news department wants to change the number of breaks, or move commercials so they don't conflict with the stories.

The local sales manager sometimes wants to give a special position to a favored customer.

A local advertiser will call in to find out what time his new commercial is on so he can show his friends.

ShareCasting gives you this local control. Your station is interacting with the community and controlling its own destiny just as it always has. At the same time, ShareCasting centralizes redundant operations. Your profits go up as your costs go down.

Best-kept secret: Florical has solved the last-mile problem, even for the smallest markets. Every station group can now benefit from ShareCasting.

ShareCasting—central cost-cutting with local control and amazing ROI.

ShareCasting. The next generation of centralcasting.

T: 352.372.8326 | F: 352.375.0859 | sales@florical.com | www.florical.com

FLORICAL SYSTEMS

Bullied engineers

To Paul McGoldrick:

Your take on engineers is right-on. We are decent professionals, all trying to work hard and make a living for our family and ourselves.

One reason we are bullied, in my opinion, is that management sees the engineering budget as a black hole that absorbs money. There is no way to "quantify" our importance, at least in the same way that salespeople are evaluated: They either make budget, or they don't.

In my case, the general manager without my input set recent expense budgets for 2004. His rationale was that the money I have to operate four radio stations was based on revenue projections. He felt $2,500 per month for parts and supplies was more than enough. I tried to point out that a single tube replacement at just one of the FM stations could take that whole amount. Nevertheless, he insisted that I make it work, and that other chief engineers were making do just fine. I guess the message was clear: Make it work, or be replaced.

I think that's why engineers can be bullied. We're thought of as a commodity that can be easily replaced, and we're afraid of losing our jobs.

NAME WITHHELD ON REQUEST

HD marches on

Yes, AMEN I say to you, Brother Brad! The relentless march of progress goes on! FOX network has seen the light. NFL games, movies, and prime-time shows are looking good. Now let's complete the last mile — local affiliate owners and cable/satellite providers. Comcast Cable is doing a great job, but let them not give into the evils of over compression. Thou shalt not mess with the 19.2Mb/s carrier!

Keep fighting the good fight!

BOB ZAJKO
HD BELIEVER SINCE 1998

DTV over digital cable

The article written by Bill Zou of Harmonic on "DTV over digital cable: Reaching a larger audience" in the August 2003 issue of *Broadcast Engineering* is very good, very informative and very well-written.

However, at one point the article states that: "And, to preserve program-guide information from the incoming PSIP, the equipment modifies the PSIP to reference the new PID numbers. Since this additional processing adds to the cost of the grooming equipment, some cable operators might opt to drop PSIP altogether."

However, the NCTA-CEA "plug and play" agreement of February 2000 included a commitment to pass through PSIP data for in-the-clear channels. This agreement was reaffirmed in a December 2002 letter to the FCC signed by a number of the major cable MSOs (including Cox, Charter, Time Warner, Comcast and Insight) and a number of major CE manufacturers. Thus, some of the smaller cable operators may opt to drop PSIP altogether, but most of the major MSOs have agreed not to do that.

GOMER THOMAS
TRIVENI DIGITAL

Bill Zou, Broadcast Solutions Marketing Manager for the Convergent Systems Division at Harmonic responds:

Traditionally, cable MSOs have been reluctant to pass-through PSIP data for the digital broadcast channels just because it represented additional headend cost and it was not technically required for their subscribers. However, the latest developments in regulation may shift the way cable MSOs view PSIP. In September 2003, the FCC decided to adopt the "plug and play" agreement between the NCTA and the CEA from February 2000. This agreement requires cable MSOs to pass-through PSIP data for in-the-clear channels. This ruling, together with the expected proliferation of DTV sets with integrated tuners and lower-cost headend PSIP processing, will encourage cable MSOs to pass-through PSIP.

REGARDS,
BILL ZOU BE

July Freezeframe:

Q. What cable television company announced in 1998 that it planned to downconvert 1080i HD broadcast signals to 480p to save bandwidth (calling that format "HDTV")?
A. TCI

August Freezeframe:

Q. Identify these two cleverly named winners of a 1997 Pick Hit award: What automation product reminded NAB attendees of "Area 51"? What storage product's name was out of this world?
A. The Odetics Roswell facility management system and the Pluto Technologies Space digital video recorder

Winners:

July - Tom Alderson, Garen Braun
August - Vicki Kipp, Garen Braun

Test your knowledge!

See the Freezeframe question of the month on page 6 and enter to win a *Broadcast Engineering* T-shirt.

Send answers to *bdick@primediabusiness.com*

AFFORDABILITY THROUGH INNOVATION

Now you can get the industry's highest-quality picture and signal performance for less than you ever imagined!

With complete Grass Valley™ news and production packages, Thomson is making the digital transition affordable for small to mid-market broadcasters and video professionals—with the highest degree of system integrity as well as industry-proven user functionality and control.

Lowering the cost barriers.

Squeezing the latest digital technology into tight capital budgets can be a tough fit. But your facility's upgrade to the capital and workflow efficiencies of digital can't wait forever.

That's why we've introduced a new line of affordable digital acquisition and studio/mobile and sports production equipment.

Now we're taking these performance leaders a step further with our Grass Valley TV Station in a Kit™ Series of four bundled, scalable packages for digital news and studio/mobile production. Choose the one that meets your production and capital budget needs today with the confidence that it will easily and economically scale to your needs tomorrow.

Whatever your facility size, we have the products and package for you. There's never been a better time to choose affordable Grass Valley products from Thomson.

Grass Valley products by Thomson.
Affordability Through Digital Technology Innovation.

www.thomsongrassvalley.com/TightBudgetUSA

Bundled Packages Starting at Under $68,000*

Products also available individually

* Entry-level news production package. See us about low-priced studio/mobile production packages. Promotional pricing subject to change and availability.

grass valley

A THOMSON BRAND

The interactive PDNE

BY CRAIG BIRKMAIER

In a recent report, "5 Technologies to Watch," the Consumer Electronics Association prognosticates about the future of the "intelligent home." A future where in-home networks, computing and home entertainment devices are interconnected to control the home environment and share digital media content. When it comes to prognostications, this author has established a credible track record. For example, I first wrote about the personal video recorder (PVR) concept in 1992, laying out the reasons that this technology would change the way we consume entertainment and information. Based on the ever-increasing storage capacities for hard disk drives, I predicted that the PVR would become a viable and successful product when the cost of a sufficiently large hard disk reached $100. That happened last year.

TiVo now has more than one million subscribers. DirecTV and Dish have deployed more than two million set-top boxes (STBs) with PVR capabilities. And cable is scrambling to catch up. Scientific Atlanta announced that it has shipped 177,000 Explorer 8000 cable STBs in the last fiscal quarter, for a cumulative total of 563,000 units since its introduction last year.

Seeds of discontent

In the December 2002 *Download* column, we examined the debate surrounding the development of a content management system for DTV broadcasts. At the time, the Broadcast Protection Discussion Group (BPDG) was trying to reach consensus on a method to implement the redistribution control descriptor, already standardized by the ATSC. Any product encountering a broadcast bitstream marked for protection by this descriptor would be required to implement an approved technology to prevent the content from being redistributed via the Internet. The BPDG did not reach consensus, leaving the thorny issues for the FCC to decide.

A year later, the FCC has ordered that beginning on July 1, 2005, DTV tuners and downstream devices will be required to look for the "Broadcast Flag" and to implement a content management technology that will prevent Internet redistribution of DTV content. In this ruling, the FCC tried to address the concerns of all interested parties. In so doing, it has added another incomprehensible layer of complexity to future DTV products. From here, it looks like this action will further delay the broadcast DTV transition, rather than accelerate it.

It looks like the FCC's ruling will further delay the broadcast DTV transmission, rather than accelerate it.

Irrational behavior?

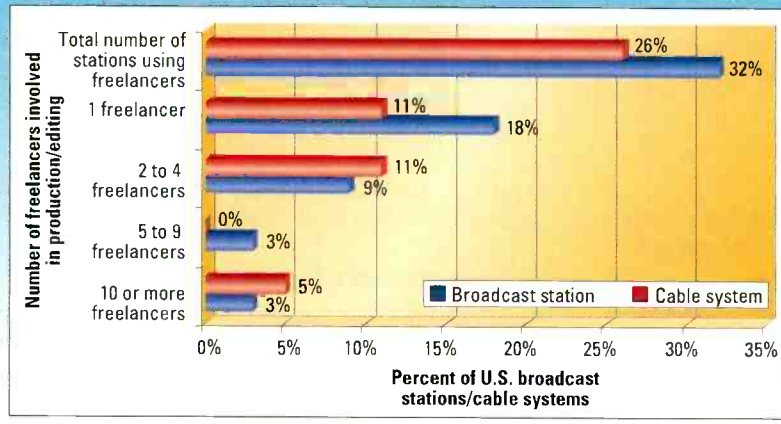
Sadly, the entire rationale behind the Broadcast Flag is based upon the prognostications of an industry with a history of resisting any technological change that is viewed as having the potential to be disruptive, and then using the technology to increase the profits of the industry.

That industry is loosely called "Hollywood." The effort to raise the Broadcast Flag has been headed by the Motion Picture Association of America (MPAA), with help from the big conglomerates that now control the creation and distribution of more than 85 percent of the television content

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

Staffing studios

One-third of broadcasters use freelancers



SOURCE: TrendWatch www.trendwatch.com

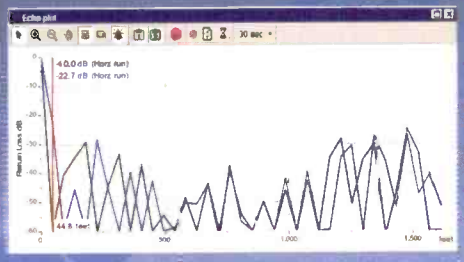
EFA Family of Television Test Receivers

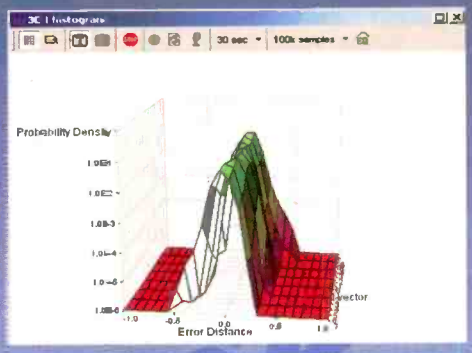
EFA-NET

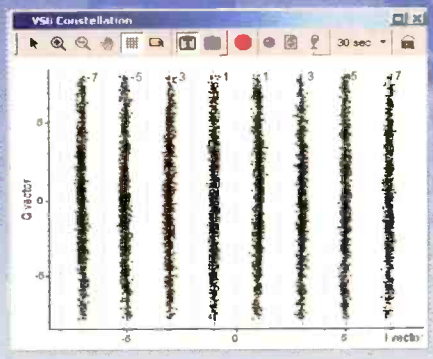
TV TECHNOLOGY STAR 2003 Superior Technology Award Recipient

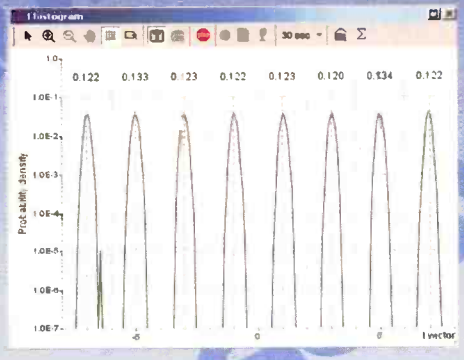
For all the days ...after you go digital.

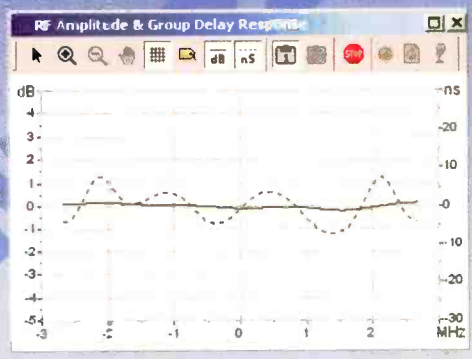
EFA-NET is the PDA that can tell you what your transmitter is doing!

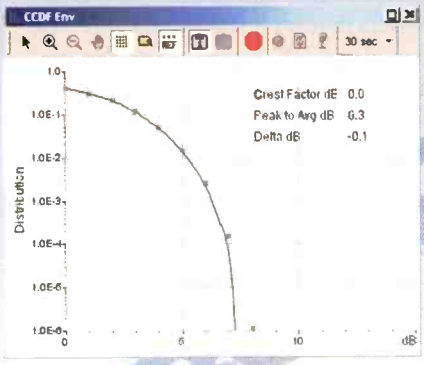


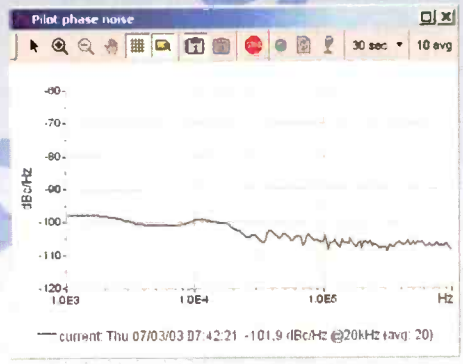


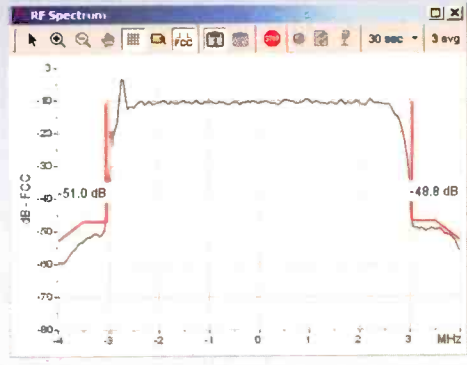












Repair and Calibration Service Available from Rohde & Schwarz, Inc.

ROHDE&SCHWARZ

8661-A Robert Fulton Drive
Columbia, MD 21046
410-910-7800 1-888-837-8772

http://www.rohde-schwarz.com

consumed in the United States — content that is now the largest economic export of the United States. It was the MPAA that went all the way to the Supreme Court in an attempt to block the sale of the VCR.

The MPAA successfully lobbied for the Broadcast Flag by *predicting* the "Napsterization of DTV." The FCC order says that content owners and broadcasters equally assert that DTV broadcast content must be protected and that, in the absence of some protection mechanism, high-value content will be withheld from broadcast television and migrate to pay services.

The reality is that high-value content has been migrating to pay services for two decades. A highly profitable niche market for HDTV products and content already exists, and there is a strong correlation between the homes that historically have subscribed to premium TV services and those that are buying HD-capable displays.

The FCC sided with those who predict a future problem by saying that although technological constraints may inhibit the redistribution of HDTV today, the potential for piracy will increase as technology advances.

Death of the integrated TV?

Let's look at some facts. While the majority of HD-capable displays sold today *do* include an NTSC/analog cable-ready tuner, they *do not* include a DTV tuner. This means the largest group of installed DTV tuners today is in the form of HD STBs for DirecTV's satellite service.

Cable set-top boxes, such as the Scientific-Atlanta HDTV-capable unit pictured above, are not required to include off-air ATSC tuners, but they may need to honor the Broadcast Flag if the cable system carries protected broadcast content. Cable boxes already include robust content protection and will likely use many of the same content protection technologies as ATSC receivers and STBs.

The recent FCC action to bless the agreement between the cable and CE industries for plug-and-play compatibility puts the CE industry in competition with the vendors of proprietary digital cable STBs. Thus, the most likely path for manufacturers will be to separate the display from the STB. In that way, they can offer consumers their choice of cable or DBS subscription services, or an STB optimized only for off-air reception of NTSC and ATSC signals. This means it will still be possible for consumers to buy a video monitor, and then add an external STB supplied by a retailer, cable or DBS service that won't receive OTA broadcasts!

The most likely path for manufacturers will be to separate the display from the set-top box.

Those opposed to the concept that free-to-air broadcasts must be protected claim that the threat is overblown. They point out that it's easy to convert today's analog broadcasts into files that can be shared, yet this has not resulted in widespread redistribution of broadcast TV content. They note also that broadband speeds are far too slow to support HD file sharing, and that there is little evidence that most people are interested in sharing TV programs in a manner akin to music.

The FCC order mandating DTV tuners includes the following footnote (page 12): "The discussion herein pertains only to broadcast television receivers as defined in Section 15.(3)(w), *i.e.*, those intended for reception of service on the television channels authorized for service under Part 73 of the rules. See 47 C.F.R. 15(3)(w). The requirements adopted in this action *do not apply* [emphasis added] to devices such as cable and satellite service receivers that are not designed to receive broadcast TV signals over-the-air." This provision allows the CE industry to build STBs that do not implement any of the DTV tuner and Broadcast Flag mandates.

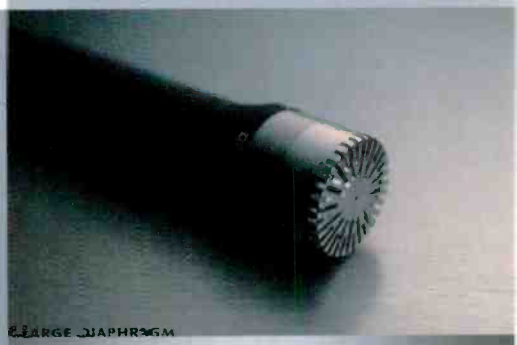
So what does all of this really mean? In essence, there is no way to protect digital broadcasts reliably unless they are encrypted, and there is tight control of the devices that can decrypt and view digital broadcasts. This would instantly obsolete all of the DTV receivers sold to date. It's not feasible to eliminate analog outputs without making most HD displays obsolete.

The FCC's *interim* solution is to place the burden of content protection in three areas: DTV tuners, with the

Web links

CEA Report "5 Technologies to Watch"
www.ce.org/publications/books_references/n5Tech_Watch.pdf
December 2002 *Broadcast Engineering*, "Retransmission control"
www.broadcastengineering.com/ar/broadcasting_retransmission_control/index.htm
Digital Transmission Licensing Authority (DTCP for IEEE 1394 and IP networks)
www.dtcp.com/
Digital Content Protection, LLC (HDCP for DVI)
www.digital-cp.com/

The Clear Difference



The DPA 4066 microphone is designed for exceptional sound and comfort. Successful professionals such as Linda Kruse, a model, actress and product demonstrator, choose the 4066 for its highly articulate sound and adjustable headband.

The versatile 4066 is compatible with most all wireless and hard-wired systems and built to perform with utmost reliability. The low profile microphone boom detaches for easy mounting on either the left or right side and can be quickly adjusted for a comfortable fit. For broadcast and theatrical applications and conference presentations and worship environments, the DPA 4066 provides a clear difference in sound quality, flexibility and ease-of-use.

For more information call 1.866.DPA.MICS or visit www.dpamicrophones.com.
DPA Microphones, Inc. info-usa@dpamicrophones.com

DPA MICROPHONES

JUST ADD TALENT

networks potentially being used to move these bits around your "home" network and the viewing devices. The exact boundaries of permitted use are still being negotiated. The FCC's *Further Notice of Proposed Rulemaking* seeks comment on the usefulness of defining a personal digital network environment (PDNE), within which consumers could freely redistribute digital broadcast television content.

The Broadcast Flag order does not mandate any specific content protection technology. Instead, it calls for the creation of a process by which competing technologies will be approved by the FCC; and a process to withdraw the approval if the technology is widely breached after deployment. The FCC is expected to bless two technologies already approved for use in digital-cable-ready TVs.

For security, digital transmission content protection (DTCP) will be used to encrypt protected streams as they travel across user-accessible buses. DTCP is fully implemented for IEEE 1394 (Firewire), with a specification being developed to extend this to Ethernet-based IP networks. For uncompressed digital links between a device and a display, high-bandwidth digital content protection (HDCP) will be used to encrypt the baseband digital signal as it travels across a protected DVI connection. DTV tuners with unprotected DVI outputs must down-res HD content to no more than 330,000 samples per frame (roughly 480p resolution).

The FCC decision to allow for the approval of competing solutions may be the worst aspect of the Broadcast Flag order.

Downstream devices such as a PC with a DTV tuner board also are affected. Tuner boards with unprotected DVI outputs are required to down-res HD content to no more than 330,000 samples per frame (roughly 480p resolution). If a PC is to display HD content, the system must be protected so users cannot copy or distribute the compressed bitstreams.

In order to share a bitstream between devices, the devices must agree if the target device is authorized to decrypt and view the content. If the device is physically connected outside of the PDNE, it can access devices in the PDNE via the Internet.

Digital format wars?

The FCC decision to allow for the approval of competing solutions may be the worst aspect of the Broadcast Flag order. This approach creates the real possibility that products may not interoperate, even if the intended use is authorized. In order for a product to play all available content from any protected device, it would need to support all of the approved protection technologies. Philips strongly objected to FCC selection of DTCP, pushing their alternative of watermarking the content. Thus, a DVD recorder using DTCP could produce a disc that would not play on a Philips DVD player that used a different protection method.

The prospect of manufacturers using different protection technologies could effectively lock consumers into the products of a particular manufacturer (or group of manufacturers). All this could give new meaning to the term "Format Wars." BE

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

SEND Send questions and comments to: cbirkmaier@primediabusiness.com

OverDrive

Production Control System

The pressure to produce more with less has never been greater. On air devices are more complex and controlling the production can be a real challenge. OverDrive™ simplifies live production control with a simple and powerful user interface.

OverDrive™

OverDrive™ is a Windows based production control system. It drives all of the devices during a production, extending the reach of the technical director to include video servers, audio mixers, robotic cameras and more. This means that you can get a more sophisticated production on the air without increasing your staffing levels. Productions are more consistent and less staff training is required to execute a production.

Synergy Series Production Switchers

The key to OverDrive™ is the tight integration to the Ross Synergy Series production switcher family. The interfaces to audio mixers, video servers and robotic cameras are connected through Synergy enabling a tightly integrated production system. This also means that the Synergy production switcher has direct control over these devices without the OverDrive™ system present.

OverDrive™ Benefits

- *Sophisticated productions*
- *Consistent productions*
- *Fewer staff*
- *Less staff training*
- *"On-the-fly" changes*
- *Immediately air breaking events*
- *Optional newsroom link*

Live Production Made Easy

ROSS

Cool Practical Technology™

Ross Video Limited P.O. Box 220, 8 John Street Iroquois, Ontario, Canada K0E 1K0
Tel: (613) 652-4886 Fax: (613) 652-4425 Email: solutions@rossvideo.com

www.rossvideo.com

Frequency coordination for broadcast auxiliaries

BY HARRY C. MARTIN

The FCC's newest prior coordination procedures for the Broadcast Auxiliary Service (BAS) took effect in October. The procedures are designed to minimize interference between services sharing frequency bands.

With implementation of the new rules, prior frequency coordination procedures are now required for *all* TV and aural BAS and CARS frequency bands. The new rules specifically affect fixed BAS in the bands 944- to 952MHz (950MHz), 2450- to 2583.5MHz (2.5GHz), 6875- to 7125MHz (7GHz), and 12700- to 13250MHz (13GHz). The procedures were already in effect for aural and TV BAS stations in the bands 6425- to 6525MHz and 17700- to 19700MHz. For the 1990- to 2110MHz band, the FCC will continue to maintain procedures that allow for local frequency coordination. However, the FCC's new rules supplement local frequency coordination procedures for fixed systems to require the submission of a certification attesting that all co-channel and adjacent-channel licensees and applicants potentially affected by the proposed fixed use of the frequencies have been notified and are in agreement that proposed facilities can be installed without causing harmful interference to other uses.

Requiring adherence to uniform frequency coordination procedures is expected to reduce interference between services sharing a band and to ease the analog-digital transition.

Proposed frequency usage must be coordinated with existing licensees, permittees and applicants in the area, as well as other applicants whose previously proposed facilities could affect or be affected by the new proposal in terms of frequency interference. Coordination must be completed prior to filing an application.

Coordination involves two separate elements: notification and response. To be acceptable, all applications and major technical amendments *must* certify that coordination, including response from notified parties, has been completed.

The new prior coordination procedures were supposed to take effect on April 16, but they were delayed for six months to give licensees time to correct inaccurate information in the FCC's electronic database. The Society of Broadcast Engineers (SBE) had requested postponement of the new rules so that licensees could correct information including erroneous or missing receive site information such as geographic coordinates, antenna height, and make and model information. The mistakes were left over from licensing methods antedating the FCC's current Universal Licensing System (ULS). Approximately 29 percent of all fixed point-to-point BAS licensee records included some mistaken information. Receive site information was not even required prior to 1974, which is why it was missing in many old licenses. The inaccuracies in the ULS would have seriously impacted prior coordination efforts to avert interference.

Prior frequency coordination procedures are now required for *all* TV and aural BAS and CARS frequency bands.

Dateline

All commercial and Class A television stations must file their Children's Television Programming Reports (Form 398) electronically on or before Jan. 10, 2004. All commercial and noncommercial TV stations must place their fourth quarterly issues/programs lists in their public files, also by Jan. 10.

No tower lights equals $120,500 fine

The FCC has issued a $120,500 notice of forfeiture to a tower company for failing to light a new 1000-foot tower in Richmond, VA.

FCC inspectors found the tower unlighted for several days and discovered that another tower at the site was unregistered. The maximum possible fine was levied because the FCC previously had fined the same company for failing to light a tower it owned in Florida. Indeed, the company had been cited for a total of three forfeitures in less than three years for at least 13 instances of failure to comply with antenna structure rules. BE

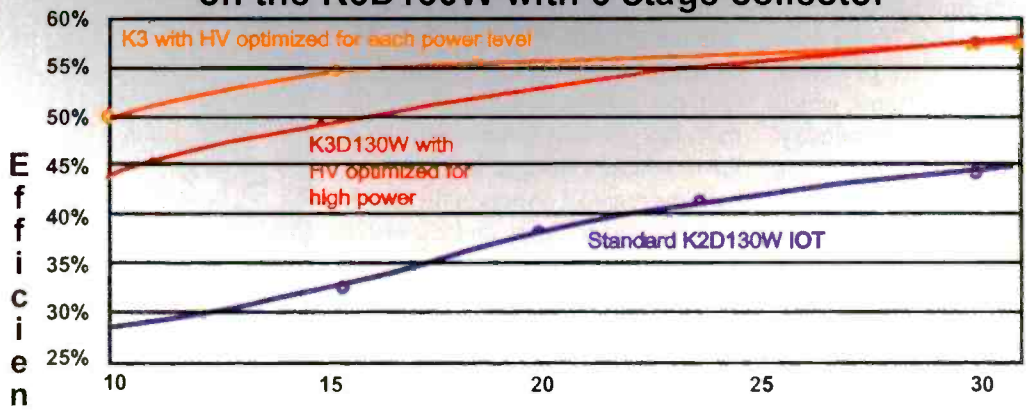
Harry C. Martin is an attorney with Fletcher, Heald & Hildreth PLC, Arlington, VA.

SEND Send questions and comments to: harry_martin@primediabusiness.com

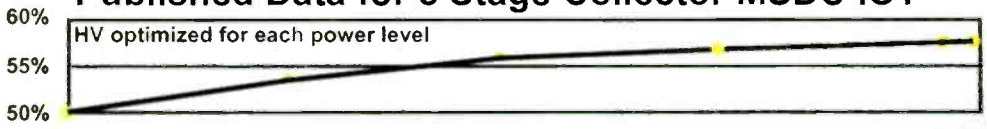
Elegant Efficiency

The Real Facts about EIMAC's K3 MSDC IOT

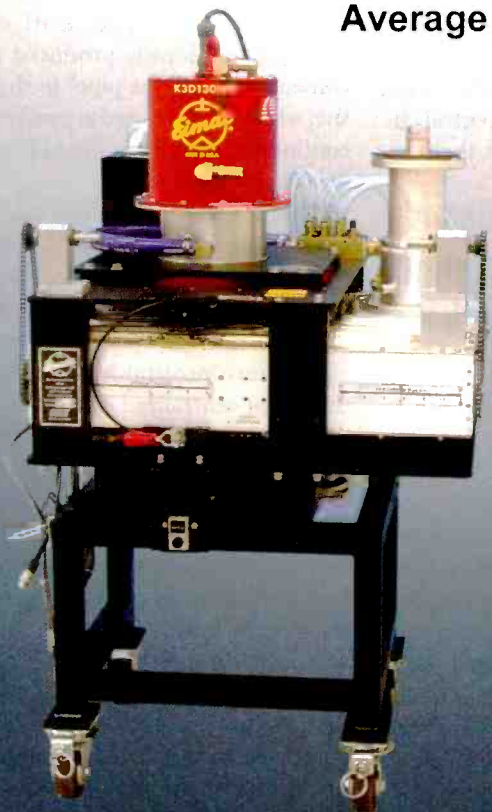
ACTUAL EFFICIENCY MEASUREMENTS on the K3D130W with 3 stage collector *



Published Data for 5 Stage Collector MSDC IOT



Average power 8VSB (kW)



* Test results with uncorrected standard 8VSB input. High voltages between 30 kV and 34 kV.

Communications & Power Industries

Eimac Division

301 Industrial Road

San Carlos, CA 94070

tel 650.592.1221

fax 650.592.9988

email.iot@eimac.cpii.com

www.eimac.com

ISO 9001 Certified . Made in USA

The centralcast model

BY JOHN LUFF

Broadcasting has enjoyed a glorious past. Today however, there are pressures applied from many directions, which tear at the very fabric of the industry. Competition, rising costs, declining revenues, advancing technology, and the Federal DTV mandate have conspired to put a new spin on the broadcast model.

Market share for broadcast television is still considerable, in fact dominant, but the percentage (and the dollars that support broadcast operations) decrease every year. Twenty years ago broadcasters predominantly got programming from a single network source and were handsomely compensated for network carriage. Cable program services, DBS sports packages, and pay per view and on demand services from cable and satellite offer the consumer compelling alternatives to broadcast. The result on revenue is direct and predictable.

DTV conversion may in fact not be possible without creative financing or consolidation in many small markets.

Advertisers spread the revenue across more options, and each gets a little less.

Adding to the factors in this equation is the FCC mandate for DTV, which saps capital investment funding available to local stations. DTV conversion may in fact not be possible without creative financing or consolidation in many small markets.

About five years ago some broadcast group owners began to see that the trend would never reverse and sought ways to cut costs to stall the decline in broadcast cash flow. Ackerley (now part of Clear Channel), the New York Times Group, and others began to toy with the idea of moving air operations to centralized sites, with the thought that the savings in labor would be more than the cost of interconnection lines. Ackerley plunged in head first, building regional centers in the North East, the Pacific Coast, and elsewhere and gutting the technical plants in the remote cities with the intention of moving video over fiber optic data circuits and consolidating labor in one site. The idea was to automate the stations, and reduce the total head count by more than the number of new technicians at the central site.

The New York Times took a different tack by putting automation in stations and then moving control and monitoring to the remote site along with the labor to control the stations. With fewer people at the local station and a minimum crew at a central site to operate multiple stations, their approach used less capital hardware and a low interconnection bandwidth to achieve only control and status via remote circuits.

These initial implementations were not experimental; they are still on the air. They achieved at least in part the goal of reducing cost, and they certainly learned a lot about the realities of centralized broadcast operations. Kelly Alford, then Ackerley's director of engineering, told me that the challenge was most importantly human. Getting the personnel in a station to understand and agree with a decision to centralize operations is a human relations problem, and one where the staff may well see no alternative, but still not be pleased with the choice to consolidate operations and reduce staff costs. Ackerley sent locally produced news content back "up the pipe" to the hub site, where it was turned around on the continuous pipe from the hub to the local transmitter.

Channel M's master control room in Vancouver, British Columbia had to be as high-tech and automated as possible to reduce ongoing operational costs.

What Ackerley and others have discovered is that before the decision is made to uproot broadcast air operations, other "low hanging fruit" exists which is less disruptive, and potentially more profitable. The central theme for centralized operations is to reduce duplication and thus head count. Promotions, traffic and back office operations are areas where the impact of technology on the decision is not as costly, and the potential return is every bit as great. For instance, moving the traffic department off site works well in most groups. If terminals are provided at the local station for entering and retrieving data, but broadcast inventory is managed remotely the impact on most of the station is minimal at best.

NewsCutter Adrenaline FX

The new standard for broadcast.

The NewsCutter® Adrenaline™ FX system offers complete newsroom connectivity and the speed, productivity, and performance that broadcast professionals demand. Tight integration with the newsroom. Full-featured color correction. Future HD expandability. Professional effects to enhance production everywhere in the station, from news to promotions and beyond. Power your edit suites and deliver programming in virtually any format with the new standard for broadcast.

Avid NewsCutter 10th Anniversary!

make manage move | media Avid.

The staff in any business wants the company to succeed to insure the continued employment of the maximum number of their co-workers. Working toward getting involvement and agreement instead of forcing the decision without discussion will help make it possible to succeed with centralized operations.

Promotions are another area where centralization can be quite effective. In the days when promotions were locally produced using linear editing bays there might have been little room to save money in consolidation. Today many group owners buy much of the same syndicated programming. Rather than have 10 stations all cutting promos for "Oprah," it is clear that one master promo with local tags can cut production time and cost significantly. The need to have extensive editing operations at the local station is reduced, freeing capital to be used in the newsroom or other parts of the station where dollars are equally hard to free up. Nonlinear editing has the additional benefit of being inherently digital, making interconnection to remote playout a potentially transparent process. Many groups are using "video e-mail" appliances to transport the completed stories to the local market from the hub production center at low cost and with "more urgency." The impact on the operations is dramatic when the tedious work of tagging promos is moved to a central site where that activity is repeated for multiple markets using the same input material. This approach also can lead to a consistent look at groups of multiple stations, and permit consistency in how promotions are done to maximize results in multiple markets.

Though promotions, traffic and lower tech solutions to lowering costs are easy to understand and achieve, the majority of professionals probably think of master control centralization as the real "meat and potatoes" of centralized operations. As one would think from only a cursory look at the issues in centralizing (or consolidating) air operations, they are anything but simple and the success is anything but assured. The equation looks something like this:

Labor savings-interconnection cost-capital depreciation=actual savings

This is deceptively simple and easy to understand, but the allure of centralized operations is compelling. USA Networks tried the grand daddy of all centralizations, building a complex facility in Los Angeles in 1999 to feed over a dozen stations across the USA. To protect the signals from "back hoe fade" they used redundant circuits. The facility was complex and sophisticated, and by some accounts a technical success and economic failure. What went wrong? One only needs to use the equation above to come up with the back of the envelope answer. The labor saved could not overcome the cost of interconnection and depreciation.

The allure of centralized operations is compelling.

The impression many in our industry have is that interconnection is cheap and ubiquitously available. Neither is true in every case, though with thoughtful implementation it can be closer to reality now than ever before. Consultants and designers are constantly looking for ways to untie this Gordian Knot. And the way may well be available, and in fact is in use at several groups today. Like Alexander who simply cut he knot with his sword instead of untying it, we need to look at the problem with no preconceived notions of the methods needed for success if we hope to achieve success. The key is analysis before action.

Centralized operations fail to be economically viable for two main reasons. Either the labor saved is not sufficient, or the interconnection cost is too high. It is hard to get additional savings from labor, for once everyone is released there is nowhere else to turn to for savings. With many stations operating with low paid master control operators the head count reduction cannot achieve dramatic savings. In large markets where staff costs are high this is not the case, at least to the same degree. However, if one assumes high bandwidth guaranteed QOS circuits for interconnection the marginal savings in labor are compounded with interconnection at high dollar.

It would seem difficult to operate a broadcast station without high bandwidth and high reliability in the interconnection medium. Unless we cut the knot and say that maybe neither is necessary! Enter Distributed Broadcast Operations, a hybrid of centralized operations in which the final stream is assembled by automation at the local station from sources which already exist when practical and cost effective. If network receivers already exist at the station why move them to a new site, only to reconnect them over an IXC circuit at high cost and with the risk of "back hoe fade" taking the station off the air? What if the programming was assembled in a combination of remote and local playlists interleaved and controlled from a central location? This has the benefit of allowing for store and forward techniques, which can work on circuits with, guaranteed average bit rate, but which do not guarantee instantaneous QOS.

Here's how it works. Programming that is live from a network is received at the local station without additional interconnection cost. Automation takes the well-defined playlist and inserts interstitials as scheduled. Programming that is delayed is received at the central site, prepped for air, and then sent on a store-and-forward system to the local station to be played out at its scheduled time. By moving the ingest labor to a central site, it is possible to ingest "Oprah" one time for many stations and simply send the media and the automation playlist events to local storage at all the sta-

the wait is over...

...it's here!

PRO850
WIRELESS INTERCOM SYSTEM

And, it's without competition.
Rock solid performance with the utmost reliability and sound quality.

The amazing all-new HME Pro 850 Wireless Intercom System is the new Industry Standard and the ultimate solution for all your RF intercom needs.

See and hear it TODAY.

WEST
888.810.1001
EAST
800.542.3332

HME

www.hmepro850.com

tions in the same format. This reduces ingest labor dramatically, and insures that all stations air the precisely same program. By distributing the playlist and media over the combined resources of the central site and local station you also achieve a degree of protection from loss of the interconnection circuit. If it is down for any substantial amount of time the problem is the same as in any other interconnection topology, but losing two minutes of interconnection when it is not live to air all the time is just not a critical problem any longer. What is important is the guarantee of delivery *in time for air*.

Data circuits for this intended operational mode can have a lower QoS, lower interconnection bandwidth, and so are cheaper to install and operate. The flexibility to multiplex variable bit rate streams together can allow for connections to include communications circuits, as well as allowing remote data bases and remote monitoring feeds to be connected. You might ask what happens when the circuit goes down, which it certainly will eventually. With less bandwidth to be re-established it is possible to use a backup strategy, which is less costly for restoration purposes only. Even if the restoration is at lower bandwidth, i.e. using ISDN dialup service, the effect is potentially to limit the number of services, which can be maintained, for instance dropping voice services, as well as clearly slowing down the FTP to a trickle from a flood. This does not mean the video will be delivered in time for air, but if the plan were to keep hours ahead of need then the outage would have to be very long to create a problem that actually affects air.

By distributing control and media the level of protection goes up, and potentially the cost goes down, raising the probability that the equation will provide positive results instead of proving that the centralization cannot work. To the extent that the topology approach relies on high bandwidth circuits, the cost certainly goes up and the likelihood that the equation produces a result that will save broadcasters money goes down.

Ultimately, what matters is not the technology, but the success of the business. Centralized operations are but one arrow in the quiver used to shoot at a moving target. Creative use of the tools is the only way to enhance the bottom line and produce value. It is our job in technology to keep our eyes open to new approaches and creatively analyze the effects on the business of broadcasting. BE

John Luff is senior vice president of business development for AZCAR. To reach him, visit www.azcar.com.

Defining the Future of Test and Measurement!

VTM-300G / 330EG

US Patents 6,532,024 and 6,069,607
Other US and Foreign Patents Pending

Five Times Better!

Fulfill your needs for now and in the future with the VTM-300G and 330EG

Videotek, the inventors of on screen test and measurement, continues to progressively engineer our VTM instruments for the most critical quality assurance environments. Recognizing the diversity of facility applications, and anticipating format evolution, Videotek offers a full line of more than ten VTM models to best satisfy each specific need.

Building on our commitment to the industry, the VTM-300G and VTM-330EG were designed for complete system solutions. Both models seamlessly integrate with professional audio, video, and communications interfaces, provide user customization, and support multi-format signal monitoring for performance verification.

Key Features Include:

- Serial Digital/Analog Composite Looping Inputs
- A-B Input Parade and Overlay
- Closed Caption Decode and Display
- SD Eye Pattern and Jitter Measurement
- Surround Sound Display with Dolby® Options
- Intuitive Gamut and Timing Display
- Comprehensive Communications/Control Suite

ANOTHER VIDEOTEK REASON TO BUY

FREE 5 YEAR WARRANTY

For more information on these and other Videotek leading products, visit our web site or call one of our product specialists today.

VIDEOTEK®
A Zero Defects Company

Toll Free: 800-800-5719 • Direct: 610-327-2292
www.videotek.com

Format conversion

BY MICHAEL ROBIN

Motion pictures that were made between the late 1920s, the advent of sound on pictures, and the early 1950s, the advent of widescreen pictures, share two characteristics:

- *Horizontal vs. vertical picture dimension ratio (aspect ratio).* 1.33:1 (4:3)
- *Number of acquired pictures per second (picture frequency).* The chosen picture frequency is 24 images per second. This satisfies the eye requirements with respect to recreating the illusion of movement. To satisfy a related eye requirement, critical flicker, each stationary picture of the sequence is projected twice, resulting in a "refresh rate" of 48 cycles per second.

When the basics of practical television were developed in the 1930s, the chosen aspect ratio was 1.33:1 (4:3) to match the contemporary film aspect ratio. On both sides of the Atlantic, the need was felt to relate the picture repetition frequency (refresh rate) to the power line frequency. For historical reasons, this was 60Hz in North America and 50Hz in Europe. Transmission bandwidth constraints dictated the use of interlaced scanning, and the result was 30 frames per second (60 interlaced fields per second) in North America and 25 frames per second (50 interlaced fields per second) in Europe. With the advent of color television, North America felt the need to alter the frame repetition frequency to 29.97 frames per second (59.94 interlaced fields per second) to reduce the visibility of the color subcarrier. PAL does not use this method.

On both sides of the Atlantic, the need was felt to relate the picture repetition frequency (refresh rate) to the power line frequency.

Transferring film to video

With PAL or SECAM, featuring 25 frames per second (50 interlaced fields per second), transferring film to video is usually achieved by running the film at a slightly increased speed (25/24 = 1.04166...). This results in shortening the duration of the projected movie, which is relatively acceptable, and raising the reproduced sound pitch, which is mildly annoying.

NTSC video required a different approach. It is evident that it would be totally unacceptable to run film at 30 (or 29.97)frames per second. The solution adopted is based on the fact that 30 (television frames per second) and 24 (film frames per second) have a common denominator — six. Essentially, four frames projected at a speed of 24 frames per second take the same amount of time (4/24 = 1/6 sec) as five television scanning frames at 30 frames per second (5/30 = 1/6 sec). Thus, if the image is scanned completely five times while four film frames are passing through the projector, then the two systems maintain synchronism.

This relationship is maintained if one film frame is scanned with two television fields (2/60 sec), the next film frame with three fields (3/60 sec) and so on. This method is called the 2/3 pull-down. While this solution was adopted before the advent of NTSC color with its modified scanning rates (29.97 television frames per second), it works equally well with the slightly reduced frame rate.

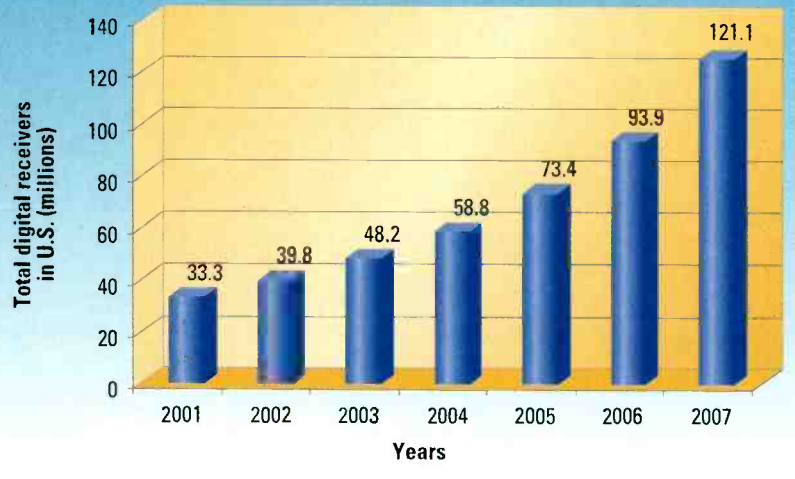
The methods described above

FRAME GRAB

A look at tomorrow's technology

DTV spreads to 120 million plus

Satellite and cable compete to more than double access by 2007



Source: Understanding & Solutions

www.uands.com

SHARPEST Detail

SE4000 MPEG-2 Contribution Encoder

NTSC *AND* PAL *AND* DVB *AND* SDI Video *AND* 4:2:2 *AND* 4:2:0 MPEG ENCODER *AND* Analog *AND* AES Digital Audio *AND* BISS *AND* PGCA Scrambling *AND* QPSK *AND* 8PSK *AND* 16QAM *AND* 70 Mhz *AND* 140 Mhz *AND* L-band.

The SE4000 can be purchased with the minimum features at a very low cost, and can be easily upgraded to the most feature-rich encoder available today. The encoder can have BISS, DVB-8PSK, IF and L-Band outputs, and composite video input signal conditioning.

TIERNAN
A Radyne ComStream Company

Phoenix: 602-437-9620 • San Diego: 858-458-1800
UK: 44-1420-540233 • Latin America: 858-458-1800
Singapore: 65-6225-4016 • Beijing: 86-10-65831975
www.radn.com • NASDAQ: RADN

worked well until the early 1950s. By then, there were about 15 million television receivers in use in North America. This created an apathy among the potential moviegoers who preferred to stay home and watch television. The movie industry reacted by enhancing the movie-watching experience visually by using various widescreen formats and color, and aurally by multichannel sound. This resulted in a variety of aspect ratios requiring the widening of the screen. Table 1 shows some of the formats. Transmitting a widescreen picture required either shrinking it horizontally and vertically to fit the screen, resulting in black bars at the top and the bottom (letterbox), or cropping it horizontally.

Format	Aspect ratio
Academy	1.33:1
Cinerama	2.65:1 to 3:1
Cinemascope	Initially 2.55:1 and later 2.4:1
Superpanavision 70	2.76:1
Ultrapanavision	2.76:1 (65- or 70mm prints) or 2.35:1 (35mm prints)
Panavision	Initially 2.35:1 and currently 2.4:1
Vistavision	Approximately 1.85:1
Todd-Ao	2.2:1 during filming and 2.35:1 on 70mm print
Technirama	2.2:1 (on 70mm prints) or 2.35:1 (on 35mm prints)
Super 35	2.45:1 filmed anamorphically

Table 1. Some contemporary film formats

ATSC implications

The ATSC/DTV standard specifies two picture aspect ratios, 4:3 and 16:9. The 16:9 aspect ratio is a compromise. The 4:3 aspect ratio formats have a luminance sampling grid of, respectively, 720x480 and 640x480. The 16:9 aspect ratio formats have a luminance sampling grid of, respectively, 1920x1080, 1280x720 and 720x480. This results in a large number of possible formats that may be encountered. ATSC also specifies a colorimetry standard (ITU-R-BT709) different from that used by SDTV formats.

A period of transition, supposed to last until the end of 2006, is expected to allow the gradual implementation of 16:9 aspect ratio DTV transmissions. During this period, TV stations are expected to simulcast 4:3 aspect ratio NTSC analog signals on the currently allocated channels and 16:9 aspect ratio DTV transmissions on separate, newly allocated terrestrial transmission channels. The simulcasting is planned to stop in the year 2006, when all analog NTSC transmissions are expected to end and the related transmission channels assigned to other uses. In the transition period, a great deal of format conversions will occur.

Downconversion

Downconversion applies to methods that reduce the full 16:9 aspect ratio HDTV sampling grid (1920x1080 or 1280x720) to a 4:3 aspect ratio SDTV 720x480 sampling grid. The process is best referred to as resizing and changes the original size of the image, i.e. the number of Y,C_B,C_R pixels used to represent the image to the selected target size. Figure 1 depicts the typical methods used.

• *The horizontal cropping method.* In the edge crop mode, a central window is extracted, which fits into a 4:3 raster. In the "pan-and-scan" mode, the operator moves the central window in the horizontal direction to follow the main action. This is the most often used approach in North America. By necessity, some details of the picture will be dropped, so there will be a definite loss of picture information. On the other hand, the screen will be completely filled.

• *The letterbox method.* The 16:9 aspect ratio picture is reduced vertically and horizontally to fit inside a 4:3 aspect ratio window. The process generates black bars at the top and the bottom of the picture. The thickness of the black bar depends on the aspect ratio of the film. Letterboxing reduces the vertical resolution because the black bars reduce the number of active scanning lines. This method is generally used in France and Germany but is shunned in the UK.

• *The anamorphic distortion method.* The 16:9 aspect ratio picture is squeezed horizontally to fit inside a 4:3 aspect ratio raster. This method results in anamorphically distorted shapes. In North America, this method is used in the beginning and end of the movie to allow showing all the credits, many of which would be masked by the pan-and-scan process.

NTSC stations will use downconverters to feed the NTSC transmitter with 16:9 originated signals. Also, given the large number of analog 4:3-format

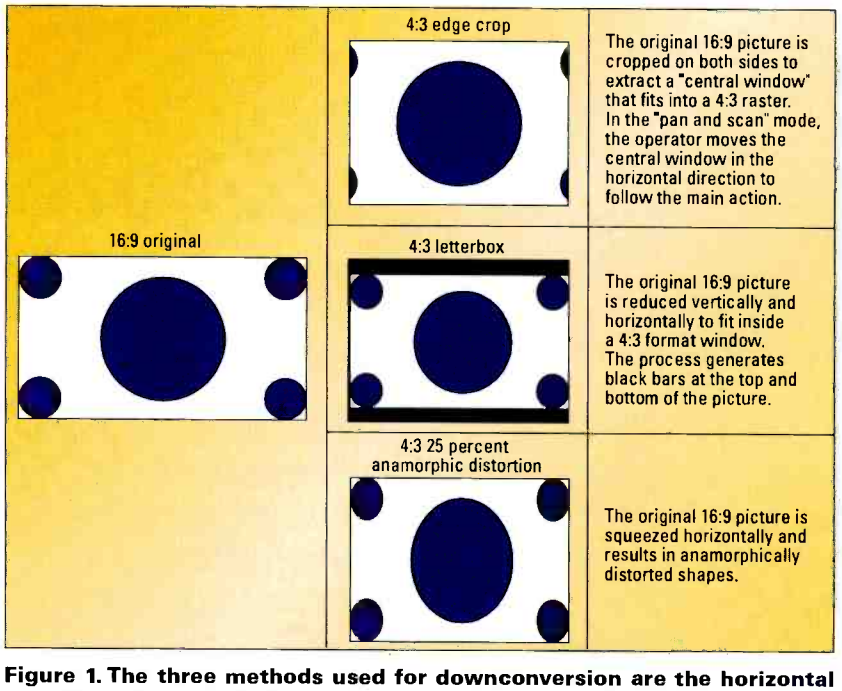


Figure 1. The three methods used for downconversion are the horizontal cropping method, letterbox method and anamorphic distortion method.

Turn Up the Experience with Dolby Pro Logic II

DP563 Dolby Surround and Pro Logic II Encoder

Audiences love Dolby® Digital 5.1 discrete surround in digital entertainment such as DTV, DVDs, and video games. But what about surround sound for two-channel audio delivery?

Dolby Pro Logic® II offers the best matrix-surround experience for stereo-only television services, top-selling video games, or VHS tapes. With five full-range channels, improved steering logic for greater channel separation, and an exceptionally stable sound field, Dolby Pro Logic II remains compatible with consumer decoders with Dolby Pro Logic, stereo, or mono outputs.

Encode your analog or digital two-channel productions in engrossing Dolby Pro Logic II matrix-surround, now available with the DP563 Dolby Surround and Pro Logic II Encoder.

www.dolby.com/pro

DOLBY®

NTSC receivers in use, it is unrealistic to expect that all these receivers will be discarded in 2006. In all likelihood, a large number of set-top converters/decoders will be used to convert the 16:9 DTV transmissions to feed the 4:3 NTSC analog receivers. These set-top decoders will use some type of format downconversion.

Upconversion

Upconversion applies to methods that increase the 4:3 aspect ratio SDTV 720x480 sampling grid to a full 16:9 aspect ratio sampling grid (1920x1080 or 1280x720). The process is best referred to as resizing, and it changes the original size of the image, i.e. the number of Y,C_B,C_R pixels used to represent the image to the selected target size. Figure 2 depicts the typical methods used.

• *The side panel mode.* The original 4:3 aspect ratio picture is inserted in a 16:9 window, which results in black side panels.

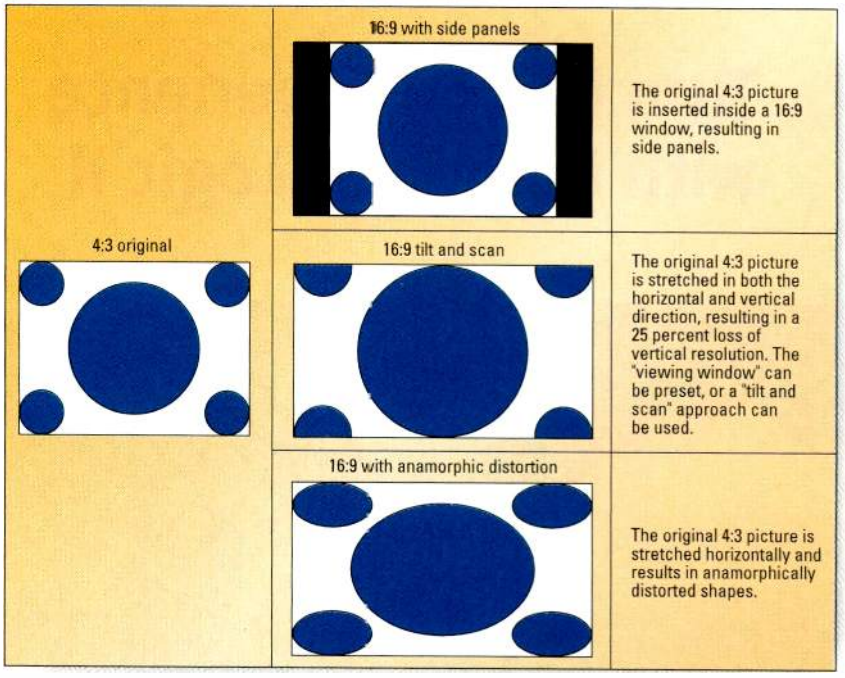


Figure 2. The typical methods used for upconversion are the side panel mode, the tilt scan mode and the anamorphic distortion mode.

• *The tilt scan mode.* The 4:3 picture is stretched in the horizontal and vertical direction to fill a 16:9 aspect ratio screen, resulting in a 25 percent loss of vertical resolution. The "viewing window" can be preset, or a "tilt and scan" approach can be used. Here the operator moves the window in the vertical direction to follow the action.

• *The anamorphic distortion mode.* Figure 2 shows the manner in which a 4:3 aspect ratio picture is stretched horizontally to fill a 16:9 aspect ratio screen, which results in anamorphic distortion.

None of the three methods offers an ideal solution. Experiments indicate that a 5 percent anamorphic distortion is undetectable and that a 7 percent anamorphic distortion is not objectionable. The current trend is to combine the three methods to obtain a picture that is subjectively pleasant to the viewer. In the long run, upconversion will be used to convert 50 years of SDTV legacy programming to DTV formats. BE

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

Send questions and comments to: michael_robin@primediabusiness.com

SNELL & WILCOX
Engineering with Vision

ALCHEMIST Ph.C 1998

ALCHEMIST Ph.C 2000

When Alchemist Ph.C was launched ten years ago, it solved the problem of jerky, blurred standards conversion for good. Since then, each generation of this Emmy-winning technology has delivered ever more transparent results.

Now, Alchemist Platinum Ph.C raises the quality bar yet again.

Its impressive specification outstrips any other converter ever built, with 12 bit core processing, 4:4:4 sampling performance, integrated "CleanCut 2.0" edit detection, and a unique 24 point filtering aperture, for the ultimate in processing transparency.

And there's much more. As well as bringing advanced conversion performance to the SD domain, Alchemist Platinum Ph.C is the only converter to offer the option of single-step, motion compensated SD to HD upconversion.

Other options designed to preserve the creative integrity of your programme material include "video-to-film" processing, "DEFTplus" the artefact-free conversion of NTSC episodics containing a mix of film and video originated material, and "P-film" the artefact-free conversion of 625 line mixed media.

So now, when only the best standards conversion will do, there's only one solution.

Ask for Alchemist Platinum Ph.C.

To see it in action and for further information, telephone 020 8917 4300. www.snellwilcox.com

NOW YOU CAN LEAVE THOSE JERKS EVEN FURTHER BEHIND.
ALCHEMIST PLATINUM Ph.C
THE ULTIMATE IN MOTION COMPENSATED STANDARDS CONVERSION.

Post-production networks

BY BRAD GILMER

Post-production networks have always been at the forefront of networking technology for video. In the early days, a post facility was able to move still images from its graphics areas throughout the facility using 10Base-T networks. As network speeds increased, post facilities were some of the first to use networks to send short motion sequences through computer networks. Today, post facilities have wholeheartedly embraced networks, and are pushing the limits of what is possible.

A case in point

For example, let's look at one particular large post facility. It began its experience in networking as many others have: an ad-hoc network here, a connection between a couple of paint workstations there. It installed 10Base-T hubs and concentrators to provide more connectivity. Up to a certain point, the network grew organically. As new equipment was delivered, engineers connected it to the existing network. Bandwidth demands increased, and it was time for planning. The facility reconfigured the network and added routers to segment the traffic. It replaced hubs with switches and, as new networking equipment was installed, the people running the network took advantage of monitoring and diagnostics available through SNMP.

When the facility relocated to a new building, network engineers took the opportunity to redesign the network from the ground up. The engineers configured the multi-story facility with 10/100Base-T switches on each floor. The switches provided connectivity to equipment on each floor. Multiple Gig-E connections between floors provided 42 Gigabits of bandwidth floor-to-floor. (See Figure 1.)

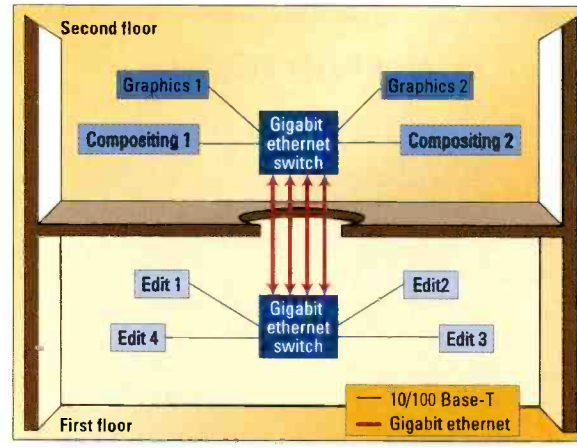


Figure 1. A multi-floor post facility with 10/100Base-T connectivity on each floor and Gigabit Ethernet between floors.

The new network was a great success. As the facility grew, it continually added new equipment. As applications improved, and as workflows changed, network traffic continued to grow. Several years later, the facility finds itself facing a real challenge. It uses state-of-the-art equipment, and the network design is sound. Unfortunately, the network is a victim of its own success. And while the network definitely has become a critical part of the post-production infrastructure, the users want more in the way of support for collaborative workflows.

Desktop post-production has become a critical part of the overall post process. Almost all post facilities and freelancers use desktop applications as part of the creative process. Desktop video editing, graphics and effects creation, and audio-post tools are now extremely powerful and full-featured. In many cases, people prefer to use these tools during a project because they are comparatively low-cost, they produce usable results, and they are, in many cases, portable, allowing a creative person to work with a client wherever he or she may be. Of course, at some point, this work must be integrated into the more traditional post facility. Typically this is done by using Firewire or an Ethernet connection.

Shared storage

Having an industrial-strength network is one way to enable collaborative workflow. Users working on a project can save their output in a reasonably ubiquitous file format such as Targa or TIFF. The next person in line can import that image or sequence and take things from there. But there is a limit to how much this improves workflow. For one thing, the metadata about the project generally does not flow with the image file. Secondly, if you have two people working in different areas of the same project at the same time, this model does not help.

Let's look at the first issue. While the

Having an industrial-strength network is one way to enable collaborative workflow.

The Most Advanced CG Ever Created

inscriber

inca studio

Inscriber® Inca Studio™ is part of a revolutionary new family of products that will change the way you think about character generators. Instead of tying up several switcher rails with multiple CGs, DDRs, logo generators and other equipment, Inca Studio lets you do it all on a single channel with features such as:

- **independent clock and logo channels**- create & display clocks and bugs without using a separate box or channel
- **realtime clip to clip dissolves**- dissolve between clips which can reside on any surface of Inca Studio's multi-layer composited graphics
- **key & fill input**- the ability to input both key and fill for capture as well as for video passthrough allows you to use it as part of your compositing stream
- **realtime organic transitions**- no NLE required. Inca Studio provides realtime transitions using images as mattes
- **multi-layer 3D effects**- apply 3D effects like warp, twist and page curl to backgrounds, text or graphics

Contact Inscriber to discover more reasons why Inca Studio is the most advanced CG ever created.

www.inscriber.com

North & South American Sales—26 Peppler Street, Waterloo, Ontario, Canada N2J 3C4 Toll-free: +1.800.363.3400 Tel: +1.519.570.9111 Fax: +1 519 570.9140 **European Sales**—Zijdstraat 72, 1431 EE Aalsmeer, The Netherlands Tel: +31.297.380930 Fax: +31.297.380939 **Asia-Pacific Sales**—Level 9, AIG Building 1-1-3 Marunouchi, Chiyoda-ku, Tokyo 100-0005, Japan Tel: +81 3.5288.5237 Fax: +81.48.838.6484

Targa and TIFF files are well understood, they do not contain much information about the context within which the images were generated. There is one common solution to this today, and that is to use a proprietary format for sharing. This works well because it provides information about the project, but it can be disadvantageous if other manufacturer products are involved in the workflow, because it is likely that they will not be able to read the proprietary files. Another potential solution is to use the Advanced Authoring Format or AAF for interchange. AAF is still under development, but even at this early stage, it is successfully exchanging information between edit and audio applications.

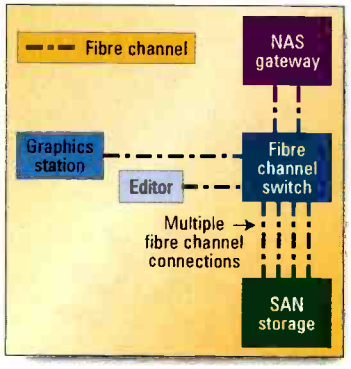


Figure 2. Combining NAS and SAN allows designers to provide high-speed direct storage connections where needed while still allowing more conventional network-drive storage for desktop applications.

As for the second issue, it is probably true that an import/export model does not really support collaboration. In this case, the only likely solution is to use a proprietary format stored on shared storage. Note that there are two pieces to this solution. The proprietary format is important because interactive, collaborative work on a single file or set of files requires not just a high level of understanding about what is going on within the file, but it also requires intimate knowledge of what is going on in the application as well. For example, if two editors are working on the same file, the manufacturer must be very sure of how simultaneous access to the file is granted to be sure that the results are coordinated. You can imagine that if two editors attempt to edit the same part of the file at the same time, chaos can result.

The second important piece of the puzzle is to have rock-solid shared storage. And, while this shared storage could be network-attached storage or NAS (where a remote drive is attached to a local device through the network), a storage-area network or SAN is probably required.

If two editors are working on different parts of the same project using SAN, each editor thinks that the remote, shared disk storage is directly attached to the device (most likely using SCSI over Fibre Channel). The network is transparent as far as the application is concerned. Well-written applications will be able to read, write and modify data in place on the shared storage concurrent with other applications. For this to work well, there must be interoperability between the two (or more) systems on several levels. Typically, this requires close collaboration between the manufacturers involved.

SAN meets NAS

What do you do if you have a modern facility, a 10/100 Mb/s network, you are out of capacity, and your users are demanding even more collaborative workflow support? One solution would be to employ both SAN and NAS. Let's take a look at one implementation you could build today. (See Figure 2.)

Start with SAN storage connected to a high-capacity Fibre Channel (FC) switch. The switch is connected by Fibre Channel to other SAN devices. No Arbitrated Loop, just straight connections from the switch to the FC devices. At this point, you have created a SAN and, in theory, any SAN/FC capable device can attach to the switch and work. But in our case, we also have several hundred desktop devices to support. Given that a Fibre Channel connection for a desktop costs approximately $2,500 (including the license and the interface card), an FC connection for each of these 200 desktops seems a bit pricey to say the least.

NAS seems like the best way to connect these devices to the production SAN. But how do you wire a NAS to a SAN? The answer is you do it with a gateway computer. The gateway has one network-interface card attached to your desktop network, and a SAN-interface card connected to the SAN switch. The gateway mounts the SAN drive and then offers it as a drive on the desktop network. There is more to it than that, but you get the idea. At that point, desktop devices drop their files on the gateway. But the gateway shared drive is actually part of the SAN storage. Once the content is on the SAN, high-end SAN devices can pick it up and run from there. At the same time, SAN devices can use the SAN storage for collaboration. (See Figure 3.)

It is important to understand that SAN and NAS employ fundamentally different protocols. It may look the same in physical implementation (both may run over the same type of fiber for example), but the signals traveling over the fiber are very different. We will cover this topic in a future article. BE

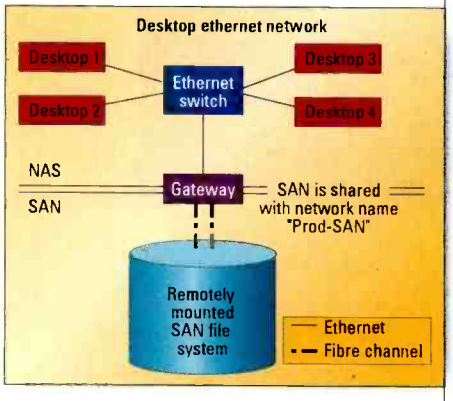


Figure 3. SAN meets NAS. The gateway provides NAS access to the SAN. The gateway mounts the SAN storage and then shares it with desktops on a conventional Ethernet network.

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

SEND Send questions and comments to: brad_gilmer@primediabusiness.com

UTAH-400

It Just Keeps Getting Better

The UTAH-400 High-Density Digital Routing Switcher, already the world's most advanced switcher, now offers even more:

- ***Analog I/O Ports*** **- Your digital Audio or Video router can now be fitted with analog I/O in blocks as small as 8 ports. No more worries about integrating your existing analog source and destination equipment into your new digital plant!**

- ***A New 64x64 Frame*** **- Now all of the UTAH-400's advanced features are available in a compact (4RU) frame for smaller applications.**

No matter what size, all UTAH-400 systems offer the same set of world class features at the industry's lowest prices:

- ***SD/HD Compatibility***
- ***Reduced Power Consumption***
- ***Full-time Monitoring of Input/Output Signals***
- ***Advanced Digital Audio Routing Capabilities***

CELEBRATING 25 YEARS OF SERVICE TO THE BROADCAST INDUSTRY

Utah Scientific has a full range of solutions to the most demanding requirements for routing and presentation systems. Let us help you find the most cost-effective and future-proof digital signal managment system for your facility. Visit us at **www.utahscientific.com** or call (801) 575-8801 today for more information.

UTAH SCIENTIFIC

New Directions in Digital Switching

4750 Wiley Post Way, Suite 150, Salt Lake City, UT 84116 USA
Ph: 801.575.8801 • Fax: 801.537.3099 • Email: sales@utahscientific.com

Calibration tapes
for analog audio recording

BY JAY MCKNIGHT

If you are new to professional analog audio magnetic-tape recording, the first and most important step you can take to ensure high-quality recording is to make sure that the recorder you're using is properly calibrated. And, to calibrate the recorder, you'll need a calibration tape.

Read the manual

First, refer to your recorder's operation and maintenance manual. All professional tape recorders have the same basic adjustments, but the adjustment procedures and the location of the adjustment controls usually differ from one machine to the next. Before you begin tweaking, have the correct test tape on hand, know how to perform the adjustments and when to call a more experienced technician.

Second, understand the basic recording parameters. While tape width may seem obvious and easily measured, most recorders can be set up for any combination of widths, speeds, levels and equalizations. As such, the recorder's model number alone may not be of much help and will require some investigation. If you're already using a calibration tape from Magnetic Reference Lab (MRL), Ampex, BASF (Emtec), Standard Tape Lab or another supplier, the label and the voice announcement will provide all of the details. If the tape has deteriorated, the MRL part numbers are still valid. For all other tape types, contact MRL for the equivalent part number.

Record level

When choosing the tape's internal (magnetic) operating level, also called reference fluxivity, you must base your choice on several considerations. These considerations include the type of program level meter you're using — standard volume unit (VU) meter or peak program meter (PPM) — the type of blank tape you're using, whether you're using noise reduction, and if you're using compression.

Fluxivity is commonly stated in nanowebers per meter (nWb/m). For older professional tapes and consumer tapes, 200 nWb/m is typical. For general studio usage, 250 nWb/m is best. For the highest output mastering tapes or when you're using audio compression, 500 nWb/m is best. If the calibration tape is not at the desired reference fluxivity but is otherwise correct, you can easily set your reproducer for a different reference fluxivity.

Make sure that the recorder you're using is properly calibrated.

Test signals and calibration tapes

In addition to level, azimuth and preliminary frequency response, a multifrequency calibration tape will include 13 spot frequencies best suited for first-time calibration and reproducer troubleshooting.

While multi-frequency tapes are only available in single-speed versions, shorter tapes are less expensive to purchase, quicker to use (for touch-up purposes) and may be available as two-speed versions. These shorter tapes provide at least two tones required to calibrate a tape reproducer: 1kHz to set reproducer gain (also called reproducer level) and 10kHz (used first to adjust the mechanical azimuth of the reproducing head, and then to set the high-frequency reproducer equalization control). An optional 100Hz tone is really too high to accurately set the low-frequency reproducer equalizer response, but it does provide a quick test that the low-frequency response of the reproducer has not failed. Some tape reproducers do not even have a low-frequency adjustment control.

Tape speed and equalization

There are several tape recording speeds available, and each has a corresponding equalization. Equalizations are known by the names of the organizations that have standardized them. These organizations have changed over the years, resulting in some confusion.

For new recordings made at 3.75in/s, the same equalization is used everywhere. It is standardized by both the NAB and the IEC, so we call it "NAB and IEC." For 7.5- and 15in/s, the equalizations used are IEC2 (mostly used in the United States and formerly referred to as NAB) and IEC1 (mostly used in Europe and formerly referred to as IEC, CCIR or DIN Studio).

For the 15in/s speed used on narrow-format recorders (eight and 16 tracks on ¼-inch tape, 16 and 24 tracks on 1-inch tape) the IEC1 (IEC and CCIR and DIN Studio) equalization is usually used. And, for 30in/s, the equalization used everywhere for new recordings is AES, also called IEC2. (Note: During the early years of tape recording — 1948 through, roughly, 1968 — some of the equalizations were changed several times, especially at the slower speeds, as new-and-improved tapes were developed.) BE

Jay McKnight is president of Magnetic Reference Lab.

CALREC
TOTAL SOLUTION
TOTAL COMMITMENT

total commitment

to broadcast

Different applications require different solutions. Most manufacturers' limited awareness of this fact just creates problems.

Calrec solves them.

Whatever your requirements, Calrec have a solution available right now.

Specialists in broadcast console design for over 30 years, Calrec provide all the broadcast features your programme needs, now and in the future.

Calrec's unique family of digital production consoles all share the same high levels of resilience, all have hot-swappable cards and panels and all operate independently of the on-board PC.

In short, all Calrec consoles share the same comprehensive broadcast specifications essential for live to air production. It's no wonder they have the finest reputation for quality and reliability.

Calrec, Total commitment, total solution.

Calrec Digital Broadcast Console Users:

- Clear Channel
- CNBC
- KJRH Ch 2 Tulsa
- KNSD-TV Ch 39 San Diego
- KXAS-TV Ch 41 Dallas
- KXTX-TV Ch 39 Dallas
- Maryland Public Television
- NBC Olympics
- NBC Television Network
- NEP Supershooters Inc.
- Trio Video
- Univision Network
- WTVJ Ch 6 Florida
- WVTM-TV Ch.13 Birmingham
- WXYZ Ch 7 Detroit

- Powerful, flexible feature set to meet all programme needs
- Embedded control system allowing for power-up and operation without the PC
- Automatic redundant DSP control processor and PSU systems
- High input headroom, excellent audio performance
- Hot-swap cards and modules throughout – ALL cards and panels are removable and insertable under power
- Full system reboot in less than 20 seconds

CALREC AUDIO LTD, NUTCLOUGH MILL, HEBDEN BRIDGE, WEST YORKSHIRE, HX7 8EZ, UK TEL: 0 144 1422 842159 EMAIL: enquiries@calrec.com WEB: www.calrec.com
South and Mid West States - TEL: (615) 871 0094 EMAIL: ericj@redwoodweb.com
North East States and Canada – TEL: (212) 586 7376 EMAIL dsimon@studioconsultants.com
Western States – SALES TEL: (917) 825 3728 EMAIL: jim.wilmer@calrec.com SERVICE TEL: (818) 781 8911 EMAIL: pstech@earthlink.net

SYSTEMS DESIGN SHOWCASE

FOX SPORTS NET New England

BY DAVID RAYNES

For any broadcaster, downtime means lost revenue, which is why Fox Sports Net New England needed to ensure that it stayed on the air during its recent facility design.

The network was moving into an entirely new facility and needed to relocate all of its operations and equipment, while simultaneously remaining on the air. This was no small redesign project, but rather a complete turnkey design and build of the network's new facility. Adding to the challenge was a short, 9-day window imposed by the network in which the facility could be dark.

The station has been using National Mobile Television (NMT) as its mobile facilities provider for more than 10 years, primarily on sports programming to broadcast all Boston Celtics games. NMT provides facilities for more than 100 of the 130 annual remote sporting events with which the broadcaster is involved. The mobile facilities provider also offers crewing services on request to handle additional remote productions.

When the network announced its plans and issued requests for proposals, Venue Services Group (VSG) had just been formed as a wholly owned subsidiary of NMT. This relationship

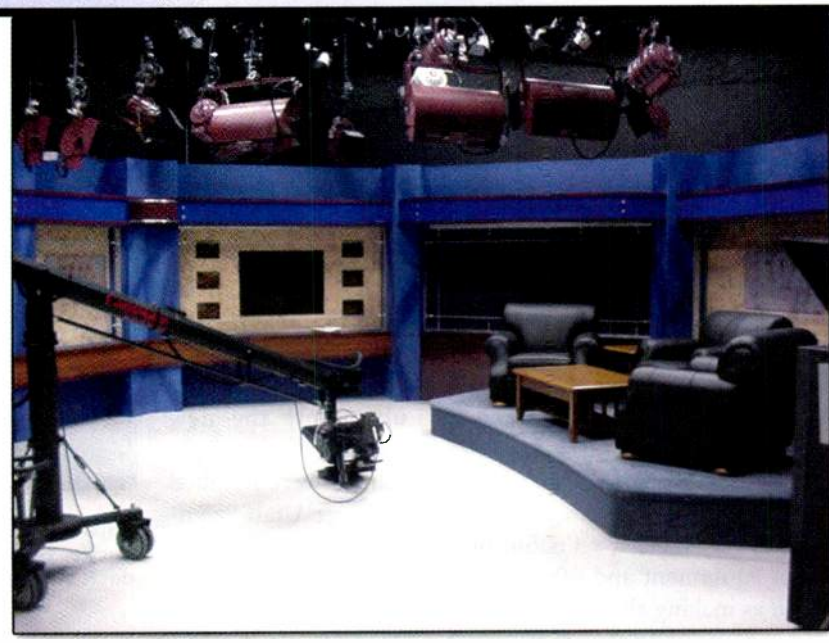
Above: FSNNE's control room features a Kalypso video production center and GVEous digital video effects systems fromThomson Grass Valley, as well as a Chryon Duet and Aprisa. The audio room, seen through the window at the right, features aYamaha console.

affords VSG the use of the mobile facility provider's considerable resources and talent, but also gives the company the independence to work with NMT customers and competitors alike. The integrator's proposal, coupled with the station's relationship with NMT, allowed VSG to win the contract for the project over several national systems integration firms.

The scope of the project was enormous. The integrator would be responsible for demolishing the existing facility, saving the old equipment, safely transporting the equipment and then powering up the new facility. The systems integrator designed the new facility and installed the infrastructure. The existing equipment was then successfully transported to the new facility without any breakage or loss of functionality. Both the new and existing equipment was installed and tested, the new and old facilities were cleaned up, and the project was completed. Services provided by the integrator also included project management in terms of additional equipment procurement and interfacing with contractors, architects and the station's technical teams.

Effectively, the broadcaster was expanding its space, moving from one small studio to two larger studios, and in the process expanding its control room capability and increasing its number of edit bays. Also, in terms of being "future-proof," the station knew that eventually it would have to make the transition to high definition. Although it doesn't currently have any HD equipment in the new facility, the cables, connectors and patchfields used are all HD-compatible. Although this represented a larger front-end investment, it will greatly ease the network's eventual transition to HD. In fact, the network is beginning to work with the systems integrator to accomplish this.

To overcome the 9-day "dark" limit, several measures were used. To minimize the dark time during the initial demolition of the existing studio, the solution was to stagger the move to keep the existing facility running on backup analog equipment while the digital equipment was carefully transported to the new facility. When that was no longer possible, the network was able to temporarily broadcast from its master control center in New York. Viewers didn't notice any change or interruption in programming.



Camera work at the FSNNE studio is handled by two Sony handheld cameras, one of which is on a jib, as well as two Sony studio cameras.

The integrator was able to capitalize on its status as a subsidiary of NMT to guarantee zero network downtime in its proposal. Because the mobile service provider's entire fleet is at the integrator's disposal, the proposal offered the network the opportunity to run its regional sports network out of an NMT truck in the event of a delay.

However, this ultimately was not necessary because the work was completed on schedule. Although the network maintains a New York-based master control room that keeps the station on the air, "dark time" is still a critical consideration for any local network. While dark, the broadcaster would be unable to produce any of the local productions or studio shows which, along with local sports programming, make up the station's bread and butter. Although it would be unable to produce these higher-rated programs, it would still be incurring its fixed costs, licensing fees, salaries and other expenses. So being dark for even a short amount of time can be a killer for this type of facility.

Project timeline

The nine days of allotted dark time was atypical for a project of this scale, as was the station's budget-related desire to retain much of its old equipment. Another interesting component was the fact that the broadcaster was moving its administrative offices too, adding complexity and additional vendors to the overall project. However, the one parallel between this and other projects was the need for careful planning from the very outset. The numerous logistical and technical requirements of the project required the team to spend approximately two months planning the job before it could be executed.

Once the network had committed to moving forward, the integrator's team, which also included the senior project manager and chief engineer, met weekly with Fox Sports Net's vice president of programming and operations and with the director of production and engineering manager.

The teams, along with the contractors and architects, met in the newly chosen, but then still empty, building to start the room design and layout process.

As the building renovation got under

way, the chief engineer and engineering manager were tasked with designing a facility that would provide the same level of functionality, but with a new floor plan that would make workflow more efficient. This was an opportunity to structure the design toward a completely digital facility.

To comply with the stipulation that all of the original equipment was to be reused for the new facility and no new equipment purchased, cables, connectors and patchfields were all chosen carefully. The integrator's senior project manager set about finding an equipment and office mover, as well as making all necessary acquisitions of personnel and materials. There needed to be tight coordination between the station and system integrator's project teams.

To help expedite the process, it was decided early on to move the newly installed digital infrastructure before moving the entire station. A Utah Scientific router frame was purchased to start wiring at the new facility, and ultimately the new facility's routing capabilities were handled by three Utah Scientific routers: one 100 (64x64 analog, 64x64 digital) and two 300s. Production switchers include a Thomson Grass Valley Kalypso and a 200 system.

FSNNE's videotape location contains six Sony SX decks, three Sony Beta decks and a single ¾-inch deck with some dubbing capacity.

In the interest of time, this process and much of the basic wiring was handled off-site at the integrator's facility in New Hampshire. The router and jackfields were wired during the second and third month of the project, concurrent with the physical construction of the facility. Once the technical area of the building was finished, then the router frame and patchfield were moved into the new equipment room. From there, cabling was run to the new technical operations area to empty racks to start receiving the equipment.

Improved layout and workflow is probably the biggest benefit of the new facility. For example, the new location now has six dedicated edit suites and one graphics composition room. Previously, tape storage was spread out over people's desks, among other areas. Now the new facility has three storage rooms with proper shelving that is location-specific.

The original facility had only one compact studio with low ceilings. The new location was built with two good-size studios. These two studios were able to be built with the pillars within the walls, allowing for a common area between them and a loading dock, which Fox Sports had never had the luxury of having before.

The satellite dishes at the original facility were abandoned due to age and the cost of relocation, allowing Fox Sports Net to acquire new dishes and new digital receivers for acquiring programs. The dishes would be located closer for better service and control than was possible at the old facility. Satellite technology installed in the new facility includes one Wegner UNITY5000 broadcast receiver, one Wegner UNITY4000 broadcast network receiver, two Motorola DSR 4500 digital satellite receivers, a DX satellite DSA-656 receiver and six RCA DSS systems.

Cameras installed in the new facility include two Sony BVP 370s and two Sony BVP 350s, while an array of Chyron systems — iNFiNiT! graphics system, Duet CG system and Aprisa clip/still store — handle the character generation and graphics duties.

Communications capabilities are handled by a Telex/RTS ADAM digital matrix intercom system, and the facility's audio infrastructure is based on a Yamaha 4000 audio console.

Essentially, the VSG team became part of the Fox Sports Net staff, working closely with all areas of the network's operations. The end result was an efficient, effectively designed facility that can handle all of the network's present and future broadcast requirements. BE

David Raynes is chief engineer of Venue Services Group.

Design team

VSG:
- John Leland, sr. project manager
- David Raynes, chief engineer

Fox Sports Net:
- Stevan Reagan, VP of programming and operations
- Jim Bourgoyne, director of production
- Sean McGuire, engineering manager

Technology at work

Chyron
- Aprisa clip/still store
- Duet CG
- iNFiNiT! graphics system
- DX DSA-656 receiver

Motorola DSR 4500 digital satellite receivers

RCA DSS systems

Sony
- BVP 370 cameras
- BVP 350 cameras

Telex/RTS ADAM digital matrix intercom system

Wegener
- UNITY5000 and 4000 broadcast receivers

Yamaha 4000 audio console

Utah Scientific routers

Managing your site problems

BY DON MARKLEY

A recent FCC action has established a new level of fear for those stations that are in a multiple facility location. This includes any site that is shared by several stations, including mountains and buildings. The action involved stations on Mt. Wilson in the Los Angeles market.

Anyone who has had the opportunity to visit Mt. Wilson will remember the unbelievable number of antennas of every type and description to be found spread along the mountaintop. With all of those stations happily pumping out RF, it probably shouldn't come as a big surprise to find one or more locations where the total RF level exceeds the applicable standard. The FCC recently did an inspection of the mountaintop and found a location where the total RF level did exceed the applicable standard. It was said to be approximately 100 feet from a United States Post Office. A news release discussing this matter can be found at *www.fcc.gov/Daily_Releases/Daily_Digest/2003/dd031022.html* or simply by going to *www.fcc.gov*, the Daily Releases, Browse Past Issues and checking October 22, 2003.

The rules are specific in this matter. If a location is found where the standard is exceeded, all of the stations whose transmitters produce power density levels exceeding 5 percent of the power density exposure limit applicable to their particular transmitter share responsibility for reducing the RFR to permissible levels. In this case, four stations were found to each be contributing more than 5 percent of the limit. They were then found to have not taken adequate steps to keep the public out of that area. The result was a fine of $10,000 each for the four stations. That would no doubt bring strange cries from the front office of your station, including loud shouts starting with "Why didn't you _____?" You can fill in the blank with whichever part of the problem you will be charged with.

So, what to do? To start, a site survey should be done with a non-ionizing radiation meter. This column has long argued that the point should be to find any location where the standard is exceeded without any consideration of time averaging. The standard is concerned with the average exposure over a 6-minute period. In addition, the standard concerns levels averaged over the whole body. Both of these little phrases open the door for mistakes, mis-evaluation, lawsuits, damages and fines. Don't go there at all. If the standard is exceeded at any location, without regard to any averaging, take steps to either eliminate the RF or block access to the location.

This view of Mt. Wilson antenna farm in Los Angeles was taken from the observatory visitor parking area in the spring of 2003. The far left tower is KCAL(TV) and the tower on the far right is KCET(TV). Photo courtesy Don Mussell.

Remember, you don't have to be at the tower base for this to be a problem. In the Mt. Wilson incident, the problem location was well away from the towers in an area where public occupancy should have been expected. So, don't just walk around the tower base and then head back to the coffee pot. It is necessary to cover the whole area where anyone might go. This opens a whole new set of questions — How far down the mountain side should you go? Do you worry about such folk as rock climbers

FRAME GRAB A look at the consumer side of DTV

Computers get a workout

PC time rivals TV time in more than half of U.S. homes

Activities computer users want to spend more time on	Percent of Americans agreeing
Managing/editing digital pictures	33%
Burning CDs	32%
Publishing my own website	27%
Download music	27%
Digital video/home movie making	21%
Burning DVDs	17%

SOURCE: InsightExpress www.insightexpress.com

and where they might be? It would seem feasible to assume that only those locations where someone might reasonably be expected to go should be of concern. You simply have to use your own judgment in that matter.

One of the manufacturers of non-ionizing radiation meters recently announced a new model that will make it possible to determine who the contributors might be to the overall radiation level. In the past, meters have read total radiation. The individual contributors were then determined by using a spectrum analyzer with an antenna or by turning off stations while monitoring the radiation level. The new meter should make that situation easier.

A technician once advised a station owner that his AM towers had to be surrounded by a chain link fence at least 8-feet high with razor wire around the top. While that might seem like a wonderful idea in order to keep everyone off of the tower, it not only isn't necessary, but also might lead to more trouble than it's worth.

First, the rules only require a fence around AM towers without really nailing down exactly how that fence should be constructed other than saying that it must provide access for maintenance. It isn't necessary to fence each individual tower, if there is a fence around the entire site. There is a requirement that the federal registration number be posted at the site along with the name of the tower owner and contact information. There also should be a no trespassing sign posted along with a sign advising of a danger from radiation and high voltage. There isn't a requirement for FM and TV tower fencing in the rules other than that the public must be restricted from access to high-radiation areas.

On the other hand, there are numerous laws and statutes concerning attractive nuisances, liability, etc. To this regard, you should determine just what your responsibilities are by discussing the matter with the station's local attorney. In this case, the local attorney probably is a logical choice due to his familiarity with state and local regulations. They do vary considerably from state to state. You also should discuss this matter with your insurance representative to insure that your protection meets their requirements and preferences.

The Resonant Results' Tower Watcher TW-100 model has power supply, remote control interface, and a sensor as one unit. It separates the electronics and the detector with the detector outdoors and the electronics indoors.

You may be advised by the attorney not to use such devices as razor wire. It is not unheard of to be sued for damages by an idiot who slices himself up on such wire when illegally trying to get over the fence. One of this author's clients was recently advised not to use either an unusually tall fence or razor wire. The opinion was that a reasonable fence, in this case consisting of six-foot tall chain link construction without barbed wire or razor wire, met the criteria of removing the tower from the attractive nuisance category without adding the risk of lawsuits. The general feeling was to comply with the law in a manner that would eliminate liability as much as possible. If the nuisance problem was eliminated and the public was suitably warned, they were on their own if they got hurt. Again, discuss this with the station's attorney and insurance company to make sure that they are ready for the results of their decision, not your decision as chief engineer; even better, try to get this approval in writing for your files.

There is a new item that can be of some help in keeping people off your tower. Richard Wood of Resonant Results recently introduced the Tower Watcher at the Madison Broadcasting Clinic. It contains a dual passive infrared detector (PIR). This detector is used to prevent false alarms from small objects and senses the movement of someone climbing on the tower. Multiple motion sensors are oriented so that they will sense someone on the tower itself without being set off by someone walking around the base. This device then gives a fault indication that can be wired into the transmitter remote control system.

It is unfortunate that unauthorized persons seem to consider climbing a tower to be some rite of passage. High school boys as well as drunken college students seem to believe that such action demonstrates some testosterone-laden bravery. In reality, it is just as stupid as trying to demonstrate one's ability to perform great driving feats in one's pickup truck without spilling a beer. The best a station technician can do is make it reasonably difficult to get access to the tower and to post signs advising of the danger and warning against trespassing. If fools ignore the warnings, climb the fences and get on the tower, they simply are taking their own chance at joining that great club made up of those whose last words were, "Hey, watch this." BE

If the RF standard is exceeded at any location, without regard to any averaging, take steps to either eliminate the RF or block access to the location.

Don Markley is president of D.L. Markley and Associates, Peoria, IL.

SEND Send questions and comments to: don_markley@primediabusiness.com

Automation:

The challenges

BY JIM BOSTON AND MARK BROWN

DTV promises viewers many new services. Most broadcasters believe that these services will help stem the exodus of eyeballs from terrestrial broadcasts to cable, DBS and, yes, even the Internet and video games. But, to reap the rewards that dynamic DTV services offer, broadcasters must overcome a host of challenges.

Moving from a single-program service to multiple-program services requires new ways of conducting operations, which often requires new workflows. Over the last couple decades, television facilities have organized operations and workflows through automation software. Automation, in its simplest sense, is a suite of software applications and databases that collaborate to enact the broadcaster's desired business plan with the hardware at hand. Historically, that has meant control of VTRs, servers, routers, switchers and, maybe, acquisition equipment such as satellite receivers. The automation system, along with the traffic system over it, formed an application layer over the equipment hardware layer, which the business and operations personnel controlled via traffic and

Above: At this commercial insertion facility for a Cox cable headend in San Diego, operations mainly center on ensuring that commercial media and other interstitial material is available and that playlists are complete and correct. The video switcher seen on the console is used only during live sporting events. In all other instances, program stream switching and other transitioning is handled under automation control.

Left: At WXXI's master control center, elaborate automation systems consisting of a number of applications all communicate with one another in a tightly coupled system to ensure that problems are caught and fixed ahead of time and not at the last minute. The workflow that WXXI has implemented means that operations staff who release multiple program streams to air work mainly on future events and seldom need to react the current on-air events.
All photos courtesy SignaSys.

As program services and requirements change, this rear-projection "glass cockpit" monitor wall can recall multiple configurations of source monitoring.

automation software.

Now that we can add additional services, we usually find that things get a bit more complicated and operations change. We need to bring new systems under automation control, and additional stand-alone systems need to collaborate with automation.

In the "dynamic DTV services" mentioned above, "dynamic" is the operative word when it comes to offering multiple services or programs. Dynamic services change, not only at daypart boundaries, but also throughout the entire day. These services change as program segments change, or during commercial breaks, or as needed during live and breaking events. Examples include expanded sports segments on minor DTV channels during normal newscasts, or a headline program on another minor channel that continues coverage of the lead story during the entire newscast. Opportunities abound in providing alternate coverage of local events, such as parades, sports or just counter programming against others. An extreme example would be airing cartoons on a minor channel while airing football on the main channel. It would be hard to argue that serving cartoon viewers would cannibalize a football audience, but it just might pull some of them away from the Cartoon Network.

To accomplish this Dynamic Service Allocation (DSA), the automation system must also control your ATSC encoders and multiplexers. Most ATSC encoder/multiplexing systems allow you to program "profiles" that define the mix of services — essentially, the number of programs available and the bandwidth devoted to each. Thus, the automation system now must be able to call these profiles as events in a program log. Groups such as the ATSC and the Multi-channel Broadcast Alliance are working on protocols that will allow automation to call different ATSC encoder/multiplex profiles directly, much like VDCP is used by automation to control video-server operation.

Early adopters of DSA operations are programming automation systems to produce GPI triggers when service reallocation is required. The GPI trigger drives a terminal server that calls APIs provided by the encoder/multiplexer vendor that invoke the desired service profile.

This leads to the fact that multiple services or programs require multiple playlists that must work in concert. Obviously, each program or service needs a playlist. But now, a playlist also is needed to control the encoder and multiplexer. All of these playlists must also remain in sync. In addition, activities occurring on one will usually affect the others. An example is live sporting events. What happens when

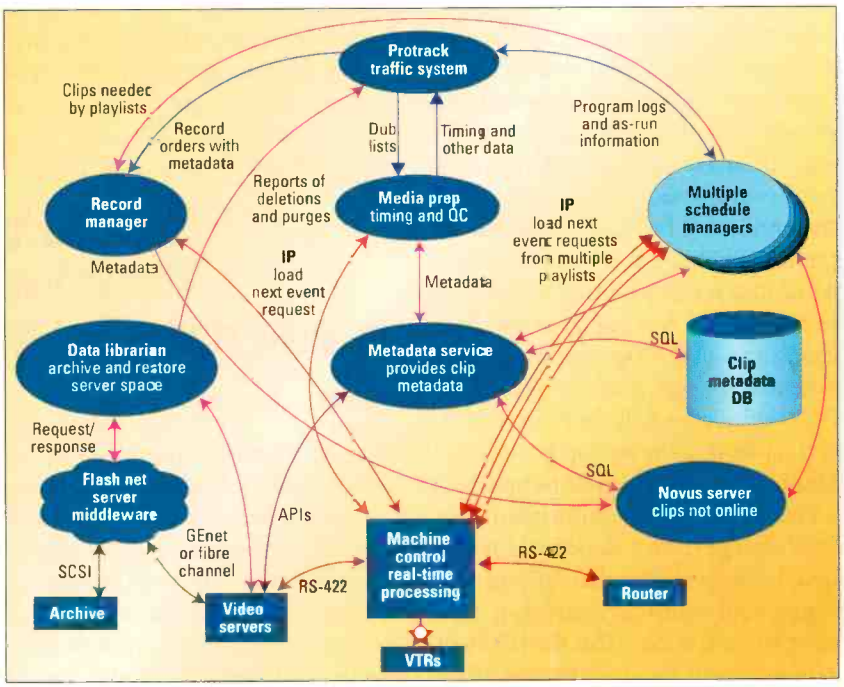


Figure 1. WXXI transmits a number of program streams based on the workflow shown here, implemented via Novus Automation. At the top of the workflow is traffic, which resides at the business layer of the station. The middle applications implement the fairly complex operational processes WXXI requires to insure that a number of high-quality program streams emanate from its facility. The bottom part of the diagram is the hardware layer. Figure courtesy Novus and WXXI.

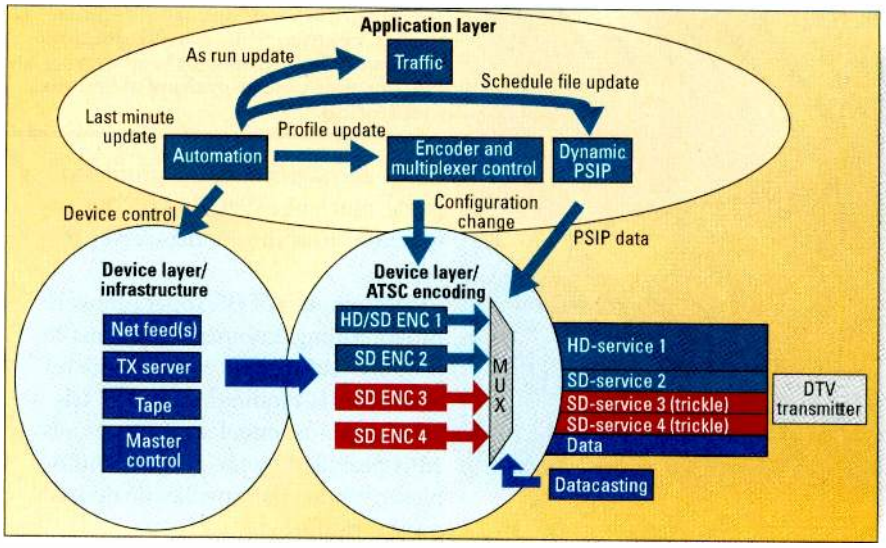


Figure 2. Multiple program streams working in conjunction to form a single transport stream must work cooperatively with one another through broadcast subsystems that did not need to collaborate previously. Figure courtesy SignaSys.

the game runs over its scheduled end time? If the game is in HD and this HD service is scheduled to be replaced with multiple SD services, what happens? While these are policy decisions made outside of engineering and operations, these two entities will have to implement them.

Statistical multiplexing, or the dynamic allocation of compression bandwidth between encoders as needed (especially now that HD and SD encoders can share the same bandwidth pool), can alleviate some but not all of the problem of bringing up additional services when the previous ones aren't concluded yet. Thus, changes that need to be made in one log often result in changes in all the logs. But wait; other potential changes also will be needed. PSIP tables, especially the EIT and ETT text tables that the set-top box uses to build PSI schedules should be updated.

The ATSC has recommended that PSIP change from a static set of tables to a dynamic stream that reflects current programming operation and conditions. It is likely that the FCC will at some point require dynamic PSIP. The ATSC multiplexer treats dynamic PSIP (which is metadata — data about the audio, video essence and other programming data) as another program. And, from an operational standpoint, you will have to treat it as such. This means that, in the example of our sporting event running long, the ETT table in the PSIP stream should inform the viewer about what is happening to the program schedule.

It appears that the natural place to enter last-minute changes is through automation. That includes PSIP changes. This "one-stop," last-minute-change operation would allow the master-control operator to enter change information once, and from one application, instead of making separate changes to automation playlists and PSIP tables. Thus, in the future, the automation system also will have to communicate with the system that is building your PSIP stream.

Multichannel operation means that the operations at master control must change fundamentally. Master control will become less of a real-time operation and will concentrate more on ensuring that the required program content is available as needed, along with the care and feeding of the various databases and logs that orchestrate the flow of programming on the various main and minor channels. To date, most multichannel operations keep a single, traditional master-control switcher, usually only for the main channel, and add router control along with downstream branding and EAS support to implement additional channels. Some operations allow the insertion of the traditional master-control switcher into minor channels as needed for more complicated event transition by surrounding the switcher by the router. In the future, master-control operations will be marked more by operations staff responding only to real-time events when last-minute changes occur or when problems or unusual issues arise.

To achieve increased functionality and the efficiency that multi-channel broadcasting promises, it is likely that more of the station's operation will have to come under an application layer, which will have to evolve from separate application islands into a single application "continent." As such, satellite and other sources that are ingested into storage, along with a library system needed to track and manage that content, need to come under a common application layer. A library or other content-management system must accept external metadata or generate metadata itself to build the necessary tables in PSIP to augment the program services offered.

The ATSC has recommended that PSIP change from a static set of tables to a dynamic stream that reflects current programming operation and conditions.

Next month, we'll look at why this new infrastructure might ensure your survival as a broadcaster. We'll also explore the forces that are compelling some broadcasters to try new business models to keep themselves relevant in the television content production-and-distribution business. BE

Jim Boston is senior director of technology and Mark Brown is CTO for SignaSys.

The promise of Web Services

Rapid changes in software technology have brought providers of vertical market applications such as automation systems to a crossroad. On the one hand, they must maintain the stability of their mission-critical software products. On the other hand, by embracing the new technology and venturing into new territory, they can make significant leaps in product capability. For the broadcast-automation buyer, this can mean choosing between a proven, stable but obsolete legacy product and a new, more advanced product based on software technology that is not familiar.

We must consider the issue in context of the rapid changes taking place today in the broadcast environment, including DTV management, multichannel and distributed operations, streaming delivery, support for packaged digital content, media asset management, IT integration and more. Stations must incorporate all of these changes without interrupting their ability to broadcast programming. And, they also need to implement them in different timeframes to meet changing broadcast requirements.

In today's facility, change is constant and inevitable. Traditional models of workflow, staffing, equipment and physical plant may already be outmoded or are rapidly moving in that direction. In areas such as broadcast automation and media-asset management, flexibility and scalability demand new types of solutions. Perhaps the best chance for success lies in Web Services.

Web Services

The future of broadcasting technology lies in shared access. Media management, scheduling, and transmission need to work seamlessly together to distribute information and content among channels, stations and groups. They need a common language to communicate quickly and reliably. Web Services is a method for systems to communicate with one another using messages sent across the Internet or a private intranet. The messages are written in XML (eXtensible Markup Language) and are contained within a protocol called Simple Object Access Protocol (SOAP). Using Hypertext Transfer Protocol (HTTP), the commands are delivered via Internet Protocol (IP) to any device on the network.

Web Services offers two major advantages to the computer industry that are also applicable to the broadcast industry: adaptability and platform independence.

Because of its XML core, Web Services is adaptable. You can use it for communication among the systems installed today, and it will adapt to an upgrade or replacement of any system without "breaking" communication among the others. Each XML message includes both data and a description of the data. As a result, a receiver can understand a message even though the sender has started using an expanded "vocabulary" without advance warning.

Web Services is also platform independent. Systems using it don't have to share the same operating system, database software, etc. Web Services uses standards supported by every software or hardware product with Internet compatibility. Systems based on Windows, UNIX, Linux, Mac, or mainframes all can use Web Services. Virtually every piece of broadcast equipment today is really a computer, and the merging of Information Technology with broadcasting is the reality for all of us. More often than not, broadcast problems are solved using IT solutions.

Over the past 10 years, our industry has moved from stand-alone, proprietary systems toward networked facilities. During this process, we faced and solved numerous communication roadblocks in hardware and software. Today, most stations can move information easily from system A to system B, although it isn't necessarily true that system B will recognize that information once it arrives. Web Services provides a common command structure that can be implemented everywhere.

Multichannel operation means that the operations at master control must change fundamentally.

Moving information between traffic and automation

How does the daily schedule move between traffic and automation? In many stations, traffic creates a schedule combining programs, spot sales and other interstitials. At the close of business, tomorrow's schedule is handed from traffic to automation as a file.

Automation airs the schedule, making any changes needed for timing, missing content or network updates. If traffic needs to change a spot, it can call down to master control. At the end of the day, automation hands an "as-run" file to the billing system for reconciliation.

The process relies on two file exchanges per day, with little or no interim communication between the systems.

How Web Services can help

One of the biggest problems facing

broadcasters today is finding ways to increase revenue. In this simple example, opportunities for additional revenue are limited by the "manual" steps in this process. If new services are to be added to the mix, it is imperative that a more automatic process be created. Web Services can improve communication between systems, allowing more systems to communicate more effectively.

With this increased speed and efficiency, salespeople can sell spots closer to air time, programs can be converted between formats automatically, program guides can be updated automatically, and everything will be confirmed and billed as required.

Pushing the envelope

The benefits of Web Services are obvious to some manufacturers, but not necessarily to everyone. To move the entire industry in this direction, the market needs to demand it. Once one supplier implements Web Services and sees significant sales growth, other manufacturers will implement it to remain competitive.

What about legacy systems? Our industry has a pretty good history of supporting legacy systems in new products and that is not likely to change. As a result, facilities should be able to move into Web Services one piece at a time, improving communication where possible and maintaining the status quo where necessary.

The last big issue with Web Services is something that we're all dealing with already. As broadcasting continues to merge with computing, the need for IT talent will continue to grow. Thankfully, Web Services is based on XML, whose files contain simple text. This could actually make it easier to diagnose and repair problems between systems.

A little knowledge is a dangerous thing, so learn more about Web Services. Discover the benefits, include it in future plans and make it a requirement for new systems. Change is hard, but as long as it's coming anyway, make it work as well as it can. BE

Stan Kingett is vice president of technical operations for OmniBus Systems.

SYNERGY SERIES
DIGITAL PRODUCTION SWITCHER

Squeeze & Tease WARP

The world's most popular production switcher just got a whole bunch better!

- New Control Panel
- New Warp Effects
- New Features

... including 8 character mnemonics

The Award Winning Squeeze & Tease Warp is also available on the compact Synergy 100 digital production switcher

... making it ideal for *Live Production, Editing, Squeeze Backs* and as a *Standalone DVE*

Head Spinning Warp Effects!

- Page Turn
- Ripple
- Wave
- Mirror
- Slats
- Melts
- Swirl
- Gnarl
- Organics
- Lighting
- Mosaic
- Posterization
- Colorization
- Defocus
- Intersect
- Slab
- Still Store
- Picture Frames
- Object Builder
- Timelines

available on Synergy 100, Synergy 1, 2, 3 & 4 digital production switchers

Squeeze & Tease Warp received one of the first NAB Awards for Innovation in Media

- In addition to the Synergy line of digital production switchers, Ross offers the OverDrive Production Control System for newsroom automation, RossGear Terminal Equipment and GearLite Compact Terminal Equipment.

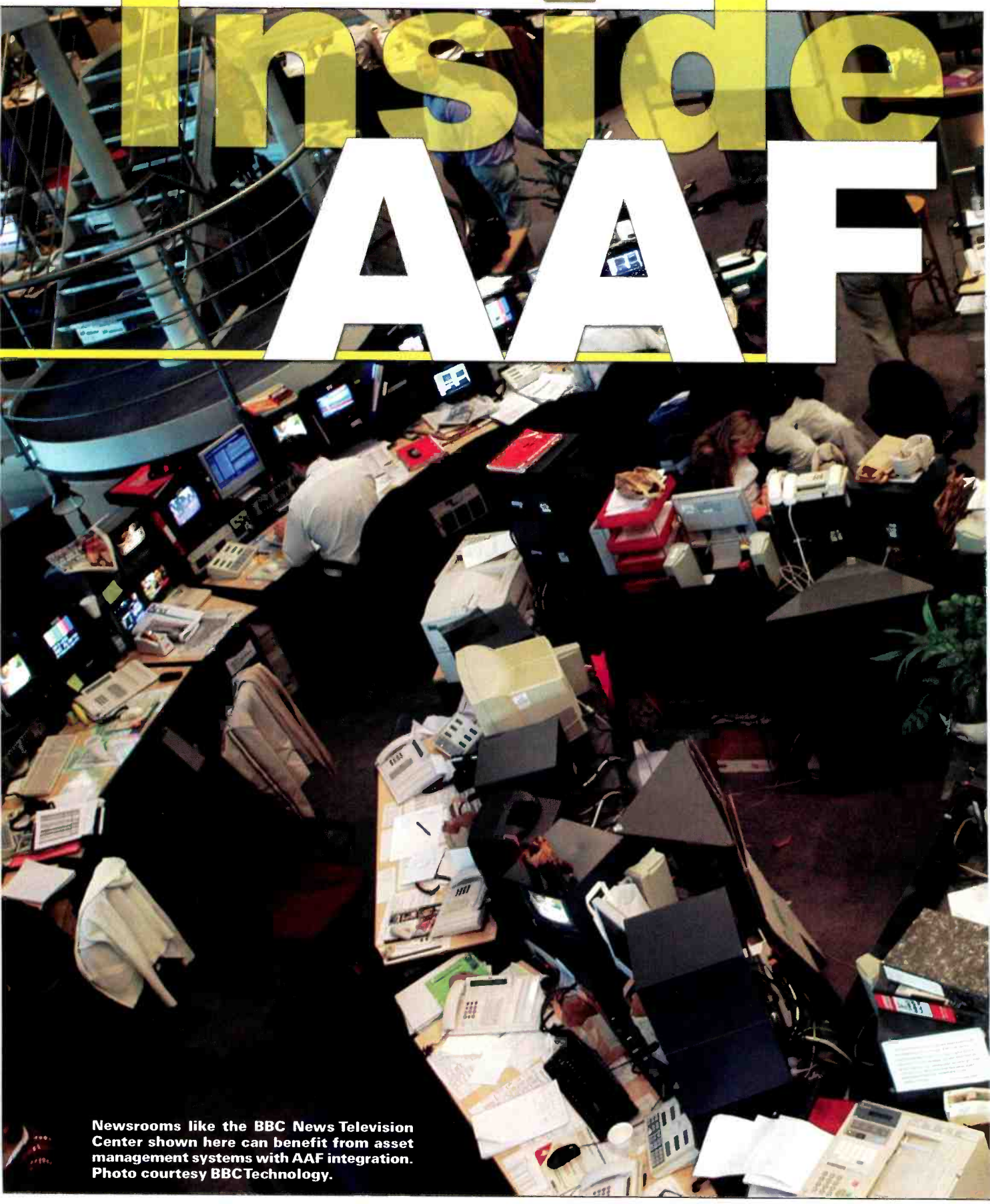
Tel: (613) 652-4886 Fax (613) 652-4425
Email: solutions@rossviceo.com

www.rossvideo.com

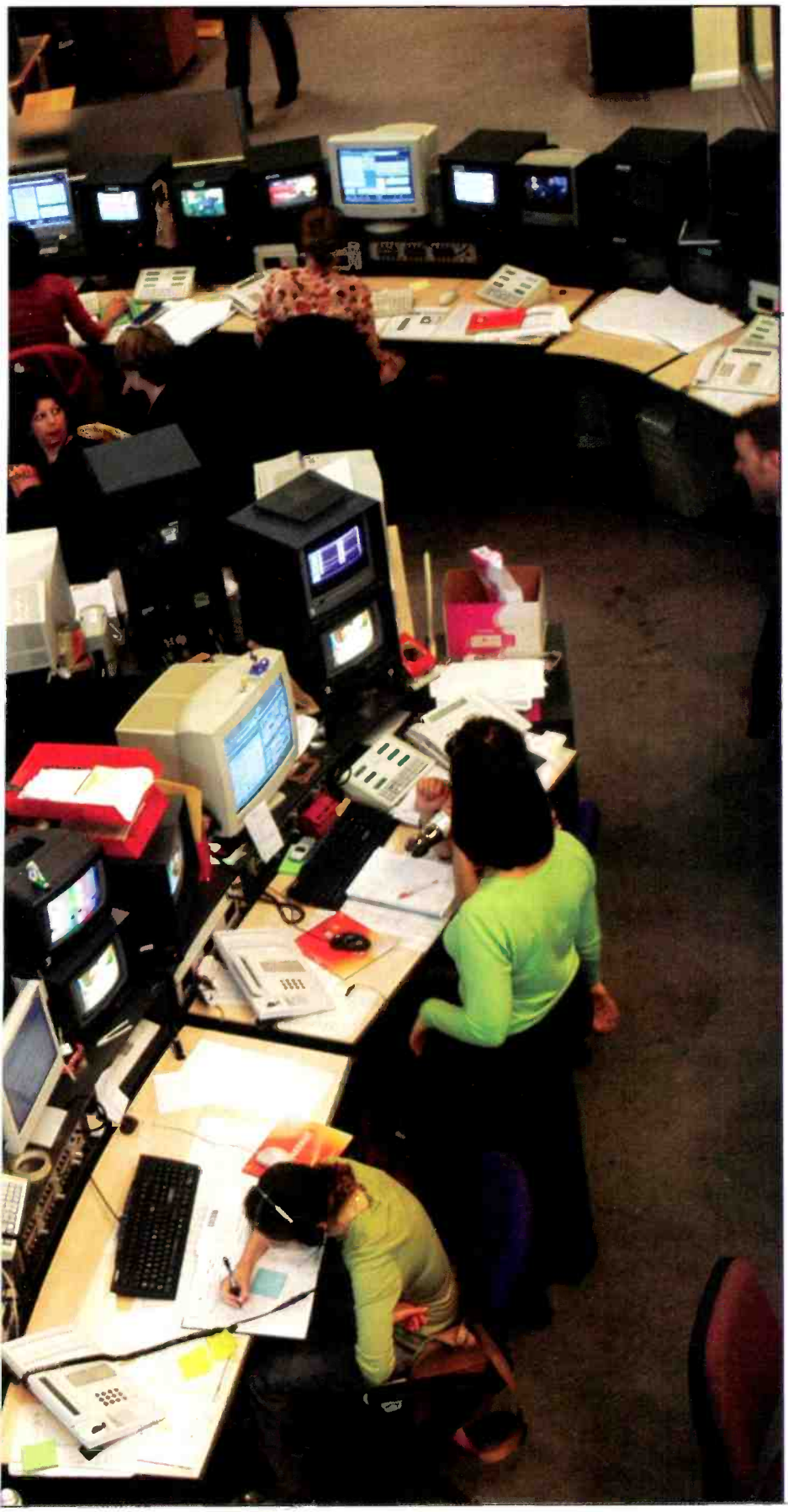
ROSS

Cool Practical Technology™

inside AAF



Newsrooms like the BBC News Television Center shown here can benefit from asset management systems with AAF integration. Photo courtesy BBCTechnology.



BY ED MCDERMID

The Advanced Authoring Format (AAF) standard is the result of unprecedented cooperation and collaboration among major media companies such as BBC, CNN, Warner Bros., FOX and Ascent Media, as well as major manufacturers such as Avid, Adobe, BBC Technology, Digidesign, Microsoft, Nucoda, Quantel, SADiE, Snell & Wilcox, and Sony. This cooperation among vendors and users is the true strength of AAF. These organizations and others have developed and refined AAF in an open-source environment, freely licensed, without any cost for using the technology. The AAF Developers' Toolkit and reference implementation includes utilities with hundreds of thousands of lines of source code.

AAF developed in parallel with other important metadata standards and offers comprehensive support for KLV and MXF metadata. The AAF Association and the Pro-MPEG Forum have agreed to a zero-divergence doctrine (ZDD) and continue working to ensure persistence of metadata integrity across both formats.

Now that major manufacturers are offering products compliant with AAF, the format has begun moving beyond the "early adopter" stage. Now, broadcasters can consider AAF interoperability when making purchase decisions.

From a technology perspective, the value of AAF lies in its abstraction of the editorial process. It separates editorial decisions from the media that are used as source material. AAF is founded on the concept that everything necessary to create a finished program can be represented as composition metadata, with references to the media essence.

AAF file components

An AAF file is an object-based file containing a collection of object-based data. These data include a file index that locates all the objects in the file, material objects that represent AAF

metadata, a dictionary for defining metadata objects that extend the AAF data model, and possibly essence data, the actual encoded media. The low-level container format is called structured storage.

Inside the Mob

AAF uses an object-based data model to represent complex metadata relationships. The material metadata items are called material objects or Mobs. An AAF file typically contains a number of Mobs. Table 1 lists the eight kinds of Mobs that an AAF can contain. Figure 1 shows the components of an AAF Mob. The Mobs reference one another and, in doing so, create a derivation chain, or Mob Chain. The derivation chain describes the relationships among edit decisions, clips, file source material and physical source material. Figure 2 on page 53 shows such a derivation chain.

Mob type	Description
Composition Mob	Specifies a composition
Sub-clip composition Mob	Specifies a sub-clip
Adjusted-clip composition Mob	Specifies an adjustment to a clip
Master Mob	Specifies a clip
File Source Mob	Specifies file source material; the essence
Import file Source Mob	Specifies file source material imported by application-specific means
Tape Source Mob	Specifies tape source material
Film Source Mob	Specifies file source material

Table 1. An AAF can contain eight kinds of Mobs.

Mob IDs

Every Mob has a unique identifier, or Mob ID. The Mob ID is a universally unique identifier and enables indelible referencing of other media objects, both within files and externally. The Mob ID functions such as a license plate for every metadata object, so that each is easily and accurately identifiable.

Mob derivation (Mob source chain)

Mob derivation enables edited programs to include references back to the primary sources. This is important in a world where content is repurposed repeatedly. News environments commonly reuse edited segments as source material for subsequent versions of the same story. When a news organization or department uses an edited sequence as source material, AAF maintains all the references to the original file or tape sources, avoiding generation loss. The elements of the previous edited version, including titles and graphics, remain editable.

AAF specifies the Mob source chain by referencing one material object from another. Figure 2 on page 53 shows the normal referencing between Mobs. An important benefit of the Mob derivation chain is that the AAF composition or clip can reference back to its primary source(s), including videotape, a film reel, audiotape or even a news-agency feed.

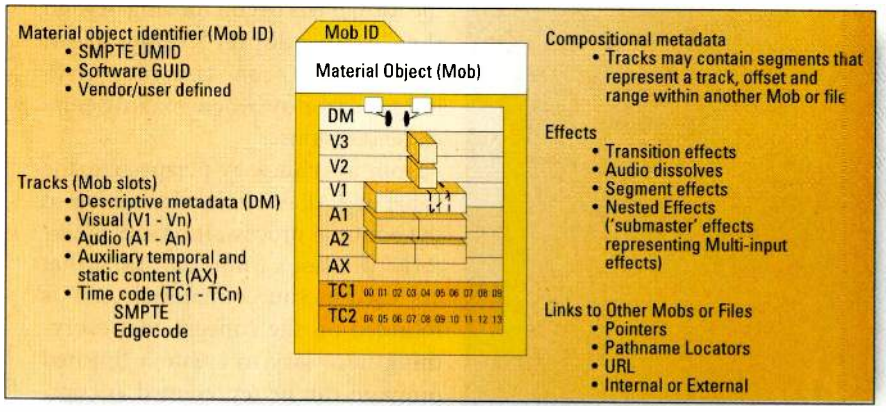


Figure 1. The components of an AAF Mob include Mob ID and tracks (slots).

The Master Mob does not contain the media essence but instead describes and points to the media essence.

Compositions

AAF represents edit decisions as a composition and specifies them using a Composition Mob. A Composition Mob can reference another Composition Mob, a Sub-clip Composition Mob or a Master Mob as source materials for an edit. The metadata contained in a Composition Mob may include:

- Edit-decision information, such as source and record time codes, source tracks, physical source names, comments, clip names and track names
- Visual-effects information, such as dissolves, SMPTE wipes, 2-D DVE spatial-positioning and zooming effects, frame-repeat effects, motion and speed-change effects, flip and flop effects, and composite-layering effects
- Audio data, such as clip- and track-based gain, stereo pan, fade in and out, symmetrical and asymmetrical crossfades, and MIDI data
- Embedded media files, such as video and audio files, as well as non-AAF files, including scripts, logs, etc.
- Sub-clip metadata that identifies a section of a clip, which a user interface thereafter treats as an additional clip

Clips

In AAF, Master Mobs represent clips. The Master Mob does not contain the media essence, but instead describes and points to the media essence. This creates a powerful level of indirection, which is key to how AAF enables interoperability among a broad range

of tools, from simple Web-based browsing and logging applications to high-definition conforming products.

AAF provides three methods of specifying the source material associated with a clip:

- Reference to source material stored internally to the AAF file and physical source material
- Reference to file source material stored externally to the AAF file and physical source material
- Reference to physical source material only, such as videotape or film

Figure 3 shows the relationship between a segment in the Composition Mob and the Master Mob that it references. The composition identifies the tracks, offset and range of the clip. All other clip-related metadata remains an attribute of the clip. Changes to the clip metadata are available by reference from the composition.

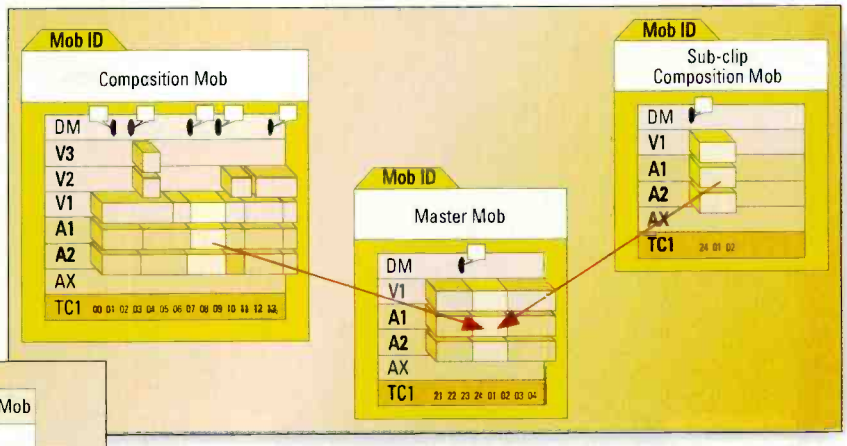


Figure 3. AAF composition and sub-clip composition Mobs reference Master Mobs.

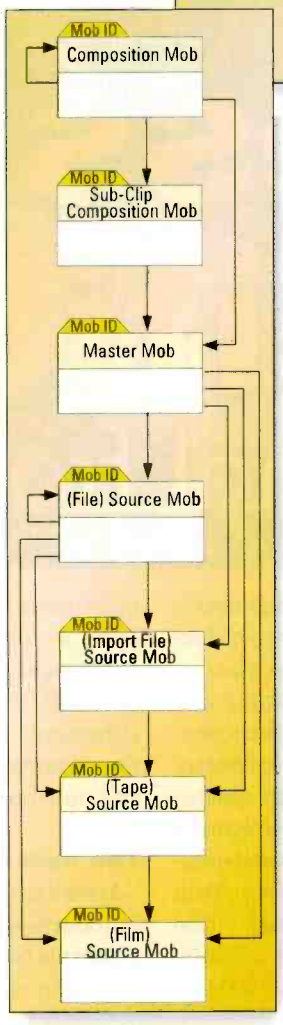


Figure 2. The derivation chain describes the relationships among edit decisions, clips, file source material and physical source material.

File source material

In AAF, a Source Mob represents all source materials. Source materials that are file-based use a file Source Mob. The Source Mob does not contain essence; it represents the specific instance of essence. It is not unusual for multiple instantiations of media essence to exist. The essence associated with a file Source Mob can either be internal to the AAF file in an Essence Data object or external to the AAF file. If the essence is external, the file Source Mob specifies the kind of essence container file, and the location of the essence.

Tape source material

Tape Source Mobs represent tape source materials. The function of tape Source Mobs is to link compositions to physical source tapes. This is useful for many functions, including creating an EDL from an AAF composition, automating digitization of a composition from the source tapes, or managing tape assets based on usage metadata.

Implementing AAF

When implementing AAF, it is important to remember the true value of AAF: open sharing and discussion among leading manufacturers and users. AAF is an open, nonproprietary interchange format that is freely licensed, including source code. Developers must first clearly understand the problem that AAF addresses. AAF is, after all, a means to an end, not an end in itself. AAF has two main advantages: it allows products to bridge tape-based media archives with a new generation of tapeless broadcast systems, and it marginalizes tape through the production process, thus reducing cost. AAF is the antithesis of tape because it is inherently nonlinear.

No matter what technology a manufacturer considers, it still must face one significant interchange challenge. Whether it is AAF, MXF, a flavor of XML or any other intermediary format, each manufacturer must "map" its internal or native data models to the interchange data model. This is no small task. Ultimately, effective interchange among vendors requires communication and consensus. The AAF Association engineering committee meets regularly to work on interoperability issues.

With the publication of the AAF Edit Protocol, it's never been easier to implement AAF. In the coming months, the AAF Association will develop a conformance program that will ensure the long-term viability of the money and effort that manufacturers and users invest in AAF. The AAF Association provides the AAF Toolkit free of charge on *SourceForge.net*. The modest cost of association membership supports tutorials, example utilities, the AAF specification and vendor support. BE

Ed McDermid is head of marketing at BBC Technology, North America.

Tapeless acquisition: The final frontier?

By Michael Grotticelli

When it comes to the future of digital acquisition, about the only thing Panasonic and Sony agree on is that it will not include recording on videotape. The two companies have introduced their own respective IT-friendly formats. With these two different, incompatible digital storage systems, they hope to attract ENG customers who currently shoot mainly on digital tape.

A tale of two systems

Panasonic's Professional Plug-in (P2) series equipment is an extension of its DVCPRO family of products, stores images on a solid-state SD memory system, while the Sony XDCAM uses professional-grade optical discs. Panasonic's equipment should be ready to ship in the first quarter of 2004, while Sony has already delivered its IT-based gear to a few broadcasters in the United States and overseas for testing.

Each company has provided details on how its system improves production workflow by enabling users to move images from the camera and into an edit system faster than ever. Both have introduced complementary products, such as laptop edit systems and studio and field readers/recorder decks. Each system offers format-neutral recording of everything from standard-definition digital video (DVCPRO and DVCAM at 25Mb/s) to 50Mb/s and, eventually, 100Mb/s high-definition recording. Sony's equipment also will record in its proprietary IMX format.

Yet, that's where the similarity ends. Whether one technology is more useful than the other depends upon a number of factors, such as equipment availability (Sony's will be available first), maintenance (Panasonic's SD memory gear offers the advantage of no moving parts) and, most of all, reliability.

The new format war

As with many previous ENG platform introductions, the advent of these new platforms has started another "format war," with each side claiming the support necessary to make its vision a success. Each company has its supporters, and each has announced broadcast customers and support from third-party NLE manufacturers.

Whether one technology is more useful than the other depends upon a number of factors, such as equipment availability, maintenance and, most of all, reliability.

CBS and FOX officially support Panasonic's solid-state acquisition; CNN and NBC will test Sony's XDCAM. At the recent IBC technology conference in Amsterdam, Sony demonstrated its Professional Optical Media drive working with a Quantel nonlinear edit system, while Avid Technology expressed its support for Panasonic's SD memory.

Panasonic's PMCIA-style P2 card contains four 1GB SD memory cards. It can hold 18 minutes of DVCPRO 25 video and nine minutes at DVCPRO 50 quality.

Thomson also has said it would support the SD memory-card technology — initially in its news-editing products and, in the near future, in its professional cameras. In the past, Thomson has worked with both Panasonic and Sony in its support of their respective digital videotape formats. This latest decision to adopt solid-state memory in its professional recording equipment — announced officially at the same IBC show — should not be taken lightly. Many in the broadcast business see Thomson's support as vital to the successful adoption of solid-state SD memory.

Panasonic and Thomson also have agreed to share and market each other's technologies under an OEM arrangement. Panasonic will sell Thomson Grass Valley Profile servers and Thomson Grass Valley's M-Series iVDR, while Thomson will include SD memory technology as well as Panasonic LCD monitors in its professional product portfolio.

No panacea

Most broadcasters are looking at both technologies cautiously. Several camera operators and broadcast executives have said that the choice comes down to individual visions for the future of image acquisition and how easily tapeless acquisition will integrate with other digital equipment in the production chain.

Panasonic wants camera operators to shoot on solid-state memory and then transfer the material to optical disc or videotape for long-term archival storage. Sony said that, at $30 per optical disc, the system affordably allows users to avoid the transfer process and remain in the optical domain from start to finish. Broadcasters can use the original disc for both acquisition and long-term storage. Panasonic and Sony both sell DVD library archiving systems, while Sony sells its SAIT tape libraries for such applications.

Different strategies

While both Panasonic and Sony have deep traditions in the consumer-electronics industry, the companies are sending out decidedly different marketing messages to achieve their goals.

Panasonic executives in Japan and the United States are making an effort to celebrate solid-state technology's consumer roots, stating that economies of scale in manufacturing and sales would help bring down the cost of the SD memory (which currently costs about $500 per GB).

To Panasonic, leveraging a consumer technology within the broadcast space is beneficial now that broadcasters are moving to an IT-centric future in which a wide variety of computer-based technologies are helping to improve workflows. And, with no moving parts, the P2 Series gear is resistant to shock, dust and moisture, which sometimes plague tape-based cameras.

Sony, on the other hand, is stressing the differences between the professional optical media storage equipment and its consumer DVD cousin. The professional Blue Laser disc, which is housed in a rugged plastic cartridge, is said to have a capacity five times that of current standard recordable DVD media, and a 72Mb/s data recoding transfer rate (per optical head). Recording-media provider TDK is adding the XDCAM professional disc to its recordable-media offerings. The disc also includes a new scratch-proof coating technology.

The Panasonic P2 cam comes with five P2 card slots, giving a total potential record capacity of 90 minutes with 4GB P2 cards. The P2 deck can also handle five P2 cards. It operates like a VTR and has VTR-like interfaces to link it to a standard broadcast infrastructure.

Sony executives say that the XDCAM holds up well in high-vibration and low-temperature applications. They reportedly tested an XDCAM camera on a powerboat traveling at high speed. Although there was lots of vibration and moisture, the camera did not drop a frame. There also have been a number of successful cold-weather tests.

Ikegami/Avid continue to push tapeless alternatives

While both JVC and Sony offer hard-disc-storage camera solutions, Avid/Ikegami's Editcam, a hard-disc camcorder now in its second generation, remains the most visible hard-disc technology, albeit with minimal sales.

Issues such as the inextricable linking of the media to the Avid nonlinear edit system and the fact that hard-disc systems have failed during high-vibration applications (Ikegami has included a two-second RAM buffer to cope with this) have plagued the Editcam's broader acceptance. Add to this the fact that the camera is expensive and the result isa good idea, but has few takers.

The camera, with its removable drives, has found a home within the government. The Army Broadcasting Service purchased more than 20 Editcam IIs about a year ago.

First introduced in 1995, the Editcam, and now the Editcam II, offer 16GB "FieldPaks" (for one hour of DV25 images) that you can take out of the camera and load directly into any Avid Technology NLE system. A special adapter allows you to instantly load the FieldPak data into a laptop.

The camera is available with either FIT or IT CCD imagers and records in a variety of resolutions, from Avid's AVR codecs to Panasonic's DVCPRO 50 and Sony's IMX. Ikegami recently introduced a new stand-alone recorder, the DNE-31. And now there's a pocket-sized FieldPak called FP-S4.

Editcam II offers time-lapse recording, retroloop (where the arrival of the subject cannot be predicted) and the ability to perform advanced Avid editing functions in the field by connecting a laptop to the camera output and using optional Remote User Interface software.

Ikegami also markets the portable DNR-20 dockable disk recorder, which can mount on most of its HL-series cameras.

Panasonic's P2 products

Panasonic's P2 Series camera, called an IT-newsgathering (ING) product, uses four 1GB SD memory cards on a single PMCIA-style card. A single P2 card stores 18 minutes of DVCPRO images compressed at 25Mb/s and nine minutes at DVCPRO 50Mb/s. Users can select among the three compression modes. The SD cards, which are hot-swappable, offer a maximum of 640Mb/s transfer rate, enabling faster-than-real-time download from camera to edit system. The proposed "P2 cam" will hold four 4GB cards (for 90 minutes of recording time) and have an extra "auxiliary" slot available for a global-positioning system (GPS) or other transmission device.

Panasonic also has shown a P2 laptop edit system (based on the company's "Toughbook" notebook PC models), a P2 deck, a P2 drive and a 5-card reader/writer equipped with a USB 2.0 interface that links the cards into a PC.

Sony's XDCAM

Sony's XDCAM Professional Optical Media equipment has been shown to journalists privately for at least three years, but took its time to develop smaller codecs and software features to

keep the camera's weight to a minimum. Models include the DVCAM-only PDW 510P and the PDW 530P. The PDW 530P offers a choice of MPEG IMX and DVCAM compressed formats at both 25Mb/s and 50Mb/s.

Each single-sided Blue Laser optical disc holds up to 23.3GB of material, or approximately 85 minutes of 25Mb/s, DVCAM-quality footage. The disc is housed in a rugged plastic cartridge, which Sony said has been shown to hold up well in high-vibration and low-temperature applications. Each optical disc can be reused more than 1000 times and offers a significant reduction in size and weight when compared with existing videotape formats.

Sony's XDCAM Professional Optical Media equipment includes the DVCAM-only PDW-510P and the PDW 530P cameras. The PDW 530P offers a choice of MPEG IMX and DVCAM compressed formats at both 25 and 50Mb/s. Other XDCAM equipment in production includes the PDW-V1 mobile deck with a built-in color LCD screen and the XPRI edit family of NLEs.

Other XDCAM equipment announced by Sony includes the PDW-V1 mobile deck, with a built-in color LCD screen, and the XPRI edit family of NLEs. Version 6.0 of the XPRI SD and HD systems also were shown working in Sony's exhibit booth on the IBC show floor. The XPRI system can recognize easily the Proxy AV files and metadata generated by the XDCAM cameras as they record in the field.

Proxy AV files

Proxy video, or low-resolution versions of files that can be used quickly to edit footage in the field or back at the station, is an undervalued benefit of these new image-acquisition systems. Among other things, these proxies help users save time in transferring material and locating individual scenes (or frames).

Sony reportedly tested an XDCAM camera on a powerboat traveling at high speed. Despite the vibration and moisture, the camera did not drop a frame.

In Panasonic's case, the P2 card stores proxies with an MXF wrapper that includes data identifying the time, date and location the images were shot to enable fast file search and retrieval of stored material. With optional voice-recognition software that can be loaded onto the camera, the user can easily log and annotate scenes as he shoots them.

Sony's gear uses a similar concept but takes it a step further by inextricably linking the proxy to the high-resolution video so that they remain together throughout the post-production process. The company said that a user in the field can transfer one hour's worth of "footage" into a laptop NLE in less than a minute. Once an editor completes offline editing, he can write the EDL back to the optical disc in seconds. When transferring the edited program in SD, the EDL will retrieve only those files the user selects.

The decision is yours

Which technology will win the recording battle is yet to be determined. At next year's NAB, you should expect to see more tapeless product announcements and customer wins from both sides. The market will eventually decide what it wants; although with digital videotape thoroughly entrenched with most station ENG crews, that final decision could be at least five years away. **BE**

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

Inscriber's
Inca CG and Inca Studio

BY DAN MANCE

The broadcast industry is undergoing a technological change. Digitization, IT methods and the Internet are transforming television creation and distribution. In particular, the use of desktop computers will fundamentally change television graphics production. The modern desktop computer now is able to manipulate any aspect of real-time audio-visual content easily. Based on industry standard hardware, these computers provide benefits in performance, flexibility and cost-effectiveness when combined with a broadcast graphics studio. Support for media processing within the Microsoft Windows XP operating system likewise will increase mainstream media integration.

This change marks the beginning of a new era of incredibly powerful, yet highly cost-effective graphics systems for broadcasters. The need for many multilayer CGs, clip stores, DVEs, mixer effects or 2-D/3-D graphics systems will be eliminated as a single 2RU box with SDI I/O can do it all. The rich graphics seen during the Super Bowl, World Cup, Olympics or Academy Awards will become commonplace on even the lowest-cost systems. These changes will occur quickly and will provide tremendous cost and creative benefits to broadcasters.

The need for many multilayer CGs, clip stores or 2-D/3-D graphics systems will be eliminated as a single 2RU box with SDI I/O can do it all.

Meeting the future head-on

Inca CG and Inca Studio, the first products in Inscriber's new Inca line, are intended to meet the demands of this emerging trend. Inca represents a completely software-centric approach to managing video and graphics. Rather than routing video signals through a graphics system to other components in a compositing chain, the system completely replaces those components with software equivalents. Acting much like a real-time nonlinear editor, its architecture also can assemble and combine elements such as audio, video clips, matte channels, effects, graphics, text and animations.

The software architecture uses a Pentium Xeon CPU and an ATI Radeon or nVidia GEForce graphics processing unit. Inscriber also has developed a suite of PCI-boards to handle multichannel SDI (SMPTE 259M) I/O within a standard Intel-based PC. The Inca PCI-100 is suited toward 1RU or 2RU configurations, while the more powerful Inca PCI-1000 is suited to a 4RU configuration.

Both boards are autonomous of fluctuating technological changes. They do not embed a graphics processor at the board level. Rather, they use the high-speed bus interconnects available in the system to deliver the same benefit. This allows the systems to remain independent of the rapid advances in either motherboard, PCI-X, AGP or PCI-Express board graphics.

Inscriber's Inca Studio and Inca CG can integrate with media file formats such as DV, MPEG-2, Windows Media, Flash and Power Point.

Processing logic is executed as software on the motherboard CPU, as opposed to being embedded in hardware FPGAs. Three-D graphics, formerly requiring hardware to support higher bandwidth and quality, are now rendered full-resolution on consumer-grade cards at broadcast-quality frame rates. Audio streams are processed alongside video with low-level synchronization between playout and triggering/control.

Advanced architecture

The main software engine behind the display dexterity is a frame-accurate mixer/compositer and filter graph. Together they allow the combined playout of multiple elements such as stills, rolls, crawls, clips, animations, masks and transition effects. The filter graph defines the layering, priority and transitions between 2-D or 3-D objects. The mixer/compositor analyzes each field

(frame) of the graph and renders the fields (frames) for full-resolution output in real time.

The system handles video as a dynamic graphic object. Real-time clip-to-clip transitions are achieved seamlessly. A clip can reside on any layer of the rich multilayer environment, and multiple clips can be active at any given time. Real-time organic dissolves can be achieved without a switcher or NLE. Any image can be used as a matte to create custom transition effects. Page-formatted rolls and crawls allow for quicker, easier creation, edits and navigation. Playlist pages become pages of the roll or crawl, with all formatting maintained.

With a traditional CG, this level of effects is achieved by combining graphic and video inputs into a production mixer with the compound effect arranged by GPIs to trigger other devices simultaneously. These effects are realized in one box, on a single channel output, freeing switcher rails and reducing the complexity of production room setups.

Inca RTX, a recent addition to the growing product line, combines diverse graphic and effects functionality with a programmable user interface. Its direct interface with video hardware and integrated data sources makes it an ideal solution for the real-time broadcasting of dynamic data in sports, weather and news.

As modern graphics systems now combine numerous elements of visual media, the lines between CGs, still-stores, clip-stores, DDRs, DVEs and vision mixers have blurred. Graphic systems that combine all these components will become the standard, while the effects made possible by these systems will determine the future look of TV graphics. BE

Dan Mance is the president of Inscriber.

Lens technology

BY JOHN LUFF

All televisions are at least partially analog. The process of acquiring and displaying images is light. One might argue that due to the dual wave and quantum particle nature of light, it is not "analog," but in the context of replicating the experience of human vision, light causes responses on the basis of analog intensity (flux density) variations over an area, as well as color, as measured by wavelength or frequency. Similarly, the display must emit light that can be interpreted by the eye as a copy, entomologically an "analog," of the original image.

To make the television system work, light is processed using at least one strictly analog device: the camera lens. Lens technology may have been the first of several enabling technologies that led to the development of television. In this article, images electronically generated, as well as the display, will not be discussed. In the German language, "television" is pronounced "fernsehen," which quite literally means "distant seeing." The role of a lens in a telescope, binoculars or other optical aid is to allow us to see further and the same could be said about the role of television.

Early commercial television cameras were modeled after film cameras, with fixed focal length lenses and a mechanically adjustable iris. Camera output gain was controlled by adjusting the gain of the chain, rather than by changing exposure. This worked fine in controlled conditions, but remote locations often provided a challenge that the camera could not handle. Television cameras have been asked over the last 75 years to acquire images with flux densities varying from starlight to nuclear explosions, which simple gain controls cannot track. Hence, a key development in the modern lens was the attachment of a motor and servo to the iris to allow exposure control from the camera CCU. With modern CCD cameras, exposure can be controlled by an electronic "shutter," which controls the time the light is allowed to build up on the sensor before being read out. Still the range of light a CCD can read is only a few 100:1, and the iris remote is still needed. It also serves to allow creative control over depth of field for the lens, which is particularly important for long, focal-length zoom lenses.

Early monochrome cameras had fixed lenses or a "turret" of several fixed

The Zoomar lens was commonly used in the 1950s.

lenses that an operator could select without moving the camera relative to the scene. The first zoom lens for television was introduced in 1946, but it was many years before the performance was good enough to be widely used.

By the 1970s, zoom lenses were common, with 10:1 and even 18:1 ratios readily available for studio and field applications. When 30:1 lenses were introduced, it became clear that the race was on for even longer zoom ratios. At that time, the quality of a lens seemed to be in direct proportion to the zoom ratio. Long zooms came with the unavoidable fact that full aperture was not usable because the lens at wide angle might be f2.8, but at full zoom it might be three f-stops slower. The falloff of light meant that in many applications, the full zoom range was not usable.

Today zoom lenses are taken for granted. Modern sports remotes command the longest possible zoom ratios, as high as 100:1. The vertical image size with such a lens is about 1/3 of a degree, less than the diameter of the moon (using a 1150mm focal length from an 87x13.5mm lens).

An RCA TK41 with a turret of lenses is shown above. Photos courtesy Chuck Pharis.

Such long focal lengths come with unavoidable side effects: They cannot be handheld, and they cannot be held steady without stabilization technology. The good news is that such technology is now readily available; the bad news would certainly be the price of these lenses, with list prices well over $100,000. HDTV lenses in this class can cost more than the list price of the camera head they mount on.

Over the last 30 years, lenses have improved in quality dramatically. Zoom lenses were not readily available early in television history because of the difficulty of getting all colors to focus at precisely the same point and with the precise same image size. Lenses inherently do not pass all colors of light through with the same refraction. As a result, the lens must be

carefully corrected to be achromatic. In tube cameras, corrections could be made for the lens to adjust the image on all three pickups to be perfectly in registration despite minor flaws in the optical path. CCD cameras do not allow corrections due to the fixed pixel locations, so the lenses must be considerably more precise. HDTV cameras raise the bar even further.

Other improvements have included advanced servo electronics. Modern lenses have a complex microprocessor-controlled servo with digital readouts of focal length, f-stop and other data communicated back to the camera for relay to the operator and the CCU. Though a good camera operator can do a wonderful job manually, it is a joy to run a camera with memory presets for focus and zoom. It can turn a mediocre camera operator into a star.

Today the future of our industry makes even passive optics a complicated technical discussion. For instance, the movement to 16:9 aspect ratio is now well under way, and many cameras are asked to do double duty for 4:3 and 16:9 uses. This requires a ratio converter in the lens to make the image size optimum for both. In addition, some cameras today can operate with variable aspect ratio, to mimic the 2.35:1 aspect ratio commonly used in film. It is not clear what kind of lens is required when a single camera/lens combination might be used for 1.33:1 to 2.35:1 images. Television lens manufacturers are now building "prime" cine style lenses for HDTV acquisition applications, a sign of the movement to electronic acquisition using film techniques.

Modern lenses also have corrected other flaws to an amazing level of precision. Focus breathing (the change of focal length with focus change) is controlled to a large degree in all modern lenses. This is done in part with internal focus elements, rather than the front element moving as was common in older zoom lenses.

HDTV lenses can cost more than the list price of the camera head they mount on.

Certainly as time goes on, the march of zoom length will continue unabated, though it is sometimes hard to understand why. Mechanical and optical precision will continue to improve and (hopefully) costs will come down to levels that will make the best optics more affordable. **BE**

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

STORAGE SERVER

SeaChange ITV MediaCluster: patented approach that combines several media servers to act as one server; every server node is directly connected to every other node so there is no single point of failure; each server has its own multichannel I/O hardware and a redundant array of inexpensive disks (RAID); when a file is stored to a media cluster it's not just written to all disks in the node — it's also being written across every disk in every node in the cluster; this is called RAID-squared because the load is balanced, and there are no hot spots; due to the cluster configuration, every output has equal access.

978-897-0100; *www.schange.com*

MINIATURE MICROPHONE KIT

DPA Microphones EMK4071 and ENG/EFP microphone kit: has built-in presence boost and a permanent 5dB soft boost at 4kHz to 6kHz; specifications include a pre-polarized condenser element with vertical diaphragm, a 30- to 40Ω output impedance and a total harmonic distortion of 123dB SPL peak; features two accessory kits: The DAK4071-E kit for ENG/EFP situations provides a range of mounting clips, pins and grids to eliminate noise sources and to provide inconspicuous placement.

+45 4814 2828; *www.dpamicrophones.com*

LEGALIZER

Eyeheight legalEyes: meets EBU specification R103-2000 covering RGB color space and luminance levels; front panel enables up to eight predefined settings to be recalled; occupies a 1/2-rack-width, 1RU-high Eyeheight miniBox; employs full 10-bit signal processing of the 270Mb/s SDI input signal; features a one-touch R103-2000 setting; two independent SDI outputs are provided with the standard model.

866-469-2729; *www.eyeheight.com*

LCD VIDEO MONITOR

PANORAMAdtv, a division of Wohler, MON8-1: contains eight 1.8-inch LCD screens; each has a composite video input, a loop-through output and termination switches; fits in 1RU; uses white LED backlights, which have a life span of more than 100,000 hours.

888-5-WOHLER; *www.panoramadtv.com*

STUDIO EDITING VTR

Panasonic AJ-SD755: offers jog/shuttle control and an IEEE 1394 digital interface to facilitate computer-based nonlinear editing; records for 184 minutes in DVCPRO25 and DV 4:1:1 25Mb/s digital component format; features auto-format playback detection for seamless playback of DVCPRO, DVCAM and DV format cassettes; compact 4RU size; performs frame-accurate, tape-to-tape editing.

800-528-8601; *www.panasonic.com/broadcast*

COMPACT CAMCORDER

Sony DSR-PD170: enables digital component audio and video acquisition in the DVCAM and DV formats; minimum illumination improvement for low-light recording increased from 2 lux to 1 lux; features a new 2.5-inch hybrid LCD swivelscreen monitor for improved viewing in bright sunlight; includes increased adjustment steps on iris control; has a lens hood featuring built-in lens cover; includes a larger handle, viewfinder and eyecup; includes additional record/start/stop and zoom controls on top handle to aid in one-handed operation; audio quality (S/N ratio) in the manual recording mode is improved by 6dB.

800-686-SONY; *www.sony.com/professional*

MULTIFORMAT SWITCHER

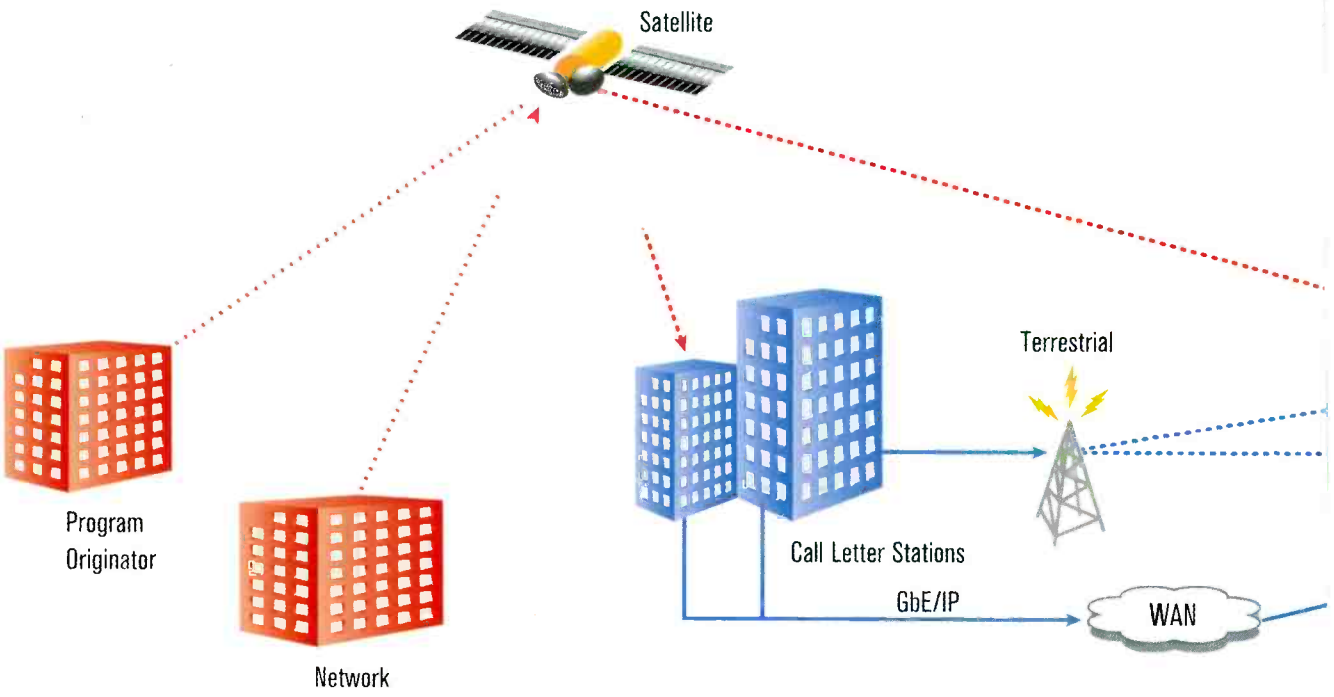
FOR-A Hanabi HVS-1000HS: is a one-M/E version of the two-M/E Hanabi HVS-3000H/S digital HD or SD switcher; supports 1080i, 24p, 720p and SD formats; 2RU system has two types of operational units available for different applications; comes with four inputs; can be configured for up to 16 inputs; four still pictures can be stored in frame memory; features four standard outputs (PGM x 2, PVW x 1, AUX x 1); has a maximum of seven outputs available.

714-894-3311; *www.for-a.com*

continued on page 67

More than
20 MILLION
U.S. households
GET IT.

Harmonic



DISTRIBUTION

- Industry Leading High (HD) and Standard (SD) Definition Encoding
- Closed-loop Statistical Multiplexing of VBR HD, SD and Data in a Single Pool
- Digital Program Insertion (DPI)
- Multiple Video Transport Options
- Digital Service Management

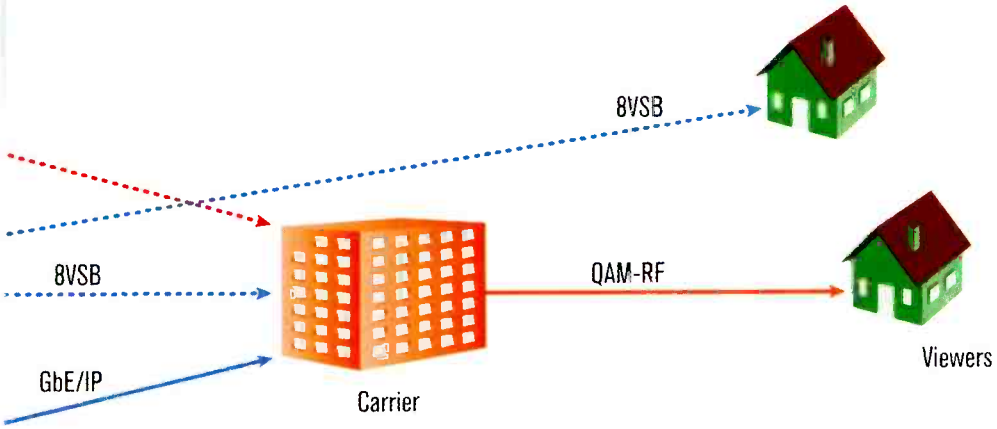
TELEVISION STATION OPERATIONS

- Industry Leading HD and SD Encoding
- Closed-loop Statistical Multiplexing of VBR HD, SD and Data in a Single Pool
- Digital Program Insertion (DPI)
- System Mode Changing
- Multiple Video Transport Options
- Digital Service Management

Practical Solutions for Delivering Better Digital Video. EVERYWHERE.

HARMONIC'S PRACTICAL SOLUTIONS maximize revenue, reduce costs and increase flexibility. They're proven and reliable. So, whether you already offer digital TV or are just starting out, we can provide a significant advantage for you.

Our DiviCom® MPEG-2 video encoders, with integrated noise reduction and filtering, deliver industry leading efficiency and performance. Everyday, thousands of Harmonic encoders are hard at work converting, compressing and cleaning video to remove even subtle imperfections. The result is superior picture quality for your viewers and more revenue generating capacity for you.



CARRIER HEADEND

- HD and SD Digital Turnaround
- Industry Leading HD and SD Encoding
- Advanced HD, SD and Data Multiplexing
- Digital Program Insertion (DPI)
- Smart Edge Devices
- Multiple Video Transport Options
- Network Management

HOME

- Extends Service Area
- Provides Superior Viewing and Listening Experience
- Increases Revenue Potential

Now, use that newfound bandwidth to increase service to your existing audience and attract new viewers. Harmonic's DiviTrackXE™–a third-generation, closed-loop statistical multiplexing system–can multicast an array of standard and high definition channels within your broadcast bandwidth. DiviTrackXE also lets you mix data services and variable bit-rate HD and SD streams in the same pool.

Monitor and manage your digital video infrastructure as a series of services rather than discrete pieces of hardware. NMX Digital Service Manager™–Harmonic's breakthrough new system–enables you to add, modify and manage your services in step with the changing needs of your business. NMX improves operational efficiencies, optimizes bandwidth and increases service availability.

Maximize your reach by delivering your entire schedule directly to a cable, satellite, telco or other carrier headend. Harmonic's video transport systems get your content there quickly and reliably while protecting your video quality the entire way.

Harmonic broadcast solutions. The practical way to succeed in the digital (and real) world.

Harmonic

Put our practical solutions for multicasting, centralcasting, distribution and digital turnaround to work for you.

Call our Broadcast Solutions Hotline at 1.800.788.1330 x2700 (+1.408.542.2500 x2700 outside the U.S.) or visit harmonicinc.com/broadcast to find out more.

Harmonic Inc. • 549 Baltic Way • Sunnyvale, CA 94089 • Tel: 1.800.828.5521 or +1.408.542.2559 • Fax: +1.408.490.6001

continued from page 62

CAMERA RIG

DvTec DvRigPro: designed for stability and comfort, freedom of movement and creative framing; pod is constructed of three spring-loaded telescopic sections; allows camera to float in front of operator; camera can be moved to any position for comfortable viewing; quick release camera plate, 180 degrees tilting and on-board camera light battery.

818-760-8240; *www.dvtec.tv*

United States Postal Service

Statement of Ownership, Management, and Circulation

1. Publication Title	2. Publication Number	3. Filing Date
Broadcast Engineering	0007-1994	09/24/03
4. Issue Frequency	5. Number of Issues Published Annually	6. Annual Subscription Price
Monthly	12	Free To Qualified

7. Complete Mailing Address of Known Office of Publication (Not printer) (Street, city, county, state, and ZIP+4)
PRIMEDIA Business Magazines & Media
9800 Metcalf
Overland Park, KS 66212-2216 (Johnson County)

Contact Person: Sonja Rader
Telephone: 913-967-1641

8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not printer)
PRIMEDIA Business Magazines & Media
9800 Metcalf
Overland Park, KS 66212-2216 (Johnson County)

9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor (Do not leave blank)

Publisher (Name and complete mailing address)
Dennis Triola
9800 Metcalf
Overland Park, KS 66212-2216 (Johnson County)

Editor (Name and complete mailing address)
Brad Dick
9800 Metcalf
Overland Park, KS 66212-2216 (Johnson County)

Managing Editor (Name and complete mailing address)
Brad Dick
9800 Metcalf
Overland Park, KS 66212-2216 (Johnson County)

10. Owner (Do not leave blank. If the publication is owned by a corporation, give the name and address of the corporation immediately followed by the names and addresses of all stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, give the names and addresses of the individual owners. If owned by a partnership or other unincorporated firm, give its name and address as well as those of each individual owner. If the publication is published by a nonprofit organization, give its name and address.)

Full Name	Complete Mailing Address
PRIMEDIA Inc.	745 Fifth Avenue New York, NY 10151 USA

11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages or Other Securities. If none, check box → None [X]

Full Name	Complete Mailing Address
None	

12. Tax Status (For completion by nonprofit organizations authorized to mail at nonprofit rate) (Check one)
The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes:
o Has Not Changed During Preceding 12 Months
o Has Changed During the Preceding 12 Months (Publisher must submit explanation of change with this statement)

PS Form 3526 (Facsimile), October 1999

13. Publication Title: Broadcast Engineering	14. Issue Date for Circulation Data Below: September 2003	
15. Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies (Net press run)	51,099	51,594
b. Paid/Requested Outside-County Mail Subscriptions Stated on Form 3541. (Include advertiser's proof and exchange copies)	28,473	29,193
(2) Paid In-County Subscriptions Stated on Form 3541 (Include advertiser's proof and exchange copies)	0	0
(3) Sales Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Non-USPS Paid Distribution	13,957	13,598
(4) Other Classes Mailed Through the USPS	0	0
c. Total Paid and/or Requested Circulation (Sum of 15b. (1), (2), (3), and (4))	42,430	42,791
d. Free Distribution by Mail (Samples, complimentary, and other free) (1) Outside-County as Stated on Form 3541	5,954	5,277
(2) In-County as Stated on Form 3541	0	0
(3) Other Classes Mailed Through the USPS	0	0
e. Free Distribution Outside the Mail (Carriers or other means)	1,046	1,500
f. Total Free Distribution (Sum of 15d. And 15e.) →	7,000	6,777
g. Total Distribution (Sum of 15c. And 15f.) →	49,430	49,568
h. Copies not Distributed	1,669	2,026
i. Total (Sum of 15g. And 15h.) →	51,099	51,594
j. Percent Paid and/or Requested Circulation (15c. Divided by 15g. times 100)	85.8%	86.3%

16. Publication of Statement of Ownership
■ Publication required. Will be printed in the Nov 2003 issue of this publication. ☐ Publication not required.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner — Date: 09/24/03
Sonja Rader, Audience Marketing Manager

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).

OUTBOARD SIGNAL PROCESSING UNITS

Solid State Logic Xlogic: new line of 19-inch rack-mounting outboard signal processing units; features SSL's SuperAnalogue audio circuitry; based on the XL 9000 K series console; is comprised of four units: XLogic Channel features SuperAnalogue pre-amplifier with mic, line or instrument inputs; XLogic multichannel compressor includes separate five-channel and LFE channel compression controls allowing separate treatment of LFE signals; XLogic SuperAnalogue mic amp provides four XL 9000 K series microphone pre-amplifiers in a 1U rack-mounting unit with optional remote control; XLogic G series stereo compressor is a 1U rack-mounting stereo compressor with front panel switches that allow the compressor and external side-chain signals to be switched in or out of circuit.

212-315-1111; *www.solid-state-logic.com*

AUDIO CABLE

Gepco X-Band: available in single-, 4-, 8-, 12- and 16-pair versions; features stranded oxygen-free conductors; reduced high-frequency absorption; special foam dielectric allows for easy cutting and stripping with minimal wickback when soldering; quick ground termination with drain wire; includes the new G-Flex ultra-flexible jacket.

800-966-0069; *www.gepco.com*

A PRIMEDIA Publication
Broadcast Engineering
www.broadcastengineering.com

Editorial Director: Brad Dick, bdick@primediabusiness.com
International Editor: Jerry Walker, jwalker@primediabusiness.com
Technical Editor: Donald Keller, dkeller@primediabusiness.com
Sr. Assoc. Editor: Susan Anderson, sanderson@primediabusiness.com
Sr. Assoc. Editor: Laura (Collins) Dixon, ldixon@primediabusiness.com
Asst. Editor: Chevonn Payton, cpayton@primediabusiness.com
Asst. Editor: Heidi Hueseman, hhueseman@primediabusiness.com
Sr. Art Director: Michael J. Knust, mknust@primediabusiness.com
Assoc. Art Director: Robin Morsbach, rmorsbach@primediabusiness.com
Technical Consultants: Computers & Networking – Brad Gilmer
Antennas/Radiation – John H. Battison
Digital Video – Michael Robin
Transmission Facilities – Donald L. Markley
Legal – Harry C. Martin
New Technology – John Luff
Industry Watcher – Paul McGoldrick
New Media – Craig Birkmaier
International Technology – Sypha

Sr. VP: Peter L. May, pmay@primediabusiness.com
Group Publisher: Dennis Triola, dtriola@primediabusiness.com
Marketing Dir.: Christina Heil, cheil@primediabusiness.com
Sr. Ad Prod. Coord.: Sonja Shaffer, sshaffer@primediabusiness.com
Classified Ad Coord.: Michelle Hooper, mhooper@primediabusiness.com
Dir., Audience Marketing: Barbara Kummer, bkummer@primediabusiness.com
Group Show Director/LDI: Sharon Morabito, smorabito@primediabusiness.com

PRIMEDIA
Business Magazines & Media

COO: Jack Condon, jcondon@primediabusiness.com
Executive Vice President: John French, jfrench@primediabusiness.com
Corp. Comm/Mkg.: Karen Garrison, kgarrison@primediabusiness.com

Primedia Business to Business Group - 745 Fifth Ave., NY, NY 10151
Chief Executive Officer: Martin Maleska, martin.maleska@primedia.com

Primedia Inc.
Chairman: Dean Nelson, dean.nelson@primedia.com
President and CEO: Kelly Conlin, kelly.conlin@primedia.com
Vice Chairman & General Counsel: Beverly Chell, beverly.chell@primedia.com

MEMBER ORGANIZATIONS
Sustaining Member of:
• Society of Broadcast Engineers
Member, American Business Media; Member, BPA International

BROADCAST ENGINEERING, ISSN 0007-1994, is published monthly (except semi-monthly in June and December) by PRIMEDIA Business Magazines & Media Inc., 9800 Metcalf Ave., Overland Park, KS 66212 (primediabusiness.com). Current and back issues and additional resources, including subscription request forms and an editorial calendar, are available on the World Wide Web at broadcastengineering.com.

SUBSCRIPTION RATES: Free and controlled circulation to qualified subscribers. Non-qualified persons may subscribe at the following rates: USA and Canada, 1 year, $70.00, 2 years, $135.00, 3 years, $200.00; Outside USA and Canada, 1 year, $85.00, 2 years, $165.00, 3 years, 245.00 surface mail (1 year, 155.00, 2 years, $295.00, 3 years, $440.00 airmail delivery). For subscriber services or to order single copies, write to *Broadcast Engineering*, 2104 Harvell Circle, Bellevue, NE 68005 USA, call 866-505-7173 (USA) or 402-505-7173 (outside USA), or visit www.broadcastengineering.com.

ARCHIVES AND MICROFORM: This magazine is available for research and retrieval of selected archived articles from leading electronic databases and online search services, including Factiva, LexisNexis and Proquest. For microform availability, contact ProQuest at 800-521-0600 or 734-761-4700, or search the Serials in Microform listings at proquest.com.

REPRINTS: Contact Wright's Reprints to purchase quality custom reprints or e-prints of articles appearing in this publication at 877-652-5295 (281-419-5725 outside the U.S. and Canada). Instant reprints and permissions may be purchased directly from our Web site; look for the iCopyright tag appended to the end of each article.

PHOTOCOPIES: Authorization to photocopy articles for internal corporate, personal, or instructional use may be obtained from the Copyright Clearance Center (CCC) at 978-750-8400. Obtain further information at copyright.com.

PRIVACY POLICY: Your privacy is a priority to us. For a detailed policy statement about privacy and information dissemination practices related to Primedia Business Magazines and Media products, please visit our Web site at *www.primediabusiness.com*.

CORPORATE OFFICE: Primedia Business Magazines & Media, 9800 Metcalf, Overland Park, Kansas 66212 • 913-341-1300 • primediabusiness.com

Classifieds

Control Products

Professional Services

For Sale

Equipment For Sale

For Sale

Business Wanted

System Integration

Help Wanted

SALES REPRESENTATIVE, TECHNICAL SALES - Conduct sales, marketing, and technical support activities for manufacturer of television automation systems. For sales to television broadcast, telecommunications, and multimedia industries. 2 yrs exp. req'd. Salary commensurate with exp. 40 hrs/wk, 8 AM – 5 PM, M – F. Send resume to: Florical Systems, Inc., 4581 NW 6th Street, Gainesville, FL 32609

TV MAINTENANCE ENGINEER KMAX-TV seeks a TV maintenance engineer. Candidate will have a minimum of two years experience in broadcast maintenance, including systems troubleshooting, repair of video, audio and ENG equipment. Computer knowledge and FCC General License or SBE certification desired. News engineering operation is a plus. Send resume to: KMAX-TV Personnel - Job Code: AW 4-1; 500 Media Place; Sacramento, CA 95815. No telephone calls. Position open until filled. EOE

Classifieds

Senior Maintenance Engineer Comcast Media Center

Senior Maintenance Engineer needed at the multi-channel TV facility in Littleton, CO. Duties include installation and repair of all types of broadcast equipment. Minimum qualifications include 5+ years of broadcast video and audio equipment repair and operations experience, as well as a solid background in Digital TV Technology. Successful applicants will have some systems experience with Grass Valley & Pinnacle Video File Servers, Harris & Encode Automation Systems, Grass Valley Group 7000 & 7500 Series Routers and M21 & M2100 Master Control Switchers. The preferred candidate will also possess an Associates Degree in electronics or its equivalent. Knowledge of computer hardware and software as related to the broadcast television environment is a must. SBE certification is desirable. Other duties, weekend and shift work as required.

Send us your resume by applying to the job opening on **www.comcast.com**. Pre-employment background and drug screening required. EOE, Drug Free.

Comcast

FOX O & O IN MEMPHIS, TN needs Maintenance Engineer who can troubleshoot (to the component level) and repair broadcast equipment, including videotape recorders, camera, video switchers, graphic equipment, and other equipment as assigned. Requires three years experience as a maintenance engineer at a commercial television station and SBE certification. Please send resume and cover letter to: Human Resources, WHBQ-TV, 485 S Highland, Memphis, TN 38111. EOE

DISTRIBUTION TECHNOLOGIES DIRECTOR WEIU TV/FM, a dynamic university licensee, is looking for a well-rounded, visionary RF/IT leader to captain our engineering/operation team aboard our fully digital ship. Email cfwsw@eiu.edu for details. Credential review begins January 5, 2004. Position is open until filled. EEO/AA employer.

TWIN CITIES PUBLIC TELEVISION ENGINEERING MANAGER Responsibilities include managing engineering installation and maintenance personnel, system support, operational budgets and capital projects for the TPT production and master control facilities. The successful candidate will possess the following: technical degree, 5 years experience in Engineering management and experience in server-based non-linear editing/broadcast automation systems, union staff, planning, project, budget management, and technical training. We seek an individual with proven management ability that is results-oriented, has strong project management skills, exceptional interpersonal, written and verbal communication skills and the ability to build and maintain relationships that will contribute to the success of TPT! Send cover letter with salary expectations and resume by January 2, 2004 to: Box Number 474-4 TPT/Twin Cities Public Television 172 E. Fourth Street St. Paul, MN 55101 E-mail to: hr@tpt.org, fax to: 651-229-1408 or apply online at www.tpt.org An Equal Opportunity Employer/AAP

DIVISION DIRECTOR I - Ideal candidate will have major market production engineering experience (top 25 TV markets as recognized by the FCC). Experience should include analog and digital routers, mpeg encoding/decoding, tape machines (multiple formats), production switchers, intercom systems, DVE's, remote operations, still stores, character generators: experience in budget preparation and have demonstrated track record working with production departments, talent and administration. Entry salary; $39,754.98/year. Requirements; AA and 8 years of special experience, 2 years of which must have been in line or functional administrative or advanced supervision. See Web Site for complete description (www.ms-networks.org). Lifting/weight requirement 75 pounds. SUBMIT: Letter requesting an application to: CONFIDENTIAL - Human Resources, Mississippi Broadcasting Networks, 3825 Ridgewood Road, Jackson, MS 39211 postmarked by January 7, 2004. EOE

MIS PROFESSIONALS

ESPN, Inc. is the worldwide leader in sports entertainment, with a broadcast portfolio that includes over 40 national and international business entities in the sports marketing arena. Currently, we have challenging opportunities available in our MIS Department, located in **Bristol, CT**, for the following:

PROJECT MANAGER

Successful candidate will manage the integration and implementation of new broadcast related computer technologies that will help streamline our daily production process. Specific responsibilities will include developing project plans, supporting operating systems, maintaining/troubleshooting network connectivity/support issues, and providing technical diagnosis of PC and Server equipment. You will also be called upon to configure and deploy newly acquired equipment to user locations, interface with hardware/software vendors, and ensure all corporate standards are met. To qualify, you must have a Bachelor's Degree in Computer Science or related field, supported by 5-7 years experience with PC's and broadcast related hardware/software technologies. Technical background with Windows 2000 Server fundamentals, Networking NT and Win2K Servers will be expected. Familiarity with Systems Management Server Administration, TCP/IP on NT and Win2K Networks, MS Office hardware/peripherals, Ethernet wiring configuration topologies, and Newsroom Automation systems also essential.

NETWORK ANALYST – 2nd Shift

In this role, you will support and troubleshoot corporate PC hardware and software as it pertains to our Production Department. Responsibilities will include providing both system and application support for end-users on NT computer systems, assisting with data backup and recovery procedures, virus protection and anti-virus procedures, and providing compatibility testing and installation support for workstation hardware add-ons (modems, RAM, CD readers, sound cards, etc). To qualify you must have a Bachelor's Degree in Computer Science or equivalent experience, along with a solid understanding of Networks and PC's. Basic knowledge of and the ability to troubleshoot and resolve problems with NT workstations, printers, document servers, modems, scanners and other shared network resources will be expected. Television production experience a definite plus.

Candidates for both of the above positions should have a knowledge/interest in various sports arenas.

We offer a competitive salary and comprehensive benefits package. **Please e-mail your resume as an MS Word attachment to: recruiterkp@espn.com. No phone calls please. Only qualified applicants will be contacted at this time.** ESPN is an EOE/AAE

www.espn.com

ESPN

Ad Index

Broadcast Engineering is not responsible for errors in the Advertisers Index.

	Page #	Advertiser Hotline	Web site Address
AJAVideo	48	530-274-2048	aja.com
AvidTechnology	21	800-949-avid	avid.com
BenchmarkMedia	70		benchmarkmedia.co
CalrecAudioLtd.	37	+441422842159	calrec.com
ComputerModules	69	858-613-1818	computermodules.co
CPI/Eimac	19	650-592-9988	eimac.com
DigitalTransactionGroup	30	512-837-3737	dtgtv.com
Dolby Labs Inc.	29	415-558-0200	dolby.com/tvaudio
DPA Microphones Inc.	15	866-dpa-mics	dpamicrophones.com
Electronic Design Specialist	69		
Ensemble Designs	24	530-478-1830	
Evertz Microsystems Ltd.	IBC	905-335-3700	evertz.com
Florical Systems Inc.	9	352-372-8326	florical.com
Harmonic	63-66	800-788-1330	harmonic.com/broadcast
Harris Corp. Broadcast Div.	3	408-990-8200	broadcast.harris.com
Hotronic Inc.	69		
Inscriber	33	800-363-3400	inscriber.com
Leitch Incorporated	BC	800-231-9673	leitch.com
Maxell Corp. of America	7	800-533-2836	maxell.com
Microfirst Inc.	68		microfirst.com
Panasonic Broadcast	5	800-528-0601	panasonic.com/dvcpro
Patchamp	57	201-457-1504	patchamp.com
Quartz USA	16	888-638-8745	quartzus.com
Radyne-Com Stream	27	602-437-9620	radn.com
Rohde & Schwarz	13	888-837-8772	rohde-schwarz.com
Ross Video Ltd.	17,49	613-652-4886	rossvideo.com
Snell & Wilcox	31	020 8917 4300	snellwilcox.com
Sundance Digital	61	972-444-8442	sundancedigital.com
Systems Wireless	23,41	800-542-3332	swl.com
Telemetrics	67		telemetricsinc.com
Thomson Broadcast	11		thomsongrassvalley.com/newsproductions
TMB	70		
Utah Scientific	35	801-575-8801	utahscientific.com
Videoframe	69	530-477-2000	videoframesystems.com
Videotek	25	800-800-5719	videotek.com
Wheatstone Corporation	IFC	252-638-7000	wheatstone.com
360 Systems	59	818-991-0360	360systems.com

Sales Offices

US/CANADA

WEST
George Watts III
(360) 546-0379; Fax: (360) 546-0388
georgeww3@aol.com

EAST
Josh Gordon
(718) 802-0488; Fax: (718) 522-4751
jgordon5@bellatlantic.net

EAST/MIDWEST
Joanne Melton
(212) 462-3344; Fax: (913) 514-9249
jmelton@primediabusiness.com

INTERNATIONAL

EUROPE
Richard Woolley
+44-1295-278-407
Fax: +44-1295-278-408
richardwoolley@btclick.com

EUROPE
Tony Chapman
+44-1635-578-874
Fax: +44-1635-578-874
ARCintect@aol.com

ISRAEL
Asa Talbar
Talbar Media
+972-3-5629565; Fax: +972-3-5629567
talbar@inter.net.il

JAPAN
Mashy Yoshikawa
Orient Echo, Inc.
+81-3-3235-5961; Fax: +81-3-3235-5852
mashy@fa2.so-net.ne.jp

CLASSIFIED ADVERTISING OVERLAND PARK, KS
Jennifer Shafer
(800) 896-9939; (913) 967-1732
Fax: (913) 967-1735
jshafer@primediabusiness.com

REPRINTS
Wright's Reprints
(877) 652-5295;
International inquiries, (281) 419-5725
eramsey@wrightsreprints.com

LIST RENTAL SERVICES
Marie Briganti, Statlistics
(203) 778-8700 x146
(203) 778-4839
primedia@statlistics.com

Customer Service:
913-967-1707 or 800-441-0294

BROADCAST ENGINEERING December 2003, Vol. 45, No.12 (ISSN 0007-1994) is published monthly and mailed free to qualified persons by Primedia Business, 9800 Metcalf Ave., Overland Park, KS 66212-2216. Periodicals postage paid at Shawnee Mission, KS, and additional mailing offices. Canada Post International Publications Mail (Canadian Distribution) Sales Agreement No. 0956295. POSTMASTER: Send address changes to *Broadcast Engineering*, P.O. Box 2100, Skokie, IL 60076-7800 USA. CORRESPONDENCE: Editorial and Advertising: 9800 Metcalf, Overland Park, KS 66212-2216 Phone: 913-341-1300; Edit. fax: 913-967-1905. Advert. fax: 913-967-1904.

Tune in today

BY PAUL MCGOLDRICK

There is an old party joke that goes: A man goes into a brain store and asks what choices there are. The storekeeper tells him that he can have an ounce of an engineer's brain for $2, or an ounce of a doctor's brain for $3. The store also has lawyers' brains at $20 an ounce and judges' brains at $250 an ounce. The customer asks why the judges' brains are so expensive and the storekeeper says, "Do you know how many judges you have to kill to find an ounce of common sense?" Well, federal judge John Roberts and two of his companions at the United States Court of Appeals for the District of Columbia showed at the end of October that, surprisingly, this isn't always true.

The panel of three judges threw out the absurd claim by the Consumer Electronics Association (CEA) that the FCC had acted in a so-called "arbitrary and capricious manner" when they ordered tuners (they're all "digital" tuners in the press these days, by the way, not RF any more) to be installed in TV sets in a program starting in July 2004, and that the FCC was going beyond its mandate in believing it had the power to enforce such a thing. The judges disagreed, saying that this will make the purchase of DTV equipment more attractive to consumers generally and help break the logjam discerned by the commission.

I guess that with a tuner we can now start calling them TV receivers again?

Since the FCC order was made in August 2002 we have heard some strange repartee from the receiver vendors, who you would think had been paid off by the cable and satellite industries, including a consistent claim that a tuner would add $250 to the retail price of a receiver! With silicon and module products from companies such as Microtune, that claim is so absurd that one has to wonder how the industry could be so blatant in such nonsensical outbursts. No, if consumer confidence can be increased so that they will be able to take a receiver home, plug in a suitable antenna and be able to receive terrestrial DTV — without calling help lines on the Indian subcontinent — then there is a good chance that DTV can take off in a hurry. As the CEA spokesperson, Jenny Miller, was quoted as saying, the CEA fully intends to follow the law. What will be interesting now is the response of broadcasters and other DTV industries in promoting antenna reception and providing compelling and ample programming. Earth to Ms. Miller — all programming on a DTV station is digital. Duh! The CEA isn't guilty of confusing HDTV with DTV is it? Is that why so many consumers are so confused too?

I'm not saying I'm happy that the arguments of 8-VSB vs. COFDM will almost certainly have to end at this point. Without tuners being an enforced requirement, there was still a chance that the broadcast engineering community would find its own level of common sense and rethink the real problems of 8-VSB reception. Maybe now that they build tuners into their products, some of the manufacturers will take the high road and include the ability to decode either standard? Dream on ...

Hopefully, the tuner debacle is now at an end and the CEA and its members won't waste any more of their customers' own money in pursuing this charade any further. If that is the case, then 50 percent of receivers with displays larger than 36 inches will have tuners by June 2004, 100 percent by July 2005; all receivers with displays of 25 inches to 35 inches will require tuners by July 2006, and all receivers with displays larger than 13 inches would have to be so equipped by July 2007.

I guess that with a tuner we can now start calling them TV receivers again?

While we celebrate the holidays this year, it is interesting to envision what the consumer electronic store displays will look like at this time next year with terrestrial DTV reception being a common theme on the larger screen receivers. Certainly the challenges of 8-VSB reception are going to spawn a completely new antenna installation industry that probably will rival the great VHF build-out in the 1950s. Unfortunately, there is no grouping of DTV stations in the UHF bands, such as the rollout of 625-line television in the United Kingdom, where you could buy an antenna by color code optimized for the channels in your locality. And of course we don't have — for the most part — co-siting of DTV stations in any one market.

This is not to say that I think terrestrial DTV has a guaranteed long-term future. But, for now, with the playing field we have, common sense seems to have won out for once. Cost of an ounce of an engineer's brain has now dropped to $1.50. BE

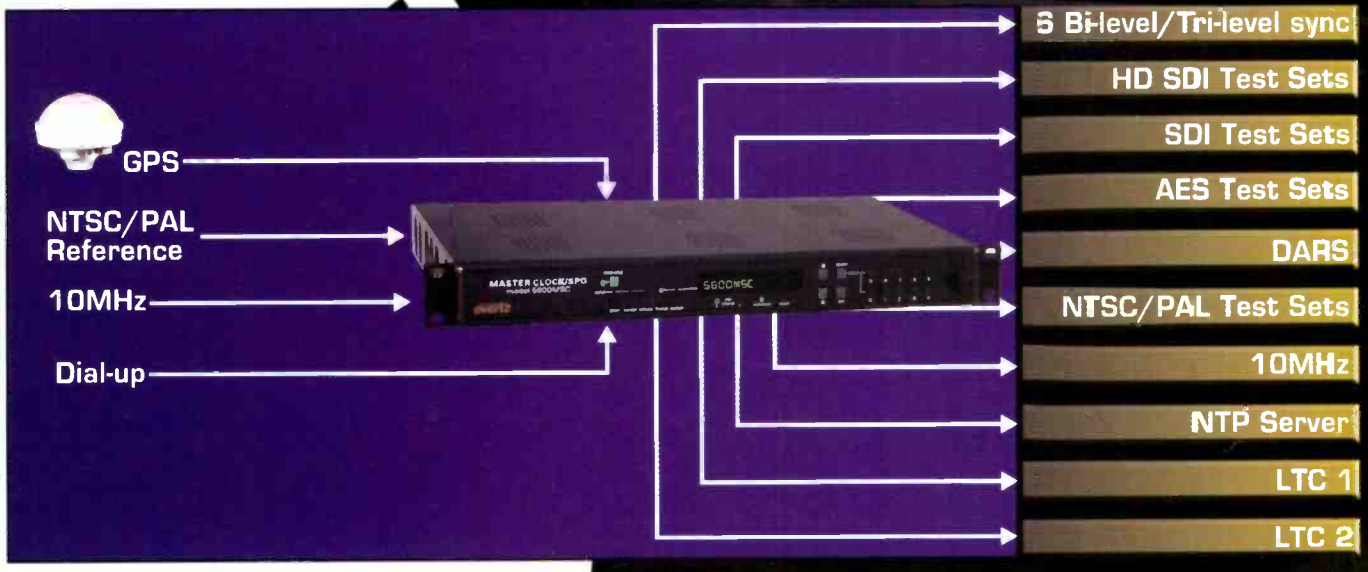
Paul McGoldrick is an industry consultant based on the West Coast.

SEND Send questions and comments to: paul_mcgoldrick@primediabusiness.com

IT'S ABOUT TIME...

...and sync
and test signals
and DARS
and NTP
and 10MHz
and...

Master Clock/SPG Model 5600MSC



...and we have the ACO to match.

Automatic Changeover 5600ACO

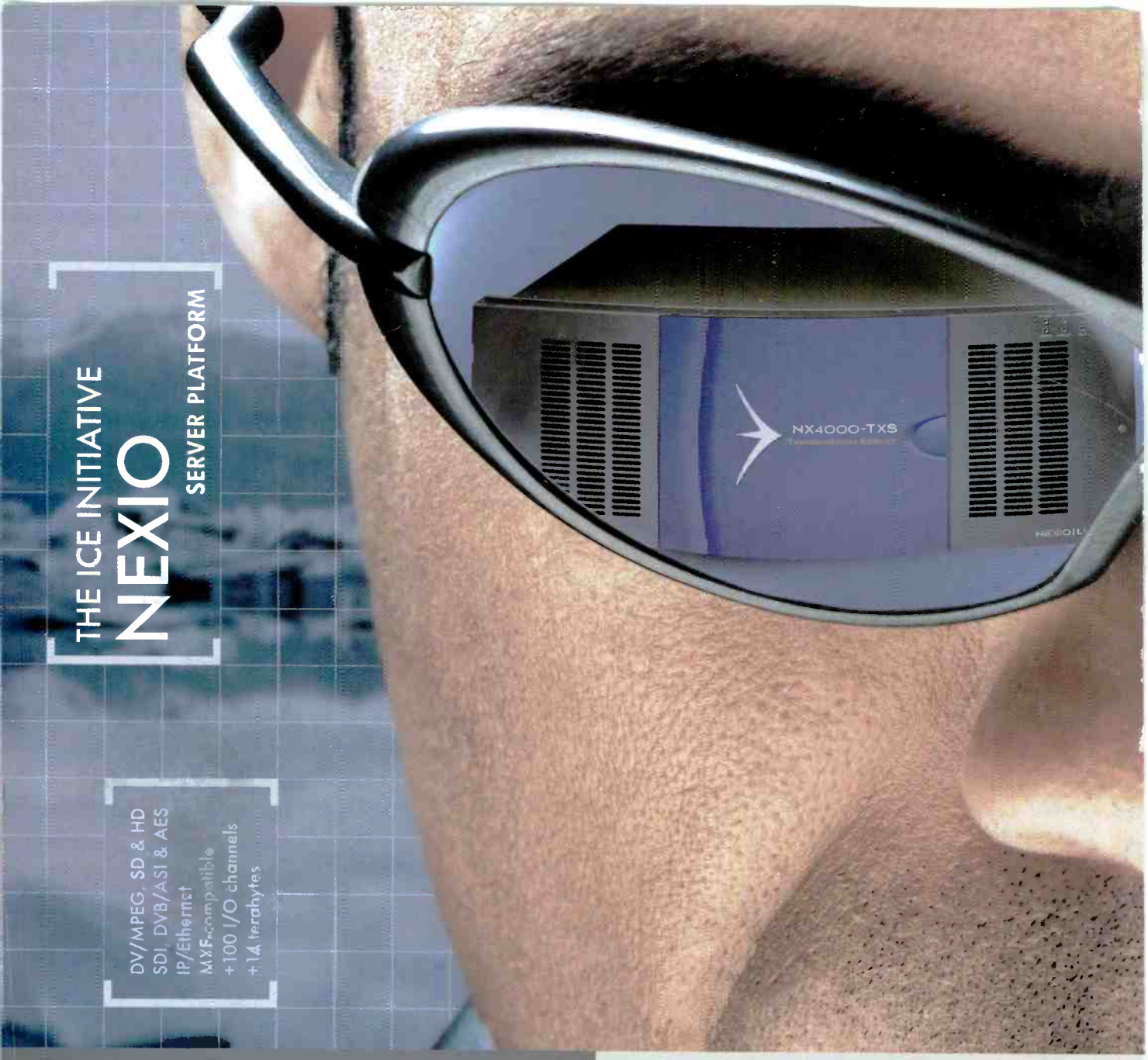
Any reference, Any standard, Any offset, Any time

- Bi-level NTSC-M
- Tri-level 1080p/24
- Tri-level 1080i/59.94
- Tri-level 1080p/23.98sF
- Tri-level 720p/59.94
- Tri-level 1080p/25
- Bi-level PAL-B
- Tri-level 1080p/23.98
- Tri-level 1080i/50
- Tri-level 1080i/60
- Tri-level 1080p/24sF
- Tri-level 720p/60

Tel: 1-905-335-3700 / Fax: 1-905-335-3573

www.evertz.com

evertz



NEXIO: The new server platform for your Integrated Content Environment (ICE)

Need TV operations that run better for less?

- True shared storage: Simultaneous access to all content by all users
- Ultra-fast Gigabit Ethernet IP connectivity: High-speed access for media and asset management
- Integrated shared-content editing: Ingest, edit, to air—with no content transfers
- Total integration: Support for all the software you count on most
- Extreme extensibility: Additional storage and channels in low-cost increments

Just add ICE.

Turbo-charge your Integrated Content Environment: www.leitch.com/nexio

LEITCH

Canada +1 (800) 387 0233
USA East +1 (800) 231 9673
USA West +1 (888) 843 7004
Latin America +1 (305) 512 0045

www.leitch.com