

Broadcast Engineering®

THE JOURNAL OF DIGITAL TELEVISION



CNBC's new Global headquarters

Benchmark for the future

**Building
newsroom
systems**

**IT becomes the
backbone for news**

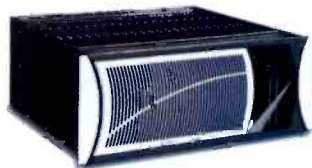
**Producing
HD for
pennies**

**JVC's new
HDV camera**

Digital Audio Network Router

The Bridge

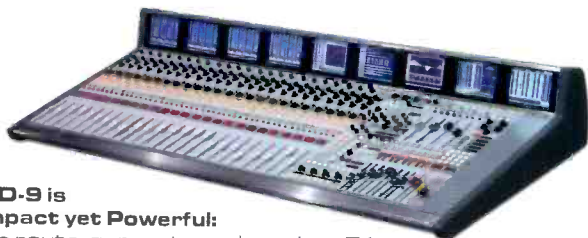
The **Bridge Router** can hold all the electronics you'll need for a small console: I/O cards, mix engines, and DSP processors. Naturally it can also have automatic fail-over DSP and CPU cards to keep you on-air. You can expand the system with a simple cage-to-cage interconnect.



It's not just a Digital Console, IT'S AN ENTIRE AUDIO INFRASTRUCTURE

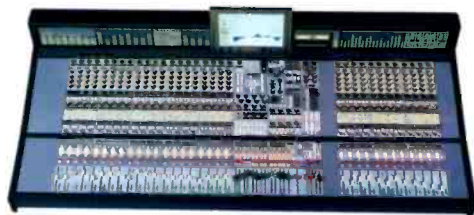
YOU CAN START with a simple AES router with analog and digital inputs and outputs. From there you can add logic I/O cards and scheduling software; you can link multiple master bridge cages together to achieve thousands and thousands of I/O ports; you can create a custom system that includes multiple 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**

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

the digital audio leaders

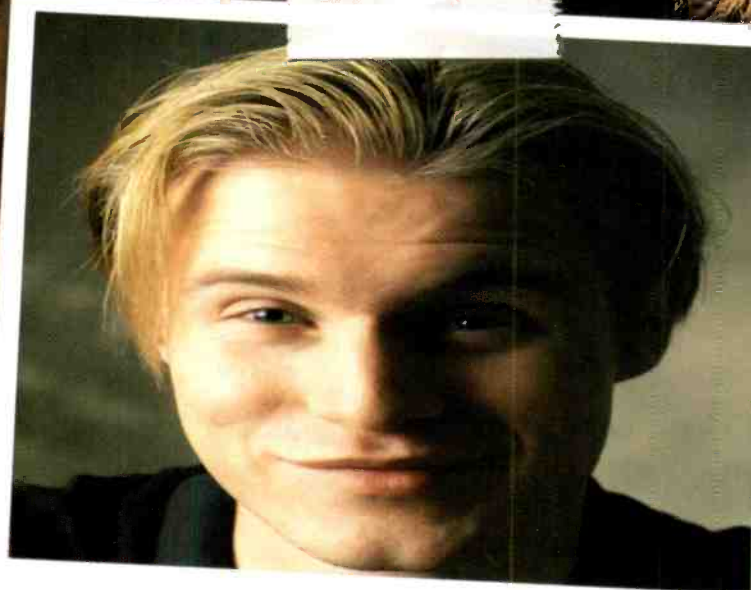


Made in USA

www.wheatstone.com

Copyright © 2003 by Wheatstone Corporation

Great Innovators In Engineering History.



Phil at Harris integrates Workflow Process Manager into the new Digital Ingest system.

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,**

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

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-plaintext (great for those last-minute, gotta-get-this-on-the-air requests), and better allocate your engineering resources.

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

©2004 Avid Technology, Inc. All rights reserved. Product features, specifications, system requirements, and availability are subject to change without notice. Avid and make manage move | media are either registered trademarks or trademarks of Avid Technology, Inc. in the United States and/or other countries. All other trademarks contained herein are the property of their respective owners.

Across

6 continents

In more than

35 countries

Proven at more than

125 end-to-end installations

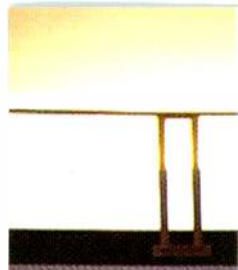
Found in more than

750 broadcast facilities worldwide

Used daily by more than

70,000 broadcast professionals

Custom set design by BROADCAST DESIGN INTERNATIONAL, INC. www.broadcastdesign.com



The numbers are in.

In an industry where numbers mean everything, Avid has delivered more all-digital, end-to-end news production systems than all of its competitors combined. Avid helps broadcasters improve the number that matters most – the bottom line.

Networks. Affiliates. Cable. Large, medium, and small markets. Around the world, more and more broadcasters are turning to Avid for a competitive advantage through integrated media asset management, editing, storage, and newsroom solutions.

- Designed to deliver true, real-time collaboration through seamless connectivity
- Integrated through an open, high-performance media network architecture
- Trusted by the people who make news happen
- Available today, engineered for tomorrow
- Find out more at www.avid.com/broadcast

Broadcast Engineering

THE JOURNAL OF DIGITAL TELEVISION

CONTENTS

FEATURES

64 Advances in news technology

By John Luff

Follow the important advances in technology that broadcasters use in the field and in the newsroom.

72 Special Report: Using metadata to manage workflow

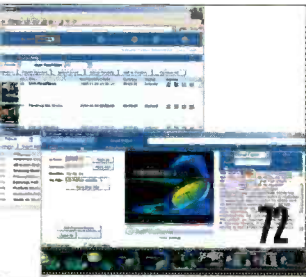
By Philip J. Cianci

Find out how to capture and use metadata properly to streamline media production and distribution.

76 Special Report: Troubleshooting digital video signals

By Michael Waidson

Engineers need to change some of their familiar practices to cope with digital signals.



DOWNLOAD

Beyond the Headlines

14 A new perspective on interoperability

FCC Update

20 Broadcasters seek modified DTV must-carry rights

DIGITAL HANDBOOK

Transition to Digital

22 Component video basics

Computers and Networks

28 Video networks for broadcast

Production Clips

32 HDV transforms sitcom budgets

ON THE COVER:

On-air talent Ted David and Liz Claman report real-time market coverage on CNBC's "Morning Call" at its main studio facility in Englewood Cliffs, N.J. Photo courtesy Andy Washnik.

(continued on page 8)

true colors

broadcast-grade flat panel displays

\$100
rebate on
BT-LS1400
14" monitor.
Visit
panasonic.com/lcdrebate
for details.

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-LS1400

ET-LH1500

BT-LH1800

Panasonic ideas for life

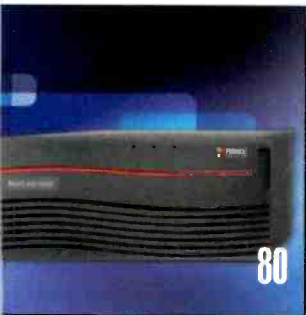
Broadcast Engineering

THE JOURNAL OF DIGITAL TELEVISION

CONTENTS

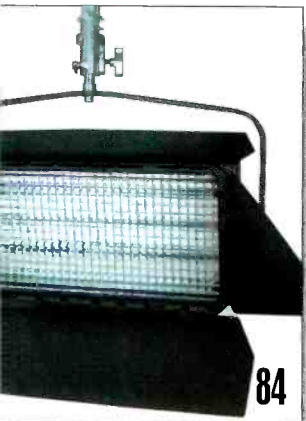
SYSTEMS DESIGN & INTEGRATION

- Systems Design Showcases
- 36 CNBC's new network broadcast operations
- 42 New York Network's broadcast center
- Transmission & Distribution
- 48 High-power antennas



NEW PRODUCTS & REVIEWS

- Technology in Transition
- 80 Video servers
- Applied Technology
- 82 Active Power's CleanSource UPS
- Field Report
- 84 NTVLD uses ARRI's Studio Cool
- New Products
- 86 Scientific-Atlanta's Explorer 8000HD, plus other new products



DEPARTMENTS

- 10 Editorial
- 12 Reader Feedback
- 90 Classifieds
- 93 Advertisers Index
- 94 EOM



Name this workstation



Name the "nonlinear AV workstation" introduced by Panasonic at NAB1995. Correct entries will be eligible to win a *Broadcast Engineering* T-shirt. Enter by e-mail. Title your entry "FreezeFrame-February" in the subject field and send it to: bdick@primediabusiness.com. Correct answers received by April 17, 2004, are eligible to win.

► **High Definition.**
Higher Standards.
Highest Performance.



© 2003 Maxell Corporation of America

As hi-def takes over the field, one media company is prepared to exceed your needs. At Maxell, we set a higher standard. Thus, each and every Maxell hi-def product, from D-5 to HD Cam, incorporates the most advanced technologies and manufacturing techniques to deliver the highest performance 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



HDTV toy store

For those of you who still don't believe in HDTV, go ahead and turn the page, because you're not going to like what I'm about to write. For the 95 percent of *Broadcast Engineering* readers who are open-minded enough to realize that HD is our future, read on.

The 2004 Consumer Electronic Show (CES) has just closed, and one of the two loud themes shouted from every corner was that HDTV is the future. The other



CES theme was home networking, but that's another story. I'm on the mail list of key professional newsletters, which ensures that I receive information on developing trends and themes. In the 19+ years I've been at *Broadcast Engineering*, I've never received so many CES releases on a single technology. I've never received so many press releases from such a wide range of companies announcing support or products for a single technology, or describing such a range of new products and applications as I have this year. I'm talking about HDTV.

At last count, I'd received more than 75 announcements on new HD-centric products and applications from this year's CES — everything from new LCD and DLP HD monitors to dual-receiver HD sets, HD DVRs, HD home networking products and new HD silicon solutions.

One of the more interesting themes is the range of HD PVRs being offered. Many will store up to 120 hours of

SD-quality material or up to 16 hours of HD material. For HD program junkies, it means you'll now be able to watch your favorite HD programs on your schedule.

The VOOOM channel has announced its HD service, which includes 39 channels of high-definition programming. Twenty-one of these channels are completely commercial-free. In addition, subscribers receive 88 channels of digital SD television feeds.

DIRECTV is also offering additional HD programming. The satellite company just announced a deal with CBS to carry the HD feeds from WCBS-DT in New York and KCBS-DT in Los Angeles. The appropriate affiliate (East or West Coast) will provide CBS network HD feeds to customers that have subscribed to local service from CBS-O&O stations. FOX is expected to provide its programming on a similar basis.

The DISH Network announced a package that includes a 16:9 HD monitor, an HD satellite TV receiver, a satellite dish, home delivery and standard professional installation, all for less than \$1000. A package of HD channels, including ESPN HD, Discovery HD Theater, HDNet and HDNet Movies is available for \$9.99 per month or \$109.89 annually. Other HD feeds include CBS, HBO, Showtime-HD and DISH-On-Demand pay-per-view HD movies. Customers can add the provider's new HD DVR for \$600. The recorder provides 25 hours of HD storage or up to 180 hours of SD storage.

And, if that's not enough to excite your HD nerve endings, how about an HD DVD recorder? LG Electronics introduced the world's first Blu-ray recorder with built-in DVR. The recorder comes equipped with a 200GB drive, an IEEE-1394 connector, the prerequisite DVI with HDCP Hollywood protection, and built-in ATSC and NTSC tuners. Add a TV guide subscription and the viewer is fully equipped to record and store his favorite HD movies and network feeds.

So, for those few old dogs out there that still think HD is a solution looking for an application, I've got news for you. That killer app has arrived.

Broad Dick
 editorial director

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



The widest range of multi-image display processors

Introducing the new highly affordable, 10-input Kaleido-Alto

The new and ultra compact, **Kaleido-Alto** multi-image display processor uses the same high quality image display technology as the hugely successful Kaleido-K2 processor. It's ideal for simpler and smaller broadcast monitoring systems requiring fewer inputs per display. Now, Miranda offers the most comprehensive choice of multi-image display processors:

32



Kaleido-K2
32-input, advanced modular multi-image display processor

10



New Kaleido-Alto
10-input, highly affordable multi-image display processor

4



Tango
High quality, SDI quad-split processor

- ➊ **Kaleido-K2 32-input, modular multi-image display processor** – an advanced, ultra robust processor designed to simplify the most demanding HD/SD broadcast monitoring requirements, with full integration with Miranda's master control switching and infrastructure monitoring systems. *Now also features a Dual Head (dual display) output option, and integrated multi-display and router control by mouse.*
- ➋ **New Kaleido-Alto 10-input, multi-image display processor** – an easy to use 1RU processor with auto-sensing SDI/analog inputs, and RGB plus DVI outputs. The processor displays clocks/timers, UMDs, tallies and audio metering, and is ideal for audio control, VTR, and satellite receive rooms, as well as mobile production vehicles.
- ➌ **Tango quad-split processor** – a highly compact unit (1/2 RU), which is well suited to high density and critical image quality monitoring applications.

Miranda Technologies - tel.: 514.333.1772 - ussales@miranda.com



HD ACQUISITION & DV INTERFACES



INFRASTRUCTURE INTERFACING & DISTRIBUTION



MINIATURE INTERFACES



ROUTING SWITCHERS



MASTER CONTROL SWITCHING & CHANNEL BRANDING



MULTI-IMAGE DISPLAY PROCESSORS



REMOTE VIDEO & INFRASTRUCTURE MONITORING



Reducing noise

Mr. Robin,

I read your October article entitled "Digitizing audio," and have a question on the SNR formula for digital audio. We have two different audio levels (one very low and the other higher), and the quantization error is higher for the lower audio level. Should we associate the same discrete levels to both signals (increase the number of bits for the lower signal) in order to have the same SNR?

Also, in this case, does SNR refer to a reference audio level (i.e. a 0dBm test tone) or to the different audio levels (considering each audio level has the same discrete quantizing intervals)?

TIZIANO COLOMBO

Mr. Colombo:

The analog-to-digital conversion is characterized by two inseparable processes: sampling and quantization.

The sampling process consists of a pulse amplitude modulation (PAM) process, where a sequence of pulses occurring at constant time intervals $T=1/F_s$ (where F_s is the sampling frequency) modulated by the sampled signal. PAM is essentially a distortionless process as long as the sampling frequency is higher than twice the sampled frequency and no aliasing occurs. PAM results in a sequence of pulses whose amplitude is

proportional to the sampled analog signal at the sampling instant.

The quantization is a pulse code modulation (PCM) process that helps represent the amplitudes of the successive samples of the analog waveform with binary integers. In this process, an infinite number of possible pulse amplitudes is reduced to a finite number of discrete levels, Q , according to the expression $Q = 2^n$, where n is the number of bits per sample. This is a nonlinear process. It is essentially a sample-and-hold where the instantaneous approximate values, with an uncertainty of $\pm Q/2$, also called quantizing error or Q_q , are held in memory until the next pulse arrives.

Depending on the original analog audio signal amplitude, Q_q is perceived as noise or distortion and noise. With large signal amplitudes Q_q has a random character and is perceived as noise. In digital systems the signal-to-noise ratio (SNR) is measured with respect to the highest possible digital signal level, known as 0dBfs or zero dB Full Scale. This noise is the result of the Q_q so it exists only in the presence of an audio signal. As the level of the analog signal is decreased, the Q_q becomes less random and the effect is a distorted representation of the analog audio signal.

Color bars

Dear Michael:

I was wondering why we use only NTSC color bars now, instead of 100 percent color bars. Why do we have 100 percent color bars?

Michael Robin responds:

NTSC and PAL transmitters get overloaded with 100 percent colors bars; so, since the early years of color television, 75 percent color bars have been used, sometimes with the white bar level raised to 100 percent. Digital video equipment, including digital

distribution networks and digital transmitters, can accept 100 percent color bars, so there is no problem. The problems appear when NTSC or PAL transmitters are fed with 100 percent color bars from a digital signal source. This raises a different question altogether: Why do we use color bars? In the good old days, color bars were transmitted shortly before the beginning of the daily transmission to allow the viewer to adjust the notoriously unstable NTSC receiver to obtain pleasing colors. To reduce the problems of program interchange, videotape recordings had a "leader" consisting of a 75 percent color bar signal to allow adjustment of Quad VTRs or, later, UMATIC and Betacam VTRs. With digital equipment the need to use a color bars signal is restricted to the adjustment of the A/D and D/A converters for maintenance purposes. So here one would use a 100 percent color bars signal, since the digital equipment is designed to carry 100 percent color bars. In the year 2003, I cannot see the need to transmit on-air color bars.

BE

December FreezeFrame:

Q. What unique feature was introduced on the Ikegami DNS-11 and DNS-101 cameras at the 1995 NAB convention?

A. A removable hard disk storage module from Avid called the CamCutter.

Winners:

David Budwash
Roberts Yent
James Allen, KTBC-TV

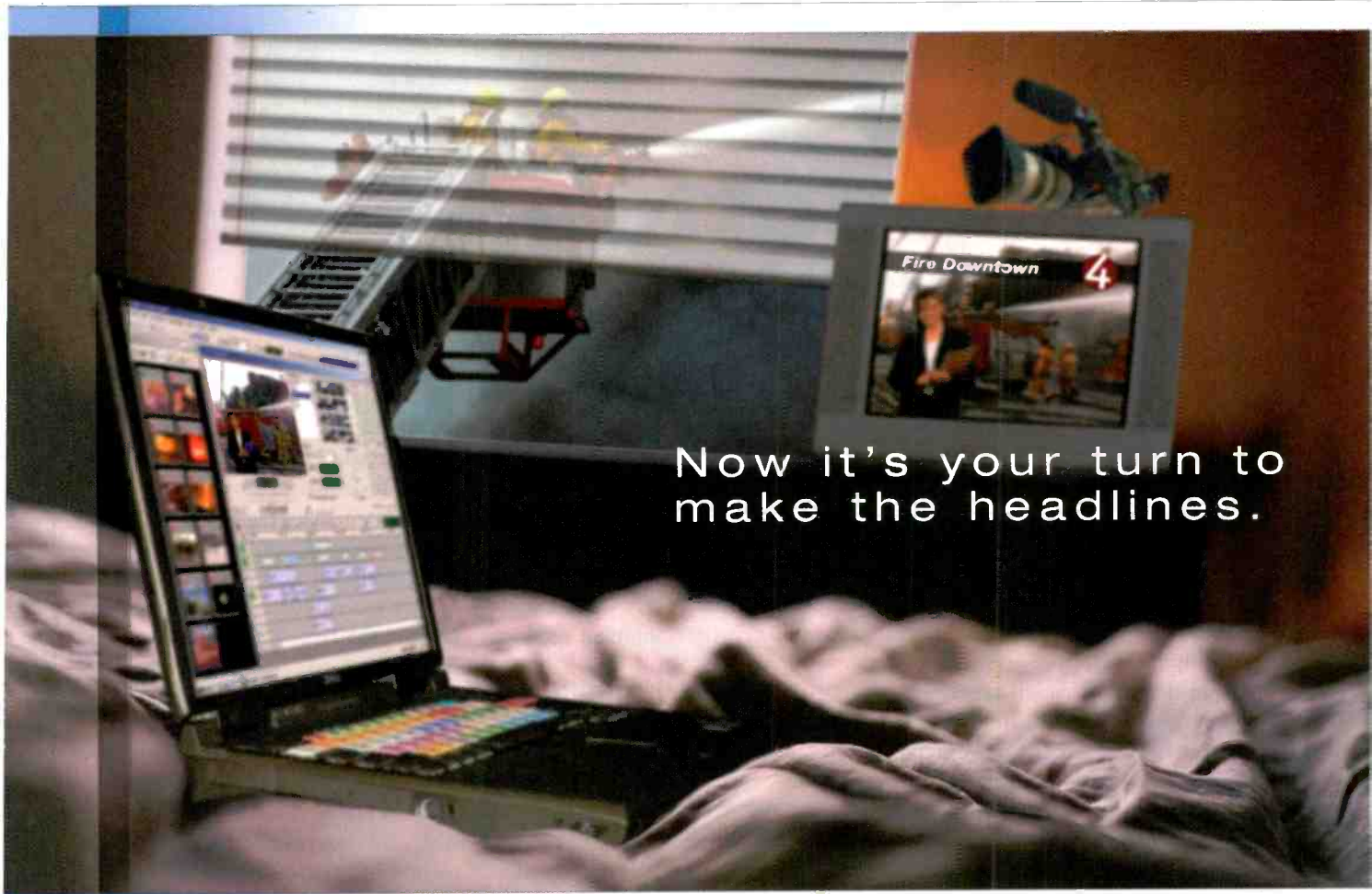
Test your knowledge!

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

Scalable software for any newsroom



Now it's your turn to make the headlines.

The story is happening right in front of you. You need to produce a high-quality edited piece for air. Now. You've always had the skill – Is the technology available?

With the Grass Valley™ NewsEdit™ LT laptop-based nonlinear editor a field reporter or producer—even a lone camera operator—can ingest media, edit sequences with cuts and transitions, add audio tracks, and output finished stories to a camcorder or back to the station.

Affordability Through Innovation

NewsEdit LT system is one part of the Grass Valley Digital News Production Solution that touches the entire news-production process, from ingest to edit to playout. Through the introduction of the NewsEdit™ SC system and Network Attached Storage (NAS), Grass Valley has provided high-quality, affordable, digital news production solutions to broadcast news organizations of all sizes.

A software based version of the most popular news edit system in the market, the NewsEdit SC system provides speed, ease of use, and tight integration with a wide range of newsroom computer systems.

Low Cost Storage Solutions

Providing fast, centralized access to everything from incoming feeds to archived clips, the Grass Valley NAS system lets editors access multiple video files in multiple video formats, including DV50 and scales to 14.6 terabytes.

Debunking myth that NAS-based storage approaches offer an unreliable quality of service, the NAS system uses Grass Valley NewsShare™ technology to provide deterministic server and client channel bandwidth, which is key to ensuring smooth workflows in demanding news production environments.

The technology is now available – It's your turn to make headlines.

To find out more visit:
www.thomsongrassvalley.com/newsproduction.



A new perspective on interoperability?

BY CRAIG BIRKMAIER

There's a hot new topic in the broadcast industry: digital workflow. If you are planning to attend NAB2004, it might be a good idea to spend some time familiarizing yourself with digital-asset-management terminology before you hit the show floor. Perhaps then you will be able to grasp the digital-workflow concepts that vendors will be pushing. Better yet, you might be able to determine which vendors are embracing the spirit behind the development of emerging digital-workflow standards and those who see this as yet another opportunity to lock you into their proprietary solutions.

This column will examine the history behind efforts to develop digital workflow solutions for broadcasters and other creators of digital media content. In March we will examine the implications of the emerging digital

workflow standards covered here, especially as they relate to multi-channel operations. Consider this column, and the Web resources that accompany it, as your introduction to digital workflow.

If you take the time to understand the fundamentals, you just might discover that broadcasters share the responsibility, with equipment vendors,

for the glacial pace of progress in the development of an appropriate digital workflow for the future of digital television. By no small coincidence, this parallels the slow pace of progress with the transition to terrestrial digital broadcasting.

Why? Because most broadcasters think that the forced march from analog-to-digital transmission will not change the underlying business model of TV broadcasting; one linear-program stream delivered to one big stick. Multicasting is beginning to garner some attention; however, most broadcasters are still focused on trying to capture the largest audience possible

Products that support emerging digital workflow concepts and standards simply do not exist ... yet.

with one program, rather than fragmenting their audience via multicasts.

Most broadcasters who have built new facilities to support the digital transition have built digital clones of the old analog plant. The most dramatic change has been the shift from tape-based to disk-based servers for commercial insertion and, for a few, program playout. Downstream of the server things look the same; everything is converted to digital baseband, integrated via a master control switcher, and then fed to an MPEG encoder for emission coding. Most facilities have chosen house format for both SD and HD, and they convert everything to those formats.

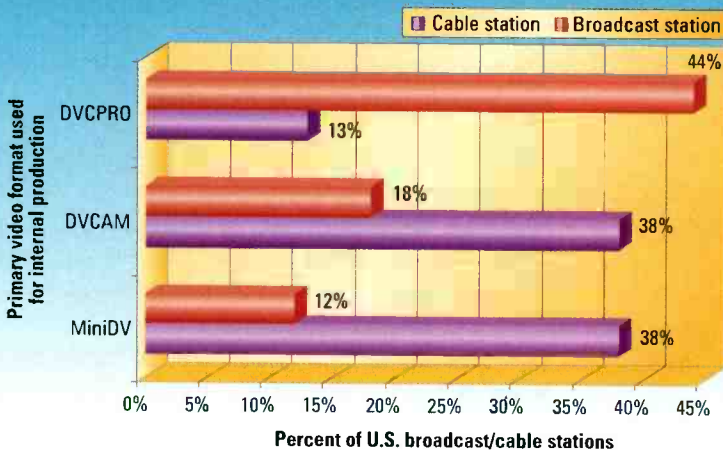
It would be easy to blame the customer for the lack of innovation and misunderstanding of the opportunity at hand. However, even those broadcasters who do see the opportunity to transform and revitalize terrestrial broadcasting via new digital-broadcasting techniques have had no means by which they could pursue them. Products that support emerging digital



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

Behind the scenes

Broadcast and cable split internal production among formats



SOURCE: TrendWatch

www.trendwatch.com

8VSB Test Instrument Trade-In Offer



Get up to \$10,000 Trade-In Allowance for Selected 8VSB Measurement Instruments.

Trade in and save towards the purchase of a new R&S EPA-53 Precision 8VSB instrument. It's a Test Receiver, Demodulator, and Analyzer all in one:

- Fast and easy to use
- 5... 1000 MHz
- High dynamic range
- High MER dynamic
- Reflections display
- Shoulder attenuation
- Accurate pilot frequency
- NTSC option
- EPA-NET option

Also ask us how to monitor and safeguard your RF installation from burning up.



Trade in, and trade up.

For information call
1-888-TEST-RSA ext. 8816
Offer ends March 31, 2004



workflow concepts and standards simply do not exist ... yet.

Historical perspectives

As a starting point, it may be helpful to consider when digital-workflow concepts first appeared on the radar screen. As a journalist, I started writing about these concepts more than a decade ago. As a consultant and participant in the development of digital-workflow standards, I have been bringing vendors and end-users together to facilitate progress since the early '90s through OpenStudio and OpenDTV conferences and forums.

It is not surprising that the stimulus for change came from the world of information technology, which was revolutionized in the '80s by the personal computer, and in the '90s by the proliferation of TCP/IP networks, and their interconnection through the Internet. Desktop audio begot desktop video and transformed the tools used for video production. This created the opportunity and the need to manage digital assets, as opposed to rooms filled with source tapes, EDLs and program masters.

By 1997, however, the industry began to address the need for digital-workflow standards. Much of this work has taken place within the Society of Motion Picture and Television Engineers (SMPTE), in collaboration with the European Broadcasting Union (EBU). The PromPEG Forum has also played a key role in the development and promotion of digital-workflow standards. At NAB2004 these organizations will be promoting the Material eXchange Format (MXF), which became a SMPTE standard late last year, and the Advanced Authoring

Format (AAF), which is tightly linked with MXF.

Vendors of computer-based video-production tools have leveraged IT-based solutions, creating a parallel digital workflow with limited connectivity to traditional broadcast equipment and signal-distribution infrastructures. Many vendors are turning to Extensible Markup Language (XML), a standard developed for the Internet for storing information that describes the actual media content. This descriptive information is called metadata, while the actual media is called essence media.

Meanwhile, a new category of broadcaster has emerged. For the most part, the content delivered by these broadcasters cannot be received via analog or digital-terrestrial broadcasts. These broadcasters operate networks delivered by cable and DBS in the United States and around the world. They all share a common problem: the need to manage assets that will be distributed via multiple network feeds from a network operations center (NOC). In many cases, multiple versions of these assets must be maintained in order to deal with differences in what is considered acceptable content in various global markets, as well as different languages and differences in formats (PAL, NTSC and, now, HD).

In parallel, these organizations typically have an extended presence through Internet portal sites, thus many assets must also be repurposed for the Internet. Increasingly, these organizations are using their IT infrastructure to manage the parallel digital workflows in their in-house video networks.

One of the most advanced NOCs in the world is in Atlanta, the home of the



All content for the Turner Broadcasting System's NOC is processed through ingest facilities where assets from Turner studios and outside vendors are digitized to the house MPEG-2 formats for SD and HD.

Turner Broadcasting System (TBS). Turner also operates a separate NOC for CNN in Atlanta. Ron Tarasoff provided an extensive preview of the new Turner Entertainment Group NOC in the March 2003 issue of *Broadcast Engineering*, (a link to that story is included in the Web resources listed in this column). The center became operational in August 2003 and now feeds 22 channels, half of which reach international audiences. By the time this article is published, another international network will be operational, and in May 2004 Turner's first HD network (TNT-HD) will begin operations.

Planning for the center began about the same time that the SMPTE began work on digital-workflow standards. Turner engineers have been active participants in the development of these standards, but they did not stop there. Together with other organizations such as Discovery Networks, Turner turned the tables on manufacturers and hosted a series of "Perspectives" conferences to educate vendors about their requirements and larger market opportunities.

One of the biggest hurdles Turner had to overcome was the perception that the market opportunity was too small for most vendors to embrace. Traditional broadcast customers were not looking for comparable solutions; most still are not. But several companies, including

Web links

An introduction to MXF and AAF

www.snellwilcox.com/knowledgecenter/mxf_aaf.html

Metadata, MXF and other AV terms for digital media

www.casbaa.com/doc/MXF_Metadata_Technology_Primer_2003-1019.pdf

A metadata dictionary

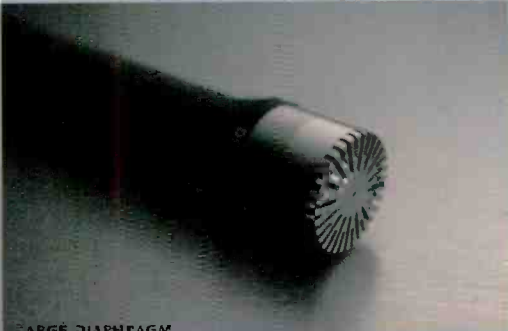
www.videosystems.com/ar/video_metadata_dictionary/

Turner Entertainment's Network Operations Center

[www.broadcastengineering.com/ar/](http://www.broadcastengineering.com/ar/broadcasting_turner_entertainments_network/)

[broadcasting_turner_entertainments_network/](http://www.broadcastengineering.com/ar/broadcasting_turner_entertainments_network/)

The Clear Difference



LARGE DIAPHRAGM



STANDARD



COMPACT



MINIATURE

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

Snell & Wilcox and Pinnacle, paid close attention and have become key suppliers to Turner. Engineers from both companies played a major role in the development of the MXF standard. Links to two Snell & Wilcox documents about MXF and AAF are included in the Web resources for this column.

Despite this extensive effort by Turner, it was not possible to procure products that supported these emerging standards in time to build the new NOC. Turner developed its own asset-management software and chose vendors who were committed to supporting these standards in the future through product upgrades. Thus, the new facility has parallel IT network and digital audio/video-network infrastructures that do not interoperate well.

All content for the NOC is processed through ingest facilities where assets from Turner studios and outside vendors are digitized to the house MPEG-2 formats

for SD and HD. In addition to the high-quality essence media, proxy videos are created that can be streamed over the IT infrastructure. This is used to maintain metadata and manage the digital-media assets stored on the MPEG-2 servers.

What can MXF do?

According to a paper written by Dave Monshaw, of IBM Digital Media, MXF is a versatile file format that can help the broadcaster perform a number of tasks. For example, MXF can wrap itself around any compression format, store cuts-only EDLs and the material they act upon, and wrap up a playlist of files and store the synchronization information. It also can store files in a streamable format, which allows viewing while transferring between heterogeneous equipment, and store simple finished works with metadata.

The perceived differences between the IT and digital video network

infrastructures that existed when work began on the MXF standard have narrowed as both have evolved. Protocols now exist to handle file transfers over SMPTE 259-M networks, and IT networks now can handle real-time streaming of compressed sources. And new hybrid solutions, such as IEEE 1394, have been designed to support real-time streaming, as well as direct attachment of hard disks and transfers of streams/files from camcorders and 1394-equipped VCRs. Typically, 1394 connections are localized to a workstation, but the next generation IEEE 1394b specs will support higher transfer speeds and the longer cable runs needed for broadcast facilities. **BE**

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



Send questions and comments to:
cbirkmaier@primediabusiness.com

NEW

XPress Animation Module for Master Control

NEW

- Digital input, output & key
- 21 EAS codes + Amber Alert
- Continuous crawls with logo
- i Temp official NWS temps
- 16 programmable GPI's
- Quick and easy crawls
- Drag & drop interface



- Time & Temperature
- One click logos
- True type fonts
- i Headlines (option)
- XPress Animation (option)
- XPress Automation (option)

Go XPress



800-273-4033
www.broadcastsoftware.tv



Booth SU7173

Keeping On-Air Transmissions

LIVE

Active Power's Battery-Free Energy Solutions

Dead air is no longer a problem when Active Power's innovative CleanSource® Energy Storage systems are protecting your broadcast networks, transmitters and microwave uplinks.

Today, having a generator for back-up power is not enough to keep your operations on-line. When a power interruption hits, crucial unprotected seconds mean broadcast interruptions and potential dead air before the facility's generator kicks in.

CleanSource from Active Power is the ideal solution to protect against power outages and damaging voltage fluctuations. With power ratings from 65 kVA to 3600 kVA, the battery-free CleanSource Flywheel UPS meets the quality demands of today's broadcasting and transmitting facilities and eliminates the need for bulky, high maintenance battery-based systems.

Visit our website at www.activepower.com/a1130 to learn why major U.S. and international television networks depend on Active Power's AC and DC solutions to keep broadcast stations on-line and transmissions live.

FCC's
Transmissions

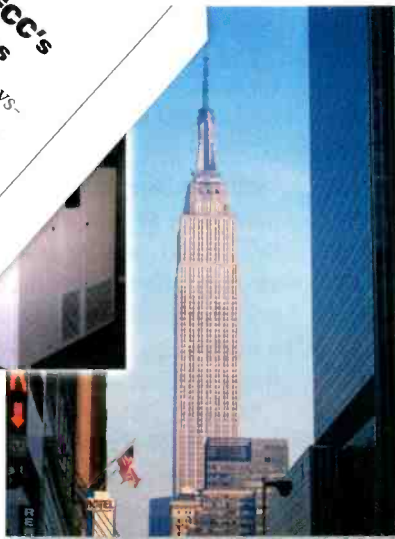
Electronic systems

and re-

TV is

CC's

ses



No Place for Batteries here...

Telemundo's multiple transmitters at the top of the Empire State Building are protected by Active Power's CleanSource technology.



FROST & SULLIVAN

Market Engineering Award Recipient
Product Line Strategy 2003

GSA Schedule
Contract GS-07F-02514



Active Power®

www.activepower.com/a1130
email: a1130@activepower.com
Toll-Free: 1-877-FLYWHEEL

Broadcasters seek modified DTV must-carry rights

BY HARRY C. MARTIN

A new DTV must-carry proposal was recently presented to the FCC by the National Association of Broadcasters and Association for Maximum Service Television (MSTV). The new proposal would allow a station to elect must-carry for either its analog or digital channel and to elect retransmission consent for the other channel during the transition. Or, a station could elect to retransmission consent for both channels. The cable industry opposes the new proposal.

The new proposal also would require cable systems to install technology by Jan. 1, 2006 that would pass through the digital channel to digital television sets and downconvert the digital channel for reception on analog television sets at no additional charge on the

analog basic-cable tier. If a cable system failed to do so, stations could elect must-carry for both their analog and digital channels during the transition. Upon delivering the digital channel to both digital and analog sets, a cable system could cease carriage of the analog channel. Cable operators reportedly see this portion of the plan as a back-door attempt to obtain dual must-carry.

Broadcasters argue that the new proposal alleviates cable's First Amendment concerns about required carriage of two channels from a single station. They further state that the proposal would protect smaller stations, which might be less likely to select digital carriage during the transition, and their viewers. Broadcasters also argue that the proposal would provide an incentive for cable operators to upgrade their systems. If stations elect must-carry for their digital channels, cable operators argue that cable systems would be forced to also carry their analog channels because most subscribers rely on analog cable service. Broadcasters responded that cable systems would be free to choose between carrying both channels or upgrading their technical facilities to reach all subscribers. They argue that this would be a business decision without First Amendment concerns.

The FCC is expected to issue a rule-making decision in early 2004 that permanently rejects dual carriage of analog and digital channels after the DTV transition. The current effort to obtain carriage rights during the transition is seen as an effort to salvage at least something from the DTV must-carry proceeding.

How to navigate the electronic filing system

The FCC has several electronic systems for filing applications and reports. The system used for CDBS, which is located on the FCC Web site, www.fcc.gov. All licensees must have an FCC registration number (FRN), which can be obtained electronically through the commission registration system (CORES). Here are a few tips for navigating the FCC's filing systems:

CORES: Determine if you already have an FRN. If you paid regulatory fees this year, or have filed any applications or paid any fees since December 2001, you should have at least one FRN. In the CORES system, click on the search button and select advanced search. Type your TIN into the box marked "TIN" and search. If your TIN has been used to register an FRN, it will show up with this search. You also may call the FCC's CORES help desk (877-480-3201, Mon.- Fri., 8 a.m. to 6 p.m. ET).

If you have your FRN but do not have a password, you need to call the help desk to get a new password.

CDBS: You need a CDBS account number and password, and an FRN and its password to file on CDBS. If you plan to pay electronically, or if you would like the computer to generate your 159 forms, you need the employer identification or social security number of the paying party. If you lose your account number or password, you may open a new account. **BE**

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

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

Dateline

Television stations in D.C., Maryland, Virginia and West Virginia must begin their pre-filing renewal announcements on April 1, 2004, in preparation for renewal application filing on June 1, 2004. Other television stations' renewal application filing dates in 2004 are:

August 1

North Carolina, South Carolina

October 1

Florida, Puerto Rico,
Virgin Islands

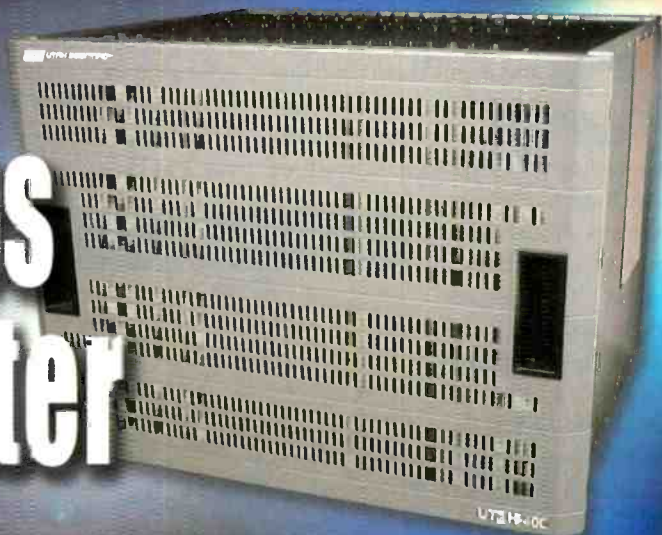
December 1

Alabama, Georgia

Also on April 1, stations in Delaware, Indiana, Kentucky, Pennsylvania, Tennessee and Texas must place their annual EEO reports in their public files.

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 Parts** - 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**



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 management 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

Component video basics

BY MICHAEL ROBIN



Component video describes a system in which a color picture is represented by a number of video signals, each of which carries a component of the total picture information. In a component video facility, the analog component video signals are processed separately. Ideally, encoding into a transmission format occurs only once: prior to transmission.

All color television systems use the principle of additive colors with green, blue and red (GBR) as primary colors. GBR signal amplitudes are best described using a color bars signal representation. In this article, we will make

reference to a standard set of color bars with well-defined characteristics. They feature a full-screen sequence of vertical bars showing the saturated

primaries (green, blue, red) and their complements (magenta, yellow, cyan) as well as black and white. The active line is thus divided in eight equal parts. The first is occupied by a luminance reference white bar, i.e. a white bar of a standard amplitude. The last bar is a black bar; that is, it is black level only.

Waveform	NTSC-related	NTSC-related with setup	SMPTE 253M
<p>Green signal</p>	714.3mV	714.3mV	700mV
Peak video	714.3mV	714.3mV	700mV
Setup	0mV	53.57mV	0mV
Blanking	0mV	0mV	0mV
Sync	-285.7mV	-235.7mV	-300mV
<p>Blue signal</p>	714.3mV	714.3mV	700mV
Peak video	714.3mV	714.3mV	700mV
Setup	0mV	53.57mV	0mV
Blanking	0mV	0mV	0mV
Sync	-285.7mV	-285.7mV	-300mV
<p>Red signal</p>	714.3mV	714.3mV	700mV
Peak video	714.3mV	714.3mV	700mV
Setup	0mV	53.57mV	0mV
Blanking	0mV	0mV	0mV
Sync	-285.7mV	-285.7mV	-300mV

Figure 1. Analog component GBR signal characteristics for 100 percent color bars

The GBR component signals

GBR component signals are essentially three monochrome video signals, each representing one of the primary colors. Possible sources of GBR signals include cameras, telecines, composite video decoders, character generators and graphics

systems. Figure 1 presents several sets of GBR signals encountered in practice. The signal amplitudes are typical of 100 percent color bars. All signals are shown with sync added. Some sets of signals have sync added to the green component only, whereas others carry sync on a separate (fourth) wire.

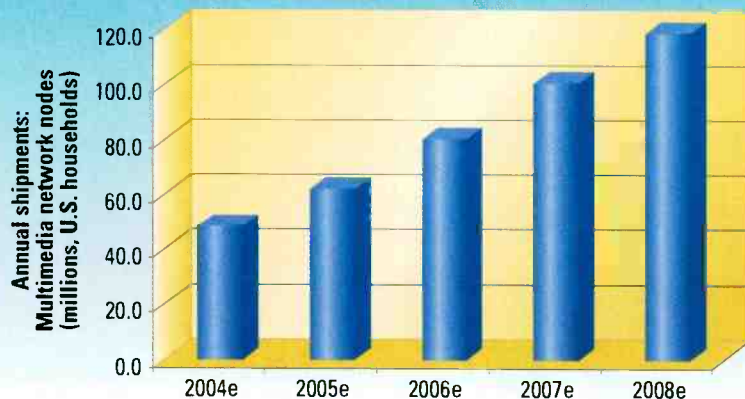
The distribution channels need to have identical bandwidths, gains as well as controlled (small) differential delays with respect to the reference (green) signal. Loose channel gain and frequency response tolerances result in corrupted (colored) whites. Differential delays result in poor registration, leading to funny-paper-like colored-fringe pictures. GBR component

FRAME GRAB

A look at tomorrow's technology

Consumers want connectivity

Multimedia networks provide home entertainment



Source: Parks Associates

www.parksassociates.com

THE ICE INITIATIVE
NEXIO

SERVER PLATFORM

DV/MPEG, SD & HD
SDI, DVB/ASI & AES
IP/Ethernet
MXF-compatible
+100 I/O channels
+14 terabytes

**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**



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

signals have limited applications in a teleproduction environment, mainly because there are no GBR component video VTRs available on the market.

The Y, B-Y, R-Y component video signals

Y,B-Y,R-Y signal components are linear combinations of signals representing the three primary colors: green, blue and red. Possible sources of Y,B-Y,R-Y signals are cameras, analog component videocassette recorders and composite video decoders. GBR signals are combined to form a full bandwidth luminance signal (Y) and two narrowband color-difference signals (B-Y and R-Y). Because the human eye relies on luminance to convey picture detail, much less resolution is needed in the color information. Some savings in bandwidth can thus be obtained by using color-difference signals. One-half or one-quarter of the Y bandwidth is usually acceptable, depending on the application. Y, B-Y and R-Y component analog signal outputs are available with most contemporary analog cameras.

The mathematical expression for the luminance component is:

$$E'_Y = 0.587 E'_G + 0.114 E'_B + 0.229 E'_R$$

where E represents a voltage, and the prime sign indicates that the signal has been gamma-corrected.

The chrominance information is conveyed by two of the primary signals minus the brightness component. These signals are known as the blue color-difference and red color-difference signals. They are:

$$E'_{B-Y} = -0.587 E'_G + 0.889 E'_B - 0.299 E'_R$$

and

$$E'_{R-Y} = -0.587 E'_G - 0.114 E'_B + 0.701 E'_R$$

There have been limited attempts at standardizing analog component video signals in North America. Currently, a number of de-facto proprietary "standards" coexist, making interconnection of equipment difficult. The difficulties

typical of 100 percent color bars. Normally, the Y signal has sync added. The color-difference signals are bipolar and symmetrical about the reference axis.

The first column of Figure 2 shows the characteristics of NTSC-related signals as would be obtained at the output of an NTSC decoder. Note that the color-difference signals have unequal p-p amplitudes as determined by the scaling factors in Figure 1.

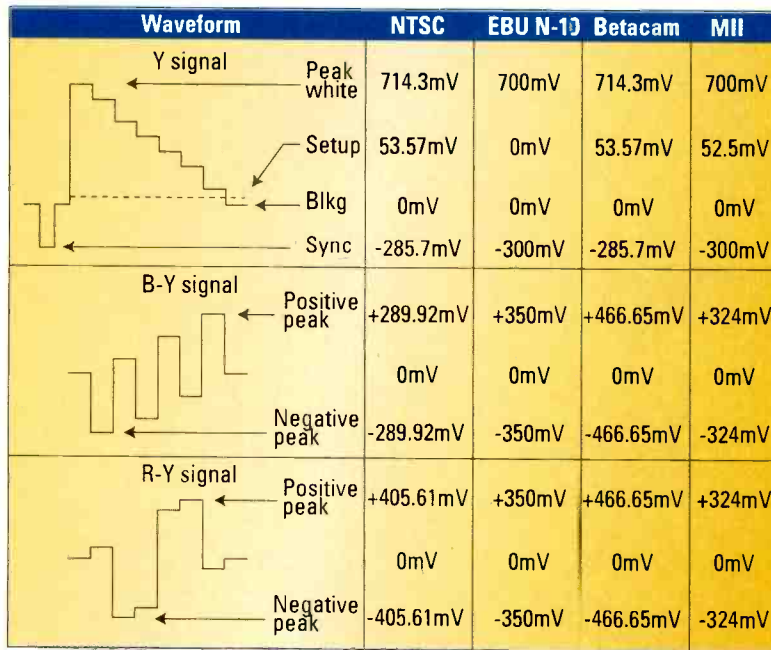


Figure 2. Analog component Y,B-Y,R-Y signal characteristics for 100 percent color bars

encountered are mainly due to the non-standard scaling factors of the color-difference signals. These are scaled in amplitude by suitable multiplication factors. The scaling factors depend on the application. Table 1 shows the various scaling factors used. The scaled color-difference signals are identified as E'_{B-Y} and E'_{R-Y} to avoid confusion.

Figure 2 shows the typical waveforms of Y,B-Y,R-Y signals encountered in practice and their characteristics. The signal amplitudes are

typical of 100 percent color bars. Normally, the Y signal has sync added. The color-difference signals are bipolar and symmetrical about the reference axis.

The third column of Figure 2 shows the signal amplitudes of signals typical of Sony Betacam VTRs and related products marketed in North America. The fourth column of Table 1 lists the color-difference signals scaling of the

North American versions of the Betacam component analog VTR format as well as the component analog outputs of color cameras of Japanese manufacturers marketed

Signal	NTSC/PAL	EBU N-10	Sony Betacam	Panasonic MII
E'_{B-Y}	0.493	0.564	0.75	0.522
E'_{R-Y}	0.877	0.713	0.95	0.66

Table 1. The color-difference scaling factors

On-Air With Max Air

Digital Audio For Broadcast



Reliable

Powerful

Affordable

Easy to Learn and Use

Packed with Features

Max Air at KRON
Local News Studio
San Francisco

Max Air
Large Format Console Technology
Mix Foundation TEC Awards Nominee



Be Sure

www.euphonix.com

Euphonix

digital emotion

©2003 Euphonix, Inc. All rights reserved • 220 Page Avenue • Palo Alto, CA 94306 • Phone: (650) 855-0400 • Fax: (650) 855-0410
Audio Engineering Society Convention • Booth 825 • Oct 10th - Oct 13th • Jacob K. Javits Convention Center, NY

in North America. Note the 933mV p-p color-difference signal amplitude and the 714.3mV (including setup) p-p luminance signal amplitude (ignoring sync). It is to be noted here that the same products marketed in 625/50 countries have scaling factors as per EBU N-10 and signal characteristics as shown in the second column of Figure 2. The same products marketed in Japan are similar to the North American version except that the luminance signal has no setup.

The fourth column in Figure 2 shows the signal amplitudes of signals typical of Panasonic MII component analog VTRs marketed in North America. The fifth column in Table 1 lists the color-difference signals scaling of the North American version of the MII component analog VTR format marketed in North America. Note the 648mV p-p color-

difference signal amplitude and the 700mV (including setup) p-p luminance signal amplitude (ignoring sync). It is to be noted here that the same products marketed in 625/50 countries have scaling factors as per EBU N-10 and signal characteristics as shown in the second column of Figure 2. The same products marketed in Japan are similar to the North American version except that the luminance signal has no setup.

Potential problems

Both component analog recording formats feature analog composite and analog component in/out ports. The composite in/out ports are mutually compatible. Consequently, connecting equipment using analog composite NTSC signals should cause no problems other than the unavoidable accumulation of analog NTSC impairments.

The color-difference scaling factors are different in the four standards discussed above. Strictly speaking, these "standards" and their component analog in/out ports are signal-level incompatible. An ideal approach is the normalization of the component analog signal levels in the component analog signal distribution path to EBU N-10 specifications and the use of signal level adaptors to match the component analog inputs and outputs of non-standard equipment. **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

SAVE A BUNDLE

ON MULTI CHANNEL DIGITAL MASTER CONTROL

Now that your DTV transmitter is on the air, you're probably looking into multicasting. Our NV5128-MC is the only fully featured master control switcher that has been designed expressly for cost effective multi channel operation. Key features include:

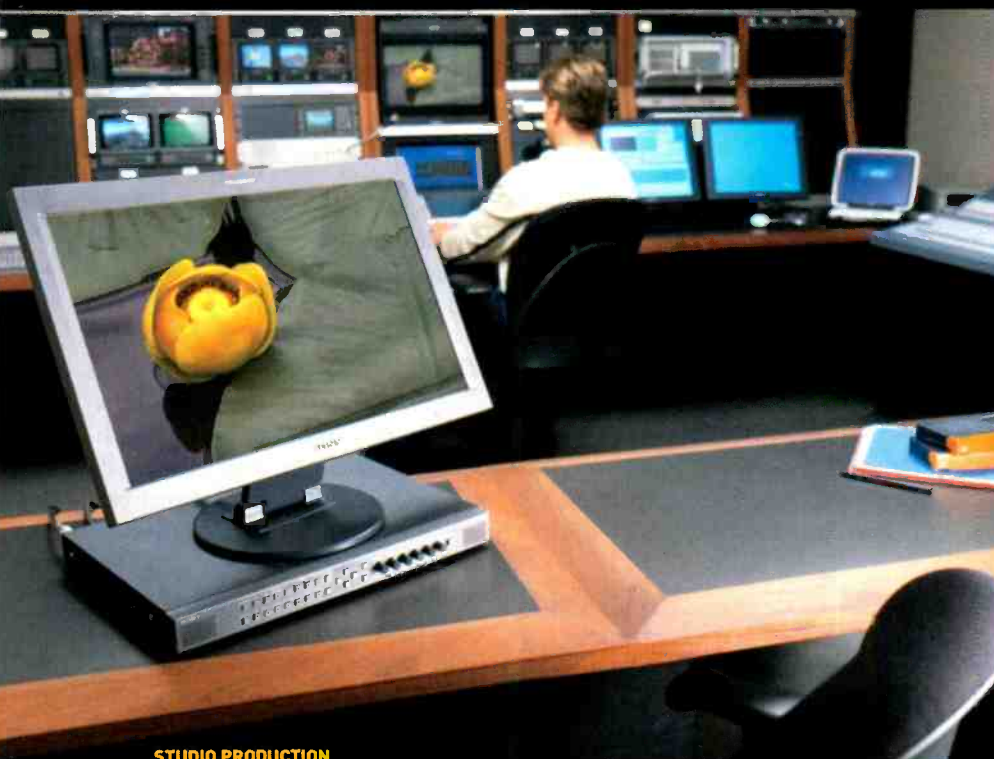
- ◆ Up to 128 inputs—digital, analog, or mixed
- ◆ Up to 4 channels per 8 RU frame
- ◆ Both SD and HD versions available
- ◆ Built-in squeezeback and logo store
- ◆ Full 8 channel audio path
- ◆ Optional built-in Dolby-E decoding



For more information, contact your nearest NVISION sales rep, or visit us on the web.

NVISION
Masters in Digital Audio, Pioneers in HDTV

SONY®



STUDIO PRODUCTION



FIELD APPLICATIONS

LCD TURNS PRO

As a studio professional, you know Sony monitors. Evaluation monitors, presentation monitors, confidence monitors – the most extensive, high-performance line of CRT monitors in the industry. Now, Sony brings the same studio-quality professionalism to LCD monitors.

Sony Luma™ LCD Monitors offer cost-effective, space-saving design. Less power consumption with less weight. Future-proof multi-format capability. And uncompromising, mission-critical performance that meets your demands and exceeds your expectations.

There's a full line of Luma monitors to suit any working environment. Including 23" and 17" models with an innovative two-piece design: a light, thin, high-resolution LCD panel for clean, simple installation... driven by a separate Multi-Format Engine packed with video inputs and production functionality.

Plus multi-monitor LCD packages combining two 7" panels, three 5.6" panels, or four 4" panels*, so you'll have every combination that suits the needs of your broadcast facility, production studio, or mobile van.

It took Sony to make LCD turn pro. Naturally, Sony Luma is the LCD Monitor series that pros will turn to.

Work Smart. Work Sony.



LUMA

©2003 Sony Electronics Inc. Reproduction in whole or in part without written permission is prohibited. All rights reserved. Sony and Luma are trademarks of Sony. Simulated pictures on monitors. Features and specifications are subject to change without notice. *Viewable area measured diagonally.

FOR MORE INFORMATION ON LUMA LCD MONITORS VISIT WWW.SONY.COM/LUMA

Video networks for broadcast



BY BRAD GILMER

Last month's column covered basic networking. This month we will look at the requirements for video networks for broadcast and how you can use technology to meet these needs. Planning a video network for broadcast can be a little trickier than planning for a conventional network. If you are designing a conventional business network, the traffic, applications and band-

width requirements are well-known; people have been building these types of networks for years. But, if you are building a network for broadcast, things are not as clear. Most broadcast facilities include some post production. Just how much of the network is used for post can greatly affect the design of the network; the files moved around in post tend to be large. Broadcast facilities also frequently include news applications. If the news workflow supports server-based editing and collaborative workflow, then the network requirements can be quite demanding. If, on the other hand, your broadcast facility is still primarily tape-based, then a phased approach that allows you to expand capacity as network demands increase may be best.

Engineers who design video networks for broadcast might do well to start with a list of requirements for their facility. Some possible considerations are: number of simultaneous connections, mix of clients and servers, video application types, criticality of network, age of connected devices, operating

systems supported, equipment lifetime, and Internet connectivity.

Number of connections

Consider the maximum number of network-interface cards (NICs) you expect to have connected to the network at one time. Include all desktop computers and servers of course, but you might also want to include temporary connections for laptops, demonstra-

tion equipment and special-event requirements. The number of connections needed, and how widely they're distributed, will determine the number of switches needed (see Figure 1).

Mix of clients and servers

It is important to know the mix of clients and servers because servers will require high-bandwidth connections.

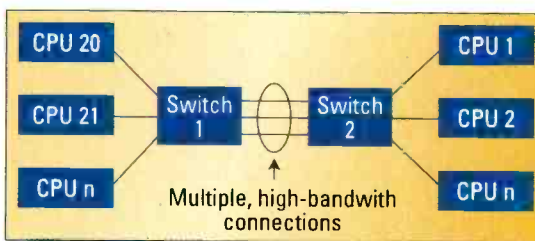


Figure 1. Networks with a large number of simultaneous connections may require two or more switches. Note the high-bandwidth connection between the switches.

In conventional networks, there are many clients and a few servers. Broadcast networks may be the same, but the number of servers can be higher. Also, the placement of central servers in your network topology is critical if you are to avoid bandwidth bottlenecks.

You should also think about whether the client-to-server ratio is likely to change radically in the near future, so you can plan accordingly.

Video application types

We are fortunate to have a wide variety of network-aware video applications available these days. Many do not significantly impact network performance. However, if you have a news department that wants to use a centralized storage facility with network editing, you must take into account the extra demand these applications will place on your network. Opening video files across a network for editing requires a huge amount of bandwidth, especially if multiple clients are involved. You may be better off keeping the content local, and only exchanging edit information across the network.

Criticality of network

When building a broadcast video network, one of the most important issues to be addressed is the criticality of the network. It is easy to say, "Of course this network is critical; it serves my broadcast facility." But are you willing to pay 10 or 20 times more for your network? If you use off-the-shelf, consumer-networking hardware, costs can be extremely low. But, if you use so-called enterprise

hardware from top-of-the-line manufacturers, the costs can be staggering.

To make an informed decision, you must know what functionality and reliability you get for an order-of-magnitude price increase. Generally speaking, a step up to enterprise technology gets

A Story Only Breaks Once.



 **inca** autocg



Give it impact with compelling graphics.

Breaking the story? Difficult. Making it more powerful with dynamic graphics? Easier than you think.

Inscriber's Inca AutoCG is your solution for driving superior full screens, shoulder graphics, banners and more live-to-air. When integrated with your news service provider, Inca AutoCG will insert breaking news into pre-set templates and broadcast the content instantly and automatically.

Utilizing Inscriber's innovative new Inca platform, Inca AutoCG provides the latest in CG advancements, such as multi-layer graphics, clocks, logos, real-time clip-to-clip transitions and more on a single channel.

Use Inca AutoCG's unique Direct Control component to manage content from anywhere on your network. Direct Control's intuitive interface makes it easy for even inexperienced operators to drive content to air with maximum speed and flexibility.

From newsroom to control room, Inca AutoCG gives you the confidence and control to be the first to air with dynamic graphics. Every time.

www.inscriber.com



inscriber

you 1) greater throughput through switching components, 2) better remote monitoring, 3) advanced failure and automatic recovery features, and 4) higher-quality components. While these features may be critical to you, bear in mind that you may be able to purchase 10 or 20 backup switches for the price of an enterprise switch.

Situations will vary, and there are some facilities that absolutely need the features that more-expensive device provides. You will need to make that decision.

Age of connected hardware

What is the age of the computers you are connecting to the network? Are they all older computers with 10Base-T NICs? Do they have NICs at all? Is it realistic to connect these computers to the network, or would it be less expensive and less problematic to purchase new computers that are network-ready? The time and effort required to get old computers ready to connect to a network may exceed the value of the computers themselves. It is now possible to buy powerful computers for under \$500, and older network-ready computers are available on E-BAY and from local sources at low cost.

Flexibility of network hardware

These days, Ethernet hardware has advanced to the point that a single piece of equipment can support 10Base-T, 100Base-T and Gigabit Ethernet. The equipment can auto-switch between these different technologies without any user configuration, and you can mix different speeds without any problem. This is good news because your new network will be able to support old equipment as well as your newest high-speed server. The price of Gigabit switches has also started to drop dramatically.

Operating systems

It is a fact that some operating systems are easier to connect to a network

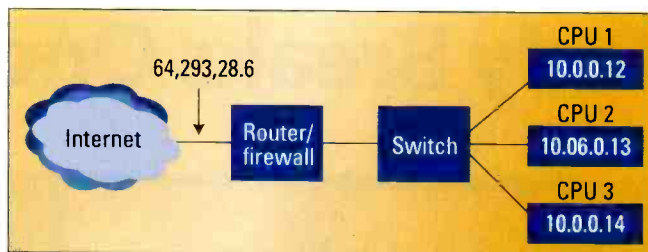


Figure 2. An Internet router/firewall uses network-address translation to hide the true IP address of your computer from the outside world.

than others. Also, it is well-known that particular versions of operating systems are prone to networking difficulty. Without getting into specifics, the author has had good networking experiences with Windows 95, 2000 and XP. He has also found various forms of *NIX including Red Hat and Free BSD to be extremely stable networking platforms. Mac OS9 and OSX also seem to be stable and reliable.

Equipment lifetime

When planning your network, you should be realistic about how long the equipment will last. You should face the fact that, the day after you purchase network components, something else will be available that is faster, less expensive and has more features. Networking hardware remains functional for a long time. The author still has some old pre-Ethernet networking cards that work just fine, but they certainly are not usable today. So go ahead and purchase new equipment when you need to and don't look back. Use old equipment when it makes sense, and throw out old technology if you suspect it will be more trouble than it's worth.

Internet connectivity

An increasingly key component of any video broadcast network is Internet connectivity. The author has found that people are of two minds on the subject, and the issue seems to be driven by user requirements. On one hand, there are many times when people need access to the Internet as part of their normal work processes in a broadcast facility. On the other

hand, broadcasters are justifiably worried about security issues that come with an Internet connection. It might be simple to say that Internet connections should never be permitted on video networks for broadcast. But with the advent of commercial and program delivery over the Internet,

the increasing use of the Internet in group-station environments through virtual private networks, and the general ubiquity of the Internet in everyday workflows, it seems that outlawing Internet connectivity altogether may not be practical.

In your network planning, you should think about whether your Internet connection will be persistent (always available), or whether it on-demand (only available when required, or when someone in the facility enables it). In most cases, you will find that the demand for Internet connectivity will be so high that it may be easier to plan on a persistent connection from the beginning, even if this goes against your intuition from a security standpoint.

Given this need, your plan should include getting someone in your facility up to speed on firewall and router configuration, network-address translation (NAT), port-address translation (PAT) and other network-security issues (see Figure 2). Classes on these subjects are widely available, and well worth the investment. That said, in any plan including an Internet connection, you must include a firewall and proper anti-virus protection to keep people with malicious intent from causing problems on your network.

BE

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



Send questions and comments to:
brad_gilmer@primediabusiness.com



Our competitors don't know Jack.



Meet Jack - one of ADC's engineering extraordinaires. Brilliant, brainy and innovative, Jack and our engineers are the reason why ADC's audio, video, and data products are technology leaders. With unique features like our high-definition Midsized (MVJ) Video Jack's patented tuning fins, environmentally-sealed casing, and 15-year warranty, you don't have to sacrifice electrical performance for mechanical reliability. Though competitors may pursue our lead, the fact is they can't beat our ingenuity. And when it comes to jacks, they don't know Jack Schmidt. Invest in the best for your network, and find out why more engineers choose ADC. Call us at 1.800.366.3891, ext. 73784 or visit www.adc.com/jack today.



Broadband Delivered.™

HDV transforms sitcom budgets

BY L. T. MARTIN

When producer Ron Greenwood and co-producers Leslie Taylor and Roger Dragsdorf put together their original budget to cover shooting the pilot of their upcoming sitcom, "Hollywood Alive," they calculated the cost of producing it in high definition would come in at around \$1.5 million. However, by deciding to tape this 3-camera shoot with JVC's new JY-HD10U cameras, the producers were able to bring the total production costs down to only \$150,000.

When JVC introduced its JY-HD10U camera in June 2003, it was greeted with some understandable skepticism, especially when the professional videographers saw its \$4000 price tag. Based on JVC's consumer-level GR-HD1 camera, the JY-HD10U manages to squeeze a 16x9 high-definition signal onto a standard mini-DV cassette by using an HD version of MPEG-2 compression (MP@H-14). Although

the specifications for the HDV format formulated by a consortium of Canon, Sharp, Sony, and Victor of Japan (JVC), include recording the 720 scanning lines (progressive)/1280 horizontal pixels 720p format (60p, 30p, 50p, 25p), and the 1080 scanning lines (interlace)/1440 horizontal pixels 1080i format (60i, 50i), JVC's first

recording technologies, but he was well aware that the necessary ancillary equipment such as dollies, cranes, matte boxes and follow-focus systems did not yet exist for the smaller format cameras. When JVC announced its hand-held JY-HD10U at NAB2003, Shuster recognized its potential and began designing add-on production

A JVC JY-HD10U with lens and sticks can be had for less than \$1000 for the same time frame.

HDV camera uses a single-imaging chip to record 720/30P high-definition images.

Robert Shuster, the executive producer of "Hollywood Alive," is the corporation manager of Hollywood Studio Rentals, a house that specializes in DV equipment. He has long-awaited an alternative to HDCAM or D-5

gear that would outfit the camera for professional production applications. By the time Greenwood brought the production to him, Shuster had designed add-on gear for pulling focus, lightweight body mounts and mini cranes that would adapt the HDV camera for the kind of studio shoot most crews were familiar with.

The rate card speaks for itself when comparing weekly camera-rental charges between conventional HD equipment with the new HDV format based on a month-long shooting schedule. Recognizing many variables, a Panasonic VariCam package, including a lens tripod, head and battery rents, for around \$3000 a week from most Hollywood equipment providers, while a similar Sony CineAlta camera set-up usually goes for \$4000 to \$5000 a week depending upon configuration. A JVC JY-HD10U with lens and sticks can be had for less than \$1000 for the same time frame. Given the ability to shoot with a smaller crew, the lack of specialized technicians, and comparable savings on body mounts, smaller dollies and cranes can leave a lot of budget left over.

Posting the HDV footage proved



The JVC JY-HD10U camera works well with a smaller crew, such as the group of technicians who worked on the 3-camera set of "Hollywood Alive."



K2 IOT and K3 MSDC IOT's from *Eimac*

EASE OF USE

No IOT system is easier to tune and maintain than the Eimac K2 and K3 MSDC IOT amplifiers.

K2 tube replacement and maintenance can be handled by one person without removing the cavity assembly from the cabinet.

RELIABILITY

Oil-cooled K3 MSDC IOT

- no electrolysis with oil.
- minimal maintenance.
- low pressure, low flow rate operation.

K3 three stage MSDC design simplifies the power supply requirements.

- simplicity = reliability

Eimac IOT's have documented lifetimes of up to 70,000 hours or more.

EFFICIENCY

Eimac's Klystron IOT pioneered high efficiency UHF-TV power amplifiers.

The K2 continued this leadership with enhanced ease-of-use.

The K3 three stage MSDC IOT demonstrates efficiency of up to 58%.



Visit Eimac at NAB 2004
Booth number C2118

Eimac Division
301 Industrial Road
San Carlos, CA 94070

tel 650.592.1221
fax 650.592.9988
email. iot@cpii.com
www.eimac.com

ISO 9001:2000 Certified . Made in USA

straightforward thanks to the Aspect HD plug-in software that Cineform created to prepare the short Group of Pictures (GOP) MPEG-2 high-definition footage for editing in Adobe Premiere 6.5. Aspect HD uses wavelet compression to convert the HDV transport stream into Cineform's own visually loss-less proprietary CFHD

format based on the Windows AVI file structure. CFHD increases 19Mb/s HDV bandwidth to roughly 6-10 Mb/s, allowing two simultaneous real-time HD channels from a 7200-rpm hard drive. Hollywood Studio Rentals set up an edit bay based on a single Pentium 4 processor Windows platform with RAID array storage that

could handle up to six HD streams at the same time, while Aspect HD provided an enhanced video pipeline with improved HD transitions, effects and motion control over those available from Premiere by itself. The final version will be converted to either D-5 or HDCAM, depending upon their client's submission requirements.

Of course, there were obstacles to overcome when pioneering the implementation of a new recording technology. HDV is less forgiving when maintaining definition in brightly lit areas than other HD formats and directors have to tailor their lighting schemes to accommodate the MPEG-2 recording's requirements. Crews accustomed to more robust HD equipment had to adjust to the light weight of the JY-HD10U camera, and the new follow-focus controls and matte box equipment designed by Hollywood Studio Rentals took some getting used to. But the look of the HDV footage, even before color correction, while not satisfying the ideals of HD purists should easily fulfill the expectations of a television audience weaned on videos and DVDs.

Greenwood and Taylor don't necessarily expect the pilot for "Hollywood Alive" will actually see broadcast. So far, it is more of a vehicle to demonstrate the story lines, the character mix and their own ability to bring such a project to fruition. But several technologies exist to convert the HDV 720P/30 images to other HD delivery formats, and tests are under way to demonstrate HDV's validity as the original source for ultimate over-the-air transmission.

With HDV making inroads into documentaries and independent features, as well as being ideal for entry-level HD ENG applications, the cost advantages of using a camera such as JVC's JY-HD10U are starting to let producers put their money on the screen rather than into equipment rentals.

L. T. Martin is a freelance writer and post-production consultant living outside of Los Angeles.



**Is a
Digital
Newsroom
still
just a
dream?**

**Make it real this year!
Sundance Digital has already worked
out the hard parts for you!**



News Link
by Sundance Digital

www.SundanceDigital.com 972-444-8442
Sales@sundacg.com

BE

TV sound doesn't have to be like this



Dolby LM100 Broadcast Loudness Meter

Tired of viewers complaining about loudness-level inconsistencies between programs or channels of your television service? Finally, there's a tool to help you solve the dilemma. The Dolby® LM100 Broadcast Loudness Meter is specifically designed to measure the subjective loudness of dialogue in terrestrial, satellite, or cable services.

The LM100 with Dialogue Intelligence™ automatically analyzes the input signal and only measures during the presence

of speech. It accurately quantifies dialogue levels in analog or digital services, including PCM, multichannel Dolby Digital and Dolby E, and, optionally, in-the-clear analog cable TV and off-air RF signals.

Make your viewers happy—take the first step toward solving the variations in your program or channel loudness.

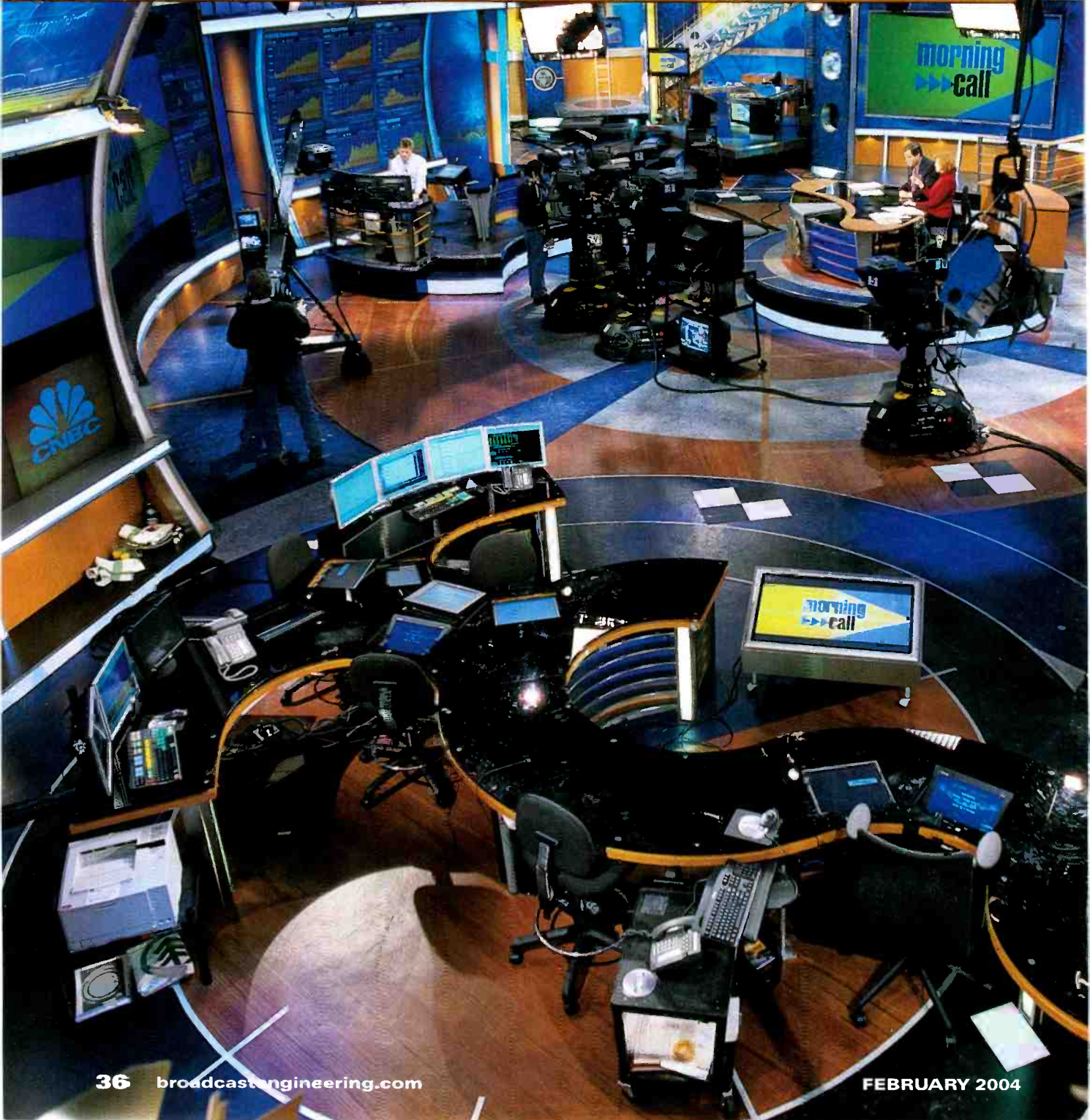
www.dolby.com/tvaudio

SYSTEMS
DESIGN
SHOWCASE

CNBC'S

new network broadcast operations

By Michael Grotticelli





Main studio at CNBC facility in Englewood Cliffs, NJ. On-air talent pictured includes Ted David and Liz Claman. Photos by Andy Washnik.

On Oct. 13, 2003, the operation of CNBC, NBC network's cable business channel, switched over from its existing Ft. Lee, NJ, broadcast center and went live from a new multimillion-dollar CNBC World Headquarters broadcast facility in Englewood Cliffs, NJ.

Building a new facility from the ground up provided the network with a unique opportunity to rethink traditional operations models and incorporate future-proof technology. CNBC took a close look at all of its production processes and eliminated non-essential steps in order to develop a completely new workflow based on today's need, according to Peter Smith, vice president of advanced technology at the NBC network.

Non-traditional suppliers to the industry provided much of the groundbreaking technology in use at the new 355,000-square-foot facility.

The new CNBC building features an efficient workflow design that includes a massive signal-routing matrix; computer-based, state-of-the-art satellite operations facilities; three fully networked audio/video control rooms; a shared, open, storage-area network for editing and graphics creation; and a comprehensive archiving system. This design offers the flexibility for growth as more NBC properties are launched.

The project team and the plan

The plan for the new center was conceived in June 2000, as the network's Ft. Lee studios outgrew capacity at the height of the stock market boom. Architects HLW International designed the core and shell of the new CNBC global headquarters, while the Phillips Group (in New York City) designed the interiors. Sony Systems Integration and the Systems Group (in Hoboken, NJ) completed the electronic installation from February to October of 2003. All of this was completed under the supervision of Steve Fastook, now vice president of CNBC Technical and Commercial Operations, and the CNBC/NBC project team.

This project team was tasked with determining the innovative technical and ergonomic strategies that could work best for both the facility and the operation. This collaboration produced a document called the "Outline Guide for Design and Construction" (OGDC). It detailed a facility that



Steve Fastook, vice president of CNBC technical and commercial operations in one of three new production control rooms that include a Sony MVS-8000 switcher and Grass Valley NewsQ Pro system for preview and access to all clips within the facility.

would house contemporary digital systems that improved workflow, optimized space, and cut production time and costs.

The goal was to build a facility that would foster collaboration among its 300 to 400 employees, optimize productivity, and maintain the familiar and friendly work environment the staff already enjoyed. The new headquarters would also have to accommodate several existing production systems moved over from Ft. Lee.

IT and equipment room

A large 461-rack central equipment room housing video and audio equipment and a vast array of IT gear not only hosts traditional functions such as user data, corporate e-mail, and business applications, but also powers all on-air data applications; including

the CNBC news ticker, charts and boards, and the 3-D Bug, all key components of CNBC's channel branding.

The equipment includes CLARiON and Celerra storage area networks, network-attached-storage products from EMC, and ADIC's i2000 tape library. These are all connected to the production environment via fiber and Gigabit Ethernet networks. Employees have full access to all assets from their edit stations and playback systems (no matter where they reside), which are managed by Thomson's Grass Valley ContentShare and EMC's AvalonIDM software. Leveraging these IT systems enabled the facility to build production clip storage and archival capacity for years' worth of material at a tremendous cost savings.

Media management

In the digital news production system, Thomson Grass Valley's Web-based application, NewsBrowse, allows satellite operations and media operations staff to initiate both scheduled and "crash" server recordings on 16 channels of the server.

These 16 channels of ingest are part of a Thomson Grass Valley SAN that connects to eight NewsEdit nonlinear systems. Editors can cut content while recordings are in progress because the NewsBrowse application lets journalists see the material while it's being uploaded into the system. They do cuts-only editing at their desktop and create EDLs for the editors to use.



Video editor Ann Marie Tarabocchia in one of several edit suites outfitted with a Grass Valley NewsEdit nonlinear system.

Thus far in the new building, CNBC has had over 70 users logged on to the application simultaneously and plans to upgrade the system to accommodate more users in the future.

Once a news story is complete, editors transfer their finished files to redundant play-to-air Profile servers, accessible by all the control rooms. These servers use software that is linked to the Avid iNews "rundown." Archivists move material out of the SAN to an ADIC data tape robotic system that runs MC/Avalon software.

Graphics

On an average day, the graphics department creates 300 to 400 images for air. In Ft. Lee, this was done using conventional legacy broadcast design hardware and video signal paths. Moving the channel to Englewood Cliffs presented the opportunity to improve the graphics hardware and infrastructure. A robust design environment was conceived that took advantage of a drag-and-drop delivery system.

In the new facility, hardware used for graphics creation changed from proprietary black boxes to desktop PC workstations running Adobe Photoshop and Adobe After Effects. This minimized training and introduced an opportunity for an overall change in the design workflow. It also allowed a reduction in the number of workstations, cut costs

and boosted productivity.

With this resolution-independent platform, artwork and animation can be created on one workstation. NTSC, PAL, SD and HD (720p, 480p 16:9) images can all exist on one hard drive and be worked on during a single session without reconfiguration or reboots. The end result is a much more efficient process of creating graphic elements.

Production

The new facility has one 7000-square-foot studio that adjoins the newsroom and supports live programming between 5:00 a.m. and 7:00 p.m. Two smaller production studios serve prime-time programming and specials. There are 11 robotic cameras with expansion capability to 16.

Analog and digital video and audio signals that enter the building are immediately converted to SDI and routed through a Thomson Grass Valley Trinitex routing switcher, managed by an SMS-7000 control system. A full complement of Grass Valley modular gear is used for conversion, distribution and multiplexing of the various signals, while a series of Leitch Neo frame synchronizers align the incoming remote feeds.

Three digital production control rooms (with expansion space for a fourth) are built around Sony MVS-8000 switchers. Marshall LCD and Sony plasma flat-panel displays — some with built-in TV tuners — to monitor program feeds, available sources and on-air status are the centerpieces of the video system. Sony BVP-950 cameras, DVE systems and CRT monitors; Image Video under-monitor displays; and Hopewell Precision control room shelving round out the equipment ensemble.

Around the corner are two mini-control rooms, one for the CNBC World channel and another to feed the Panasonic AstroVision large-screen color monitor located in the middle of Times Square.

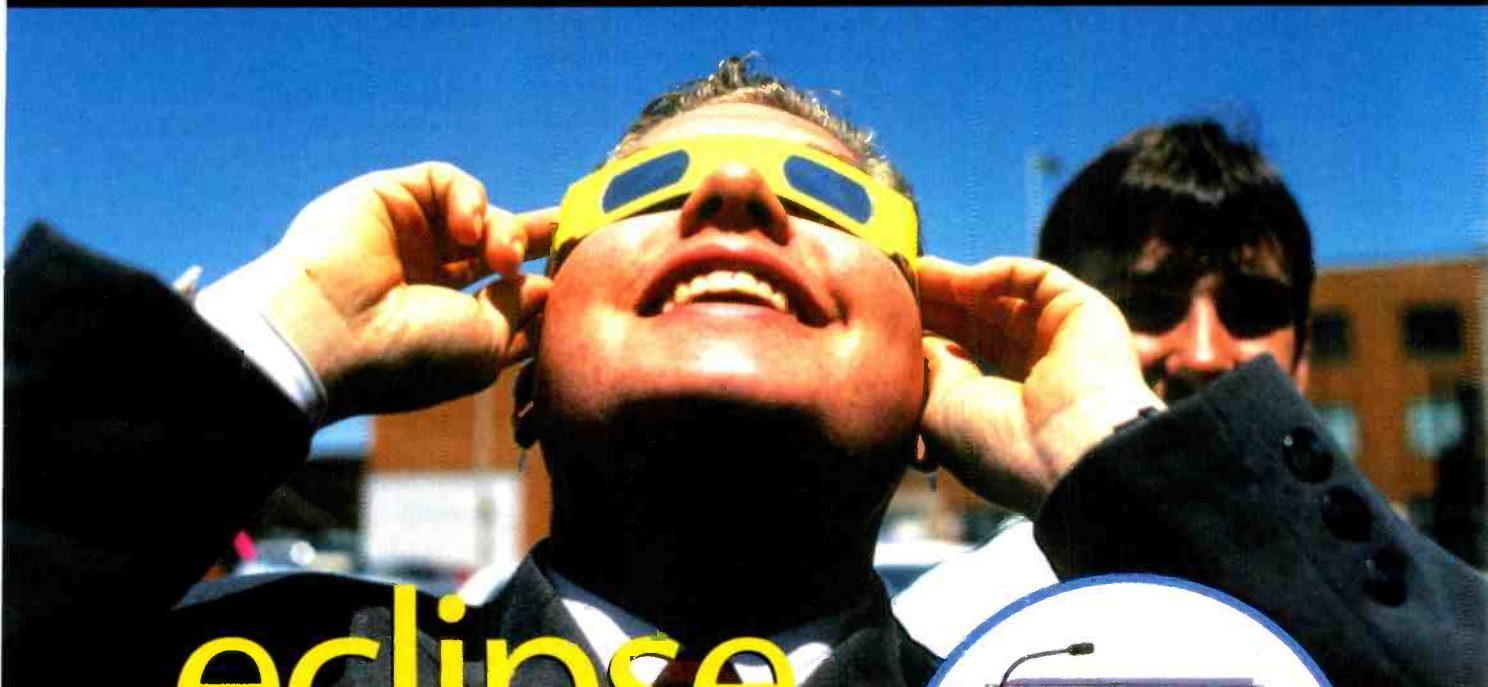
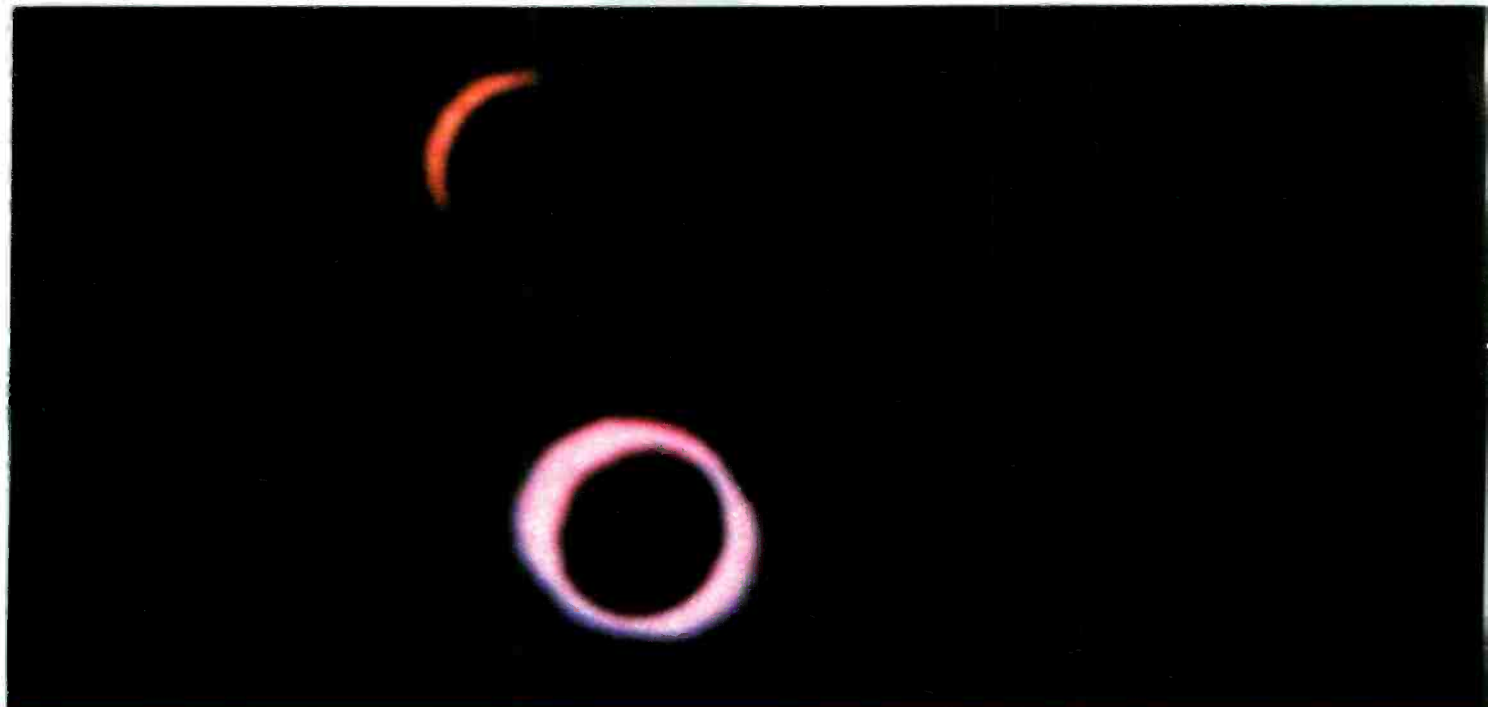
Design team

Architects:

HLW International
Phillips Group
Sony Systems Integration
The Systems Group
Craig Diana, CD Management group

NBC/CNBC:

Peter Smith, VP, Advanced Technology
Steve Fastook, VP, CNBC Technical and Commercial Operations
Jim Starzynski, PE, NBC Adv. Tech.
Eric Pohl, VP, NBC Engineering
Pat Twomey, mgr., graphics Tech, CNBC
Tony Alicea, dir. of IT on-air broadcast op., CNBC



eclipse

A new generation of intercoms that just made your life a whole lot easier!

Introducing the advanced digital matrix intercom that offers up to 208 communications ports in 6RU — the highest port density of any existing system — PLUS intelligent linking; expandable system architecture; modular, configurable stations; and powerful, transparent interfacing.



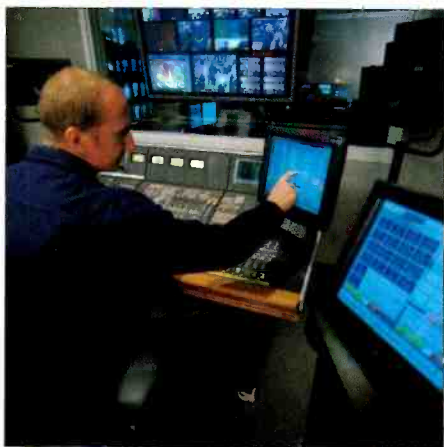
www.clearcom.com

 **Clear-Com**
COMMUNICATION SYSTEMS

Audio

The new facility is the first installation to network three Calrec Sigma 100 digital-audio consoles operating on Calrec's Hydra networking system, according to Jim Starzynski, principal engineer for NBC.

The audio control rooms share inputs and outputs among the consoles and the three studios. This maximizes production flexibility and efficiency



Three NBC audio suites use Calrec Sigma 100 digital audio consoles and a Hydra networking system that eliminates the use of cart machines. Pictured: Senior audio engineer John Kerswell.

and minimizes setup time, traditional cable runs and source distribution such as mic splitters and DAs.

In the audio rooms, a Miranda Kaleido-K2 video processor displays

multiple images of cameras and remotes from snapshots on a Sony 42-inch 16:9 plasma screen. Throughout the facility, audio is monitored on dozens of Genelec loudspeakers. A Systems Wireless 48-channel RF microphone system, with independent distribution, feeds talent audio to all three rooms.

The trend to share audio assets between NBC and its cable channel led to the company's first installation of a shared on-air digital audio storage system. An Enco central file server and three workstations replace individual cart machines. Browse capability is provided so staff can preview audio clips from their desktops. This allows producers anywhere in the company to use their PC speakers to preview audio clips for use in their edit packages, via the company's secure wide-area network. Once they've identified the desired clip, editors can drag and drop these files to their stories.

Satellite operations

The backbone of the satellite operations control center is a PC/server-based system with no buttons to push or knobs to turn. ILC was contracted to design and implement a customized version of their standard Maxview product to control up to 200 live remotes a day.

All of these remotes are handled from a simple ILC GUI on a Dell PC workstation. This user interface sends



Alex Asaro in the satellite operations center at CNBC, using a custom ILC Maxview control panel and Grass Valley NewsBrowse system to handle dozens of feeds from around the world.

messages to 18 satellite receivers, 62 frame syncs, the 512x1024 Trinitron router and more, from seven workstations via a private LAN. The system is open-ended, requiring minimal programming to add features or new equipment.

Video, audio, time of day and signal identification are monitored on four high-resolution 67-inch Clarity Digital projectors fed by four Kaleido-K2 multi-imagers. This video wall can switch from its default 64 images to four full-frame 62-inch images, or anything in between.

BE

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

Equipment list

- ADIC i2000 tape library
- Thomson Grass Valley
 - ContentShare
 - NewsBrowse
 - NewsQ Pro
 - NewsEdit workstations
 - Profile servers
 - Trinitron router w/SMS-7000 control system modular products
- EMC
 - AvalonIDM software
 - CLARiiON and Celerra storage area networks
- Leitch Neo frame synchronizers
- Avid iNEWS newsroom system
- Image Video under-monitor displays
- Adobe Photoshop and AfterEffects

- Sony
 - MVS-8000 production switchers
 - BVP 950 studio cameras
 - DVE systems and CRT monitors
- Pinnacle Systems FX Deko
- Hopewell Precision control room shelving
- Marshall LCD and Sony plasma flat-panel displays
- Calrec
 - Sigma 100 digital consoles
 - Hydra Networking system
- Enco central file server with DADPro32 Workstations
- Genelec loudspeakers
- Systems Wireless 48-channel mics
- ILC Maxview control System
- Clarity Digital projectors
- Miranda Kaleido-K2 multi-imagers



Are You Betting Your VHF Station's Future on 1980's Technology?

Did you know that some major manufacturers' current VHF transmitter product lines are still based on technologies that were developed in the 1980s? While these products may have been cutting edge in their day, the times have certainly changed. This year at NAB Axcera will be introducing a new concept in VHF technology. Come to see the first VHF transmitter of the 21st century at NAB booth C8606.





New York Network's broadcast center

By William F. Snyder

A New York Network's (NYN) new all-digital broadcast center, owned by the State University of New York (SUNY), serves the Empire State's educational institutions and government agencies, as well as private-sector clients.

The new facility, with a total contract value of \$10.6 million, features

multiformat (HD/SD) production switchers, video routers and cameras, as well as full HD connectivity, to provide a simple upgrade path to high definition. The facility was built by Sony Electronics' Systems Integration Center (SIC).

When the network was established in 1967, its mission initially was to serve New York state's

nine public television stations. When PBS changed to satellite distribution for its stations in 1978, NYN re-examined its purpose. Gradually it evolved into an interconnect for all 64 SUNY campuses — the State University Satellite Network (SUNYSAT).

A need for greater re-invention occurred just after 2000 when it became clear the network would have to move



New York Network's new broadcast center includes space for three studios - one of which is used three days a week by the New York State Assembly's talk show productions.

out of the capitol's Alfred E. Smith building, which was scheduled to undergo renovation. The relocation gave the network an opportunity to design a new facility from the ground up.

The network's new space features generously high ceilings, and its location inside the concourse of Albany's Empire State Plaza — a retail and government office complex — allows the

network's many anchors and interviewees easy access to subjects and sources.

NYN now includes three studios, three control rooms, master control, two non-linear edit suites, an announcer's booth, offices and support space, satellite uplinks, and field production facilities.

Studio A and B are each 30 feet by 30 feet and can also be operated as a

single 30-foot by 60-foot studio. A moveable wall insulates each studio from the other's sound. Studio A contains a set for standard talk shows, news programs and conferences. Studio B is a general-purpose space, often used for talking-head productions.

There is also a smaller 20x20 studio, which is occupied three days a week

The plant itself can handle 1.5Gb/s, so the upgrade path to HD is clear.

by the New York State Assembly's talk show productions, which are distributed via cable throughout the state.

The broadcast center is equipped with seven Sony HDC-950 high-definition studio cameras — which were selected in anticipation of the network's eventual conversion to full HD operation. Five are located in Studios A and B and two are placed in the smaller studio. At present, their HD signal, visible only on the viewfinders and a handful of HD monitors around the facility, is being converted to SD before being passed through the plant. The plant itself can handle 1.5Gb/s, so the upgrade path to HD is clear.

The facility also has two BVW-790W ENG cameras for use in the field. The studio configurations are soft, allowing deployment of the studio cameras in the field as well.

In addition to cameras, Sony also provided decks, monitors, linear editing gear, audio gear, boards, switchers and a slew of back-room equipment. The facility's house videocassette standard is Digital Betacam, and the facility is equipped with 13 DVW-A500 VTRs.

The broadcast center runs nine channels. They include a 24-hour cable channel available to one million households statewide via Time Warner Cable; an occasional channel for videoconferences; a channel dedicated to the New York State

just add water...



Energy saving collector IOTs (ESCIOTs)[®]

Proven water-cooled designs

Increased efficiency up to 60% in
3 or 5 stage designs

30kW average digital power

60kW analog power

Plug-in style for ease of maintenance



Expanding on its
current broad
ranges of IOTs
and Klystrons.

Innovation, power unleashed.

e2v technologies UK Tel: +44 1245 493 493
Email: enquiries@e2vtechnologies.com
e2v technologies Inc USA Tel: 1-914-592-6050
Email: enquiries@e2vtechnologies-na.com

<http://comms.e2vtechnologies.com>

e2v technologies

Lottery, whose official drawings are broadcast in every market in the state four times a day; and a channel reserved for another 24-hour customer, soon to be announced.

In addition, six other channels are dedicated to New York state off-track betting, carrying images from racetracks across the state to betting parlors. These channels originate from a nearby uplink facility, where they are co-located with receivers and decoders. (The network is running an older MPEG-2 digital compression system



A New York Network engineer works at the Sony MVS-8000 multiformat switcher with integrated digital multi-effects.

for the uplink but is in the market for an upgrade.)

In the master control room there are six simultaneous playout streams. Three of these are allocated to channels 1, 2 and 3. The fourth is redundant protection channel for Channel 1. The fifth is used by the ingest operator (e.g., someone filing a tape into the server), and the sixth is used by master control as a utility review channel (e.g., to check incoming spots). The number of playout channels can be increased with the addition of decoder boards.

There are five record channels. One is allocated to the media ingest operator and the others are available for scheduling as needed — for example, to record a satellite feed. The number of record channels can be increased with the addition of encoder boards.

Two Pinnacle MediaStream 900 shared-storage devices are configured for up to 150 hours of storage at 8Mb/s with four channels of audio per stream. This capacity can be increased with the addition of more RAID storage.

Video ingested into the server but not required for playout within a certain time window is automatically transferred to archive storage, which consists of an ASACA "jukebox" containing 750 DVD drives, each of which can hold approximately 9.4GB of data — for a total of 4TB or 2000 hours of material. Harris Automation manages this transfer.

It also controls all aspects of the transmission of program channels. Once program schedules are entered into the automation software, the system first checks that the



THE NEW COMPLETE NETWORKING SYSTEM FOR BROADCASTERS



HYDRA AUDIO NETWORKING

In a modern broadcast environment the key to maximum efficiency is flexibility. Hydra gives you exactly that.

Calrec's new Hydra audio networking system provides broadcasters with a very cost-effective infrastructure for sharing and controlling I/O resources across a network of digital consoles.

Built on gigabit Ethernet technology, the Hydra audio system provides a highly reliable and user-friendly system with a very high bandwidth and a clear evolutionary path.

Hydra maximises studio flexibility by integrating the widest range of broadcast specific digital mixing consoles via a resilient industry standard networking technology.

Potential cost benefits are significant. Cat-6 cabling reduces wiring and installation costs, and a reduction in router size is achieved as all sources and console outputs are available to the whole network.

Hydra ties together any combination of Calrec's three advanced, field-proven digital broadcast consoles to give you a whole new way of looking at the way you work.

- Gigabit Ethernet fabric provides a cost effective and reliable infrastructure
- Very high bandwidth
- Up to 256 bi-directional channels
- Fibre or copper connections

CALREC AUDIO LTD, NUTCLOUGH MILL, HEBDEN BRIDGE, WEST YORKSHIRE, HX7 8EZ, UK TEL: 01144 1422 842159 EMAIL: enquiries@calrec.com WEB: www.calrec.com
South and Mid West States - TEL: (615) 671 0094 EMAIL: ericj@redwoodweb.com
North East States and Canada - TEL: (212) 586 7376 EMAIL: dsimon@studioconsultants.com
Western States - TEL: (818) 841 3000 EMAIL: jschaller@audiospec.com

requested video item is available on the server. If it is not, it attempts to transfer the video from archive storage. If archive storage does not contain the scheduled item, an alarm will appear on a screen in master control and also in the traffic office, allowing the operator time to address the problem.

At the scheduled time, the automation system will set the appropriate router crosspoints, execute the defined video transition by controlling

Miranda master control switchers, and start the server playing the scheduled program. Automation also controls the tuning of three satellite receivers and a dish controller, allowing the scheduling and automatic recording of satellite feeds.

Operators in master control can oversee the entire operation via computer screens, a monitor wall and quality-control stations, making sure the program is correct and the video and audio parameters are to spec. In the event of a scheduling error, an equipment failure, or a live program being over or under its scheduled run time, operators can make adjustments or, if necessary, take manual control of any part of the system.

The center's routing comprises gear including a PESA Tiger and a Sony HDSX 5800 router. The associated audio router is a PESA TDM-3000. Control room equipment includes a Pinnacle Deko character generator, a Graham-Patten 8000 edit mixer, a Yamaha console, a BKE-9400A linear editor and three DMX-R100 audio mixers.

The facility also includes three MVS-8000 multiformat switchers with integrated digital multi-effects, 264 monitors, (including seven BVM-D20F1U evaluation monitors), and systems from Avid, Evertz, Fujinon, Leitch and Vinten. About 110 miles of cable ties it all together. A Clear-Com intercom system is used throughout the facility, with 20 WRT-822 wireless mics and 40 EMC-77BC lavalier mics.

NYN is not a terrestrial broadcaster. All its transmissions are via satellite or fiber. An Iptek HBR-2500 OC-48 optical digital transport system connects the New York State Plaza production operations to the network's Ku



Karl Diehl, NY network producer/director, at the controls of one of two identical Avid Composer suites at NYN.

band uplink facility six miles away. Satellite feeds for recording and for monitoring the transmissions are sent back from the same facility. Two fully redundant fiber paths are used; they incorporate an automated self-healing system. In addition, DS3 lines, provided by Verizon and Worldcom/MCI, allow a 45Mb/s datastream connection to NY-1, the cable news channel in New York City, which provides cross-connects to all major media.

No major hardware problems resulted from the broadcast center's installation and construction. Some software bugs emerged as a result of the system's complexity, but these were resolved within a few months.

The network receives an annual appropriation from New York state of nearly \$600,000. Its mandate is to generate about \$3.4 million in revenue each year in order to meet its operating budget of almost \$4 million. So far, the network has accomplished that goal. Its major customers include the New York State Lottery and the state's off-track betting organization. Other public-sector clients include SUNY and the state Office of Children and Family Services. Private-sector clients include Albany area broadcasters and Time Warner Cable.

The RFP for building the broadcast center was written to ensure that the standard-def facility would have an easy upgrade path to HD. In a sense, NYN today is a standard-definition implementation of an HD plant, so that when the switch is made, no forklifts will be required.

BE

William F. Snyder is executive director of New York Network.

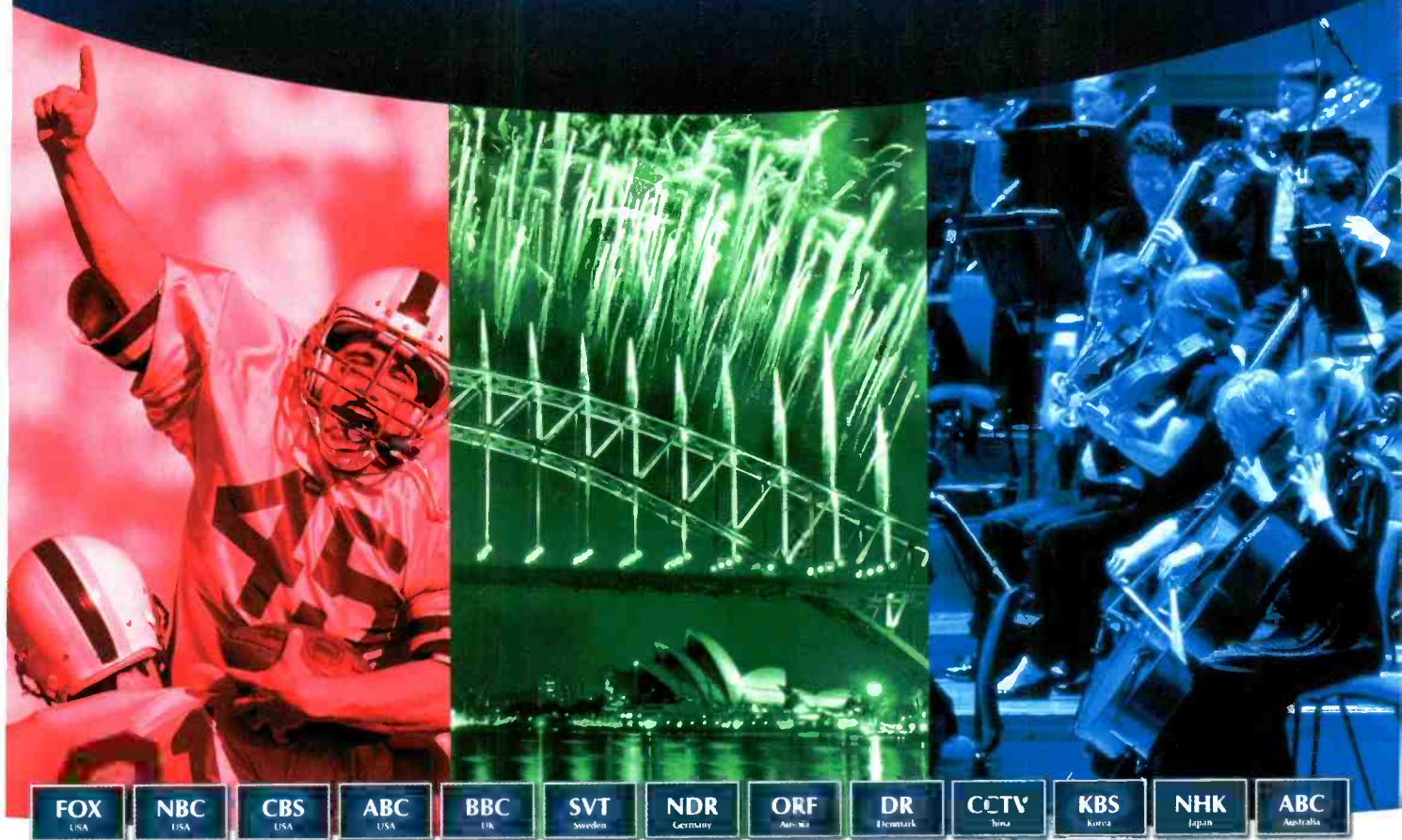
Design team

New York Network
William F. Snyder, exec. dir.
Gary Talkiewicz, dir. of eng.
Roy Saplin, dir. of admin.
Dave Palmieri, engineer
Lori Staples, prod. Specialist
Richard Fortune, EIC (retired)
Jacob F. Nowak, Jr., dir. of network services (retired)
Sony SIC personnel

Equipment list

ASACA archive storage
Clear-Com intercom system
Evertz D/A conversion
Graham-Patten 8000 edit mixer
Harris automation
Iptek HBR-2500
Miranda MC OXTPM2 switchers
PESA
TDM-3000 audio router
Tiger router
Pinnacle
Deko CG
MediaStream 900 servers
Sony
BKE-9400A linear editor
BVW-790W ENG cameras
DMX R-100 audio mixers
DVW-A500 VTRs
EMC-77BC lavalier mics
HDC-950 studio cameras
HDSX 5800 router
MVS-8000 multiformat switchers
WRT-822 wireless mics
monitors

Trusted.



When a world audience is watching a unique event, there's no chance for a 'take two'.

For almost 30 years, the world's largest broadcast organisations have trusted SSL consoles to cover events of this importance and scale.

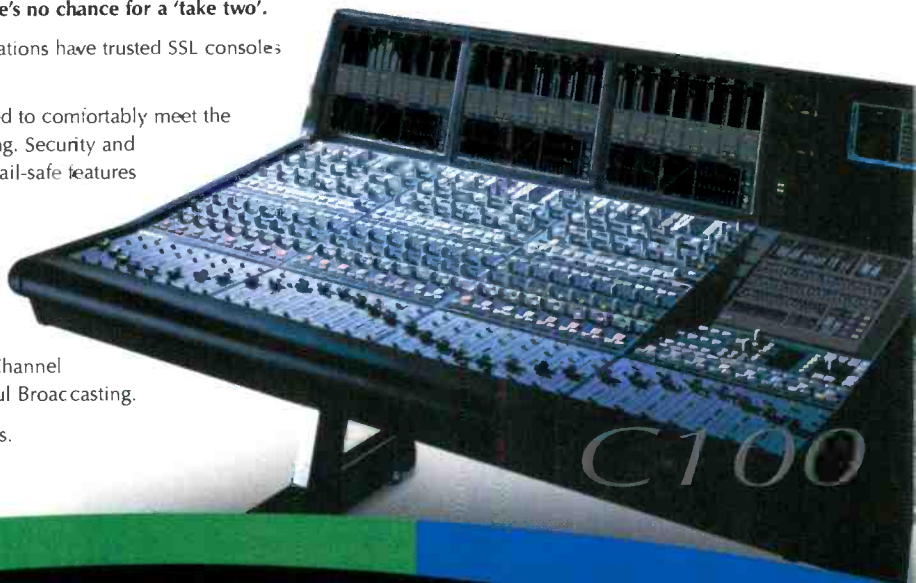
SSL's latest digital broadcast console, the C100, is designed to comfortably meet the needs of surround production and interactive programming. Security and performance are built in, with a host of redundancy and fail-safe features such as Self-Healing DSP.

The C100's freelance-friendly control surface makes for a short learning curve, and the ability to scale consoles also helps to meet your budget.

The C100 is already the first choice for respected broadcasters worldwide, including: NBA-TV • The Golf Channel
Disney Broadcasting • Danish Radio & TV • NHK • Seoul Broadcasting.

Find out how the C100 can help achieve your audio goals.

www.ssl-broadcast.com



Solid State Logic

BROADCAST AUDIO TECHNOLOGY

Begbroke, Oxford OX5 1RU, England. Tel: +44 (0)1865 842300 Fax: +44 (0)1865 842118 Email: sales@solid-state-logic.com Web: www.solid-state-logic.com

NEW YORK
Tel: +1 (1)212 315 1111

LOS ANGELES
Tel: +1 (1)323 463 4444

TOKYO
Tel: +81 (0)3 5474 1144

PARIS
Tel: +33 (0)1 3460 4666

MILAN
Tel: +39 039 2328 094

Managed monitoring for broadcast and distribution



- Efficient solution to display analog, digital & High Definition video, audio, alarms, network load and computer generated data.
- Autonomous or multi-screen display to monitor up to 60 windows simultaneously.
- Perfect control room design offering the best possible combination of display technology, hardware and software for 24/7 operation.

Barco Control Rooms
Noordlaan 5, B8520 Kuurne - Belgium
Phone: +32 56 36 82 11 • Fax: +32 56 36 82 48
email: sales.bcd@barco.com

Barco Projection Systems
3240 Town Point Drive, Kennesaw, Georgia 30144 - United States
Phone: +1 770 2183200 • Fax: +1 770 2183250
email: bpsmarketing@barco.com

BARCO

Visibly yours

vibration and movement. Still, there are no flexible lines to be replaced and essentially zero external hardware to be serviced.

The big panel antennas, while using a pot full of lines, splitters, etc., offer the advantage of wide bandwidth to accommodate multiple stations. The components can sometimes be

serviced by having the technician climb up inside the antenna. In particular, RFS and Shiveley are marketing antennas that are serviceable from the inside. Panel antennas also offer the unusual advantage of allowing a different amount of beam tilt at different azimuth values. But, remember, electrically the big antennas don't of-

fer a great improvement over their lighter-weight cousins. The patterns available are similar, their gains are essentially the same and they will all provide good service within their mechanical or structural limits.

Service contours

The question becomes one of determining just what you accomplish by going to a higher-power operation. As we discussed last month, DTV service is determined by use of Technote 101, the Longley-Rice propagation model. That method is not normally considered to generate a contour. Rather, it determines areas that receive the desired level of signal or more. Figure 1 is a map that shows the service area for WTVP-DT in Peoria, IL, based on both Longley-Rice and the FCC curves. The clear area enclosed by the irregular, light-blue ring is the Longley-Rice service of 41.86dBu or more. For comparison, the FCC F(50,90) contour is shown in black. The significant variation is caused by the even nature of the terrain once the signal gets well clear of the river. On the other hand, the map shows areas along the river, especially to the north, where the signal drops due to terrain blockage at the river bluffs.

The interesting thing here is that there isn't a lot of difference when changing from 100kW to 400kW. That is especially true where the terrain is the most even, as in the areas northeast of the site. Where the terrain is rougher, the difference becomes greater. This tends to agree with what is observed in actual signal reception. The higher power doesn't have as much effect in the distance to the edge of service as it does in filling in the holes in the service. That is something that doesn't show up much in the propagation calculations. But, higher power provides a more "solid" signal.

Remember what happened when Class A FM stations were all upgraded to 6kW (separations permitting)? Many expected it to make a huge difference in

THE AZDEN 1000 SERIES... A QUANTUM LEAP!

The sleek all new Azden 1000 Series, featuring the 1000URX receiver, 1000BT bodypack transmitter, and 1000XT plug-in transmitter, delivers performance and features usually associated with systems costing thousands more.

- 121 UHF channels (723-735MHz) user-selectable, with LCD readout.
 - True diversity system with 2 complete front-ends and high-gain antennas.
 - Proprietary DLC (Diversity Logic Control) circuitry for reduced dropouts.
 - State-of-the-art dielectric filters throughout, for improved image rejection and superior diversity isolation.
 - High 5th order filters for improved S/N ratio.
 - Multi-function LCD shows channel number and frequency, battery info, AF level, and diversity operation.
 - Ultra small, lightweight, switchable, Earphone-out w/level control.
- Note: Order cables specifically for your camera and battery configuration.**



The 1000URX receiver shown here with the Anton Bauer "Gold Mount", is designated the 1000URX-AB

System prices start at \$1350 MSRP

Bodypack transmitter (1000BT) with reduced current-drain for improved battery life, is available with Azden EX-503H, Sony ECM-44H or ECM-55H.

Plug-in transmitter (1000XT) works with dynamic or phantom power mics.



147 New Hyde Park Rd., Franklin Sq. NY 11010
Telephone (516) 328-7500 • FAX (516) 328-7506
E-mail: azdenus@aol.com
web site: www.azdencorp.com

SONY



HIGH-RESOLUTION VIDEO
PROXY VIDEO
SCRIPT

SOMETIMES AN INNOVATION COMES ALONG
OF SUCH SIGNIFICANCE IT COMPLETELY
REDEFINES THE WAY WE WORK

XDCM
Professional Disc System

D
Professional Disc

INTRODUCING
**THE XDCAM™
PROFESSIONAL
DISC™ SYSTEM**

THE NONLINEAR WAY TO WORK
FROM ACQUISITION TO ARCHIVE.

Think of the innovations that totally changed the workplace. Consider landmarks like Electronic Newsgathering, the one-piece camcorder, and the migration from analog to digital. Sony invented, launched or led the market in every one of these innovations. And now Sony introduces the next breakthrough in workflow. Presenting the XDCAM system.

Instead of merely recording a clip, the XDCAM system writes your content as a high-resolution data file, a low-resolution, frame-accurate "proxy A/V" version, plus metadata that can include your voice over scripts. Instead of tape, the XDCAM system records onto the Professional Disc media. Instead of searching along the length of a tape, you get nonlinear, split-second access. And in addition to real-time playback, you can view XDCAM files on a PC, transfer them via the i.LINK® interface or Ethernet, or even browse them and transfer the files around the office or around the world.

Experience the XDCAM system and you'll understand. It's a whole new way to work.

1

VIDEO AS DATA FILES

2

FINISH FASTER WITH PROXY A/V

3

ROBUST METADATA

4

REMOTE EDITING WITH MXF

5

SHOCK RESISTANCE

6

EDIT IN CAMCORDER

7

AFFORDABLE MEDIA

8

DV CAM AND MPEG IMX RECORDING

9

LOW COST OF OWNERSHIP

THE XDCAM SYSTEM

IT DOESN'T SIMPLY RECORD CLIPS.
IT WRITES **DATA FILES.**

MXF

1

Every time the XDCAM Professional Disc media records an audio/video clip, it writes your content as a data file. That makes a world of difference. Imagine your camcorder or deck connected to a PC, working as an external drive. Imagine editing without digitizing—because XDCAM files are already digital and directly compatible with selected nonlinear editors. Imagine using your PC to browse XDCAM files on a disc located on another continent. Then imagine transferring just the clips you need across the data network.

Your creative possibilities and workflow efficiency go way up. Your cost of ownership goes way down.

GET STARTED SOONER AND
FINISH FASTER WITH **PROXY A/V.**

In the ongoing battle to beat deadlines, XDCAM production is your ally. For example, your office staff can start editing, even before the material arrives! The secret is the XDCAM system's "proxy" audio/video, a frame-accurate, low-resolution copy of the full-res A/V. Using MPEG-4 compression at 2 megabits per second, proxy A/V is an incredible tool for browsing, editing and transferring your footage over great distances.

You can zoom the proxy A/V into a nonlinear editor at up to 50x real-time speed and automatically paint a storyboard with thumbnail pictures. For example, transfer proxy A/V from the TV newsgathering van to the station, and your staff can immediately start scripting and offline editing. When the disc arrives, only the required clips get transferred—another time saver. Then full-res video is automatically conformed to your offline edit. And in an emergency, when your remote crews don't have access to a satellite feed, you can even play the proxy A/V to air! The MPEG-4 picture is vastly superior to a videophone.

2



STEM. YOU'VE NE

METADATA: THE PERFECT PLACE TO STORE YOUR SCRIPTS.

3

If you're writing voice over scripts in the field, you'll love the ample storage capacity of the XDCAM Professional Disc media. You can write a script on your laptop, transfer it to the camcorder via the i.LINK® interface and save that file in the metadata area of the disc! The script becomes a part of your disc, accompanying the A/V files everywhere from postproduction to archive!

Other metadata capabilities abound. Industry-standard Unique Material Identifiers—UMIDs—can distinguish each clip. Thumbnail pictures and essence markers identify each recorded scene. Automatic marks can flag filter changes, audio overshoots or video clipping. The result? Metadata enables journalists, camera operators, editors, producers and archivists to collaborate more effectively than ever before.

MXF MEANS INTERCONTINENTAL EDITING.

Thanks to data networking, a producer in another time zone can browse the lightweight, low-res proxy A/V on a distant disc, identify the desired clips and then transfer just the selected

clips as full-resolution Media Exchange Format (MXF) files. The combination of proxy A/V and MXF is a breakthrough that enables you to shoot news in Moscow and edit in Atlanta. Your central casting operation can concentrate recorded assets in Dallas, while giving free access to sister stations in Houston, Seattle and Phoenix.



4





THAT TIME IS NOW

XDCAM™
Professional Disc System


Professional Disc™

XDCAM INNOVATION.

NOT JUST A DISC, A SYSTEM.



PDW-530 CAMCORDER offers your choice of DVCAM or MPEG IMX recording at 30, 40 or 50 Mbps. Features 16:9/4:3 switchable, Power HAD™ EX CCDs, 12-bit A/D flip-out LCD color monitor, picture cache recording, 60i or 30PsF capture, and even 24PsF with optional board.



PDW-510 CAMCORDER provides DVCAM recording at 25 Mbps. Features 16:9/4:3 switchable Power HAD™ EX CCDs, 12-bit A/D, flip-out LCD color monitor, picture cache recording, 60i or 30PsF capture, and even 24PsF with optional board.



PDW-V1 MOBILE DECK enables single-machine cuts-only editing, compact viewing on 3.5-inch (viewing area measured diagonally) LCD monitor and easy connection with Ethernet and i.LINK interfaces. Features up to 30x real-time transfer of proxy A/V.



PDW-1500 COMPACT DECK is a half-rack machine ideal for feeding nonlinear editors. Transfers proxy A/V at up to 50x real time. Supports DVCAM and MPEG IMX recording. Features Gigabit Ethernet and i.LINK interfaces.



PDW-3000 EDITING RECORDER offers a full panel with VTR-like transport and editing controls. Transfers proxy A/V at up to 50x real time. Supports DVCAM and MPEG IMX recording. Features Gigabit Ethernet and i.LINK interfaces.



PFD23 PROFESSIONAL DISC media holds 23.3 Gigabytes of data, offers more than 30 years of archival life and supports more than 1,000 Erase/Write/Read cycles. Leverages industry-standard blue-violet laser technology for low media cost: less than \$30 MSRP per disc.



GET YOUR VERY OWN GUIDE
TO THE XDCAM SYSTEM
—A COMPREHENSIVE DVD—
ORDER AT
WWW.SONY.COM/XDCAM-DVD

© 2003 Sony Electronics Inc. All rights reserved. Reproduction in whole or in part without written permission is prohibited. Features and specifications subject to change without notice. Sony, Betacam, Betacam SP, Betacam SX, DVCAM, i.LINK, MPEG IMX, Power HAD, Professional Disc, XDCAM, Xsri and their respective logos are trademarks of Sony. Avid is a registered trademark of Avid Technology Inc. Pinnacle Systems is a registered trademark of Pinnacle Systems, Inc. Thomson and Grass Valley Group are registered trademarks of Thomson. i.LINK is a Sony trademark used only to designate that a product is equipped with an IEEE 1394 connector. All products with an i.LINK connector may not communicate with each other. Please refer to the documentation that comes with any device having an i.LINK connector for information on compatibility, operating conditions, and proper connection.

SYSTEM

SMART INVESTMENT.



And Sony continues to protect your half-inch tapes dating back to 1983! Fitted with our e-VTR kit, the Sony MSW-M2000 multi-format VTR will play all your Betacam, Betacam SP®, Betacam SX®, Digital Betacam® and MPEG IMX tapes—and convert them into MXF files, fully interoperable with the XDCAM system.

XDCAM decks also have the connections to work in your current infrastructure: analog composite, SDI, i.LINK SBP2 and i.LINK AVC interfaces, AES/EBU audio, analog audio, Ethernet, and familiar 9-pin control.

LOWER YOUR TOTAL COST OF OWNERSHIP.

Not only will the XDCAM system save you money by allowing you to work more efficiently, it can also save you money on maintenance, service and support. For example, while a tape-based camcorder can have over 30 moving parts, the XDCAM camcorder has just two! You'll also benefit from smart self diagnostics, with network-enabled SNMP remote monitoring of equipment health.

9

WORK NONLINEAR. WORK SMART. WORK SONY.

Clearly, the XDCAM system will make your work move faster than ever before. You'll take advantage of powerful production shortcuts and speed-ups. You'll benefit from compelling long-distance collaboration. And you'll be able to use your data network to access everything from breaking news to archival footage. When an innovation of this magnitude comes along, you've just got to experience it first hand. Speak to your Sony representative today to arrange a demonstration.



THE XDCAM SMART INTEGRATION.

7

NONLINEAR MEDIA AN ACCOUNTANT COULD ACTUALLY LOVE.

Sony's XDCAM system's Professional Disc™ media costs less than \$30 MSRP. So you can actually afford to archive

every disc! Just one disc has a total user data area of 23.3 Gigabytes* in the same diameter as a DVD. That translates to 85 minutes of DVCAM® footage or 45 minutes of MPEG IMX™ material (at 50 Mbps). Based on accelerated testing conducted by Sony, the media can be re-recorded more than 1,000 times and lasts more than 30 years. It also enjoys the protection of a rugged, shock-resistant, dust-resistant cartridge.

Of course, recording on disc also means no more fumbling and hunting for video clips. No more searching for the end of the last recorded scene. No more recording over material because you're cued up to the wrong spot

* A portion of user data area will be used for data management; therefore, total user area may vary.



10

(10)

8

WHAT DO I DO WITH ALL MY VTRS AND TAPES?

The XDCAM system works beautifully with the VTRs you have now, because XDCAM products use the established DVCAM 25 Mbps or MPEG IMX 30/40/50 Mbps codecs. So you can continue using tape, secure in the knowledge that you can migrate into the optical world at your own pace and on your own schedule. XDCAM products also give you the choice of 60i interlace or 30PsF progressive video.

For cinematic production, you can even shoot in 24PsF with an optional board!

VER WORKED SO

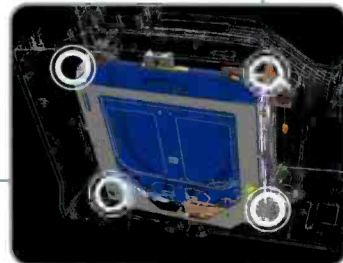
MXF works with a growing population of servers, hard disk recorders, e-VTRs and Xpri® nonlinear editors. MXF is an industry standard. It's won the announced support of a who's who of industry leaders, including Avid, Pinnacle Systems, and Thomson/Grass Valley Group.

5

SHOOT WITH A NEW LEVEL OF CONFIDENCE.

Take the camcorder skiing, skydiving, offroading and speedboating. We already have. After all, we designed XDCAM acquisition to stand up to real-world conditions like splashes, salt spray, bumps, jolts, extreme vibrations and temperature changes. Internal dampers and a robust laser servo withstand the constant vibration of a helicopter shoot. Cache memory recovers from the big jolts you get when you pull the ripcord or your SUV rumbles over a log. In any case, there's no tape dropout, no tape flashing, no tape jumping. Oh yeah. There's no tape. *(Please refer to the operators Manual for recommended operating conditions.)*

Effective shock protection includes internal dampers (shown), a robust laser servo and extensive cache memory.



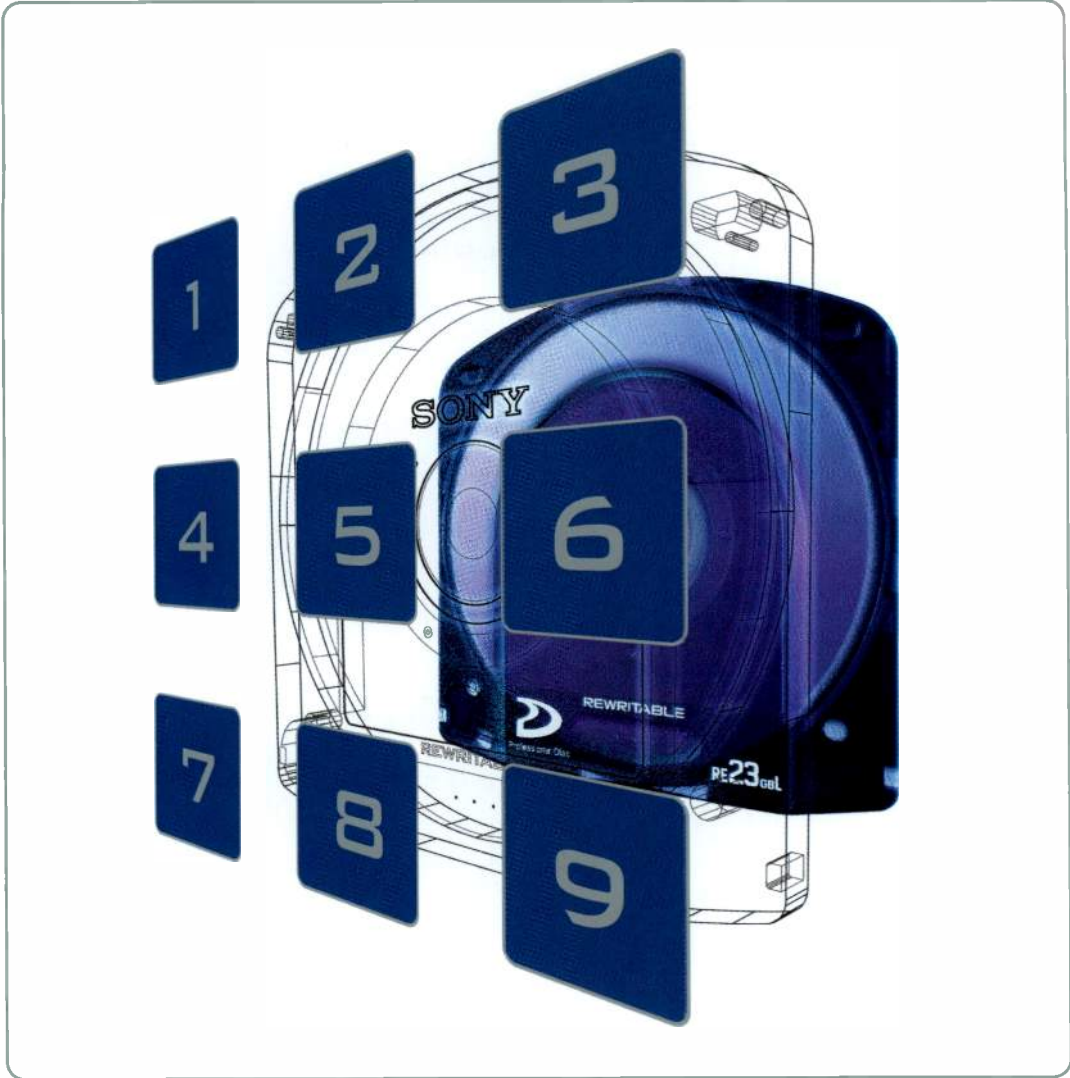
SMART.

6

EDIT RIGHT ON THE SPOT.

If you're on a deadline, the XDCAM system is a lifesaver. Each clip automatically generates a thumbnail. And every camcorder and deck can perform single-machine editing. All you need is a monitor, which is already built into the camcorders and the mobile deck! So you can flip out the camcorder's LCD monitor, access the scenes directly by thumbnail, make your selections and even re-order the shots. The entire sequence plays out seamlessly!





continued on page 63

the coverage area of the stations. It did make some difference, but many feel that the small increase in the distance to contours was much less significant than the overall improvement in signal quality within the service area. The increase in power helped penetrate buildings and greatly reduced the size of "holes" in the existing service. That is something that doesn't show up much in the propagation calculations. But, higher power provides a more "solid" signal, for lack of a better word. Such is the case with analog television, and we can expect it to be so with DTV. The big factor isn't how far out the station's service goes, but how much better the service quality is within the coverage area.

Reality bites

The problem with any method of prediction is that the real world isn't as nice and uniform as we calculate it

to be. The real world has buildings, big trees and ridges that don't show up well, even on 3-inch databases. Granted, it is possible to include a "fudge factor" based on the type of terrain, the average extent of foliage or forestry, or the existence of buildings. While such factors do improve the overall accuracy of signal-strength predictions, it still isn't possible to predict the field-strength value at a given point. We must admit that prediction methods are only viable over an area and are so considered by the commission. That is, they clearly state the field strength at 50 percent of the locations in an area.

If you want the real field strength at a given area, it is probably most accurate to attempt field-strength measurements. But, everything can affect the value of readings, especially in UHF. That includes the receiving antenna, the exact location of the measurements,

the accuracy of the meter, etc. The commission says that you should take measurements at 30 feet above ground level (AGL) over a distance of 100 feet, recording the measured values. But then, taking measurements is a good subject for another column.

High and low

Lightweight antennas can provide good service when their mechanical limitations are acceptable and low power is necessary. The higher-power service does extend the distance to service contours but, more importantly, it provides a better-quality signal in the service area.

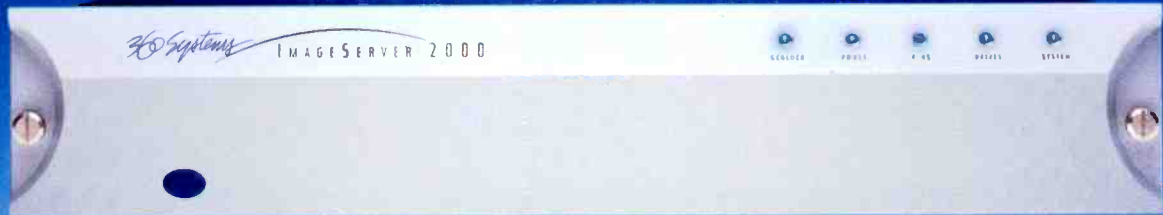
BE

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



Send questions and comments to:
don_markley@primediabusiness.com

The Broadcast Quality Server With a Price that Makes Sense.



Up to now, it's been tough explaining how buying more video servers would fatten up your bottom line.

Which is exactly why 360 Systems has introduced the Image Server 2000™. It delivers three independent video streams, and all the features of the high-cost competition, for just \$10,000. Complete.

Image Server 2000 is the perfect replacement for tape machines – use it for satellite ingest, program delay, slow-motion, commercial insertion, or full time play-to-air.

Its advanced design provides composite and SDI video, 12 AES channels, balanced analog audio, up to 128 hours of internal RAID-5 protected storage, impeccable images, great specs – and zero maintenance.

And at \$3,333 per channel, the Image Server 2000 also makes good business sense. Isn't it time to rethink what you're paying for video storage?

Check out the Image Server 2000 at www.360systems.com, or call for a demonstration at your place.

360 Systems
BROADCAST

Tel: (818) 991-0360 • E-mail: servers@360systems.com

©2003 by 360 Systems. Includes 40 hours of storage at 12 and 10:1 DCR.

WLS-TV's newsroom in Chicago features technology from Digital News Technology solutions. Photo by Frank Pedrick of Pedrick Photography.



Advances in news technology

BY JOHN LUFF

In 1933, the Communications Act opened the broadcast spectrum and required that broadcasters be licensed. At that time, there was not much need for broadcast news, at least in the eyes of the newspaper publishers in this country. But much has changed in the

last 70 years. Few people imagined that broadcast news would compete head-to-head with newspapers.

Nonetheless, it took decades for short, 15-minute news wrap-ups to become a staple of the TV program schedule. In the early years of television,

journalists were not too interested in becoming part of the news business. It offered no advantages to them, because news graphics were just still photos and the copy read much like radio had. But, as technology improved, news became an irresistible

SHARPEST Detail



**LOWEST
PRICE!**



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

siren's song to many journalists.

In no small measure, technology has driven the changes in broadcast journalism. A former network-news president, speaking to an international conference on broadcast news in the early '90s, described the immediacy of news and the effect technology has on the delivery of informed journalism to the

public. He noted how, at the time of the Civil War, it took weeks to receive the results of battles and compared that with how, by the time of the Gulf War, we were watching news as it happened



Sony's XDCAM line of optical-disk products fulfilled the promise of affordable random-access record and playback technology long awaited by many large broadcasters.

without the time for the journalist to reflect on the meaning and context of the story.

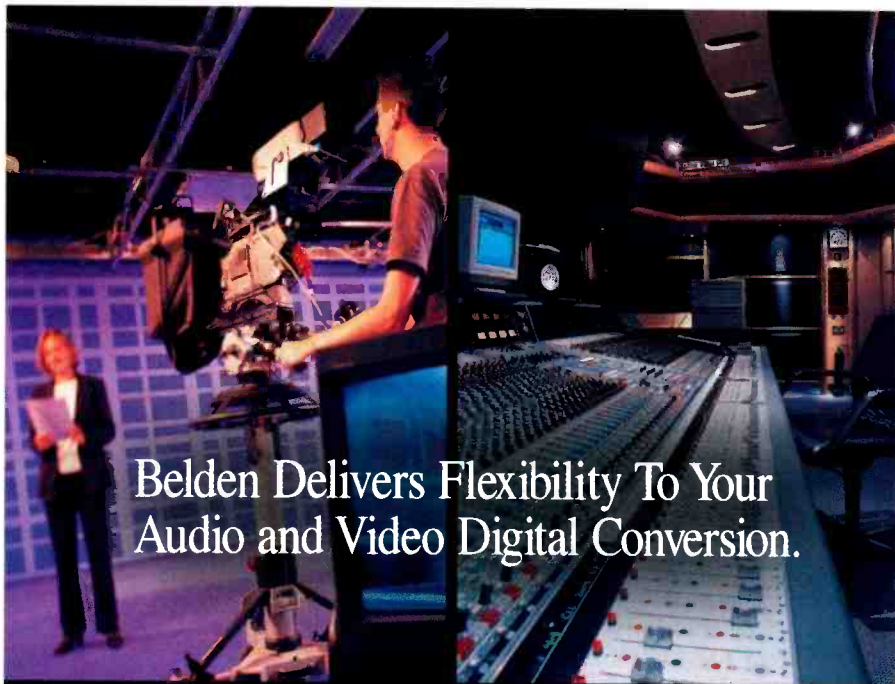
But news technology isn't stagnant; it keeps advancing. The ultimate goal of this advance is to facilitate the immediacy viewers have come to expect (indeed, demand) while freeing the journalist to recover the time to reflect and add context and meaning to their stories.

Acquisition

Capturing stories is a fundamental part of the journalist's trade. Recently, journalists have seen a couple of dramatic advances in acquisition technology. Sony and Panasonic are starting to deliver highly evolved news-acquisition camcorders using new and exciting technology.

At last year's NAB, Sony introduced its XDCAM camcorder system. It uses an optical disk recorder to deliver 45 to 85 minutes of recording on a 23.3GB blue-laser optical disk. Optical-disk technology, which has been long promised by many manufacturers and long awaited by many large broadcasters, makes random access affordable. The Sony product line includes studio recorders, cameras, and nonlinear editing systems. The I/O of the studio decks is what you would expect from Sony, with SMPTE 259 and high-speed transfers between studio decks. Other features, including metadata transfer, thumbnail recording and shot selection in the camera, are natural for news acquisition.

Panasonic raised many eyebrows



Belden Delivers Flexibility To Your Audio and Video Digital Conversion.

Analog, Digital or Data — More Broadcast Engineers Choose Belden Than Any Other Brand of Cabling Products.

Why? Because broadcast engineers know that Belden has an extensive line-up of digital cabling products — including data cables — and the quality to match.

Whether you're installing cable in a television or radio studio, a video post-production facility, an indoor or outdoor sports arena, a film production studio, a church, a government chamber, or an entertainment venue — any area where a high quality signal is important — Belden has the digital cable to meet your needs.

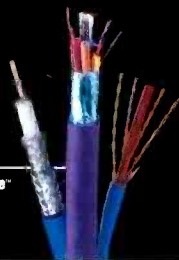
To make your selection process easier, we're offering a 3rd Edition of our "Digital Studio Cable Guide." This Guide will help your understanding of digital cables, SDI and AES/EBU specifications, HD Radio concerns, key electrical/distance parameters, and why Installable Performance™ is important to cable performance.



Look to the leader. Call 1-800-BELDEN-4 and get a free copy of the definitive "Digital Studio Cable Guide." Or download a copy from Belden's Web site at: www.belden.com/1b65.pdf.

Belden

Performance Delivers The Future™



©2003 Belden Inc.


BRILLIANCE®

HD CHAMPIONS!



US Patents 6,069,607 and 6,532,024
UK Patent 2,330,475
Other US and International Patents Pending



VTM-450E HD/SD



VTM-440HD/SD



VTM-420HD/SD

Videotek Continues to Dominate On Screen Test and Measurement!

Building on a 30-year commitment to the television industry and Emmy winning technology, Videotek's series of High Definition test and measurement instruments were innovatively designed as complete system solutions for HD, SD, and composite formats. Videotek stays ahead of the curve and sets the standards by providing such features as an intuitive gamut display, pixel zoom, HD and SD data analysis, HD/SD eye pattern, 708 closed caption display, lip-sync and loudness monitoring, Metadata display and alarms, as well as Dolby® surround decoding and display. With all of these features and more, Videotek's HD test and measurement instruments are undoubtedly the dominant players.

Whatever the application: Operations, Engineering, or Broadcast, Videotek has the product that is right for you. Free VTM enhancement and a five year unconditional warranty proves that Videotek is FIVE TIMES BETTER than the competition!

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

FREE

5

YEAR WARRANTY

ANOTHER
VIDEOTEK
REASON TO BUY



VIDEOTEK®

A Zero Defects Company

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



Panasonic's Professional Plug-in (P2) news-acquisition products have no moving parts and offer the promise of near instantaneous access to any shot recorded.

when it introduced the Professional Plug-in (P2) recording technology for news acquisition. These solid-state-memory-based, professional video products record onto SD memory cards. They have no moving parts and offer the promise of near instantaneous access to any shot recorded. As the capacity of the SD cards increases, the technology holds the promise of HDTV recordings with no moving parts. A number of manufacturers of editing products have announced they will support direct import of the DV-based recordings on P2. This support is critical in enabling properly functioning integrated newsroom systems. The absence of moving parts, coupled with low-power-consumption cameras, should extend battery life considerably. P2 is not delivering yet, but Panasonic is taking orders for delivery this year.

After capturing the story, the ENG journalist must get the story back to the station as quickly as possible. Today, he or she can transmit the story from a microwave or SNG truck, or find the nearest high-speed data connection and forward a digital copy of the footage or completed story back to the newsroom.

Satellite-transmission technology hasn't seen any revolutions lately, but video compression has improved by leaps and bounds in the last few years. MPEG-2 can now deliver acceptable results for news at 5Mb/s and under. And, in the next year, we will see real-world use of MPEG-4 AVC (H.264)

codecs that will dramatically drop bit rates for all types of content. At such low data rates, live transmission over a T-1 line (1.544 Mb/s) will become routine. This will move terrestrial transmission into the real world for news backhaul. Imagine putting a T-1 into



the local courthouse and other common sites to allow a portable rig to transmit real-time or faster-than-real-time content. Soon, ENG journalists might be able to simply walk up to the nearest house and offer a few bucks to use the homeowner's DSL or cable modem to send content through vir-

compact transmission systems that will make suitcase ENG and SNG an affordable and commonplace tool.

A parallel development is the high quality and reliability of store-and-forward appliances like Telestream's ClipMail. Such devices allow variable-speed transmission that adapts to the circuit to which it is connected. They make the process of sending video no more complex than sending e-mail.

Editing

You only have to think back to the Vietnam War to see how far news editing has come. During that period, cameramen were shipping film from field cameras from Saigon to New York, where editors cut the film into stories. The finished stories played on film chains. Asset management probably consisted of keeping track of the cans of completed stories on 3x5 cards, and

The ability to browse at the desktop in the newsroom is becoming an increasingly important function.

tual private network (VPN) back to the station, or even connect for a live shot from any street without an antenna.

Low-bit-rate transmission systems gained considerable notoriety during the Iraq War when live shots were transmitted from moving vehicles half a

the outtakes likely hit the trash bin every day. Metadata was on yellow legal tablets that went to the script writers.

Today, the editing process can begin in the camera, where the videographer can mark shots for later use and record them to thumbnails for browsing. The recordings can have GPS location data; some new cameras also allow time code. When editors review them in a laptop, they can annotate the shots with considerable metadata, and the outtakes and usable footage stay together. The original footage and its metadata are always available during the editing process. Whether ingested at real time (as in a backhaul through satellite or microwave) or transferred at faster-than-play speed, the nonlinear news-editing environment offers the editor nearly instantaneous access to content as soon as it has been transferred, or, in fact, during a recording. Such rapid transfer can provide critical time for the journalist to plan the



Store-and-forward appliances like Telestream's ClipMail allow variable-speed transmission that adapts to the circuit to which it is connected.

world away. H.264 will greatly improve the quality of such approaches and likely will spawn a crop of lightweight and

TAKE YOUR STATION TO THE NEXT LEVEL.

IBOC, DAB, HD, DTV, SAN, RF, DBS, DTH, KA Band, Digital Cinema, Multicasting, Broadband...if these are the buzzwords of your business, then you already know this is the only place to explore the entire world of content management and delivery technologies.

Targeted conferences, on-floor educational pavilions and the world's largest broadcast marketplace, offer insight, cost-saving solutions and alternative technologies to keep you competitive.

If you're a broadcast engineer...you need to be at NAB.



For Sponsorship information, contact us at 1.202.429.5426 or advertising@nab.org
For Exhibit information, contact us at 1.202.595.2051 or exhibit@nab.org
For Membership information, contact us at 1.202.429.5300 or membership@nab.org

SHOP THE GLOBAL CONTENT MARKETPLACE See the World's Leading Suppliers – 1,300+ Exhibitors!

Accom – Beck – BBC Technology – Canon – Dolby –
DNF Controls – Evertz – Floral – Fujinon –
Harmonic – Harris Corporation – IBM – Ibiqity
Digital – Irdeto – Leitch – Masstech – Miranda
Technologies – Nagravision S.A. – Nautel Maine –
Nvision – Panasonic – ParkerVision – Pathfire –
Pinnacle Systems – Ross Video – Scopus –
SeaChange International – Sencom – Sony –
Sundance – Tandberg Television – Telestream –
Thomson Grass Valley – Trivium Digital – ViAccess
S.A. – Vintex – and more!

Visit www.nabshow.com for a complete list.

STAY AHEAD OF THE COMPETITION Learn From the Industry's Leading Experts

Broadcast Engineering Conference
Radio & Television Management Conferences
Digital Asset Management Pavilion
NEW! Satellite Business & Technology Pavilion



THE WORLD'S LARGEST
ELECTRONIC MEDIA SHOW

April 17-22, 2004 · Las Vegas, NV

Exhibits: Monday, April 19 – Thursday, April 22

REGISTER TODAY ONLINE!

completed slug so that it tells a valuable and accurate story.

Nonlinear editing for news is distinctly different from other nonlinear editing in that it must interface to content-management software to inform the producer as to what stories are in process, and whether or not the content has arrived. Also, the field material (transferred by various methods), along with file footage and live recordings, must all be available to a group of editors networked to a storage network. Keeping numerous people aware of what material is available is a complex job. Thus newsroom editing software can have many modules from several vendors. Different vendors can supply software for ingest, edit, browse, play to air, and asset management. All this software must interact with the newsroom computer system, which, in many ways, acts as a traffic cop and central repository of the metadata needed to tie all the pieces together successfully.

The ability to browse at the desktop in the newsroom is becoming an increasingly important function. It allows producers and journalists to understand the context of the pictures much more rapidly than ever before possible. Using the browse-level content, it is quite possible to do a rough-cut of a story and send the decision list to a craft edit bay for finishing. This can cut down on the number of craft editors required, saving considerable money — so long as the browse and rough edit is not outlandishly expensive.

The play-to-air function may be a system separate from the editing environment. If it is, the newsroom computer system must transfer the stories to the air server. To ensure the right stories are cued and played in the program, the newsroom system must be tightly tied to the air server. If it is part of a single storage network, the air server can draw on the output of the craft editors in a number of ways, including copying the content to a separate directory, or just playing from the current location. Name conventions matter; you must

take care to ensure that the content is connected to the newsroom-computer-system's slug for the story.

Newsroom computer systems

The newsroom computer system is the brain, nervous system and heart of a news department. It is the brain in

edit wire copy for local use and then assemble the copy into a rundown. The same script could run the teleprompter. And all the staff members involved could share messages in the same system — neat and tidy. Of course, the computers were a bit clunky then, so the system ran with ASCII terminals hanging off one computer. That solved

MOS technology provides a standard communications protocol for newsroom computer systems.

that it rationalizes all of the input and keeps it all in order. It is the nervous system in that it ties the technology together. It is the heart in the sense that, without it, the rest of the system grinds to a halt. The earliest newsroom computer systems started as a way to gather the newswires into sorted directories to make it easier for the various production and journalistic staff to find what they wanted. Sports stories went one place, business news another, etcetera. System designers added script-writing features that allowed editors to

the need to network everyone together.

As newsrooms became more automated, the newsroom computer system has evolved into a much more sophisticated environment. It can perform all of the same functions, but it has replaced dumb terminals with highly evolved networked systems featuring redundant servers, device control for production devices, interfaces to editing and browsing systems, and the ability to interface to affiliate news-distribution systems. It allows news staff to make and post assignments, preview stories, and interactively change rundowns right up to the time of air and during programs. Seamless browser interfaces allow staff to search for additional information for a story on line without complications.

New media features can be integrated into the newsroom computer system as well. The system can be the engine that publishes the Web version of station's output, integrating with Web authoring packages. In some cases, this interface uses media-object-server (MOS) technology.

In the past, newsroom-system software writers had to write specific device drivers for each and every device they wished to control. The onus was on the controlling device to understand the *lingua franca* of the production devices and, as necessary, change the driver to enable new features, or even maintain basic control as the device manufacturers changed their own code.



Journalists prepare the news at the Inland California Television Network (ICTN), a highly automated, multichannel television network serving the San Bernardino Valley. Photo courtesy of Digital System Technology.

But to speak to the devices they need to control and from which they need to receive status messages. MOS allows a newsroom system to write to a common platform. For instance, it can allow a system to use a standard language that all character generators understand, or a standard language that all video servers understand, and so forth. On the other side, the device manufacturer needs only to understand one method of interfacing instead of keeping up with many competing newsroom computer systems. This greatly simplifies the system architect's job.

News content distribution

In the dark ages (a few years ago), each news-distribution agency, including broadcast networks like ABC, CBS, CNN and NBC, offered a real-time distribution rotation that the user had to record and edit as necessary. But in today's age of enlightenment, distinguished by the penetration of computers into the nooks and crannies of every business in the country (and wireless PDAs in the pockets of technocrats), we no longer need to roll tape at all. Most of the same services now offer either push- or pull-mode distribution that deliver the story to a local cache server on demand. From that point, the story can be pushed to tape at leisure, or moved using MXF or format conversion to an integrated newsroom nonlinear-editing system. The improvement is dramatic. Only the stories of interest are recorded, and there is no reason to roll tape at a time that might be inconvenient (or simply when the technician is not watching).

The business

Broadcast news represents and important source of profit for owners. It also represents potential for losses if the market is overloaded with outlets, or when the expected volume of sales won't support the cost of producing high-quality news. Some broadcasters, notably Sinclair, have chosen to rework the local-news paradigm to one

that keeps local stories in the hands of local producers and journalists, but moves national stories to a central site where many stations can share the production costs. This is, in fact, a larger version of the regional-news consortiums that have existed for many years. The bottom line is what it always is: broadcast news is an asset

when, and only when, it makes money. Technology has made that much easier, but the newsroom staff must commit their creativity to running news as a business. **BE**

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

How smart can you get?

What do you do when you're running out of time and you need to put together an interface system? Use System Builder.



Systems engineer Frank was under pressure, frustrated and pulling out what hair he had left - until he discovered System Builder. This unique web-based product selector software helped Frank design his big interface system in no time, by walking him through a series of screens where he selected everything he needed.



Log on to www.crystalvision.tv now to find out how the free System Builder can make your life easier too.

Crystal Vision

Converting you the smart way!

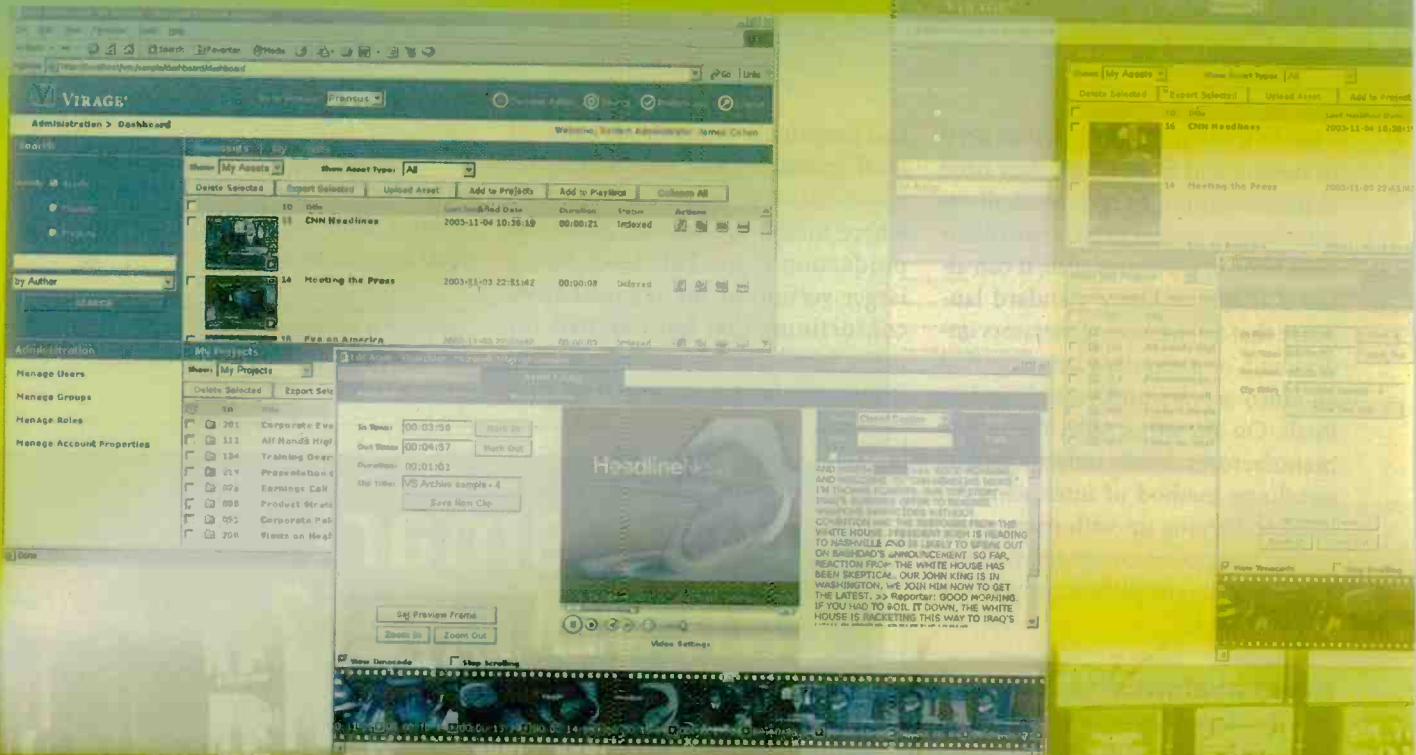
1000 West McNab Road Pompano Beach FL 33069.

Tel: (954) 788-3334 Fax: (954) 943-2035

E-mail: sales@crystalvision.tv www.crystalvision.tv

NAB

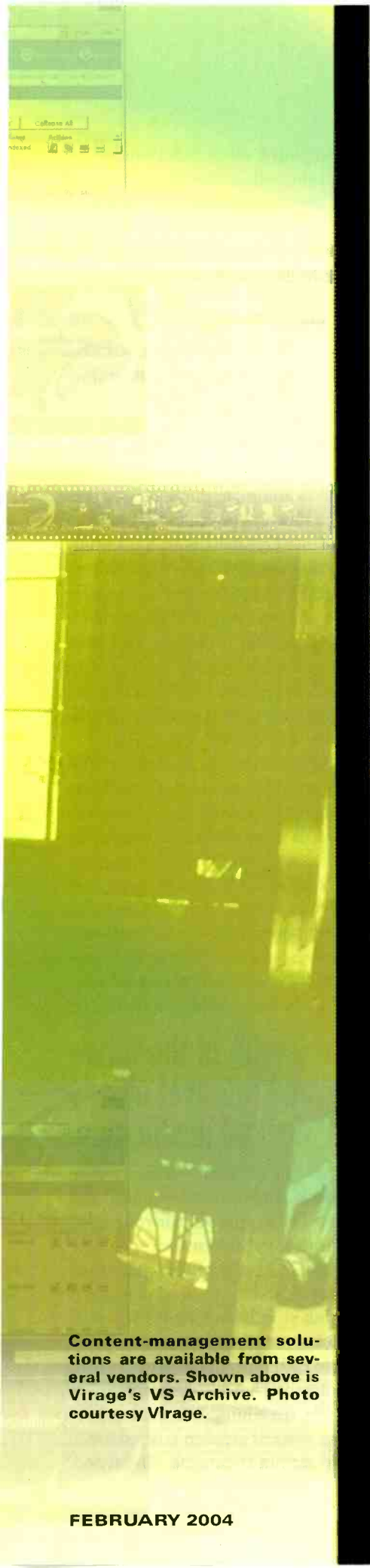
THE WORLD'S LARGEST
ELECTRONIC MEDIA SHOW
April 17-22, 2004 - Las Vegas, NV
See us on Booth C7143



SPECIAL REPORT:

Using metadata to manage workflow

BY PHILIP J. CIANCI



In today's world of digital media, metadata are inescapable. Metadata are pieces of information about other information — they are data about data. In a broadcast sense, they are descriptive information about program elements. In a tapeless world, metadata act as digital labels.

Media-industry terminology generally describes content as consisting of essence (video, audio, data) plus metadata (descriptive information about the essence). An asset is thought of as content and its associated rights (who owns and

Creation

When creating graphics elements or ingesting programs, it is important to generate metadata that enables efficient authoring functions. Appropriate descriptive information such as time, date, location, talent, director, producer, etc. must be logged and associated with the newly created essence. Technical details pertinent to format conversion, color correction, equipment calibration, compression encoding, EDLs, transitions and steps taken in the editing process are all metadata that must

Some metadata standards are open standards; others are proprietary. No one standard covers all phases of the metadata lifecycle.

controls the content). But, in this article, the scope of the term metadata includes rights-management information.

Broadly speaking, an asset's metadata comprise three distinct types of information: descriptions of the essence, technical parameters and rights obligations. Metadata provide the content descriptors used in media-asset-management (MAM) systems and, collectively, they enable indexed content storage and retrieval.

Metadata lifecycle

Figure 1 on page 74 illustrates metadata's role in the production and distribution of programming for broadcast. The four phases in the lifecycle of metadata are (essence) creation, (program) assembly, (asset) distribution and (library) archiving. For each phase, the illustration lists associated open-standard metadata formats and offers representative examples of metadata attributes.

Various metadata standards are best suited to a particular phase in the production and distribution processes. Some are open standards, intended to be freely available and compatible with each other. Others are proprietary, used by groups of OEMs and offering a turnkey solution to MAM. But no one standard covers all phases of the metadata lifecycle.

be recorded for editing and assembly. Rights must be associated with particular elements so that individual contributors can receive production credits and royalty payments.

Assembly

The assembly phase brings together all the elements (video, audio and logo) into a program and makes them ready for distribution. From this point on, there is little use for much of the metadata pertinent to editing the original source material into a program element. Technical data necessary for decoding at the consumer's receiver/decoder will be placed into the program stream. Creators' contributions and copyright information must be catalogued in this stage and distribution-rights management (DRM) must be activated before publication and ultimate loss of control.

Distribution

It's in a master control room (MCR) that the program, commercials, logos and other elements go to air as scheduled on the playlist. Each of the three primary types of metadata are now contained in a single program stream. Technical information is conveyed in the MPEG video or AC3 audio packets. Program descriptions are communicated by PSIP. Redistribution-rights

Content-management solutions are available from several vendors. Shown above is Virage's VS Archive. Photo courtesy Virage.

management is accomplished through the broadcast flag. All these packetized elementary streams are combined into a single transport stream. Transmission of the completed program can be

collection and long-term preservation of digital content. Appropriate metadata, attached at various times during asset creation and distribution, should be compatible with this public

- Simplified office functions — integration with back-office functions and event scheduling eliminates manual logging of content, avoids clerical errors and automates billing and royalty payments.

Issues

The following paragraphs address some issues associated with implementing metadata in the workflow-enhancement process.

Element creation. Capturing metadata properly can be a significant task. The key is to automate the metadata process as much as possible, beginning at the point of creation. Start by carefully analyzing workflow and metadata requirements. Remember to transfer those processes across all departments to help prevent problems with asset management. It is extremely important to understand how the metadata will be used and propagated through the creation and distribution process.

Attribute naming conventions. You must establish properties, attributes and naming conventions as mandatory standards throughout a facility. For instance, is a tag “home run,” “homer” or “HR”? Your MAM search engine will need to know that each of these terms has the same meaning. Be consistent in your use of case, a “Home Run” may not be a “home run” across all platforms. Do not use illegal characters

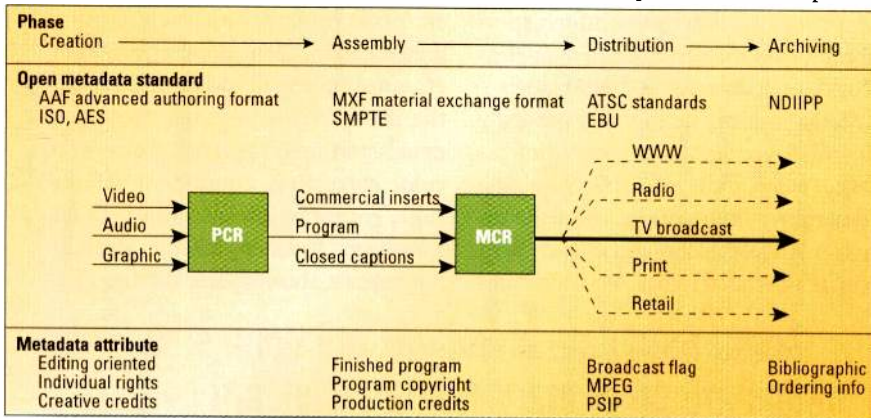


Figure 1. The four phases in the lifecycle of metadata are (essence) creation, (program) assembly, (asset) distribution and (library) archiving. For each phase, the illustration lists associated open-standard metadata formats and offers representative examples of metadata attributes.

through terrestrial, cable or satellite.

Individual program elements can easily be repurposed. For example, an audio clip can be used by radio or streamed on the Web. Individual video frames can be released in print. Clips or completed programs can be repurposed as streaming video over the Web. Video-on-demand services can offer previously aired programs over cable as pay-per-view service. These collateral distribution channels can provide added revenue to the program’s creators.

Archiving

The networked homes (and world) of the future demand instant access to, and retrieval of, any desired media item. Recommender systems that sift through available media metadata to find just the kind of asset you personally like and alert you to its availability are necessary to maximize your use and enjoyment of the abundant media choices. There are efforts underway to expand today’s libraries to media libraries, which the media industry should support. The National Digital Information Infrastructure and Preservation Program (NDIIPP) is an effort by the Library of Congress to build a national infrastructure for the

archiving effort. Television broadcasts, after all, have historical value.

Workflow enhancements

The intelligent implementation of metadata in a MAM system, along with improvements in a digital infrastructure, can increase workflow efficiency and offer other benefits such as:

- Instantly accessible content — everyone can access it as it is ingested.
- Streamlined asset retrieval — intelligent metadata facilitates searches and saves time. You don’t have to

The networked homes (and world) of the future demand instant access to, and retrieval of, any desired media item.

physically track down content.

- Facilitated re-editing — the original edit decisions are stored in metadata and source material can be easily traced and retrieved.
- Facilitated file transfer — not having to reformat files saves a time-consuming step.
- Simplified rights management — DRM embedded in an asset can simplify content rights clearance and payment, save time and ensure full control over an asset’s use.

such as / or @. Whatever convention you decide upon must be applied and enforced enterprisewide or your assets will be unsearchable and virtually lost.

Flattening. As elements are created and assembled, and the finished program is distributed, it is important to include some, but not all, of the metadata pertinent to each phase. This parsing of the metadata is known as flattening. For example, the editing information used during element creation is of no use to a viewer and can be discarded.

Conversely, copyright information is metadata that will have important uses after the program has left the control of the originator and should be persistent. So, while it's always possible to remove metadata, be sure you don't take out information that will be needed later.

Platform and file interoperability. Open standards vs. proprietary implementations are conflicting approaches to metadata standardization. Using different standards can result in an inherent lack of compatibility and cause difficulties when trying to create content with one vendor's application and then working on it with a different vendor's application. Even when different vendors implement the same metadata standard, problems with file compatibility still can occur. If you believe that multiple vendors may be involved in your solution, require them to demonstrate file transfer early.

Digital rights management. At the

heart of the matter is revenue generation, and the key to this is rights administration and enforcement. Rights management of program elements during program creation and rights management of a completed program after dissemination to the consumer are two separate issues. Prior to distribution, copyright is the responsibility of the program originator. Tracking the rights of creative contributors is a legal responsibility. The recently mandated FCC broadcast flag is intended to stop unauthorized copying and distribution of programming once it reaches the consumer. There is an added benefit when repurposing content to other platforms. Copyright metadata must be persistent through all phases of creation, assembly, distribution and archiving.

A tower of metadata babel

Broadcasters can choose from nu-

merous emerging metadata standards. But the interoperability of the available standards is in a developmental stage and has not been standardized. The goal for broadcasters is to coordinate metadata relevance through all phases of program creation, distribution and archiving. This will afford them the opportunity to realize new revenue streams through repurposing content.

For more information about ongoing metadata standardization efforts, visit the following Web sites: www.smpte.org, www.aes.org, www.iso.org, www.ebu.ch, www.pro-mpeg.org, www.atsc.org, www.digitalpreservation.gov, and www.aafassociation.org.

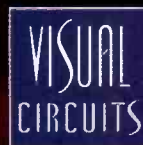
Note: The reflections from Philip J. Cianci in this article represent his own opinions. Photos provided by vendors not necessarily associated with ESPN. **BE**

Philip J. Cianci is a broadcast media engineer at ESPN.

Attend the
Visual Circuits Symposium
Register now:
www.visualcircuits.com/symposium

Your future's so bright.

(It's in the Gemini Card.)



Look closely and you shall see... the Gemini™ Decoder Card from Visual Circuits is your insight to the complex demands of today's video applications. Gemini's advanced features let you seamlessly and simultaneously integrate high-resolution graphics with both standard- and high-definition video. With Gemini, you get superior performance, plus:

- > MPEG-2 and MPEG-4 decoding
- > 32-bit accelerated graphics
- > Multiple regions for video and graphics

The way to satisfied clients is clear. Let our unsurpassed integration assistance help you deliver on time, in spec and within budget.

(800) 250-5533

www.visualcircuits.com



SPECIAL REPORT:

Troubleshooting digital video signals

By Michael Waidson

The transition from analog to digital offers broadcast facilities many advantages to help maintain the quality of the video signal. Once a video signal is in the digital domain, it is immune to many analog phenomena that can diminish signal quality. But engineers need to change some of their familiar practices to cope with digital signals.

Watch out for the cliff

Unlike analog picture signals, which experience gradual degradation, digital pictures can experience sudden degradation. If a transmitted digital

signal degrades beyond the point where you can guarantee its integrity, the received picture will likely disappear suddenly. This is called the "cliff effect." For example, the serial digital interface (SDI) signal is robust, but the fact that the clock is embedded within the datastream can be its Achilles' Heel. If, for some reason, the receiver is unable to recover the clock, it won't recover the video data and, therefore, it won't display the picture. At a digital television facility, it is up to the engineer to maintain the health of the signal and prevent it from falling off the digital cliff.

Stress test

To qualify the installation of a system, you can use a test-pattern generator to apply specific digital stress-testing signals to the system. Figure 1 shows the SDI check field, a specialized, two-part test signal. One part of the SDI check field tests equalizer operation by generating a sequence of 19 zeros followed by a one (or 19 ones followed by a zero). This occurs about once per field as the scrambler attains the required starting condition and will persist for the full line until terminated by the end-of-active-video (EAV) packet. This sequence produces



Pathological test signal

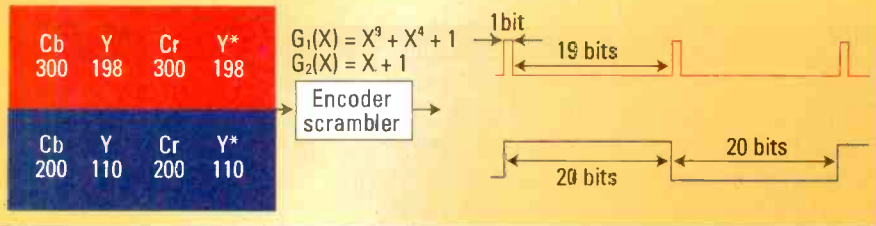


Figure 1. The SDI check-field signal has two parts. One part tests equalizer operation; the other checks phase-locked-loop performance. In both parts of the test, Y occurs with the two chrominance components, while Y* occurs separately.

a high DC component that stresses the analog capabilities of the equipment and the transmission system handling the signal. The other part of the SDI check-field signal checks phase-locked-loop performance with an occasional signal consisting of 20 zeros followed by 20 ones. This provides a minimum number of zero crossings for clock extraction.

Error monitoring

Error detection and handling (EDH) is based on inserting cyclic-redundancy-code (CRC) calculations for each field of video within the vertical ancillary data area. The signal generator sends separate CRCs for the full field and active picture, status flags, and other serial data through the transmission system. The deserializer

then recalculates the CRCs. If the recalculated CRC values are not identical to the transmitted values, this indicates an error. Therefore, you can use this method for in-service monitoring of the SDI signal. Most video equipment now supports embedding of EDH within the vertical ancillary data area. Various waveform monitors and SDI analyzers can provide



Figure 2. The video-status screen available with various waveform monitors and SDI analyzers can provide status reports of the EDH condition and can log errors.

status reports of the EDH condition and can log errors, as shown in Figure 2. These devices present typical error-detection data as errored seconds over a period of time, along with time since the last errored second. If the monitoring equipment reports that EDH errors are occurring often, this is an

status reports of the EDH condition and can log errors, as shown in Figure 2. These devices present typical error-detection data as errored seconds over a period of time, along with time since the last errored second. If the monitoring equipment reports that EDH errors are occurring often, this is an

Measurement	Standard definition	High definition
Amplitude	800mv +/- 10 Percent	(720mv-880mv)
Timing Jitter	0.2UI	1.0UI
Alignment Jitter	0.2UI at 1kHz	0.2UI at 100kHz
Rise,fall time	0.4 - 1.5ns	Less than 270ps
	differ less than 0.5τs	differ less than 100ps
Overshoot	Less than 10 percent of amplitude	

Table 1. SMPTE measurement specifications for the SDI signal's launch amplitude, jitter, overshoot, and rise and fall times.

Today's digital broadcast facilities require an arsenal of monitoring and test equipment and techniques to ensure signal integrity. Photo courtesy of Tektronix.

Measurement	Standard definition	High definition
Amplitude	800mv +/- 10 percent (720mv-880mv)	
Timing Jitter	0.2UI	1.0UI
Alignment Jitter	0.2UI at 1kHz	0.2UI at 100kHz
Rise/fall time	0.4 - 1.5ns differ less than 0.5ns	Less than 270ps differ less than 100ps
Overshoot	Less than 10 percent of amplitude	

Table 1. SMPTE measurement specifications for the SDI signal's launch amplitude, jitter, overshoot, and rise and fall times.

calculates the CRCs. If the recalculated CRC values are not identical to the transmitted values, this indicates an error. Therefore, you can use this method for in-service monitoring of the SDI signal. Most video equipment now supports embedding of EDH within the vertical

ancillary data area. Various waveform monitors and SDI analyzers can provide status reports of the EDH condition and can log errors, as shown in Figure 2 on page 77. These devices present typical error-detection data as errored seconds over a period of time, along with time

since the last errored second. If the monitoring equipment reports that EDH errors are occurring often, this is an indication that the SDI signal is getting close to the edge of the digital cliff. You should investigate the signal path further to troubleshoot the problem.

system, you'll need a waveform monitor that can display an eye diagram of the SDI signal. For accurate measurement, it is important to use a short length of high-quality cable. The monitor constructs the eye diagram by overlaying portions of the sampled datastream until enough data transitions are available to produce the 3-eye display, shown in Figure 3. On some instruments, it is also possible to correlate the eye display to data-word boundaries (10-word for SD and 20-word for HD). This feature is useful for detecting jitter patterns related to parallel-to-serial conversion.

A serial receiver determines whether a signal is a "high" or a "low" in the center of each eye, thereby detecting the serial data. As noise and jitter in the signal increase through the transmission channel, they can close the eye, thereby reducing the usefulness of the received signal.

SMPTE standards specify requirements for the launch amplitude, jitter, overshoot, and rise and fall time of the signal, as Table 1 shows.

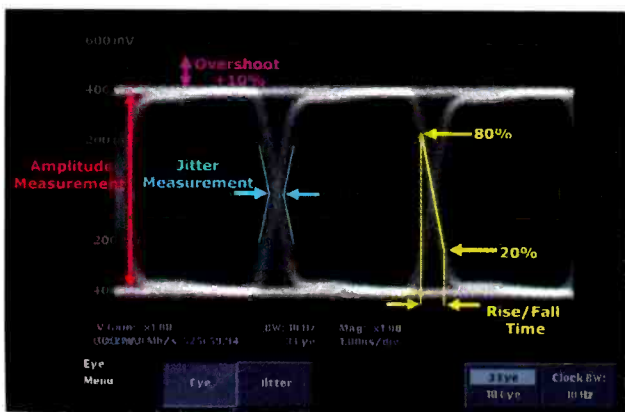


Figure 3. A waveform monitor constructs an eye diagram by overlaying portions of the sampled datastream.

Isolating the problem(s)

To isolate such problems within a digital

Amplitude

Signal amplitude is important because of its relation to noise and because the receiver estimates the required high-frequency compensation

network
the innovator

VIKINX
Flashlink
conquer

Contact Network Electronics
Phone: 800-420-5909
E-mail: ussales@network-electronics.com
11075 South State Street, Suite 27
Salt Lake City, Utah 84070

LATEST TECHNOLOGY

It's a competitive world. You need the latest and the best technology to stay at the top of your game. Our MTBF numbers are industry leading and will give you peace of mind.

QUICKEST DELIVERY

No more waiting! Our huge inventory guarantees speedy deliveries. 50-100 small routers usually ship in 5 working days; 10 routers or less can ship the same day.

FASTEST SERVICE

Through our Advanced Replacement Policy you will receive a new unit BEFORE you send the old one back - no questions asked!

HIGHEST INNOVATION

Need space? Need flexibility? Need expandability? Our compact routers, signal processing products and optical modules address every format in the most configurations available today.

3 YEAR WARRANTY

Worry free! Stress free! Our extensive warranty gives you peace of mind for 3 years. And if you want even more ask about our NET-CARE system that extends your coverage to 5 years or longer.

TOTAL PICTURE

A full range of products to accommodate every need, every format, every budget. Our TSS (Technical System Sales) Group is ready to design your system to suit your requirements at prices you can afford.

ROUTERS • FIBER OPTIC TRANSPORT • SIGNAL PROCESSING

www.network-electronics.com



Competitive Television THROUGH TECHNOLOGY For Stations, Groups & Networks Summit

Faster and leaner:

Using technology to improve
your operations and become
more competitive

Presented by

BROADCASTING & CABLE[®]

BroadcastEngineering[®]

A SPONSORED SUPPLEMENT TO BROADCASTING & CABLE AND BROADCAST ENGINEERING

GOLD SPONSORS

Avid

GV grass valley
A THOMSON BRAND

Harmonic

PINNACLE
SYSTEMS

SONY

SILVER SPONSORS



dalet 
Digital Media Systems


OMNEON
VIDEONETWORKS


PATHFIRE
Enabling Digital Media

SES AMERICOM
An SES GLOBAL Company

SNELL & WILCOX
Engineering with Vision

A letter from the publishers...

New technologies and solutions offer television station management a competitive edge in their own market. From centralizing operations, changing to enjoy the benefits of an IT world, making money from multicasting and high-definition origination, executives find many advances that offer the benefits of operating efficiencies and potential income enhancements.

One of the primary editorial missions of both *Broadcasting & Cable* and *Broadcast Engineering* magazines has been to provide television executives the information they need to incorporate the latest developments into their operations. It is clear that, today, choosing the right technology is crucial to the business success of station groups and networks.

The Competitive Television Supplement is a special project focused on educating television station and network owners, management, and engineering talent on how technology solutions are driving marketplace competitiveness.

This supplement reflects a Competitive Television Summit held Feb. 10 and Feb. 11 in Atlanta. More than 100 top television executives joined leading equipment providers to discuss, explore and find solutions that will improve their competitiveness.

We hope this special effort provides insight that is helpful to the readers of both magazines, as they strive to make their enterprise more competitive and successful.

Regards,

Dennis Triola
Group Publisher
Broadcast Engineering

Chuck Bolckom
Group Publisher
Broadcasting & Cable

Contents...

The central question	3
It's an IT world	12
HD and me	20
Re-thinking broadcasting	28

The central question

Opportunities abound for broadcasters who centralize operations, but they will face old-school challenges along the way.

To station, group and network managers, centralizing operations offers the long-term prospect of significant savings by cutting labor costs and expenditures for recurring consumables (such as tape), improving efficiency and building and maintaining a brand.

But the ultimate Nirvana for television management — one that includes everything from traffic and billing, to preparation and distribution of commercials, syndicated

“The wide-area network is going to revolutionize how broadcast stations work.” - Al Kovalick, Pinnacle Systems

programming and graphics, from the ultimate playback and transmission of content to home viewers, to log keeping and the inevitable make-good — remains illusive.

It's not that the pieces to pull off such centralization don't exist. In fact, many broadcasters currently have centralized one slice of group operations or another. But few have taken the plunge into creating what amounts to a “virtual television station” that is fed and cared for through a wide-area network (WAN) from a central “mothership” group headquarters.

Today, the main question of centralization is: How do stations move from the baseband-video culture

(where discrete operations such as news, management of satellite feeds, commercial and program playback are tied together and controlled from a master-control switcher) to a data culture (where programming content resides in files and discrete station operations exist virtually on a computer network)? Right now, the answer appears to be: one step at a time.

You say you want a revolution

“The wide-area network is going to revolutionize how broadcast stations work,” says senior Pinnacle Systems fellow and strategist Al Kovalick. “Right now it's a little too expensive, but as it gets cheaper, there will be more centralized commercial preparation, syndicated programming preparation, graphics preparation and automation.

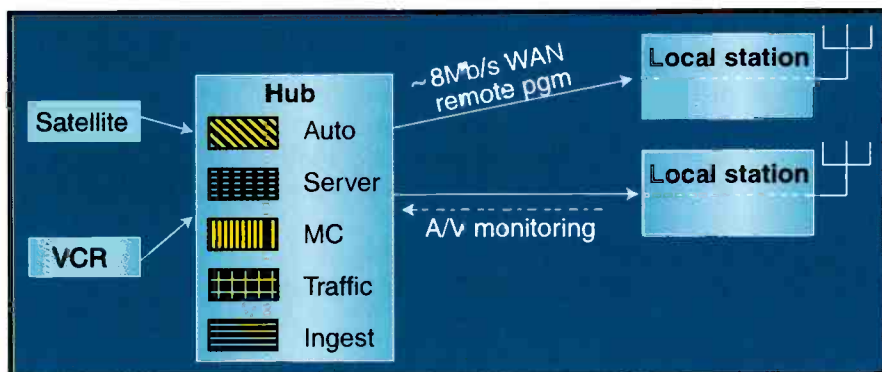
“I've gone to stations where there is nobody in master control, the graphics room or the content-

The model of a streamlined broadcast operation where group headquarters sends content and controls playout to satellite stations in local markets is “a grand view of the world to come,” according to Paul Turner, vice president of product marketing for Omneon. But station groups aren't quite ready to take the plunge.

“In reality, station groups are working with best of breed,” he explained. “The idea of centralcasting is very attractive. The manned station is a hybrid approach. The idea of moving material as data is becoming extraordinarily attractive to broadcasters, but physical playout is still manned.”

WANs impact centralization in two ways, according to Glen Sakata, director of sales for broadcast and telecom at Harmonic. “There are totally separate reasons to connect in a centralized system.

“One reason is business — that is, sharing traffic and skill sets,” he



In the 100 percent centralcasting model, most programming originates from the hub “mothership” group headquarters and is sent to individual stations over a WAN. Drawing courtesy Pinnacle Systems.

preparation area. It's happening today. Stations may be doing one or two, but not all of them, yet.”

said. “In one station, a certain skill set might be great, and in another station in the group it may not be

so good. On the other side of it, you might be sharing material — real-time material — and moving it to air in real time.”

According to Snell & Wilcox’s Joe Zaller, using WANs in broadcast can make television production more

efficient. “File-based facilities using networks are the key to dramatically improving workflow in the making of television programs,” he said. “Today’s production methods are wasteful and inefficient. The networked facility is the beginning of

a new era that will transform production processes.

“Wide-area networks also offer a centralized way to monitor and control an entire broadcast facility. Our company’s RollCall technology uses a network to control the entire facility’s ‘smart’ infrastructure from a single PC. The value of this network technology is immense, saving hours of engineering time.”

What’s to centralize?

Opportunities abound for station groups to centralize operations.

Graphics creation

Rather than relying on CG operators and graphic artists at individual stations, centralizing graphics production at group headquarters offers several advantages:

- Consistency in look and feel across all group stations
- Better quality control and greater accuracy: This approach limits points where errors can be introduced to one.
- Flexibility: Through the use of MOS in news systems, centrally generated lower-thirds can be updated by journalists, even during breaking news.
- Cost savings: Reduces redundancy of hardware and personnel

Program and commercial preparation

Centralizing syndicated program and commercial preparation at group headquarters:

- Eliminates redundancies, such as taking down satellite feeds at designated time
- Reduces preparation requirements, such as marking in and out points, by allowing one central staff to do the work previously done at each station
- Transforms traditional push method of program distribution to a pull approach where satellite stations can download material at convenient times
- Saves in outlays for hardware and personnel

News production

- Improved efficiencies in multiple areas, including presence of unlimited copies of source material
- Greater journalistic control over content
- Redistribution of redundant news resources to magnify news reach
- Improved cataloging and archiving
- Cost savings in personnel and equipment

Automation, traffic and billing

- Centralized quality control and assurance
- Efficiency and cost-savings enhancements
- Automated billing on a groupwide basis for stronger centralized management control

Central advantages

Centralizing and automating production and distribution activities offer benefits in several areas, including news, sports, graphics, and distribution of commercials and syndicated programming. While centralization in all these areas improves efficiency and cost savings, many of the benefits are specific to the individual task.

Centralized news operations can reduce news-staffing costs, tape expenditures, and the amount of time and money needed to manage satellite feeds. The work Dalet is doing for Prime Television in Australia demonstrates the benefits of centralization in news production.

“We provided a system with a single database hosted in Canberra, where Prime Television’s headquarters is located, that could hold storage at all of their broadcast sites,” explained Thomas Zugmeyer, product manager in charge of DaletPlus Media Library.

“We set up small servers at the remote bureau that uses journalists’ hard disks for content,” Zugmeyer explained, “and sent finished packages to bureaus to be produced and sent to the broadcast site where they need to be played out.”

“So, basically, we are producing what they had done before when it was sent by satellite as DV. Now, everything is transferred as files over an IT network. They (Prime Television) is taking advantage of that to bring down costs.”

In graphics, centralization can reduce personnel, assure a consistent

look across an entire station group and improve accuracy. "Centralized graphics production minimizes mistakes," explained Turner at Omneon. "It guarantees a look and feel across the entire station group, and it does so without a graphics operator at each station."

Centralization of graphics lets a station group select its most talented artists to work from one location where they can create templates for promos and news graphics such as lower-thirds and station identifications. From their central location, the templates are sent as files to satellite stations, which complete them by inserting each station's call letters and network-affiliation logos or news titling.

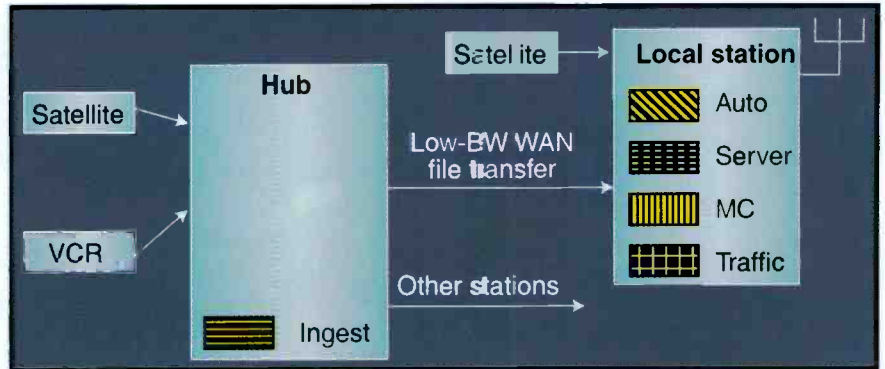
"You look around and wonder, 'Why are we doing this? Why do we need 20 stations with all this equipment and all of these people?' " -Glen Sakata, Harmonic

Centralized graphics are also easier for a station group to analyze in terms of workflow and use, said Bruce Lane, Thomson director of applications engineering.

"By centralizing," he explained, "it's possible to analyze the workflow to make sure you are as efficient as possible. Then you can look after the fact at graphics usage to analyze if you are providing too much or too little support.

"You can go back and do an analysis on a station-by-station basis. Because it is centralized, you can see who is using the graphics the most and determine which type of graphics are used most and why."

Given the number of commercials and amount of syndicated



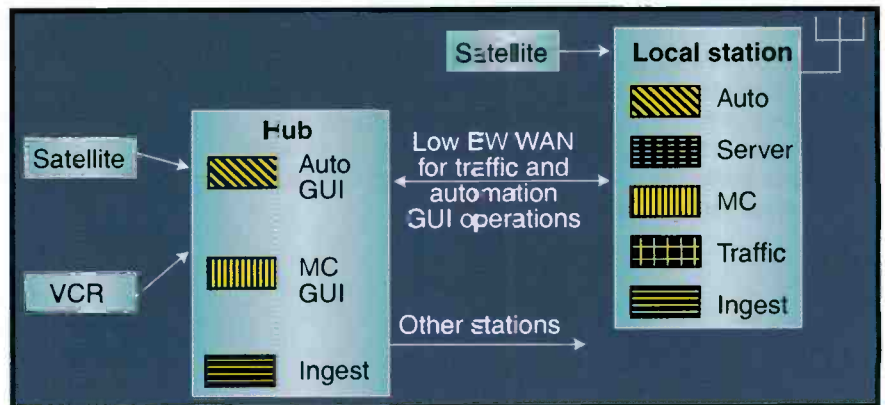
In the centralized content aggregation model, most non-live content needed at individual stations is captured, prepared and given a quality control check at the "mothership" hub. Files are transferred to remote servers via a low-bandwidth WAN. Drawing courtesy Pinnacle Systems.

programming that stations receive, it's no wonder station groups are looking to WANs to lower costs.

"The popularity of servers in broadcast environments is driving a desire to simplify the delivery of programming — syndicated, spot and news — into broadcast facilities," said Zaller of Snell & Wilcox. "Centralized delivery systems are born of need to simplify and smarten the ingest process — if for

played off that tape again. Once a single ingest is complete, it can be made available to everyone in the centralcast system."

"At your group's 20 stations, whenever they are going to download a show, you have 20 stations each with a satellite dish, each with a tape operator, all marking in and out points," said Glen Sakata of Harmonic. "That happens 20 times for each feed throughout the group.



In the centralized personnel model, the automation and master control systems of a remote station are operated by personnel at the WAN. Typically automation control hardware is at the local site and controlled remotely. The remote site has a person for ingest, preparation and quality control.

no more reason than there are fewer people available to handle the inefficiency of multiple media formats.

"If you ingest once and store the content on a server and make it available to multiple outlets, you never have to do the same process again. So if a program or spot comes in on tape, it will never have to be

Harmonic's Sakata illustrated the efficiencies of centralizing syndicated program distribution by describing a hypothetical 20-station group licensed to broadcast the show on each station.

"You look around and wonder, 'Why are we doing this? Why do we need 20 stations with all this



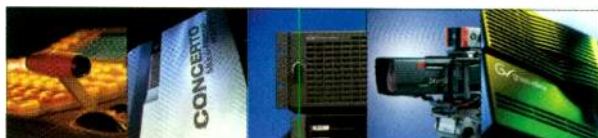
And you think they're fanatics?

There's a purpose to our passion

At Thomson our passion is your product, whether it's sports, news, live, or dramatic production. In fact, we're downright fanatical about it. From engineering to field testing to support we put the world's best tools at your fingertips.

Our line of Grass Valley™ products is one of the most trusted in broadcasting. And with good reason. With 19 technical Emmy® awards, our worldwide research and development effort is unparalleled. And we are constantly working directly with customers to create features and products that meet their current needs and grow with them in the future.

It's why you'll find us in some of the world's largest multi-format broadcast facilities. In fact, from major sporting championships to high-profile commercials to the most glamorous award ceremonies to all-digital newscasts seen by millions, the world's media leaders have chosen Grass Valley products from Thomson because they won't settle for less.



Setting standards on principle

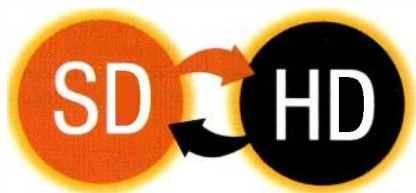
Every HD product with our name on it adheres to a common set of principles:

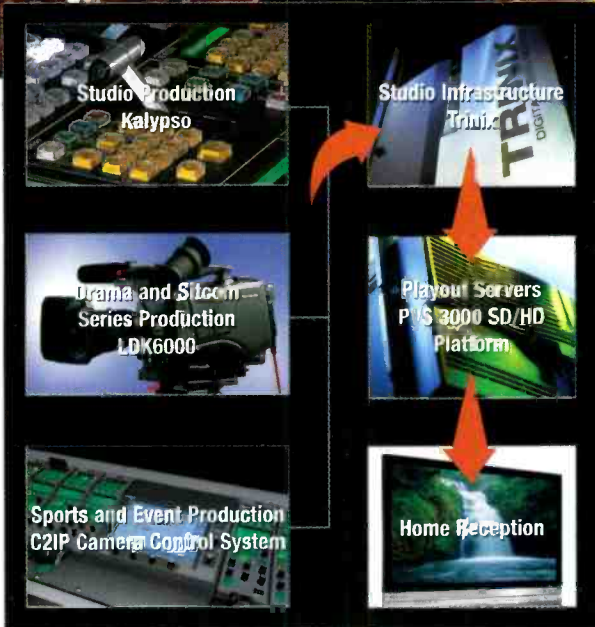
- It must support multiple formats, or be truly format and resolution dependant
- It must be prepared for the future by being switchable, configurable, or easily upgradeable
- It must deliver superior quality images and/or sound
- It must be feature-rich and fully capable so as to exceed the highest industry benchmarks

Step up and win

Wherever you are in your digital transition, we have the tools, talent, and expertise to make it a smooth one. You can choose an SD switcher, like the Kalypso™ Duo Video Production Center, and upgrade it via software to HD whenever you're ready. Or get your hands on a camera like the LDK 6000 mk II WorldCam that lets you capture true progressive HD images, natively, in multiple formats and frame rates, using three 9.2-million pixel HD-DPM+™ CCDs for the highest quality images available.

Media leaders worldwide are leveraging Grass Valley HD solutions because they want to bring their "A" game. They know that if they want to compete with the best content possible, it's imperative to demand the best.





The de facto standard for mobile production

Today, our Grass Valley line of products is emerging as the de facto standard for mobile production. Over the last year, more mobile production companies in the U.S. and Europe standardized on our equipment than any other manufacturer. Some of them include:



New HD and SD Modules for the Kameleon Media Processing System help you transition your facility to HD.

- Alfacam
- Cinevideogroep
- Colorado Studios
- Dome Productions
- Media Mobil GmbH
- National Mobile Television
- NEP Supershooters
- New Century Productions
- Trio Video
- Visions

Multi-format and future-proof

Our strategy is to develop products that can meet your SD needs today, while protecting the path to your HD future. Need proof? Just take a look at our products, which offer the industry's broadest support for true multi-format switchability and future-proof designs. They include:

- New Kayak™ HD 1 M/E digital switcher
- New Maestro™ next-generation SD/HD branding and master-control system
- New HD and SD additions to the Kameleon™ Media Processing System modular product line
- LDK 5000 camera, field upgradeable from SD to HD
- LDK 6000 mk II WorldCam, a highly popular choice for multi-format production
- PVS 3000 Profile® XP Media Platform SD/HD server
- Kalypso Video Production Center and XtenDD switcher lines
- Trinix™ SD/HD digital video router
- Concerto™ Series multi-format video and audio router
- Apex digital audio router, the highest density and most reliable for large-scale infrastructures

Committed to winning

After introducing more than 25 new products last year, you'd think we'd call a time out. But we won't wait for the next big thing. Not only are we committed to being at the forefront of the industry, but we want to ensure that our customers can rely on us to provide high-performance, cost-effective, scalable, multi-format solutions.

Our goal is for you to win. And to win, you need a partner, not just a technology company. Regardless of how you develop or deliver your content, we have solutions that fit the way you work.

And when you buy Grass Valley products, you get more than world-renowned quality. You hire the most knowledgeable support team in the industry—highly trained professionals who can support you, from installing new equipment, training your technicians or simply reducing long-term maintenance costs. In other words, we're on your team.

To find out more, see us at www.thomsongrassvalley.com

equipment and all of these people? We need two — one for backup. And two is a lot less than 20.”

As an alternative, distributing commercials and syndicated programming as files across a WAN allows a station group to post material when it becomes available. Individual stations can then download the content as scheduling allows, thus transforming a top-down push process to a pull operation that gives individual stations more control.

WAN distribution of commercials and syndicated programming is more robust than traditional methods and reduces the amount of quality control needed. “Distributing programming by file transfer cuts down on the amount of quality checking that’s required,” said Kovalick of Pinnacle Systems. “When you transfer video, say via satellite to stations, you have to do a lot of quality-assurance testing for dropouts. If there’s a problem, such as a rain fade in a satellite transmission, the video has to be re-transmitted. PBS is doing file transfer to stations, and they can allow for a 20-minute dropout. It’s built into the transfer protocol.”

The benefits of centralization are even touching the sports production slice of the broadcast business. Aside from the sports-highlight shows — which are scripted much like news programs and can benefit from comparable centralized control over content creation, storage and playout — live sports production is benefiting from centralized control and IT technology in some interesting ways.

“The thing about sports automation,” explained Turner of Omneon, “is that much of the statistical analysis is being generated through data mining. The ability of the graphics packages to go to databases and generate graphics in response is being exploited in sports production.

“ESPN owns a statistics database, as do the NHL, NBA and NFL. They all have their own. These guys have anything about any team and

anybody. The graphics systems are mining from these databases.”

Anyone who’s watched football recently is familiar with the on-screen results. “Now we are seeing the line-of-scrimmage marker and graphics zones that illustrate the kicker’s completion-success percentage from 20 yards, 30 yards and 40 yards. Those graphics are the result of data mining,” said Turner.

Box scores on Fox Sports and CBS Sports coverage are generated in a similar way. “The information comes literally and physically off the scoreboard at the stadium. They take that physical information that someone is feeding into the scoreboard and feed it back to CBS or Fox. A

computer constantly culls through that information and looks for changes, and the score box pops up. That is a good case of WAN-based connectivity,” said Sakata.

Remember the future

One day in the foreseeable future, walking into a television station may be reminiscent of walking through a ghost town. Where once the master-control operator sat behind his board similar to a saloon-hall piano player calling the tunes, servers will flash their drive lights and whirl their hard drives. They will sit on the WAN taking in files containing commercials and programs, network feeds, local news stories, and

Approaches to centralization

Centralizing broadcast operations means different things to different people. However, all centralization can be broken into three parts, or categories. Understanding a little of each can help in charting a path for a more-efficient, profitable future.

100 percent centralcasting

Think network operations center (NOC) and satellite stations, or group headquarters and owned stations. In this model, most or all of the satellite stations’ programming (sans local news) comes from the NOC. There’s no master-control operator at the satellite stations; however, there is local news production. Considerations of using this approach include WAN costs and reliability, which can be enhanced with mirror servers.

Centralized content aggregation

Nearly all non-live content used at satellite stations is captured, prepared and given a quality-control check at the NOC. Using a low-bandwidth WAN, content files are transferred to file servers at satellite stations. This does not require big servers and is easy to implement.

Centralized personnel

Personnel at the NOC control all automation and master-control systems for the satellite stations. Typically, the real-time hardware needed for automation control is located at the NOC. At the satellite stations, a person is responsible for ingest, preparation and quality control. This means that personnel at the remote site, excluding news, are reduced to one.

Information courtesy of Pinnacle Systems senior fellow and strategist Al Kovalick.

run lists from station group headquarters and play it all back with cold precision.

Harmonic's Sakata prefers a more contemporary analogy for what is about to happen. "The stations doing centralization today and tomorrow are still basing everything on the operational paradigm of the past," he said. "There are no completely tapeless environments at TV stations yet.

"When all is said and done, when there really is a tapeless facility, there will be a dramatic shift in centralization. And it will be the same transition that occurred 10 to 15 years ago in radio. There is no tape in ra-

dio, and no people operating it. Most things are centralized.

"We've gone from master-control automation controlling separate tapes in separate tape decks to giant cart machines. The next step was to cache it into a video file server.

"All of that legacy will come to an end and move onto a different architecture, and it will look a whole lot more like radio," said Sakata.

Whether or not the transition to centralized operations actually goes that far, one thing is certain. Even in a time when the FCC has renewed its interest in reminding stations of their commitment to local-

ism and has organized a task force to assess how well broadcasters are serving their local markets, the technology of television will increasingly pull control over stations to a central, remote group headquarters.

Such consolidation of station operations at group headquarters could appear to fly in the face of the FCC push for localism, but it may bolster the position of broadcasters in serving their local community. It could free up financial resources and make them available for increased production of local news coverage, information services and public-interest programming. ●

RollCall control is central to efficiency improvements at Turner, WTOL-DT

Wide-area networks offer a centralized way to monitor and control an entire broadcast facility. Turner Broadcasting in Atlanta and WTOL-DT in Toledo, OH, are two broadcasters that rely on the same technology to reap those rewards but on dramatically different scales.

Both use the Snell & Wilcox RollCall software and IQ input/output, control modules to direct their facilities' "smart" infrastructure, saving hours of engineering time.

At Turner Broadcasting, more than 7000 IQ modules are in operation, touching every aspect of Turner's operations for more than 20 networks. Despite the

complexity of this system, all Snell & Wilcox equipment at Turner can be controlled centrally from a single computer with the company's RollCall control and monitoring software. The benefits Turner

realizes include greater efficiency, cost savings, time savings and improved operational efficiency.

The Snell & Wilcox digital infrastructure solution may be of even greater importance to small broadcasters. At WTOL-DT in Toledo, OH, a much smaller RollCall and IQ installation is used for digitization, monitoring and control. WTOL-DT has achieved similar results to Turner in terms of quality, reliability and efficiency gains.



At Turner Broadcasting, Chuck Armitage uses one of more than 7000 IQ modules, allowing the Snell & Wilcox RollCall software to control and monitor equipment needed to keep more than 20 networks on the air.

©2004 Avid Technology, Inc. All rights reserved. Product features, specifications, system requirements, and availability are subject to change without notice. Avid, Avid Technology, Inc. in the United States and/or other countries. All other trademarks contained herein are the property of their respective owners.

Across

6 continents

In more than

35 countries

Proven at more than

125 end-to-end installations

Found in more than

750 broadcast facilities worldwide

Used daily by more than

70,000 broadcast professionals

Custom set design by BROADCAST DESIGN INTERNATIONAL, INC www.broadcastesign.com



The numbers are in.

In an industry where numbers mean everything, Avid has delivered more all-digital, end-to-end news production systems than all of its competitors combined. Avid helps broadcasters improve the number that matters most – the bottom line.

Networks. Affiliates. Cable. Large, medium, and small markets. Around the world, more and more broadcasters are turning to Avid for a competitive advantage through integrated media asset management, editing, storage, and newsroom solutions:

- Designed to deliver true, real-time collaboration through seamless connectivity
- Integrated through an open, high-performance media network architecture
- Trusted by the people who make news happen
- Available today, engineered for tomorrow
- Find out more at www.avid.com/broadcast

It's an IT world

Television is on the cusp of a radical change due to IT, which offers unimaginable efficiencies in production, distribution, traffic and billing.

It's funny how things can change in an instant. Take the Yucatan peninsula 65 million years ago. One day dinosaurs were lumbering along, munching away on the verdant landscape or, in some cases, each other.

The next day, a giant rock from space slams into what is today the village of Chicxulub, Mexico, in-

**"Where possible use industry available components to build your system."
-Bruce Lane, Thomson**

stantly killing everything for hundreds of miles. Thanks to the millions of tons of debris thrown into the atmosphere, the repercussions of that cataclysmic event wiped out most of the life on Earth and restacked the evolutionary deck.

Fast forward to today's typical television station. Each day, CG operators, graphic artists, maintenance techs, tape-machine operators, billing staff and traffic managers lumber through station hallways to their offices or work areas. They do their jobs; they earn their pay; they eat their lunch. Then one day, the nemesis arrives—not in the form of a computer, a server, a network router or a WAN.

"Adoption of video over an IP connection completely changes everything at television stations," said Glen Sakata, director of sales for broadcast and telecom at Harmonic. "Two

years ago, this was on no one's radar screen. Now it's on everyone's."

Forget formats, think files. So long tape machines. Hello, file servers. Machine automation, gone. In its place, network controllers and routers. Bye, bye coax. Come right in, Ethernet—big, fat broadband Ethernet and Fibre Channel. Hasta la vista cassette labels. Hola metadata.

The IT revolution is upon the industry, and it is unleashing a titanic shift in how television will be done. To those who are curious and willing to adapt and evolve, the IT changeover at stations presents more than opportunities to improve efficiencies and realize cost

savings. It demands growth and develops leadership.

"Certainly IT will continue to grow in importance when it comes to the entirety of station technology," said Pathfire vice president of strategic broadcast solutions Steve Flanagan. "Even transmitters have IP addresses. The video engineers need to expand their knowledge base."

Who's in charge here?

No one believes station operations will remain how they are. The question appears to be will IT swallow those operations whole, or will the station's existing technical staff



IT-based infrastructure will touch every facet of station operation, including news production. Here one of several Grass Valley NewsEdit systems is used to assemble a story at WJAR-TV in Providence, RI.

become the IT staff, as well?

"The best, most experienced technical managers will run the station, as they do now," said James Frantzreb, Avid Technology's senior product marketing manager. "The technology in place at stations will

"Project where you are going to be in two decades and put infrastructure in place that you can easily upgrade ..." -Joe Zaller, Snell & Wilcox

rely more and more on IT-type networking enabled for digital media, so knowledge of IT and proper IT infrastructure is certainly important. The broadcast engineering profession is steadily becoming more IT savvy, so perhaps you could say they will be the IT guys."

"There will be a gradual merger between engineering and IT," said Thomas Zugmeyer, product manager in charge of the DaletPlus Media Library. "If you talk today about a network to a broadcaster, he understands SDI baseband. But gradually, he will talk about Fibre Channel and Ethernet."

But in the view of Al Kovalick, Pinnacle Systems' senior fellow and strategist, placing control over technology in the hands of IT people is a fait accompli in some broadcast organizations already. "PBS is already this way. At the mothership in Alexandria, VA, the CIO runs the technical side of the house, and he is an IT guy," he said.

However, there is a cultural difference between the IT world and the broadcast world, according to Harmonic's Sakata, that should give broadcast engineers with IT knowledge comfort. "Quality of service of video has to be perfect, and a tradi-

tional IT guy can't get his hands wrapped around that," he said. In other words, at the end of the day in television there is a deliverable program that gets broadcast. "IT guys aren't used to operating in that mode," he said.

"The most successful stations," Sakata said, "occur when an IT group reports to the vice president of engineering and an us-vs.-them attitude is never allowed to take hold."

Regardless, for the IT transition to be successful broadcast engineers would be well-advised to go to school on IT. "Recognize that IT is a new technology for broadcasters," said Joe Zaller of Snell & Wilcox. "No traditional engineer is expected to be an instant IT expert. This transition will require re-education for many engineers. Choose a trusted manufacturer with proven expertise to help solve specific problems during a facility upgrade.

"Broadcasters should not see IT as a panacea but as a way to make them better at what they do. But they must recognize that broadcast requires real-time deterministic systems and IT cannot always promise and provide these. That's why Snell & Wilcox makes systems that are IT- and metadata-aware today — and work in real time as required by broadcasters."

Infrastructure

Whether it's the IT department or the television engineer wearing the IT hat, the goal remains the same: developing an IT infrastructure that's robust enough to handle the demands of television, flexible enough to accommodate legacy equipment and secure enough to stave off malicious viruses and worms.

Building flexibility starts with optimizing for media, according to Avid Technology's Frantzreb. "You start with a media network, which is a network optimized specifically for handling digital video and audio, and supporting nonlinear workflow.

"High bandwidth, in terms of the ability to support multiple simultaneous high-resolution streams for a variety of different applications, is the single most important capability a media network should have — but by no means the only one.

"Unrestricted shared access to media is particularly important for broadcast environments. A real-time-oriented media-asset-management system is also a key infrastructure component for providing a variety of additional capabilities."

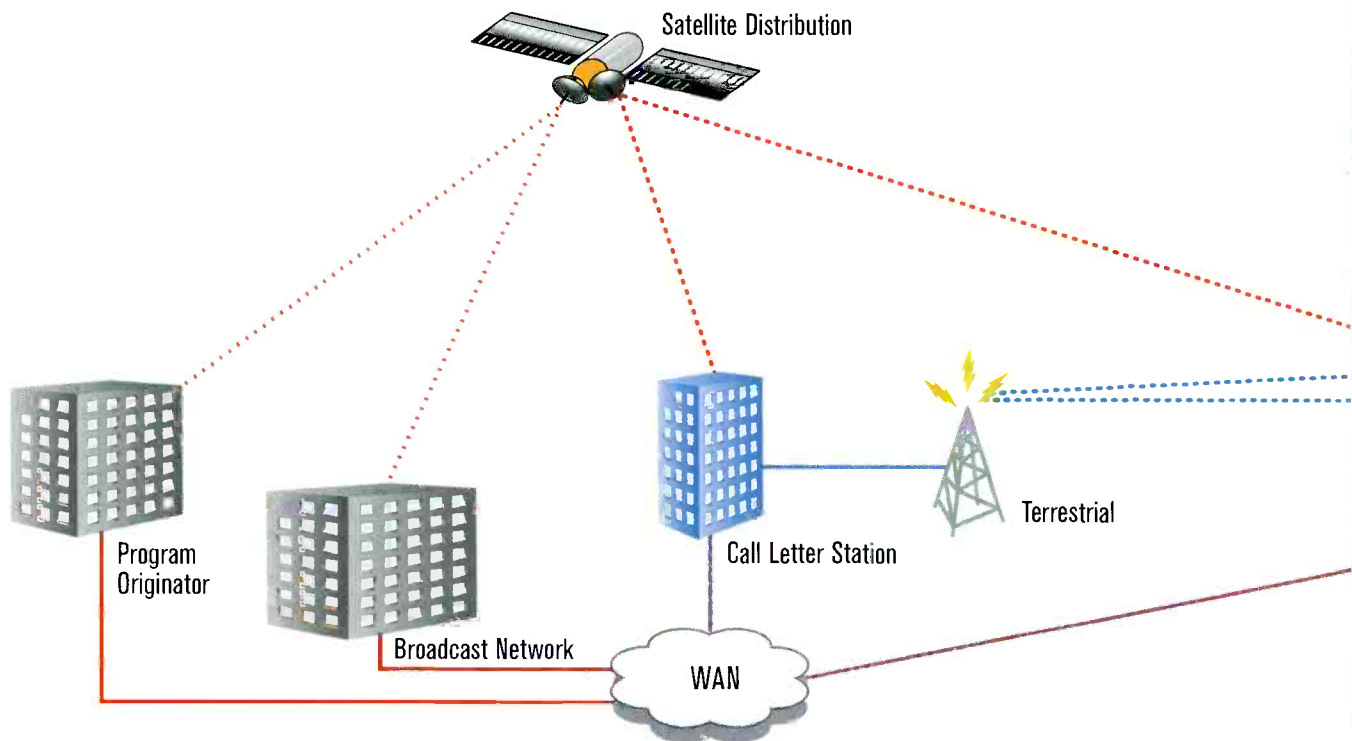
On an even more fundamental level, flexibility demands a re-orientation of attitudes toward television. "Embracing changing methodology of store-and-forward technology with delivery of digital assets allows deeper migration of content and metadata into the station, which streamlines workflow," said Pathfire's Flanagan.

On a practical level, Paul Turner, vice president of product marketing for Omneon, suggested bandwidth. "You need the biggest pipes possible," he said. "My advice to anyone putting in an IT infrastructure is to go for Gig-8 if you can afford it. Bandwidth is rather like hard drive size. No space goes unused. That is human nature. There are a lot of facilities running on 100Base-T for testing and moving low-resolution proxies. Gigabit Ethernet is endemic, and 10 Gigabit Ethernet and 100 Gigabit Ethernet are being contemplated. Gig-8 is not that expensive anymore."

Planning for the future should also be the aim of any infrastructure design. "Start with an open mind and plan on building a broadcast infrastructure that will last for up to 20 years," said Zaller of Snell & Wilcox. "Project where you are going to be in two decades and put infrastructure in place that you can easily upgrade for those future needs. If you are still SD today, plan for HD tomorrow. It costs much less in the end."

Finally, when considering IT infra-

More than 20 Million



DISTRIBUTION

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

TELEVISION STATION OPERATIONS

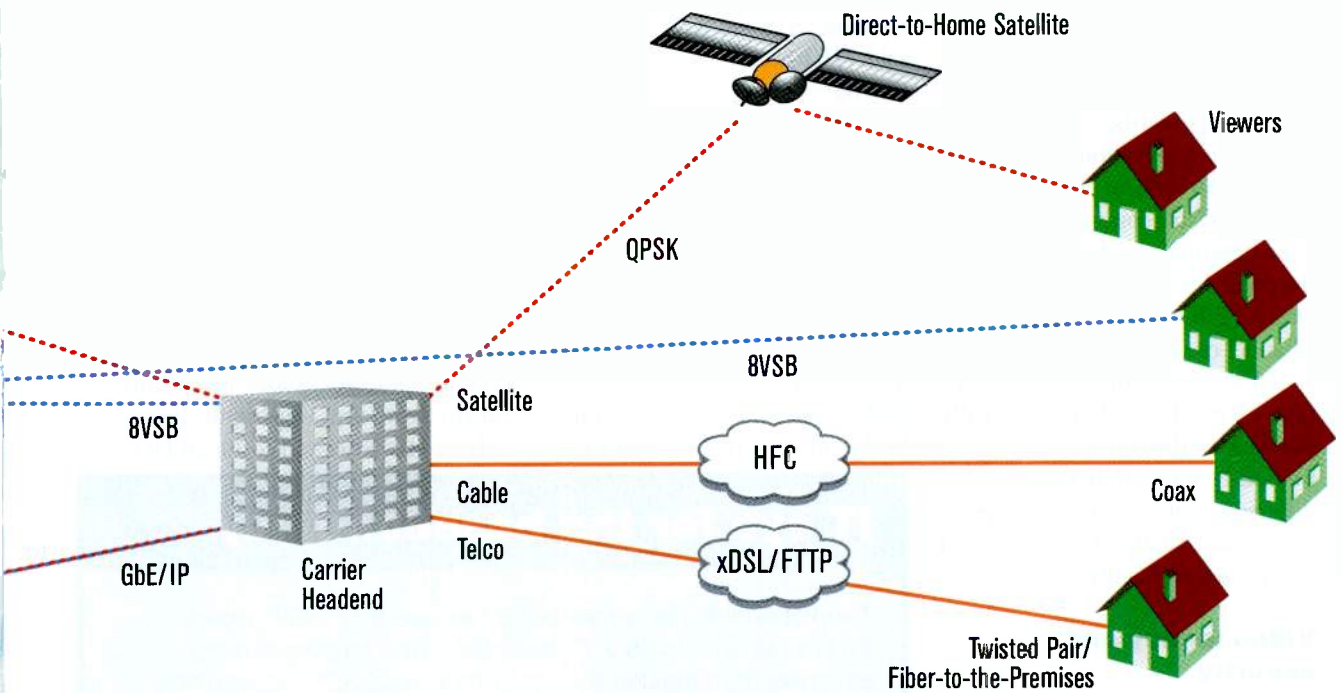
- Industry Leading HD and SD Encoding
- Closed-loop Statistical Multiplexing of VBR HD, SD and Data in a Single Pool
- Digital Program Insertion (DPI)
- System Mode Changing
- Multiple Video Transport Options
- Digital Service Management

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, no matter what you offer today in the digital domain, Harmonic 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. Every day 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.

U.S. Households GET IT



CARRIER HEADEND

- HD and SD Digital Turnaround
- Industry Leading HD and SD Encoding
- Advanced HD, SD and Data Multiplexing
- Rate Shaping
- Digital Program Insertion (DPI)
- HD and SD Video-on-Demand
- Smart Edge Devices
- Multiple Video Transport Options
- Digital Service 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 digital video solutions. The practical way to succeed in the digital (and real) world.

Call us or visit: harmonicinc.com to discover more.



structure remember to draw on the strength of broad industry acceptance. "Use and depend upon industry standards," said Thomson director of applications engineering Bruce Lane. "Where possible use industry available components to build your system. If you look at many of the products we build and support, we have Ethernet capability on Fibre Channel or Gigabit Ethernet.

"All of our products take advantage of products that are readily available in the consumer industry, but understand that there's a big difference between a \$50 Ethernet switch and what needs to be used in a broadcast facility."

Video legacy and security

For the foreseeable future, IT and video technology will coexist, even if the role of baseband video wanes with each passing year. If a station were starting from scratch, its design would center on IT, said Dalet's Zugmeyer. "But that's not what broadcasters want because they have an installed base," he said. "They are not going to put all their eggs in one basket. The changeover to IT isn't going to happen overnight."

Accommodating legacy video equipment isn't difficult, according to Avid Technology's Frantzreb. "It is not hard for the synchronous signal and asynchronous file-based fabrics to coexist at a station. There are several crossover points, such as VTRs with asynchronous outputs, servers and control systems. Sometimes it makes sense to replace some legacy analog equipment with digital file-based systems."

That replacement will accelerate. "Right now it is a combination," said Pathfire's Flanagan. "Clearly it's headed in the IP direction. But it won't ever be 100 percent IP. There will be certain monitor wall functions that will remain baseband, but certainly for non-real time, everything will move to IP."

"There's always a speed vs. cost

trade-off as technology evolves," he said. "That is the kind of conundrum that has to be checked annually. Has the new technology been reduced in cost enough that it makes sense to use? You should have the fastest connectivity you can afford."

In the view of Snell & Wilcox's Zaller, discrete islands of technology will exist as the conversion unfolds. "There will long be analog islands, SDI islands, file-based islands," he said. "Build a solid infrastructure to bridge those islands. As your needs

change, adapt your infrastructure to accommodate new solutions.

"Islands will exist in broadcast plants for many years to come. The trick is to create an infrastructure that can easily adapt and grow with them. That's a key area of expertise at Snell & Wilcox.

"Snell & Wilcox has a long history of bridging these types of transition for its customers. Today, broadcasters are undergoing four transitions at the same time: analog-to-digital, SD-to-HD, baseband-to-file and tra-

IT eye for the baseband guy

Tired of feeling like a baseband Neanderthal? Well, maybe it's time to update your IT essentials. And nothing is more essential than making sure your rock-solid SDI expectations are met with IT technology.

While SDI dominates frame-accurate switching between synchronized sources — and will for the foreseeable future — the benefits of using Ethernet in other non-live applications can be enjoyed without the worry of A/V data jitter resulting from LAN and WAN connections, disc latency, IP routers, data servers, and other sources.

Through the use of proper data buffering, IT equipment can deliver and process A/V data error-free in real time. With proper system design and the right equipment, the use of buffering will correct A/V jitter and go undetected by the end user.

Often three types of buffers are used:

- The look-behind buffer stores A/V material that has just been ingested. It is elastic, filling at a constant rate from the video input and emptying somewhat erratically as data is written to a storage array. As long as the buffer doesn't empty or overflow, all input data will be saved.
- The look-around buffer protects from access irregularities in applications, such as editing where a user needs to bounce back and forth between a narrow range of frames. A local buffer smoothes out the sluggishness that would be present if jogged frames had to come from a remote server. Such smoothing is essential when several users access the material across a WAN.
- The look-ahead buffer is used in signal playout devices. This buffer is filled with a few seconds of material prior to playout and empties at a regular rate.

Information courtesy of Al Kovalick, Pinnacle Systems fellow and strategist.

SONY

THE XDCAM SYSTEM. AN INNOVATION THAT COMPLETELY REDEFINES THE WAY WE WORK.



Edit in camcorder

After decades of recording on tape, professionals are discovering the sweeping significance of the XDCAM™ Professional Disc™ system.

XDCAM recording redefines speed, rushing low-res "proxy A/V" into an editor at up to 50x real time. Not to mention the ability to edit on the spot in the camcorder. The XDCAM system redefines video by recording your clips as MXF data files, inherently friendly to IT networks and IT storage. And XDCAM recording redefines robust with a bump, jolt and shock-resistant laser transport protected by Sony's 7-year "powertrain" warranty (see actual warranty for details).

There's so much more to the story. You'll be amazed by the revolutionary, affordable, reusable Professional Disc media. You'll choose from DVCAM® or MPEG IMX™ codecs, shooting in interlace, progressive or 24PsF. And you'll command multi-megabytes of metadata.

You owe it to yourself to experience the XDCAM system, an innovation so powerful, it's a whole new way to *Work Smart. Work Sony.*



Finish faster with Proxy A/V



Video as data files



VISIT WWW.SONY.COM/XDCAM

ditional broadcast infrastructure to file-based infrastructure.

"The key thing to understand is that there is not one answer out there, since each broadcaster is at a

**"To protect news editing systems from the hazards lurking on the Internet, limit port availability."
-Bruce Lane, Thomson**

different point on the continuum of transition. What broadcasters need is the peace of mind that they can make purchasing decisions today that will solve their immediate issues and also help them move toward the file-based future."

Protection

Broadcasters contemplating IT may feel a little queasy about the prospect of a worm or virus gnawing at their content or knocking their commercials off the air. But they shouldn't, said Omneon's Turner.

"When was the last time you heard Bank of America went down because of a virus or worm?" asked Turner. "If you want to see 24-hour reliability, look at Wall Street. The technologies are out there to protect mission-critical operations. To an IT guy, this is no different than the normal workday issues in any computer network."

Isolating various LANs that are used at the station and reducing points of entry to the Internet to one are among the strategies to use, suggested Pathfire's Flanagan.

"We think that due to security and throughput concerns, for the time being the separate LAN has a good strong place," said Flanagan. "We don't want the general manager's secretary's PC to affect master control. We still



The Turner Cartoon Network uses Snell & Wilcox RollCall terminal technology in the short-form ingest station to centralize control and monitoring functions.

see a lot of separate LANs. There are business LANs and e-mail LANs and little connection between them.

"What we are seeing many broadcasters do is a single point of entry from the outside world with a very strong firewall."

"Keep the LANs separate," Pinnacle Systems' Kovalick added. "Get the news system isolated from viruses, and maintain really good quality of service. All of this segmentation is really great, but it doesn't mean you can't get files in and out. You just have to do it through gateways where there is a control."

In the view of Thomson director of applications engineering Bruce Lane, separate LANs will be used at stations for the foreseeable future. "Playback automation needs to talk to traffic," he said. "News editing needs to talk to the newsroom computer system.

"They will be on their own LAN, but through a facility router they

will be able to talk to each other. They will be limited to appropriate communication and provide appropriate protection against viruses and spy ware."

To protect news editing systems from the hazards lurking on the Internet, he advised, limit port availability. "Journalists need access to the Internet, but in no way do I want Internet with access to my news editing system. Through the use of IP routing, I very heavily limit port availability, whether it's one direction or bidirectional, the type of communication and the access."

Adequate protection of files from malicious worms and viruses will ensure that the product of the cataclysmic IT explosion at television stations will deliver improved productivity, lower overhead and greater profits, not a primordial soup of corrupted content, missed commercial playback and misgivings about the changeover. ●

SONY.

THE SONY SWITCHER FAMILY. #1 IN LIVE HD PRODUCTION.



480i
480p
720p
1080i
1080p



Flexible SD/HD production

Why are so many switching to Sony? Because with Sony's family approach, you get a proven, no-nonsense solution for today's SD needs into the HD future. No one else comes close.

Start with our DVS-9000 SD switcher, and upgrade to HD without changing your control surface or method of operation. Or start with an MVS-8000 and switch between SD and HD today or until the day you switch to HD forever. Even the new, compact MFS-2000 enables you to start in SD and move up to HD with a simple software upgrade!

Thanks to our family, all three switchers offer the ergonomics that Technical Directors have embraced. The library of effects you build on one Sony switcher can run on all three. You'll even enjoy two years of SupportNet™ service, standard with the DVS-9000 and MVS-8000! (See actual warranty for details). Proof that it pays to *Work Smart. Work Sony.*


A family of switchers



VISIT WWW.SONY.COM/PROFESSIONAL

HD and me

*Six HD questions local
broadcasters must consider*



HD is a personal thing, and with good reason, because it represents a significant investment in time, effort and money for broadcasters, viewers and government regulators.

Ken Ferree, chief of the FCC Media Bureau, recently interrupted his prepared statements before the

“Many people, including myself, have noted that content is the key to consumer adoption, and let me say now that this has become very personal.” — Ken Ferree, FCC Media Bureau chief

commission to express his attachment to high definition.

“This year, six million DTV sets are projected to be sold,” he said. “As an aside, that number should actually be 6,000,001, as my household made the DTV transition this past weekend.

“Many people, including myself, have noted that content is the key to consumer adoption, and let me say now that this has become very personal. I like my HD set, but there are only so many times that I can watch beautiful scenes of the Hawaiian Islands on Discovery HD. As a consumer, I want more and more

high-definition programming.”

At stations, too, HD is becoming a lot more personal as broadcasters begin to contemplate moving beyond passing through a network HD feed to actually originating local HD news and other programming. Pioneers, such as WRAL-DT in Raleigh-Durham, NC, have gained an intimate knowledge of what it takes to produce local HD programming over the past few years. But now as the number of network shows and sporting events distributed in HD grows and several million TV households actually own DTV sets, HD is about to get a lot more personal for the majority of broadcasters.

The following six “HD and me” questions and answers are intended to provide insight into succeeding

on a local level with HD origination.

Should I shoot widescreen SD until we're ready to transmit HD?

In the view of Sony's Robert Willox, general manager of the content creation group, the only reason to shoot widescreen now is to archive material. “Shooting widescreen in standard definition means you'll have to resample video for 4:3,” he said. “So you'll end up with a lower-resolution product.

“HD cameras will eventually hit the cost point of higher-end SD cameras. It really becomes a capital call. When do you have enough DTV audience to warrant going widescreen? That's a really big decision for a news



While HD requires more bandwidth, SES Americom is putting packages together to encourage local broadcasters to share the cost of uplinking high-definition remotes.



Introducing Your New News CG Operator

With DekoVIA and Vortex Networked News the power of Deko™ graphics and automation provides the newsroom editor direct access to graphics templates and effects. The sneaker-net between news and graphics becomes a thing of the past as journalists can select and edit lower thirds, OTS and other graphics quickly and easily. Unlike other systems which render individual graphics, the DekoVIA capability schedules graphics to be built and conformed on playout. Journalists simply pick the templated look, enter the text and move on, no rendering, no sneaker-net, no wasted time.

- On-air consistency
- Branded look every time
- Streamlined news workflow
- Station "look" graphics templates

For information on DekoVIA, please call **1-877-733-5846**



department. Widescreen gets you future-proofing and archiving.”

The way that Al Kovalick, senior Pinnacle Systems fellow and strategist sees it, widescreen is essential. “For me, digital television has four things: really good sound, Dolby 5.1, quality pictures, a 16:9 aspect ratio, and it might be HD,” he said. “If I invite friends over and they see the 16:9 and the clear picture, and they hear great sound, they will think it is HD. Three out of four isn’t bad.”

Initially, stations that shot 16:9 SD

“It (HD origination) gives the local stations several advantages, including better quality and a perceived market leadership in these early days.”
— Bryan McGuirk, SES Americom

found that there weren’t many viewers, said Glen Sakata, Harmonic director of sales for broadcast and telecom. “That’s all changing now,” he said. “People are seriously looking at doing HD.”

“It’s a much better image for standard definition,” he explained, even if it is letterboxed a little to make the aspect ratio right. The 4:3 and 16:9 nightmare will continue for stations until the next-generation television set comes out with a decoder that looks at a flag embedded in the signal that tells what type of signal is present and automatically switches to the right aspect ratio.”

What are the advantages of originating my local programming in HD?

To Bryan McGuirk, SES Americom senior vice president for domestic sat-

ellite services, presenting HD demonstrates a commitment to leadership in the market. “It gives the local stations several advantages, including better quality and a perceived market leadership in these early days,” he said. “One notable example was KUSA-DT in Denver, which broadcast a local parade in HD. It really gave them per-

ceived leadership in the market. It blew me away that they did the whole thing in HD and promoted it.”

Sony’s Willox sees shelf life and stock life as the main reasons to originate in HD. “We have been working with people, such as Home Time. They are originating a show in HD and are just beginning to broadcast

HDTV metrics

Slowly, the industry appears to be emerging from the chicken-and-egg quagmire that’s slowed the development of high-definition television. Here’s a glance at some of the brighter spots.

DTV unit sales

Total DTV units sold in November 2003:	505,223
Total DTV units sold in December 2003:	640,443
Total DTV units sold in 2003:	4,100,000
Total DTV units sold in 2002:	1,925,000
Total DTV units sold since Q4 1998:	8,240,000

Source: CEA Market Research

DTV unit sales projections

2004	5.8 million
2005	8.3 million
2006	11.9 million
2007	16.2 million

Source: CEA Market Research

Estimated total U.S. TV households 2002-2003: 106 million

Source: Neilsen Media Research

2003 DTV coverage of U.S. TV households

Percentage served by transmitted DTV signal:	99.36
Percentage in markets with five or more DTV stations transmitting:	84.15

Source: National Association of Broadcasters

Number of stations transmitting DTV as of January 2004: 1129

Source: National Association of Broadcasters

U.S. households passed by HDTV service from local cable operator: 70 million

Source: National Cable & Telecommunications Association

Percent of top 100 markets with HDTV available via cable: 96

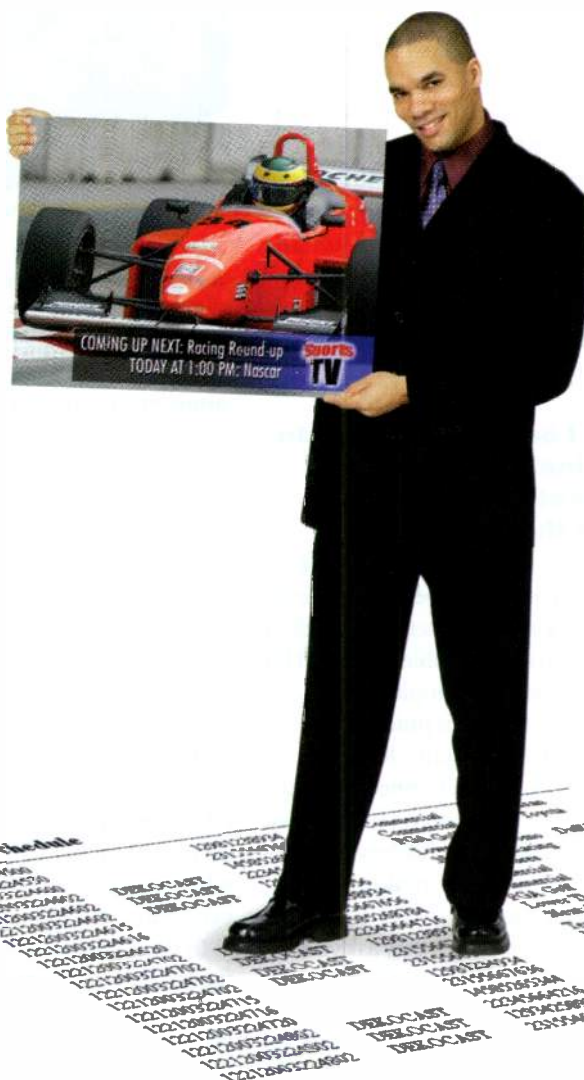
Source: National Cable & Telecommunications Association



Introducing Your New On-Air Promotions Department

DekoCast Power Promo makes sophisticated on-air promotions easy. For the first time, Marketing and Traffic Departments can quickly and easily schedule and change on-air promotions without the graphics process. No longer do you need to rely on a time consuming process involving multiple departments. With DekoCast Power Promo, you can create, schedule and dynamically change promotions directly and quickly. Last minute changes don't need to involve the Graphics Department. Experience streamlined DekoCast Power Promo on-air promotions solutions and move to the next level of graphics workflow.

For information on DekoCast Power Promo,
please call **1-877-733-5846**



in HD. If you don't have clothes or cars, you have good shelf life, such as a home repair show. They have a safety factor of being able to produce competitively for NTSC and HD.

"If I were moving now from a BetacamSP and doing magazines or documentaries, I'd take a look at a new HD camera. The difference from moving from digital Betacam to HDCAM is a minor step. The only delta that exists is media costs."

"With SD, you are kind of stuck with the format that you shot it in. It's not as robust a signal to manipulate to other aspect ratios."

In the view of Paul Turner, vice president of marketing for Omneon, the advantage of HD origination is its draw to top-notch advertisers. "Some advertisers are drawn to stations with the highest-quality programming," he explained. "BMW is producing ads in HD. Why? They are an image-driven company. They want the cleanest, most pristine video they can get. The last thing they want is for those commercials to be played back from a U-Matic."

Will I be able to afford to originate HD if I'm in a market that's smaller than the top 10?

There's a broad range of opinion, but the consensus seems to indicate that stations in markets smaller than the top 10 won't be able to afford HD origination for a couple of years.

"I don't think it is practical today," said Pinnacle Systems' Kovalick.

Omneon's Tuner concurred. "It's a couple of years away. However, we do see it coming in the buying decisions stations are making today, based on the equipment capability now. The first things they ask you are 'Is it HD capable?' and 'Can I add HD?' That is driving the purchase decision right now. Customers are looking at a server and want to know if our system is HD-ready. Absolutely, it is in the machine right now."

In the view of Thomson director

of applications engineering Bruce Lane, HD origination will happen in phases for local news operations. "What you'll find is TV stations will transition to HD as it makes sense for their facility," said Lane.

"For a lot of broadcasters, the news studio makes the transition first and then field acquisition will follow. Studios will all be in HD, but the news stories shot in the field will be in 16:9 or 4:3 and upconverted to HD,"



Among the recommendations from Sony on ways to economize on HD origination and production are to use the J-H3 as a seed machine for nonlinear editors and the HDW730 with 8MB of cache to reduce the amount of tape that might be wasted.

he said. "Overall, the broadcast will still need to be downconverted to NTSC, but that's how they will roll out HD initially. Field acquisition and editing will follow to HD."

According to Sony's Willox, HD origination is a big concern in markets that might surprise some. "There are markets in the United States that you wouldn't expect, but all three affiliates are ready to go. Like Cleveland, they are very concerned about being ready to go HD when the parent goes. I was surprised that it's a big issue."

In the view of Harmonic's Sakata, there's a broad range of stations that can afford to originate HD programming — to a point. "Local origination of HD is practical in the top 30 legitimately," he said. "From there it will taper off, and after DMA 50 there will be a cliff effect."

How can I originate HD least expensively?

Willox from Sony offered a number of tips on how to minimize HD origination costs. "We make a cache (memory) board for our camera that allows you to be constantly re-



recording audio, video and time code into eight seconds of RAM while the camera VTR section is asleep. It eliminates false starts because it's always recording to RAM and saves on tape and battery life."

Another area is repurposing lenses.

"There are a lot of high-end SD lenses made for Digital Betacam that can be recast to HD use," he said.

"We've introduced a line of VTRs that are not editors but can be seed machines to a nonlinear editing system. They are the models J-H1 and J-H3, which are significantly less expensive than HD-editing machines.

"Another money-saving tip is the MSWM series that will play back even the old SD Betacam formats and upconvert them to 1080i or 720p. That's built-in capability."

James Frantzreb, Avid Technology senior product marketing manager, noted that planning purchases today for HD production tomorrow can help. "Within about two years," he said, "we expect that local-HD origination will become very practical. It's now possible to buy reasonably priced professional nonlinear

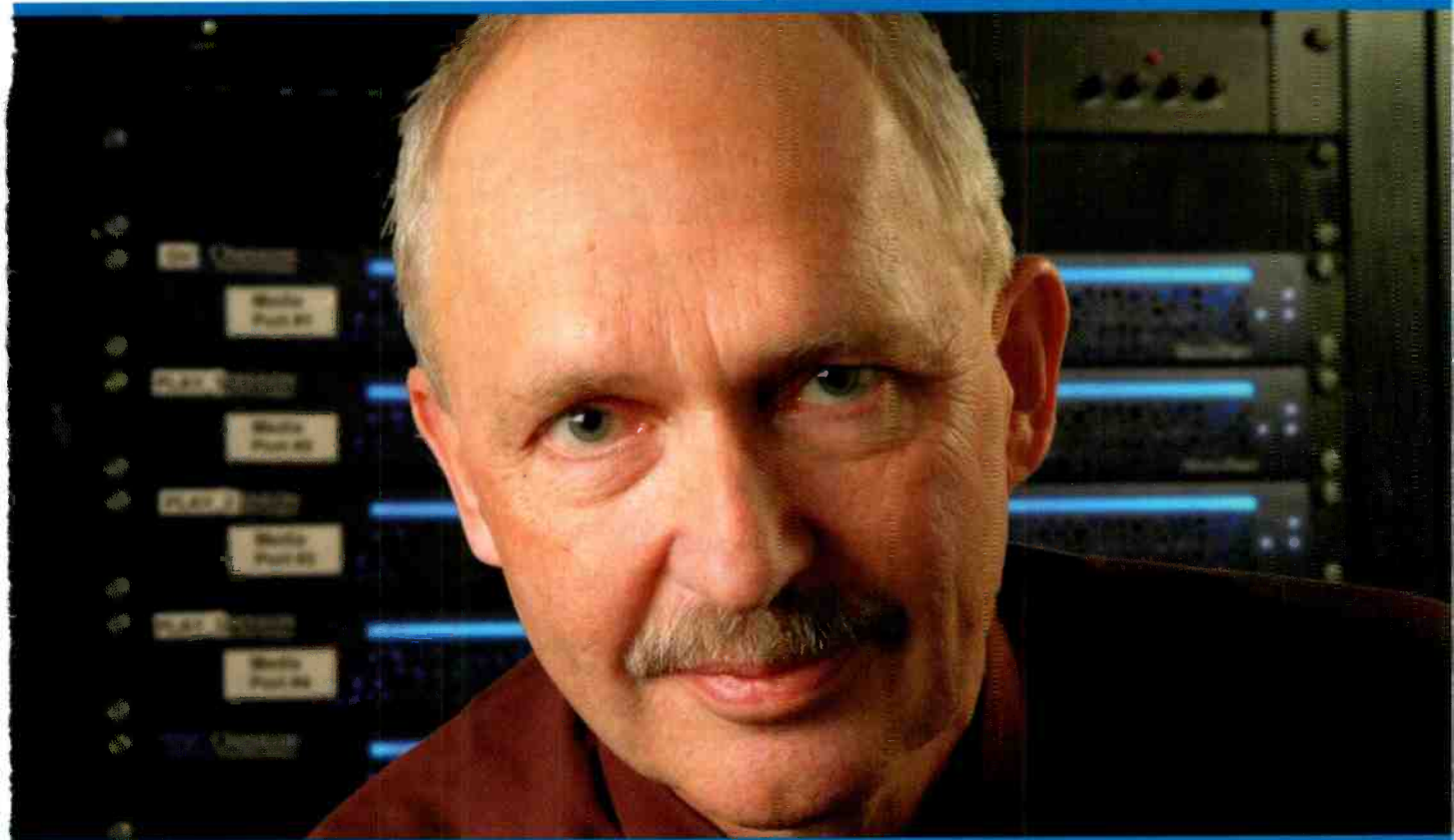
"We selected Omneon servers and shared storage for playout, and have since connected our production processes. Omneon is the one solution that fits our tight budget, meets all our requirements today and supports us as our needs change."

Helge Blucher
Vice President
Detroit Public Television

Detroit Public Television operates on a very tight budget with limited resources. When it came time to select a media server, they needed a cost-effective solution that gave them both operational efficiencies and the flexibility to satisfy multiple requirements.

With Omneon SPECTRUM™ media servers, Detroit Public TV implemented a solution that worked across their entire operation. Built around the concept of Smart Scalability™, Omneon SPECTRUM systems can be configured to meet precise format, channel count, bandwidth and storage specifications. What's more, Omneon SPECTRUM systems can then be expanded in smart, manageable increments—without replacing the original system and in many cases, without taking the system off-line.

To learn more about the unique advantages of an Omneon SPECTRUM media server system visit www.omneon.com.



It's not just
what you serve.

It's who.

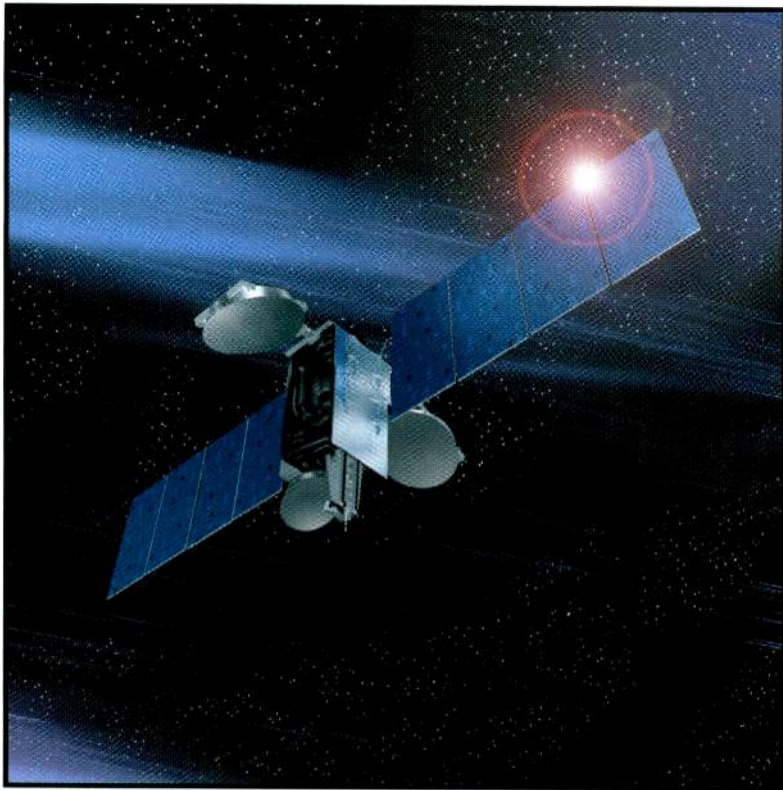


OMNEON
VIDEONETWORKS

www.omneon.com

408.585.5000

See Us At NAB Booth SU7466



SES Americom is launching the AMC 10 and AMC 11 satellites this year to accommodate the growth in HD traffic it is anticipating.

editing systems that are upgradeable to HD.

"Inexpensive media networks, such as the Avid Unity LANshare system, have the capability of — and can be qualified for — supporting a 7:1 compressed HD workflow, and we believe less-expensive acquisition and playback solutions will be in place within that time frame."

Sending live reports and special event coverage from the field can be costly; however, SES Americom works with stations on programs to share HD services to hold costs down for individual stations. "In HD, we see an opportunity to support HD in local markets," said SES Americom's McGuirk. "Because of the bandwidth of HD, I think they will be shared between affiliates in markets.

"The cost of HD satellite on a shared basis would allow all three affiliates in a DMA to share it, and we do anticipate at the local level that it makes sense to share."

This month, availability of HD

transponders will increase when SES Americom launches the AMC 10 satellite. AMC 11, which also has HD transponders, is scheduled to launch in May 2004.

What impact will HD have on the look of my news set and talent?

It's amazing what four times the resolution of SD will pick up and display. It's not all pretty, according to Pinnacle Systems' Kovalick. "Many sets look cheesy in true HD," he said.

Omneon's Turner agreed. "Going HD technically is only part of the problem. The second issue is you can't get away with that piece of black gaffer's tape hiding a flaw on the set because it will show through."

However, shooting with the complete knowledge of what a higher-resolution system will capture isn't an unknown art, said Harmonic's Sakata. "All it means is that producers of HD will have to deal with the same thing

that filmmakers have always worked with," he said. "Artists know how to deal with the increased resolution."

"Most stations don't have lighting directors anymore," he said. "Most of the talent they used to need went away when CCD cameras came along. However, we are hearing of a lot of consulting companies popping up to address proper lighting, sets and makeup."

Camera technology also offers some solutions. "We have circuitry in our HD cameras that addresses this," said Sony's Willox. "It softens skin and puts negative detail in to strip resolution out of there. It's been done in SD for years. The circuitry reduces wrinkles out selectively, and the camera can be programmed for three different skin tones."

What can I do to promote HD in my market?

This is a good-news, bad-news situation. The good news is that there are some things, such as on-air promotions, that local stations are good at that can be effective in promoting HD to an audience.

The bad news is that it appears that local stations don't have much influence over some of the most effective promotions happening.

"There's a synergistic triangle that can help to make HD a success," said Sony's Willox. "It's the network, the retailer and the manufacturer. Together, those three can develop that synergy.

"The networks can produce HD shows that manufacturers sponsor on-air, so the retailer can show the quality of HD — things like the bigger sporting events that get mass public attention."

Harmonic's Sakata agreed that the sports programming connection is important. "Some thoughtful marketing by the TV manufacturers and/or local broadcasters and sports broadcasters to push HD into bars and restaurants is occurring," he said. "It's not an accident bar owners are getting great deals on HD displays." ●



P A T H F I R E™

Enabling Digital Media

The leading provider of digital content distribution and management solutions – from origination to air – for the broadcast television industry.

Pathfire has the integrated solutions to deliver, manage and move digital content and metadata from ingest to playout – all of which enable our customers to streamline operations, gain efficiencies and significantly reduce costs.

Our advanced digital IP store-and-forward technology delivers news stories, syndicated programming, commercial spots, public service announcements and video news releases to broadcasters throughout the U.S. and Canada.

Once received by the broadcaster, Pathfire's family of station solutions provides the connectivity control and digital file movement required for today's efficient station operations.

See Pathfire's Expanded Line of Integrated Solutions at NAB 2004, Booth #SU10000, Upper Level, South Hall, Las Vegas Convention Center, April 19 - 22

www.pathfire.com



Re-thinking broadcasting

How multicasting and datacasting could impact what a station does and where it makes its money

Strip away all of the extras and the broadcast business model is pretty simple: Get a federal license to use a bit of spectrum for transmitting programming that attracts viewers to watch commercials that generate revenue.

Pretty cut and dried, really. Sure, there are a lot of complexities, such as acquisition, production, transmission, newsgathering and a little thing known as the station's obligation to serve the public interest, convenience and necessity. But, for the most part, the underpinnings of the business have remained the same for commercial stations since the service took off after the lifting of restrictions imposed during World War II.

Today, thanks to technical innovations such as DTV and the availability of technologies such as ATSC receivers to supplement the broadcast service, television broadcasters

**"The problem with datacasting is that it is a technology in search of a workable business model."
- Glen Sakata, Harmonic**

have the chance to expand and grow their business in ways unimaginable at the dawn of television service. DTV multicasting, which allows broadcasters to divide their digital channel allotment to transmit a

main channel and several subchannels, opens new programming and revenue opportunities. Additionally, datacasting, the broadcasting of digital data to intelligent receivers and players to provide information in an interactive environment, provides commercial and non-commercial stations with new, if largely untapped, possibilities.

"The problem with datacasting," said Glen Sakata, director of sales for broadcast and telecom at Harmonic, "is that it is a technology in search of a workable business model."

Al Kovalick, senior Pinnacle fellow and strategist, concurred. "A lot of companies have come and gone in datacasting," he said. "It's an uphill battle. If you are selling fruit for a living and someone says, 'I want you to sell integrated circuits, you have the trucks,' you'll say, 'I love the product but I don't know the business.' It's a lot like that for broadcasters with datacasting."

Datacasting is intrinsically different from broadcasting, according to Sakata. "There's a push vs. pull paradigm," he said. "Broadcasters can push all the data they want. It goes back to video over IP. It could be data or video, but it has to be persuasive enough for a consumer to want it."

For datacasting to succeed at a commercial television station, Sakata explained, it must enhance the availability of local information in a way that's not real-time.

"There are a number of video and data services that don't have to be delivered in real time, and if they don't it can be a data model. For example, airport schedules don't

have to be on a real-time video channel. They could be streaming," said Sakata.

While exploiting datacasting for increased revenue at commercial television stations is in its infancy, the technology has found a niche in the public-broadcast arena to supplement the efforts of teachers in the Los Angeles area.

"KLCS-DT creates programming and puts it on a server to be broadcast," said Paul Turner, vice president of product marketing for Omneon. "At the same time, low-bandwidth streaming proxies are available on a server. The station publishes them on a Web page, and teachers at the district can look at them and find something that emphasizes class content."

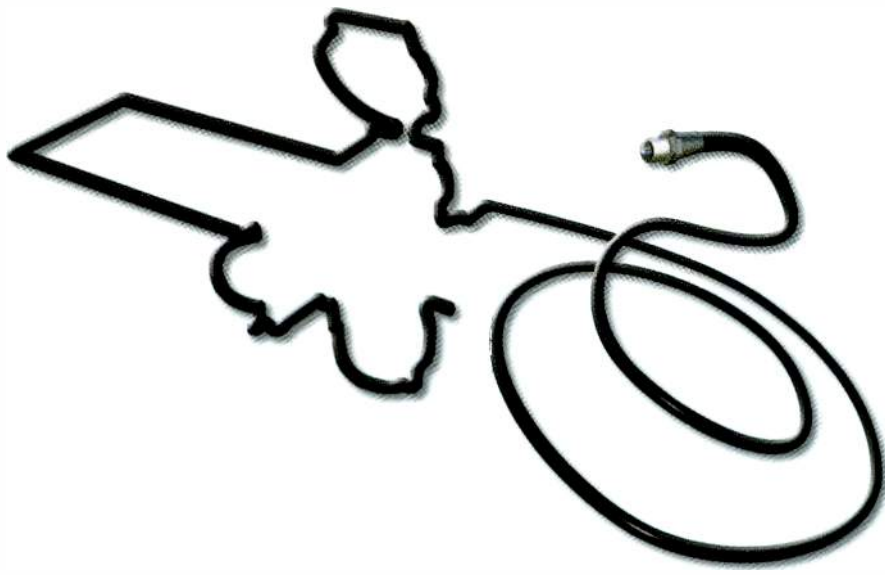
"They send in a request, and KLCS datacasts the material back to the local school. The station looked at dead-air time, and uses it to datacast to the school at night."

(For more information on the KLCS datacasting project, see the "Datacasting proves a success at KLCS-DT" sidebar.)

Multicast mania

Perhaps multicasting is initially more attractive than datacasting to television broadcasters because it's similar to their existing business. Multicasting fits nicely into the programming-viewership-ratings-commercial-sales business model, and it lets broadcasters exploit their existing core production and transmission competencies to increase revenue.

Thomas Zugmeyer, product manager in charge of the DaletPlus Media Library said, "The challenge many



Cable Begins with AMERICOM Satellites

Looking for a home? We've got the two best neighborhoods with the most sought after addresses for programmers who want to reach virtually every cable household in the U.S.

We attract the best neighbors, with the best quality built homes on the block at 131° and 135° West and 101° and 103° West.

In addition to our prime orbital locations, our focus on reliability, detail, and curb appeal sets these neighborhoods apart. And we're constantly improving our real estate assets: two next-generation satellites are slated for launch in 2004.

More than half of the homes aboard these two satellites have already sold. Why?

We're a leader in HDTV distribution, with more channels and bandwidth being dedicated to high definition programming every month. That's one reason.

Our specialized delivery service, DigitalC[®], is another big advantage -- an innovative, turn-key MCPC service that features digital encoding and compression, local transport, East and West coast uplinks, and protected space segment. They are all the features of any cable programmer's dream home.

To our growing list of residents, we say thank you.

To those of you looking for the best cable neighborhood, welcome.



SES AMERICOM
An SES GLOBAL Company

Committed to Cable

800-273-0329 (U.S.) | +1-609-987-4200
info.americom@ses-americom.com | www.ses-americom.com

These programmers have homes in the best cable neighborhoods:

Animal Planet
CMT
Comedy Central
Court TV
C-SPAN
Deutsche Welle
Discovery Channel
Discovery en Español
Discovery HD Theater
Discovery Health Channel
Discovery Home & Leisure Channel
Discovery Kids
Discovery Times Channel
Discovery Wings Channel
DIY Do It Yourself Channel
E! Entertainment Television
Fine Living
FLIX
Food Network
Golden Eagle Broadcasting
Great American Country
Hallmark Channel
Home & Garden Television
HSN
HSN America's Store
iN Demand
The Movie Channel
MTV
MTV 2
MTV Español
MTV Jams
MTV Mega Hits
The N
Nick At Nite
Nickelodeon
Nick Gas
Nicktoons
Noggin
Oxygen
Pax TV
Showtime
Spike TV
style Network
Sundance Channel
TechTV
TLC
Travel Channel
TV Land
TV Guide Networks
Unitel Hellas
VH1
VH1 Country
VH1 Mega Hits
VH1 Soul
VH1 Uno
The Weather Channel
Wisdom Television

broadcasters face is producing more with the same staff or same capital expenditure. Technology allows you to use more shared content by one station to rebroadcast it on another station, all from a central repository.”

Sakata from Harmonic agreed. “I’ll

always go back to the operational side. There’s not much incremental cost to put it on another station,” he said. “Adding additional playout to an automation server is a no-brainer. Playback from servers with multiple outputs is a minimal cost. The other

thing is encoding. If it is an SD encoder, you are looking at \$20,000 or less (and, for HD, \$50,000 or less) to put another on the air.”

While the costs of adding a channel may not be prohibitive, broadcasters who are serious about

Datacasting proves a success at KLCS-DT

Say “datacasting” to most broadcasters and you’re likely to notice a shoulder shrug, hear a little mumbling about not knowing what to do with it and get a quick change of subject.

But that’s not the response you’ll get from Alan Popkin, KLCS-DT’s director of television engineering and technical operations. Popkin is a pioneer in the use of datacasting from a public television station to augment the class material offered by area teachers.

“This is an attempt to use DTV spectrum in a new and different way,” he said. “Instead of just pretty pictures, we can do pretty pictures and serve other needs.”

This year, KLCS, which is licensed to the Los Angeles Unified School District, began datacasting after a \$5.8 million upgrade to the station’s facilities to support the effort.

KLCS has at least 10,000 titles in its video library that eventually will be digitized and stored on a file server so that district teachers can access pertinent material to augment their classroom presentations. “Initially, the station is working to make a couple hundred hours of middle school math and science programming available from its server,” said Popkin.

The datacasting system relies on changing how the station’s DTV channels are used throughout the day. From 8 a.m. to 4 p.m., KLCS replicates its analog channel on a DTV channel and transmits four to 10 channels that stream educational programming requested by district teachers. From 4 p.m. to 11 p.m., the station ceases streaming and multicasts four DTV channels. From 11 p.m. to 8 a.m., KLCS transmits one DTV channel, and on the remaining bandwidth does “a massive push for near video on demand,” said Popkin.

“This is the equivalent of using seven or eight T1 lines with no additional burden on the station and little cost to the district except for receivers,” he explained.

From the point of view of a district teacher, the system is as easy to use as browsing the Internet. “Teachers just log onto the (district’s) Internet Web site and browse all the material, including low-res video proxies,” said Popkin. “All of the material is indexed and is searchable thanks to the metadata.

“When the teacher finds something to show the class, it’s a simple matter of adding it to the shopping cart and overnight the content is datacast to the edge cache. Once it’s received, an e-mail is sent to the teacher informing them that the order has arrived.”

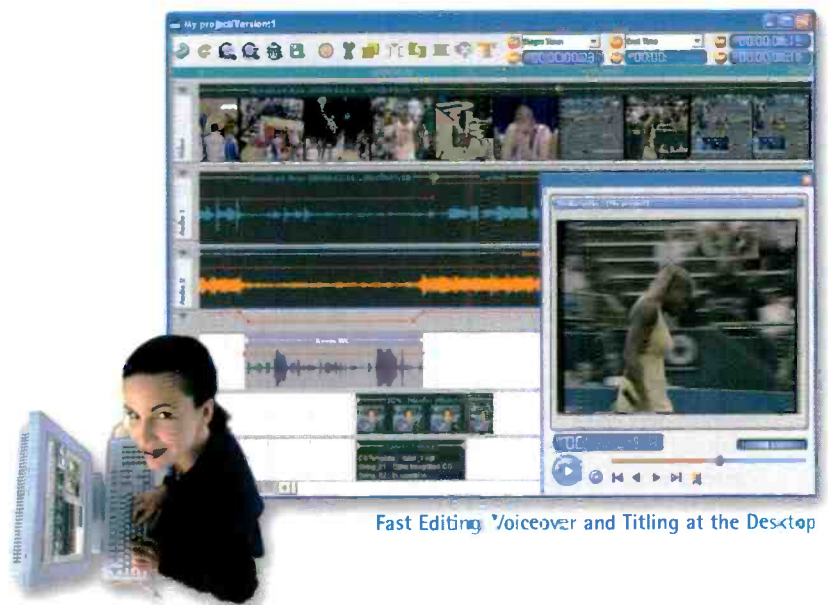
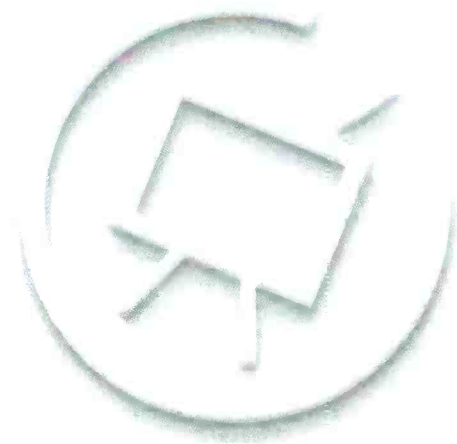
KLCS was able to build this system in less than a year for several reasons. First the district already had a “sensational IT infrastructure” with four computers in nearly every classroom. Second, the station received superb cooperation from vendors in making off-the-shelf solutions serve the station’s requirements for tapeless storage, archiving and retrieval. Third, Popkin could rely on orders of scale to ensure system coverage. One datacasting receiver covers 700 to 3000 students, which is important considering there are nearly one million students in the district.

Recognizing the potential use of datacasting to help teachers required Popkin to see the changing paradigm of DTV. “It is no longer about video, it is now all about data,” he explained. “If you think of it as datacasting and some of it as video — if you don’t care whether it is MPEG-2 or PowerPoint — you can change how you think about the pipe and how you build the infrastructure.”

Updating your newsroom?

Go for Easy, Fast and Efficient

Dalet *plus* News Suite

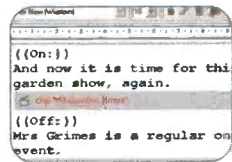


Fast Editing, Voiceover and Titling at the Desktop

Multichannel Ingest



Integrated Text and Video



Low Res Browse



Rundowns



Playout



Don't fall into the proprietary product trap.

Tailor and scale Dalet's open IT-based solutions to your specific newsroom environment. Get the freedom to integrate what you need and nothing more.

Whether 8 or 800 journalists, DaletPlus gives you the perfect fit on price and scale.

From ingest to archive, DaletPlus Asset Management streamlines the workflow every step of the way. All users have real-time access to a shared central storage thanks to the support of the same video material in multiple resolutions.

Easy to use. DaletPlus Desktop tools are designed for journalists. Make quick edits, add voiceovers, and create titles. No complicated features.

Fast. Plug the camera into the firewire port, edit video while recording, and "one click" sends material to air.

Cost effective. DaletPlus runs on standard PCs and IT servers.

Open. Interfaces through MOS, XML, DDCP, MXF, AAF and other standards with video servers and studio devices from Thomson Grass Valley, Sony, Dnnceon, Pinnacle, Quantel, SeaChange, Chyron, VizRT, Aston, Orad and others.

adding multicast services to their offerings are likely to encounter a few bumps in the road. Access to cable for multiple SD-digital channels is a thorny issue, with competing interests submitting filings to the FCC in anticipation of action this year on the question of must-carry rules for digital television service.

“These conversations are happening because people want information, and now there’s a practical way to broadcast it.” — Glen Sakata, Harmonic

Programming may be another serious obstacle for broadcasters wishing to multicast. Many broadcasters who initially contemplate multicasting ask themselves: “Where am I going to get the programming? I have a tough enough time filling my channel now.” Repurposing newscasts and magazine shows is a start. Station origination of such programming means broadcasters won’t face the same rights issues as they would with syndicated programming.

But multicasting can offer a local station more than a distribution channel for rehashed news. Local information that currently goes unreported or underreported on television can make a station invaluable to viewers, and multicasting is a logical way to distribute such programming.

“There are airports that want deals with local stations for multicasting to transmit flight arrival and departure information,” said Sakata of Harmonic. “It’s of value to someone wishing to check the status of his or her flight before leaving for the airport, and it’s an advertising value to operators of companies such as taxi services or airport shuttle businesses

— or even a company like Starbucks. These conversations (between stations and airport authorities) are happening because people want information, and now there’s a practical way to broadcast it.”

Another area with a proven value to viewers is traffic reporting. About 14 years ago, Los Angeles began sharing information from on-ramp cameras and metering to a cable carrier to show traffic-flow density in a high-level way. Roadmaps with arteries displayed in red indicated traffic was stopped; green meant it was flowing. Similar local traffic coverage could provide local viewers of a multicast station with important, timely information.

Whatever the programming content, as long as it’s local, it’s pertinent to living in the community. If a station is first in the market to offer it, financial rewards are likely to follow. “A station in Louisville took off Saturday-morning cartoons in the early ‘90s and put on three hours of local news,” said Sakata. “Newspaper readership was dropping and local hardware stores and car dealerships still wanted eyeballs to view their advertising on Saturday mornings.

“They repeated the model elsewhere and wherever they were the first to do it, they took market share. Localization can provide extra revenue, but it will be an early-mover type of issue.”

Show me the money

For multicasting to make sense financially, it must not cannibalize revenue the station already earns from selling commercial time on its primary station. One way to avoid that is specialization. “When you go to multicasting, you start to specialize,” said Omneon’s Turner. “As you do that, you can deliver more targeted advertising. So, if someone is doing a home do-it-yourself (DIY) channel, they can guarantee potential advertisers that viewers are interested in DIY.”

“The popular argument is that multicasting will dilute the market

for any one channel, but by delivering more targeted programming to viewers with a specific interest, you might be able to convince a Lowe’s (hardware superstore) to pay an advertising premium on a channel reaching an audience they are trying to hit.”

Perhaps commercial availability will be a powerful tool in helping to convince cable operators to carry the multicast channels of television stations. “One driver causing people to look at what could work for multi-channel is the idea of providing availabilities for cable on a secondary channel,” explained Sakata. “There is the potential to allow cable companies to sell some of that commercial inventory on a secondary channel.”

But the biggest impetus in motivating cable operators to work with broadcasters in order to accommodate their desire to have multicast channels carried via cable is direct broadcast satellite (DBS), according to Sakata.

“The number-one issue with cable MSOs is HD,” he said. “They are in a hot battle with DBS. DBS will have problems having a lot of HD. Cable is realizing their take rate for HD set-top boxes is growing exponentially, and local HD programming could be something that gives them an edge in the market over DBS.”

That’s all well and good for stations that use their DTV channel allotment to deliver full-blown HD, but what about multicast SD? “They didn’t want to give you, as a station, a full 6MHz of bandwidth when you were going to multicast SD,” said Sakata. “In the beginning, it was a philosophical objection, but now it’s a management issue. If you are going to deliver it in HD for a portion of the day and then switch to multicast SD, how are they going to know what is coming when?”

“The thing that really drives the cable guys nuts is they don’t want to manage all these channels coming and going. They have to deal with PSIP and put their own in

there, which will be different from the over-the-air PSIP.

"If a broadcaster sometimes has two channels, sometimes five and sometimes one channel, that's hard for the cable system to manage. On the cable EPG [electronic program guide], they'll indicate a channel is there but just off the air."

But given the importance of HD to cable in doing battle with DBS providers, Sakata said he believes

MSOs will be willing to work with broadcasters to accommodate multicasting SD as long as part of their offering during the day is HD.

"Cable would just rather take the HD," he said. "They will give you the bandwidth and let you play around with it. They'll commit the 6MHz to broadcasters. Then the cable operator won't mess around with the broadcaster's signals.

"If you are occasionally doing five

channels, they will show major and minor channels. If you pull it out from the multiplexing pool, it disappears from them."

Rather than working out a formal must-carry doctrine between DTV broadcasters and the cable industry, Sakata suggested that cable operators be flexible with television broadcasters on a one-on-one basis. "These cable MSOs would really rather deal at the individual level," he said. ●

WRAL-DT turns to datacasting, multicasting to extend market presence

The lessons from the trenches of datacasting and multicasting are threefold, if the experience of WRAL-DT in Raleigh-Durham, NC, is any indication.

First, it isn't about the revenue — at least not yet. It's about enhancing the station's presence in the market by becoming an indispensable resource. Second, it's about positioning the station to compete with cable and satellite broadcasting in the future and being able to thrive in that environment. Third, it's about delivering a better product.

In other words, said WRAL programming and special projects manager Jimmy Goodmon Jr., multicasting and datacasting are about being more competitive. "Essentially, we have been on the cutting edge because the president of this company is adamant about the future of broadcast television, and digital gives us the opportunity to compete," he said.

The station, which pioneered digital broadcasting seven

and a half years ago, splits its digital bandwidth allotment into an HD channel, an SD channel and a 1Mb/s to 1.5Mb/s channel for datacasting. Bandwidth is dynamically assigned to the channels as needed through statistical multiplexing. This, along with efficient encoding, maintains optimum picture quality on the SD and HD channels.

"The picture WRAL delivers using statistical multiplexing and efficiency of encoding is superb," said Goodmon. "We can deliver HD and SD with no degradation, and we expect to see a 10 percent to 15 percent improvement in the encoding process every year. We are happy now and know where we are going."

WRAL NewsChannel

In August 2001, the station launched the WRAL NewsChannel, a 24-hour operation, which focuses mainly on local news, as its

SD channel. Besides re-broadcasting WRAL-TV's evening 6 p.m. newscast at 7 p.m., the NewsChannel carries news specials, such as gavel-to-gavel coverage of the Michael Peterson murder



WRAL, which launched NewsChannel in August 2001, on its SD multicast channel, sees the 24-hour locally originated news channel as a way to promote the station's brand to viewers.

trial, and network news programming like CBS MarketWatch. It also is "flanked" by graphics and content from the WRAL.com Web site.

Repurposing material from the Web site and the news operation of WRAL-TV allowed management to put the WRAL NewsChannel on

the air for a fraction of the price of starting a station from scratch. "With very low personnel and equipment costs, we have started a new channel," said Goodmon.

"We need to be clear that it is a balancing act," he explained. "We don't want to take anything away from the capacity of WRAL news. We want to use it to add to the NewsChannel when we have extra capacity. We run a tight ship on the NewsChannel."

The station hired a producer and assigns its digital media manager to integrate material for the station's Web site onto the NewsChannel. Otherwise, it draws on existing resources from what Goodmon called "the big news operation" to shoot, gather, produce and air news.

Complementing the "big news operation" extends beyond newsgathering to encompass news coverage. "Earlier this year, we had a car chase," said Goodmon. "We broke into coverage on WRAL news but couldn't stay with it the whole time as it unfolded. But on WRAL NewsChannel, we could punch right in and stay with the chase. All that required was a producer/director and font coordinator, and we were live."

Datacasting

WRAL uses the 1Mb/s to 1.5Mb/s devoted to datacasting for a variety of offerings, including distribution of game software, short movies, a 380Kb/s edition of WRAL's 6 p.m. news, live streamed news from the NewsChannel, an abridged

version of WRAL.com and a locally originated game show called "Brain Game."

"This is program content that we couldn't deliver before," said Goodmon.

While the current offerings are good, Goodmon said the future will be even better. He explained, "We have been experimenting with ideas that will be great for the future - approaches that are not interactive per se but send information out that can be stored in the memory of the users' computers that they can access as desired."

"If you are watching WRAL News and our sportscaster comes in with news about Duke basketball, with datacasting you will be able to get instant stats from the game. That's the future.

"Or, imagine being able to watch a basketball game and hit a pushbutton to see a graphic that was sent of the shot percentages of the various players from different parts of the floor."

Over the past two years, the number of people for WRAL's datacasting has grown beyond the initial test

audience of 100, but Goodmon does not know by how much. However, he expects the role of datacasting to grow as interactivity becomes feasible. "Interactive is growing — one step at a time," he said. "That is an important move for broadcasters to make."

More than money

Ultimately, multicasting and datacasting may lead to new revenue for the station, but it hasn't yet. "We have not specifically sold a NewsChannel spot, although we have sold HD commercials for our HD channel," said Goodmon.

"But as far as the ad-buying community, you have to understand the kind of company we are. We are not driven by shareholders trying to gain a buck tomorrow.

"We are guided by a person who believes in long-term branding. These things (datacasting and the NewsChannel) will enhance our image in the community.

"We have to be everywhere that viewers or seekers want to find us. It's not a revenue play at this point but a branding play."

WRAL NewsChannel expands news coverage

The WRAL NewsChannel multicast has allowed the Raleigh-Durham, NC, broadcaster to expand news coverage beyond what's covered on the flagship station. Here are a few highlights:

Kinston Plant Explosion Memorial Ceremony (<i>Delayed</i>)	1/29/04
Governor Easley Winter Storm Press Conference (<i>Live</i>)	1/27/04
MLK Triangle Interfaith Prayer Breakfast (<i>Live</i>)	1/19/04
Senator Richard Lugar Speaks at Duke University (<i>Live</i>)	1/14/04
Triangle Economic Outlook Forum (<i>Live</i>)	1/6/04



Built for post. Ready for prime time.

Apple's Emmy Award-winning Final Cut Pro is a sophisticated and scalable digital nonlinear editing system. HD, SD, DV, online or offline, Final Cut Pro 4 has the creative tools, professional features, and flexibility to meet the grueling demands of the broadcast industry. In fact, 26 percent of U.S. broadcast stations and cable systems use the Mac as their primary system for editing and production.*

Emmy Award-winning editing tools

Final Cut Pro 4 allows editors to work offline or online in formats ranging from DV and DVCPRO50 to uncompressed 10-bit SD and HD. Uncompromising image quality, sample-accurate A/V synchronization, and extensive XML-based integration capabilities make Final Cut Pro 4 appropriate for virtually any SD or HD production.

Final Cut Pro 4

- Scalable: DV, SD, HD, and film
- Multistream real-time effects and transitions
- Multichannel audio mixing and output
- Customizable keyboard and user interface
- 8-, 10-, and 32-bit (floating-point) image processing
- Custom workflow integration
- Color correction tools with scopes and waveforms

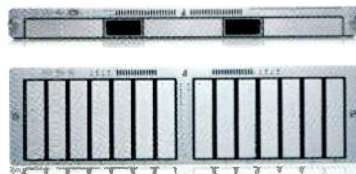


World-class production hardware

With the powerful new Power Mac G5 and the rock-solid, UNIX-based Mac OS X, news production moves into high gear. Add an Xserve G5 and an Xserve RAID, along with Apple service, support, and training, for a news solution ready to provide power and flexibility to an industry that demands both.



Power Mac G5. Built for speed from the inside out.



Xserve G5 and Xserve RAID. Industrial-strength, purpose-built server hardware.



PowerBook G4. Full-featured notebooks that let you take your editing studio on the road.

BROADCASTING & CABLE®

Broadcast Engineering

We would like to thank the following
sponsors for their support of our
Competitive Television Summit and Supplement

GOLD SPONSORS



Harmonic



PINNACLE
SYSTEMS

Avid

SONY®

GV grass valley
A THOMSON BRAND

SILVER SPONSORS

dalet 
Digital Media Systems

SES AMERICOM
An SES GLOBAL Company



PATHFIRE
Enabling Digital Media

SNELL & WILCOX
Engineering with Vision




OMNEON
VIDEONETWORKS

(equalization) based on the half-clock-frequency energy remaining as the signal arrives. Incorrect amplitude at the sending end could cause an incorrect equalization at the receiving end, resulting in signal distortions.

Rise and fall

The rise and fall times are defined between the 20 percent and 80 percent amplitude points, as Table 1 shows. Incorrect rise time could cause

The effect of jitter on the system also depends on the frequency of the jitter.

signal distortions such as ringing and overshoot. If the rise time is too slow, it could reduce the time available for sampling within the eye. Overshoot of the rising and falling edge must not exceed 10 percent of the waveform. Overshoot could be the result of incorrect rise time but, more likely, is caused by impedance discontinuities or poor return loss at the receiving or sending terminations.

The jitters

Jitter is seen in the eye diagram as a horizontal thickening of the trace. As jitter increases, the opening of the eye shrinks until the receiver can no longer decode the data. Jitter is measured in unit intervals (UI) where 1UI is equivalent to the reciprocal of the clock

period — 3.7ns for SD and 673.4ps for HD. The effect of jitter on the system also depends on the frequency of the jitter. SMPTE defines different frequency bandwidths for measuring jitter. Timing jitter provides an overall measure of the jitter present within the transmitted signal, while alignment jitter isolates jitter components that adversely affect the receiver's ability to recover the data.

The jitter display in Figure 4 plots peak-to-peak jitter vs. time related to

video line and field rates. This display allows you to characterize jitter related to the video-signal timing. Many jitter-related problems are the result of transferring genlock reference jitter into the serial system. This type of jitter is typically between 20Hz and several hundred Hz. The phase-detection process used by genlock systems can also add noise that contributes to jitter in the 10Hz to 1kHz range. By using the appropriate bandwidth-limiting filter, you can include or reject specific jitter components from the jitter measurement.

The right stuff

The eye and jitter displays of the waveform monitor are the tools of choice for measuring the performance of a digitally transmitted signal. EDH, if implemented correctly in a system, can help monitor critical signal paths and warn of potential problems in the system. The key to a properly maintained system is a well-designed facility that uses and maintains the correct cable type, cable length and equipment termination. **BE**

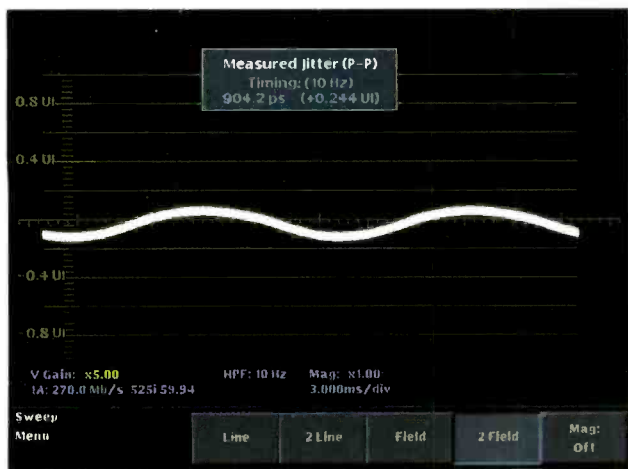


Figure 4. This jitter display plots peak-to-peak jitter vs. time related to video line and field rates. It allows you to characterize jitter related to the video-signal timing.

Clarity

Calling Clarity a Character Generator is very misleading.

Fast, multi-channel CG with SDI previews

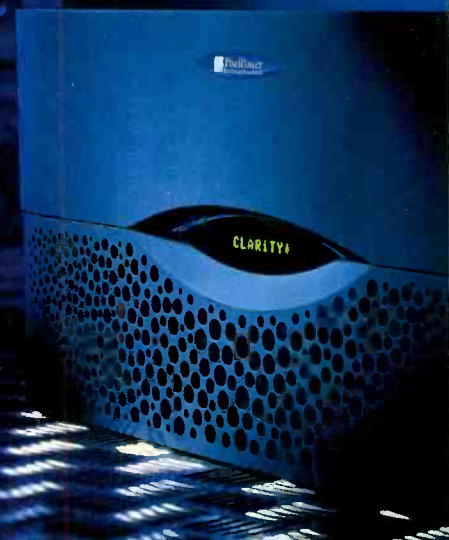
2 streams of uncompressed video clips with key

2 live inputs with dual 2D DVE per channel

Unlimited layers of text, stills, clips and animation in each channel

Dual downstream keyers with fault sensing relay bypass

Interfaces with all common automation systems



PixelPower
broadcast graphics solutions

www.pixelpower.com

Michael Waidson is an application engineer at Tektronix.

Video servers

BY JOHN LUFF

The meaning of “serving” has some interesting connotations. I think of doing the bidding of others, of taking care to provide what others require and of impartially doing what is right. So it is with modern video servers. However, I think it is valuable to think of just how recent and shallow the roots really are, and how deeply they have modified the effective workflow in important parts of our industry.

My recollection is that Tektronix showed the first “video server” in public at NAB. It used JPEG compression, which at that point was used only for still-image compression. Concatenating successive still frames makes motion video and thus “motion JPEG.” The Profile video server was not so much aimed at a specific market, but it was shown as a development project with clearly some inkling of what potential they were releasing. But it stored too little material to be an effective spot server, had no real interface to the automation systems of the time and had lower perceived quality than the VTRs of the era. Concatenating multiple passes through the box was problematic unless the bit rate was set high. But the seed was planted. Within a year or so, it was being used as a cache on the output of robotic VTRs, enabling back-to-back playback all day long of 10-second segments. At sufficient bit rate it was arguably high enough in quality, and as a cache, large amounts of storage were not needed. Over the next few years, the most sincere form of flat-

tery and imitation, brought many servers to market and radically changed the industry.

Today we find ourselves in a rather different time. Servers are a mature product. Most, such as the Profile, Leitch VR and Pinnacle Mediastream, have gone through at least a couple

In some segments, the widespread usage of servers has displaced older technology virtually completely.

of generations of hardware and many revisions of operating software. Huge servers and small have been deployed. In some segments, the widespread usage of servers has displaced older technology virtually completely. One is clearly spot playback for television. Increasingly, servers are playing video in museums and even in point of presence displays in retail shopping environments.



Most servers, such as the Pinnacle MediaStream shown here, have gone through at least a couple of generations of hardware and many revisions of operating software.

Capacity has driven much of the change, as has the advent of low-cost servers without some high-end video application features. Without the current crop of low-cost devices, retail

and other public space implementations would not have become as commonplace as they are. Behind all of this are some technical advances that have little to do with video and everything to do with computing.

Storage space of two or three hours was sufficient in early servers for only

limited applications. Chassis were costly and adding large amounts of storage was cost-prohibitive. As disk-drive size crept up past 2GB and 4GB to today's 141GB and 181GB drives, and the cost for a drive fell from thousands of dollars to hundreds, the size of common configurations has dramatically increased. It is not unusual to see base configurations storing 60 to 70 hours, a 30-fold increase in a decade, at a real cost of approximately half. The drop in cost and increase in capacity together have removed barriers to storing long-form content on servers. Indeed, in the last four years, many large plants for DIRECTV, Turner Entertainment and others have been built around sophisticated architectures with all-server record and playout of programming. Together with archive management and media asset management (all from the IT domain), the rosy reality has made highly efficient plants with drastically different workflow possible.

The architecture of the storage was at one time a major issue to be considered. We are, however, reaching the point where the technology and



topology of storage is less an issue than the total cost of ownership. For instance, in the Turner Entertainment plant, a complex environment stores copies on multiple servers, on redundant (RAID) storage arrays, and on DVD and data tape archives. The probability of loss of content is virtually non-existent. The content is moved from one medium to another under software control. It is no longer terribly important to know where the physical copy is, as it once was with videotape. It suffices to know that the media exists in one or more pools of storage (hopefully more than one). The method of storing can be debated by any two technologists available for the fight. NAS, fiber channel storage, and other options are available.

What matters is the performance of the total system (bandwidth demands and throughput available), MTBF and the standards supported. If you want

to do H.264 or fractals, you will have a limited set of manufacturers to choose from. If you need garden variety MPEG-2, you have loads of options. If you need HD (SMPTE 292) I/O, there are few options, but if ASI I/O (or I or O) are satisfactory, the options open up.

Choosing a server comes down to verifying that the device meets the current and medium-term needs you can project, analyzing performance required (I/O, video-performance targets, concatenation effects, ability to transfer files directly via MXF), specifying the input and output connections (digital and/or analog, embedded audio, AES, number of channels), identifying the vendors you prefer to do business with, negotiating a price that is supportable for your application and verifying all of the above. All serious manufacturers will allow you to try out a box on your turf and gen-

erally are helpful in providing the data needed to analyze bandwidth capabilities of various configurations.

Lastly, you need to go back and look at special-purpose "TV needs," such as automation interfaces supported, remote-control capabilities, stunt-mode features such as slow motion, availability of time delay or sports-replay software if it is applicable, and other unique needs of a television plant. Servers are not commodities when all factors are considered, but you will find a unique configuration that best suits your needs if you analyze the options carefully and thoroughly. Price is certainly not the only factor. **BE**

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



Send questions and comments to:
john_luff@primediabusiness.com

MCS
SERVER



Multi-Channel Video Server

- Provides up to 4 independent video channels per server
- Link servers for additional video channels
- Compatible with popular automation systems
- RAID-5 option provides over 400 hours of storage
- Affordable & Reliable. Base system starts at under \$16,000



► See our Video Disk Recorders - Broadcast Delay Servers - MPEG2 HD Encoder

Doremi Labs, Inc. | tel. 818 562-1101 | info@doremilabs.com | www.doremilabs.com

doremi

Active Power's CleanSource flywheel technology

BY BRYAN PLATER

Incoming electric power disturbances can easily disable a transmitter, resulting in dead air and, potentially, a corresponding loss in commercial revenue. A momentary power outage can cause some transmitters to experience a hard shutdown, which can lead to transient voltages, sudden loss of cooling or other control malfunctions that can damage costly transmitter components. Unfor-

momentary short-circuit applied directly to the output of the UPS. As long as the UPS can supply the high current that is demanded, the crowbar protects the IOT and no harm occurs to the transmitter. After a few seconds, the high-voltage supply restarts and the transmitter returns to normal operation. If the crowbar action does not work properly, the IOT can be damaged. Further, several IOTs may be con-

tions, starts the engine generator and switches to generator power as soon as normal voltage and frequency are present. The UPS system continuously conditions and regulates power coming from either source and, most importantly, provides bridging power during the few seconds needed to start the engine generator and transfer the load to it.

While UPS systems can provide power conditioning and voltage regulation to ensure constant quality power to transmitters, and the necessary ride-through power until a standby generator takes over, not every UPS is equipped to handle crowbar events. Caterpillar's Cat UPS uses Active Power's CleanSource flywheel technology to offer a solution that features battery-free operation and high efficiency. The architecture of the UPS handles overloads and step loads better than traditional, battery-based UPS systems, in part because it is designed to efficiently manage crowbar events. The flywheel-based UPS can handle overloads as great as 1000 per-

The special needs of transmitters place extraordinary demands on uninterruptible power supply (UPS) systems.

unately, the special needs of transmitters place extraordinary demands on UPS systems. In particular, a feature called a crowbar circuit protects TV transmitters with sensitive inductive output tubes (IOTs). One of the most common problems in these transmitters is damage that may result from an improperly handled crowbar event.

The function of the crowbar is to remove the high voltage from the tube, typically within a few microseconds of the detected problem, by placing a short-circuit directly across the high-voltage power supply of the transmitter. This function is usually performed by a thyatron. It serves as a fast, high-voltage switch, comparable to a silicon-controlled rectifier (SCR) but with much higher voltage ratings and speed. When a problem is detected in the amplifier, the crowbar acts quickly; otherwise the IOT could be destroyed.

One problem with a crowbar action is that it draws several thousand amps from the AC mains. This peak current can equal 20 times the rated transmitter input current. It is equivalent to a

nected to a single UPS. To avoid dead air, the UPS must maintain good voltage to the others when one crowbars.

At a typical transmitter site, the UPS is installed in conjunction with a backup engine-generator set and an automatic-transfer switch to provide backup power for extended outages caused by storms, floods, earthquakes, fires or other natural disasters, or by utility infrastructure failures. Frequently the engine generator is located in an outdoor enclosure. The transfer switch and UPS can also be located in an outdoor enclosure if space inside the broadcast facility is unavailable or inconveniently configured. As illustrated in Figure 1, the input of the UPS is switched between utility and the generator set using an automatic-transfer switch. This switch senses out-of-tolerance utility condi-

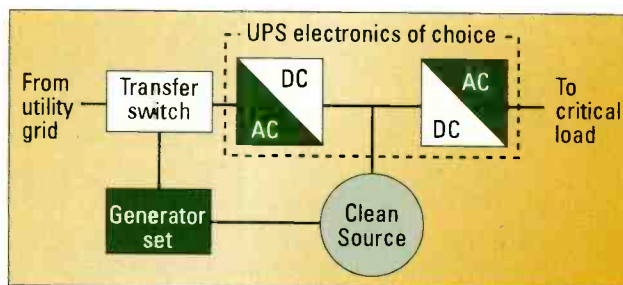


Figure 1. A power supply like the CleanSource flywheel UPS bridges the gap in the event of a power outage, carrying critical equipment until an automatic-transfer switch transfers the load to an engine generator.

cent for 10ms. Even when the crowbar event causes a large overload on the UPS, the fast-switching power electronics enable a smooth transition to bypass,

supplying the desired current from the lowest impedance source. And it does so without disturbing the operation of any other amplifiers connected to the same UPS.

Combining a solid-steel flywheel with power electronics, the system stores kinetic energy in the constantly spinning, low-friction, 600-pound disk and uses this energy to provide protection from momentary power outages, while the power electronics eliminate voltage irregularity and harmonic distortion. Flywheel UPS systems are available that can support loads up to 3600kVA in a fraction of the space of battery-based systems. Battery-free operation eliminates facility design and operational problems arising from the less-desirable characteristics of the large valve-regulated battery systems commonly used in UPS systems. Also, the footprint required by flywheel systems is typically

one-quarter to one-third of battery-based UPS systems. This allows the UPS to be more easily integrated into cramped broadcast facilities.

Flywheels are insensitive to temperature variations. Battery systems require temperature to be maintained between 72° F and 83° F, while flywheels operate within a range of 32° F to 104° F. Therefore, flywheels have no stringent HVAC requirements and, in many locations, can be cooled without air conditioning. In UPS applications, valve-regulated batteries are a consumable rather than a permanent piece of equipment. They are typically replaced every three to five years, and battery life can be further shortened by frequent use. Flywheels are designed to last for more than 20 years, and the number of power outages does not affect product life. Flywheels also require less maintenance than batteries. Finally, UPS battery

systems are configured as long strings of battery cells, which reduce the overall mean time between failure (MTBF) of a valve-regulated lead acid battery system to less than a year, on average, during its life. The MTBF of flywheels is orders of magnitude greater, which greatly improves the overall reliability of the UPS system, particularly when the UPS is subject to frequent utility disruptions.

Flywheel technology offers an alternative to batteries for power protection in critical broadcasting environments and a proven solution for handling crowbar events. It is particularly beneficial in situations where high reliability is required, space is at a premium, and/or environmental conditions make the installation of battery systems inconvenient or expensive. **BE**

Bryan Plater is director of North American sales for Active Power.

IT'S TURBO CHARGED

8500 Series

Perfect for signal acquisition, the 8500 module is a converter, frame sync, proc amp, and more. With both digital and analog I/O, it can handle any signal you can throw at it. This turbo charged module has 12 bit video and 24 bit audio.

Perfect for broadcast, great in remote trucks, it's the alternative to dedicated 1 RU frame syncs. The Avenue 8500 is the most powerful, single module solution available.

And with Avenue PC Software and Avenue Touch Screens, you can control and monitor all types of Avenue modules from any location in the world.

AVENUE™ from

ENSEMBLE
DESIGNS

- Tel +1 530.478.1830
- Fax +1 530.478.1832
- www.ensembledesigns.com
- info@endes.com
- PO Box 993
Grass Valley CA 95945 USA



TVLD uses ARRI's Studio Cool

BY DAN MCKENRICK

In the past, television production studios had their own in-house lights and lighting designers. The changing economics of TV production have forced studios to outsource lighting to external consultants. In 1996, a group of lighting designers formed Television Lighting and Design (TVLD) to help serve this market.

Incandescent vs. fluorescent

TVLD uses a wide array of lighting equipment, including incandescent and fluorescent lights. In the early years of television, studio lighting was exclusively incandescent. These lights are easily concentrated into a beam and emit a smooth, natural spectrum. But they are notoriously inefficient, consuming large amounts of power. Fluorescent lights were introduced for TV-studio use about 15 years ago. They were much more efficient than incandescents, but were difficult to concentrate into a beam and emitted an uneven spectrum with an overabundance of green that gave the subjects they lit an unnatural appearance. Lighting engineers express the "naturalness" of light with a measurement called color-rendering index (CRI). The sun is the most natural light source, and is given a CRI of 100. Incandescent studio lights typically have a CRI of 95 to 100. By contrast, the early fluorescent studio lights had a CRI of about 65 to 70.

Fluorescents ascend

Over the past 15 years, fluorescent studio lights have improved dramatically, both in their CRI and their ability to concentrate light into a beam. About eight years ago, OSRAM, a fluorescent-tube manufacturer, introduced a new tube with a CRI of 82.

Current tubes offer CRI ratings from 82 to 96. These tubes were also more efficient than the earlier fluorescents, producing twice the light output of their predecessors, and far less power than incandescents. They became popular, and many vendors offered them in their fixtures. Since then, other tube and fixture manufacturers have jumped into the market, and a wide variety of tubes and fixtures is now available.

Studio Cool

ARRI has introduced a new fluorescent fixture called the Studio Cool. It is available in two models: 2-tube and 4-tube. The Studio Cool 2+2 with four tubes is oriented with two pairs of tubes side by side, which is ideal for washing large areas or using with Chroma Key backgrounds. Earlier this year, TVLD received a call from ARRI, requesting our assessment of its pre-production 4-tube model. Several days later, a huge box arrived at our office. In a few minutes, we had the 4-tube

twin-tube, 21-inch compact OSRAM fluorescent lamps with a CRI of 85, and it offers some welcome features. Instead of it being necessary to carefully align the four small pins of the lamp to their matching socket holes, and then secure the long lamp to a clip or mechanical fastener, the slide-in lamp supports and sockets make lamping quick, easy and secure.

Power up

Powering up the fixture required the use of a separate power cord. We were surprised to see that ARRI chose the Neutrik PowerCon, a connector we had not seen used in the lighting industry. The idea of having to deal with another specialty cable was initially unappealing. But, after several weeks in the field, the connector's positive locking feature proved its worth — whenever we connected it, it stayed connected.

We turned on the unit and let the new fluorescent tubes warm up for 10 minutes. During that time, we looked over the fixture's five different control

Over the past 15 years, fluorescent studio lights have improved dramatically, both in their CRI and their ability to concentrate light into a beam.

unit on a stand ready for lamping. The aluminum extrusion housing of the compact unit seemed ruggedly built. A large single latch secured the accessory frame, which swung out of the way, providing easy access to the reflector and lamp sockets. The reflector was held in place by four quick-turn screws, allowing for a quick changeover from the 120-degree "soft" reflector to the higher-output, 90-degree "hard" reflector.

The fixture uses four single-ended,

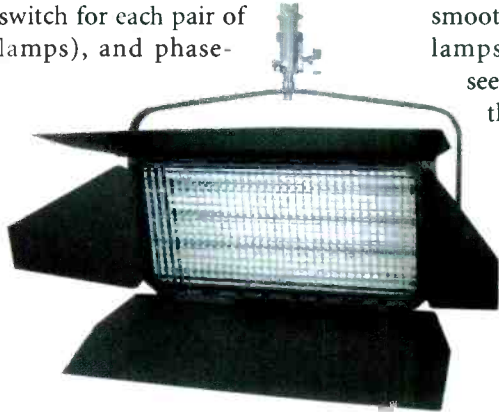
screens/egg crates and the large set of barndoors. This basic fixture has a beam spread of 90 degrees. The screens allow you to narrow down the beam, in several steps. We had some frustration deciding which was the correct orientation for some of the screens. Since we addressed this to ARRI the Eggcrates received orientation marks to indicate the correct placement in the fixture.

The optional barndoors provided two distinct advantages. The 10½-inch doors provide excellent horizontal

beam cutoff and, when closed, they create a hard protective "cover."

Dimming

This unit has several light-output options, an easily detachable power module, switched on/off (rocker switch for each pair of lamps), and phase-



ARRI's Studio Cool fluorescent fixture is available in three models: two-tube, four-tube and eight-tube.

control dimming (powered from your dimmer outlet) or analog dimming (0 to 10 volt)/DMX 512. Once the lamps had warmed up, we tested the dimming capabilities and compared the light output to the provided specifications. The dimming was smooth down to 5 percent, when the lamps extinguished. Light levels seemed to be slightly better than the rating. One problem: the fixture dimmed to zero would flash every 15 to 20 minutes. ARRI has fixed this problem.

Road test

Compact fluorescent fixtures work well in the studio but have had their challenges in the field. Typically, the biggest headache is protecting the lamps from breakage. We often have to

ship the bulbs in their own containers. We wanted to see how the improved lamp supports and the big barndoors would work together on the road. Adding only a Velcro wire tie to secure the power cord, we tossed the 15-pound fixture into the backseat or into the trunk. After weeks of bouncing around, the fixture and lamps were ready to go. With a set of daylight and 3200K lamps, we could deal with different color-temperature environments.

Mounting options allow for flexibility in placing the fixtures. You can hang these units horizontally or vertically and link several together to create a continuous row of light.

The Studio Cool presents our industry with an effective compact fluorescent fixture that works very well in the studio and on the road. **BE**

Dan McKenrick is president of TVLD.

CONFUSED ABOUT WHICH ROUTE TO TAKE?



PROBLEM SOLVED



It's hard to know what your future routing needs will be, but whichever direction you choose, SIRIUS can take you there.

- Built-in analog & digital conversion for audio & video signals
- Mix & match different formats in the same chassis including HD
- Modular architecture for up to 256 x 256 in blocks of 8



Master Control Signal Management Automation

www.pro-bel.com

SEE US AT NAB, BOOTH C8123

USA +1 631 549 5159 UK +44 (0) 1189 866 123 France +33 (0) 1 45 18 39 80 Asia +852 2850 8383

HOME ENTERTAINMENT SERVER

Scientific-Atlanta Explorer 8000HD:

Combines HD programming, digital video recorder (DVR) and HD on-demand content into one integrated set-top; dual-tuner functionality; control of live TV; instant replay button; reduces churn by providing multiple services for consumers.

770-236-5000; www.scientificatlanta.com



LOGO GENERATOR

Eyeheight impact channel ident system: Designed for use in 525 and 625-line systems; can capture SDI logo feeds in real-time; up to eight logos can be stored in user memory and selected from the control panel or via GPI-interfaced automation; features x/y positioning and full 10-bit linear keying, enabling logos to be superimposed at any point on the transmitted display; up to six impact modules can be housed in a 1U chassis, giving immediate access to 48 logos; control panel can be directly coupled to the front of the chassis or remoted via up to 100 meters of 110Ω digital-audio cable.

+44 1923 256 000; www.eyehight.com



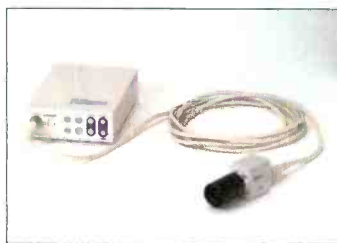
TUBE MIC

Brauner Engineers VMA:

Combines the performance of two tube microphones in a single package; choose between the original and a "vintage" sound with the flick of a switch; features unique circuitry and biasing; switching from one position to the other

introduces parameter changes, re-biasing the microphone and different sets of components.

702-365-5155; www.transaudiogroup.com



MICRO CAMERA

Toshiba IK-TU51: Is a 3-chip, 10-bit digital signal processing camera; offers interchangeable 1/2-inch or 1/3-inch

remote heads and standard RGB analog output; features IT Exwave HAD CCD's, which improve camera sensitivity (2 Lux) for detection of faint signals, while also reducing smear; delivers broadcast-level resolution of 800 TVL, plus a high S/N ratio of 64 dB; processing system includes a 6-vector color enhancement circuit; includes electronic shutter speeds up to 1/50,000 of a second; offers versatile white balance, 14-step detail enhancement, freeze frame, auto exposure function, and an RS-232C interface for precise control via a PC.

949-461-4986; www.cameras.toshiba.com



FIBER OPTIC TRANSPORT PLATFORM

Force Model 3762 Digital EXCELLinx: Transports and simultaneously converts SMPTE to ASI formats; multiplexes two channels of digital or analog formats in any combination depending on system requirements; modules are hot-swappable and can be uniquely configured for each user; with the new SMPTE to ASI conversion module, users can multiplex and hand off a converted SMPTE-ASI format, plus an analog broadcast signal with six audio channels or a 270 Mb/s SDI signal or multiple 19.4 Mb/s SMPTE signals; the MSO receive site can monitor transmitter performance through telemetry information provided by a wide range of control options; packaged in a 1RU terminal.

800-732-5252; www.forceinc.com

STREAMING AUDIO ENCODER

Urban Opticodec-PC: Features MPEG-4 aacPlus encoding software; software lets streaming providers supply content encoded with the coding technologies aacPlus codec; is available in two versions: LE and PE; encodes a single stream at bit rates between eight and 32 kb/s and can encode multiple simultaneous streams at bit rates from eight to 320 kb/s.

510-351-3500; www.urban.com

OPTICAL DISC SYSTEM

Sony XDCAM: Facilitates the transfer of material at high-speed from the field to the television station for nonlinear editing; a single professional-grade XDCAM disc holds about 90 minutes of 25Mb/s material, 45 minutes shot at 50Mb/s, 55 minutes at 40Mb/s and 75 minutes at 30Mb/s.

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

STUDIO FURNITURE

Custom Consoles Media Desk and Wave Desk:

Media Desk has a 1750-mm width dual-level design with individual height adjustment of the front and rear

worksurfaces; is available in MDF with a choice of blue, pale grey and beech wood-grain surface finishes; legs are silver-steel; options include a 13U or 27U equipment bay, chairs and adjustable monitor arms; Wave Desk is available with fixed, single or dual-height adjustable work surfaces; consists of an MD4001-L/R, single MD4002-L/R plus dual MD4003-L/R (L/R indicating left or right hand work surfaces); rear under-shelf storage is fitted as standard on the dual-height-adjustable version; other options include power tower, PC mount and meeting table.

+44 1525 379 909; www.customconsoles.co.uk



SWITCHER TRADE-IN PROGRAM

Ross Video switchers: For a limited time, trade-in older analog switchers for up to \$10,000 in credit against a new Synergy Series Digital Production Switcher with Squeeze & Tease WARP; program applies to all Ross Video digital switchers and most models of analog switchers in use.

613-652-4425; www.rossvideo.com



CONTROLLER SOFTWARE

Vela Frontline EAS NDU (Network Data Unit): New 2.4-5 software upgrade includes the up-to-date Linux network security patches for open SSH (Secure Shell) and SSL (Secure Sockets Layer); EAS administrators can now manage the SSH security keys among networked NDUs from a central location and simultaneously change access codes; log-in to remote NDUs from any computer through a standard Web browser in order to verify any or all tracking information; e-mail, cell phone or paging options are available.

727- 507-5300; www.vela.com

DOWNLOADABLE VIRTUAL SET SYSTEMS

Virtualsetworks, FOR-A's digiWarp EX-II: Download pre-designed virtual sets for FOR-A's digiWarp EX-II virtual set system; view a wide range of pre-designed virtual sets, select a studio, and download the set immediately after making an online purchase; each set allows the user to pan, zoom, and scan across the backgrounds in perfect sync with the tracked camera movements.

714-832-0346; store.virtualsetworks.com

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

QMC - Scalable Master Control



The most flexible, most scalable, Master Control system you can buy.

200 channels On-Air now in 20 countries.

- 1-60 Channels
- Up to 4 key levels
- Internal signal protection
- Dual-channel DVE
- Built-in Logo Store

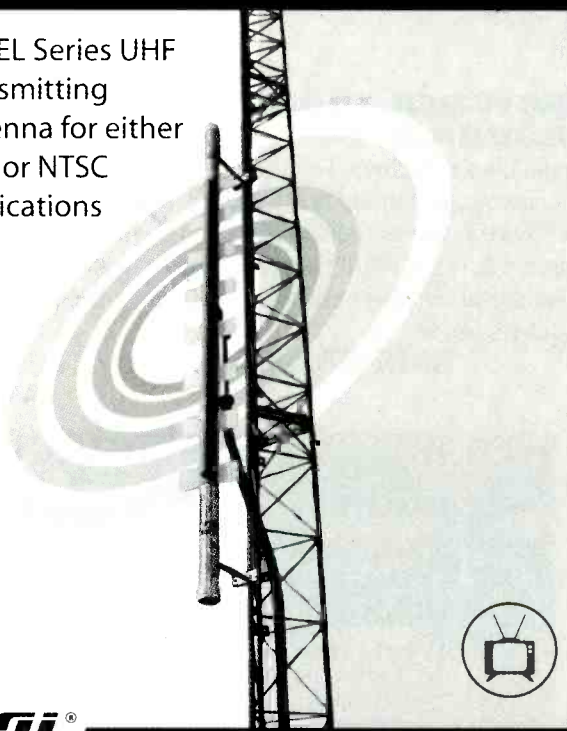
**HD Version
Now Shipping!**

Call for a demo now- 888.638.8745
www.quartzus.com sales@quartzus.com

Quartz

EL Series UHF Antenna

The EL Series UHF Transmitting Antenna for either DTV or NTSC applications

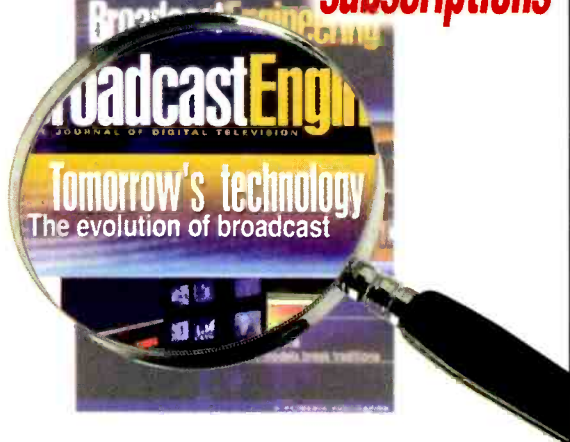


ERI® Your Single Source for Broadcast Solutions
Sales@ERInc.com | +1 (812) 925-6000 | www.ERInc.com

US/Canada Edition

Broadcast Engineering

subscriptions



As the television industry continues to redefine itself, **Broadcast Engineering** is there. **Broadcast Engineering** is the industry's preferred resource for learning about the ever-evolving television market. Stay current on the latest technology developments, new players, products and decision-makers.

To start your **FREE** subscription with the industry's #1 authoritative source of technical information*, go to www.broadcastengineering.com and click on SUBSCRIBE NOW.

*2002, Paramount Research Study, World Edition.

redefining television

New Products

NETWORK LOGO INSERTER SYSTEM

Video Design Software DigiSnap: Has built-in SDI/I/O, active video bypass, and multiple GPIs; can be used upstream or downstream of master control; consists of three major authoring and playback components: DigiAuthor, a Windows-based content creation module that runs on any computer networked to one or more DigiSnap units; DigiPlay, a client software module that can manage and operate the DigiSnap Server; DigiSnap Server, a stand-alone PC server (1RU or 2RU) fitted with a Chyron Digital PC-CODI and an optional audio card running the DigiSnap Server application and DigiPlay management software.

631-249-4399; www.videodesignsoftware.com



WIRELESS RECEIVER

Anchor Audio UHF-6400: Has 64 user-selectable channels; is PLL synthesized and rackmountable; features tone key noise suppression, displays and receiver inputs/outputs; has a digital display for easy reading; output connection included — balanced and unbalanced, aux-level output from a ¼-inch and XLR jack to the sound system, mixer or amplifier aux-level input; features factory-set, squelch control, which allows a maximum operating range while reducing noise.

800-262-4671; www.anchoraudio.com

HDTV COMPRESSION CODEC

Evertz 7770CS-HD: Encodes one SMPTE 292M (1.485Gb/s) serial digital video signal with up to four AES channels of embedded or separate audio into one 270Mb/s SDTI (SMPTE 305M) compliant output stream; preserves VANC data in the incoming HD-SDI stream and transports this across the 270Mb/s SDTI interface; automatic detection and support of 1080i/59.94, 1080i/50, 1080p/29.97sF, 1080p/25sF, 1080p/23.98sF, 1035i/59.94 field rates is provided; occupies two card slots and is housed in either a 1RU frame that holds up to three modules, a 3RU frame that will hold up to seven modules or a stand-alone enclosure that will hold up to one module.

905-335-3700; www.evertz.com

QUANTEL/P2 INTEROPERABILITY

Quantel generationQ and Panasonic P2 solid-state technology: Quantel will offer interoperability between its generationQ editing and server systems and Panasonic's professional plug-in P2 solid-state memory-based acquisition system; material acquired on Panasonic P2-equipped camcorders can be directly transferred into Quantel editing and server systems; material will be played back from the P2 cards and edited directly with the Quantel user interface.

800-331-8327; www.quantel.com
800-528-8601;
www.panasonic.com/broadcast

HD MPEG-2 ENCODER

JVC DM-JV600: Create an MPEG-2 bitstream from a high-definition source; features HD-SDI video input; reference either HD-SDI input or house sync; DVB-ASI MPEG-2 transport stream output; MPEG-2 compression; front panel 9 Mb/s to 40 Mb/s bit rate; is 1RU high.

800-582-5825; www.jvc.com/pro

TRIPODS

Miller SOLO DV: Features selectable counterbalance, 75-mm ball leveling and quick release; is designed for single-operator crews: set up to 160-cm height in seconds and pack down to a compact 60-cm for transport; selectable leg-angle locks ensure rapid stabilization, while the 75-mm diecast alloy bowl offers quick leveling, optimum torsional rigidity and long-term durability; is available in three models: SOLO 5 handles zero to five pound MiniDV palmcamcorders; SOLO 10 handles five pound to 10 pound Mini and mid-sized DV camcorders; and SOLO 20 with the Miller DS20 fluid head handles 10 pound to 20 pound payloads.

973-857-8300; www.miller.com.au



PREAMPLIFIER

Daking Mic-Pre IV: Offers four channels of Class A preamplifiers in a 1RU with outboard power supply; use as a stand-alone or in conjunction with a console; each input offers continuously variable gain control using Daking's aluminum knobs, a 20-segment LED level meter with +24db peak indicator, switchable mic/line or hi-z instrument, switchable +48V phantom power, switchable input phase and switchable 20dB pad.

302-658-7003; www.daking.com;
www.transaudioelite.com

AUDIO/VIDEO MULTIPLEXER

Multidyne HYDRA-8000 Series: Transports up to 32 video and 128 audio channels in 1RU with a maximum of more than 768 channels using one tactical cable; available with WDM and CWDM technology with each wavelength supporting up to eight video and 32 audio channels; tactical fiber cables are available with four, eight or 12 fibers with Hermaphroditic or TFOCA II connectors; the system is 100 percent digital; high density and modular in design; supports 24 bit stereo audio flat from 20 to 20kHz Hz with S/N greater than 90 dB and THD less than 0.05 percent.

516-671-7278; www.multidyne.com

Now You Can Have Higher Accuracy Plus Value GPS MASTER CLOCK & TIME CODE GENERATOR



QUALITY STANDARD FEATURES:

- SMPTE/EBU, ESE, IRIG-B, ASCII Time Code Outputs • 1PPS Output
 - 8 Satellite Tracking • Battery Back-up • GPS "Lock" Indicator
- Automatic Daylight Savings Time Correction • Time Zone Offset • Antenna
- 45 nanosecond accuracy • 3 Year Warranty • Plus More, for just **\$2495**

AVAILABLE OPTIONS:

- Parallel BCD Output • 1 KPPS • 10MHz Output • 220 VAC • 12-35 VDC
 - Video Inserter • Video Sync-Generator • Hourly contact closures



142 Sierra Street • El Segundo, CA 90245 USA
Phone (310) 322-2136 • Fax: 310.322.8127
www.es-web.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, morsbach@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 Birksmaier
 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, \$55.00, 2 years, \$95.00, 3 years, \$140.00 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-reprints of articles appearing in this publication at 877-652-5295 (261-419-5725 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
 Copyright 2003, PRIMEDIA Business Magazines & Media Inc. All rights reserved.

Dual Channel TBC/Frame Synchronizer with A/B Roll Switching

Single Channel
(1/2 Rack Size)
\$720.00



HOTRONIC ATS51

(available since 2002)

- Single or dual channel TBC/Frame Sync
- Composite input/output
- Digital comb filter
- Gen-Lock capability
- Full proc-amp control with no interruption presets
- Cut/dissolve switching

Compatible with
VHS, Camcorder
U-matic, U-matic SP
Betacam
Satellite Feed



HOTRONIC, INC.

1875 S. Winchester Blvd., Campbell, California 95008, USA
 Tel: 408-378-3883 Fax: 408-378-3888
 Web Site: www.hotronics.com E-mail: sales@hotronics.com

DVB... ASI... ATSC... Now DVEO

The New Standard
in Digital Video



DVEO, the newly formed broadcast division of Computer Modules, delivers a diverse line of products, ranging from PCI cards and software to complete turnkey systems at prices far below other manufacturers. For a **free 30 day trial*** of any DVEO products, please call 858 613-1818. Or visit www.dveo.com. *Visit Web site for details



Computer Modules, Inc.



Systems PCI Cards Software

TALLY MAPPER™

- ◆ Tally Routing & Mapping
- ◆ One Button Operation
- ◆ Store Maps Internally
- ◆ Edit From a PC/Laptop



A Compact Solution,
Ideal for Mobile Units and
Multiple Production Setups.

Videoframe™

Control System Solutions

Tel: 530-477-2000

www.videoframesystems.com

HDVI-10

SDI TO DVI CONVERTER



Convert your low cost LCD Monitor into a HD/SD SDI video monitor for \$1,000!



doremi

tel. 818 562-1101

www.doremilabs.com

Help Wanted

MAINTENANCE ENGINEER WCTV, a CBS affiliate in Tallahassee, FL. is seeking a Television Maintenance Engineer to perform maintenance on television broadcast equipment including troubleshooting to the component level of cameras, videotape recorders, audio and video systems. Working knowledge of routers, serial digital switchers, microwave, satellite and fiber systems. PC and networking experience preferred. Operational knowledge of automation software a plus. Associates degree in electronics, 3 years' of Broadcast Maintenance experience, an FCC license or SBE certification and clean driving record required. Forward resume along with salary requirements to: HR Manager 4000 County Road 12 Tallahassee, FL 32312 FAX: 850-893-5193 E-MAIL: janet.jakes@wctv6.com <<mailto:janet.jakes@wctv6.com>>

BROADCAST ENGINEER (STUDIO) - KNME-TV (PBS) at the University of New Mexico, seeks an experienced studio engineer to work in a dynamic environment. KNME, New Mexico's oldest public television station, was first in NM to begin broadcasting digital in 2001. The studio digital conversion project is well under-way and fully funded. KNME serves 1.6 million+ viewers in central and northern New Mexico. It operates a complete digital production facility with SD and HD capability, and a full-service teleport with Vyvx network connectivity. We are seeking a career-oriented professional who wishes to grow with us. The position offers an excellent benefits package, including university tuition for the entire family, and 4 weeks vacation. The Albuquerque/Santa Fe area offers great quality of life with many cultural and recreational opportunities. Salary range: \$30,146-\$52,165. For complete vacancy announcement and application, please check www.unm.edu under "jobs". Position open until filled. Refer to requisition #M38137. Resumes must be accompanied with a "Supplement to Resume" form, in web page. Contact Jim Gale (505) 277-2049 for more details about this opportunity. ALL APPLICATIONS FOR THIS POSITION MUST BE SUBMITTED VIA eJOBS, UNM's ONLINE APPLICATION/RESUME SYSTEM. Go to the eJOBS website, <http://ejobs.unm.edu>, to apply. This posting opens on Jan 23, 2004 and will remain open until filled.

TV TRANSMITTER ENGINEERING SUPERVISOR WBBH/WZVN TV in Southwest Florida is seeking an Engineering Professional to supervise daily operations and maintenance of their analog and new full-power digital transmission facility. Applicants need a minimum of 5 years experience with the installation and/or maintenance of modern High Power UHF Transmitters and Auxiliaries. Must be a team player, and able to initiate and complete tasks in an orderly fashion. Studio knowledge a plus, SBE certification is preferred. www.nbc-2.com and www.abc-7.com Send resumes to Mary Cervenk, Waterman Broadcasting, Human Resources, 3719 Central Ave., Ft. Myers, FL. 33901, maryc@water.net

Help Wanted

BROADCAST MAINTENANCE ENGINEER - KLAS-TV just completed remodeling its facility to a state of the art, digital broadcast house. Applicant must possess and exhibit a thorough working knowledge of basic electronics, digital technology, satellite, and RF skills. Troubleshooting at component level is a necessity. Candidate should have at least 4-5 years experience in broadcast television. Familiarity with Beta, DVC-Pro, server formats a must. SBE Certification is a plus. Check our website, www.klastv.com. EOE. Mail cover letter and resume to HR Director/Eng, KLAS TV 3228 Channel 8 Dr. Las Vegas, NV, 89109. Or, e-mail jobs@klastv.com

BROADCAST MAINTENANCE ENGINEER - Fox Toledo is seeking a Maintenance Engineer. Requirements: 2 years recent experience repairing, maintaining, and installing television broadcast equipment, familiarity with computers and the Windows network environment. SBE certification preferred. Resumé to Human Resources, Fox Toledo, Four Seagate, Toledo, OH 43604. EOE.

System Integration

GENCOM TECHNOLOGY MPEG II & Satellite Headends Remote Trucks & ENG Production Studios
34 Years of Television Experience
 Design & Consultancy - System Integration
Ph: 516-997-5675 - Fax: 516-997-4666
www.gencom.tv

Business Wanted

BUSINESS WANTED
 Private investor seeking to purchase broadcast manufacturing firms, distributorships, divisions or product lines from established companies. No dealerships, please. Contact mark@towerpower.com or fax to 845-246-0165.

Control Products

ES-SloMo

Universal Instant Replay Controller

- Control Up To 4 VTRs, DDPs or Server Channels
- Professional Quality
- Programmable Cueing
- Supports RS-422 P2, Octalcs and Doremi



Order Now
\$1999.95

www.jlcooper.com

Professional Services

D.L. MARKLEY & Associates, Inc.

CONSULTING ENGINEERS

2104 West Moss Ave.

Peoria, Illinois 61604

Phone (309) 673-7511 • FAX (309) 673-8128

www.dlmarkley.com

Member AFCCE

The NLE Buyers Guide

A buyers guide to nonlinear video editing systems and disk recorders / servers for editing with a searchable database of over 200 products

<http://NLEguide.com>

GILMER & ASSOCIATES, INC.

TECHNOLOGY / MANAGEMENT CONSULTANTS

BRAD GILMER
PRESIDENT

2207 RINGSMITH DR.
ATLANTA, GA 30345
TEL (770) 414-9952
FAX (770) 493-7421
EMAIL: bgilmer@atnet.com

JOHN H. BATTISON P.E.
CONSULTING BROADCAST ENGINEER,
FCC APPLICATIONS AM, FM, TV, LPTV
Antenna Design, Proofs, Fieldwork
2684 State Route 60 RD #1
Loudonville, OH 44842
419-994-3849 FAX 419-994-5419

For Sale



AcousticsFirstTM
Toll-Free Number: **888-765-2900**

Full product line for sound control and noise elimination.

Web: <http://www.acousticsfirst.com>

For Sale

ANALOG TO DIGITAL

upgrade without spending a fortune!

BUY



SELL



TRADE



NEW



USED



SONY
DSR1800
Digital Editing
Recorder

Studio Exchange

818.840.1351

email for quotes Paul@studio-exchange.com

816 N. Victory Blvd. Burbank, CA 91502 FAX 818.840.1354



Authorized
Professional
Reseller

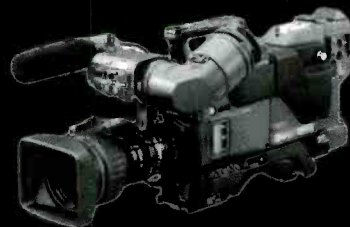
Equipment For Sale

DXC-D50

3ccd Portable Camera

SONY

*The next-generation
in the DXC-series
of cameras, designed
for even greater
picture quality
& operational
convenience!*



AZCAR
Digital Products

Call: 1 888.873.0800

Email for Quotes: sales@azcar.com

121 Hillpointe Dr., Suite 700 Canonsburg, PA USA 15317

	Page #	Advertiser Hotline	Web site Address
ActivePower	19	877-flywheel	activepower.com/a1130
ADCTelecommunications	31	800-366-3891	adc.com/jacktoday
Apple	35S		
AvidTechnology	4-5,10-11S	800-949-avid	avid.com
Axcera	41	724-873-8100	info@axcera.com
AzcarUSA	92		
Azden	50	516-328-7500	azdencorp.com
Barco	49	770-218-3200	barcocontrolrooms.com
Belden	66	800-belden-4	belden.com
BroadcastSoftwareSolutions	18	800-273-4033	broadcastsoftware.com
CalrecAudioLtd.	45	+441422842159	calrec.com
Clear-Com	39		clearcom.com
ComputerModules	90	858-613-1818	computermodules.co
CPI/Eimac	33	650-592-9988	eimac.com
CrystalVision	71	954-788-3334	crystalvision.tv
Dalet	S31		dalet.com
Dolby Labs Inc.	35	415-558-0200	dolby.com/tvaudio
Doremi Labs Inc.	81,91	818-562-1101	doremilabs.com
DPA Microphones Inc.	17	866-dpa-mics	dpamicrophones.com
ERI Electronics Research	88	812-925-6000	sales@eriinc.com
Ensemble Designs	83	530-478-1830	
ESE	89	310-322-2136	ese-web.com
Euphonix	25	650-855-0400	euphonix.com
Evertz Microsystems Ltd.	IBC	905-335-3700	evertz.com
E2V	44	914-592-6050	comms.e2vtechnologies.com
Harmonic	14-15S	800-828-0400	harmonic.com
Harris Corp. Broadcast Div.	3	408-990-8200	broadcast.harris.com
Horita	67		
Hotronic Inc	90		
Inscriber	29	800-363-3400	inscriber.com
Leitch Incorporated	BC,23	800-231-9573	leitch.com
Maxell Corp. of America	9	800-533-2836	maxell.com
Miranda Technologies	11	514-333-1772	USsales@miranda.com
NAB Broadcasters	69	202-429-5300	NABshow.com
Network Electronics	78	800-420-5909	network-electronics.com
NVision	26		nvision1.com
Omneon	25S	408-585-5000	omneon.com
Panasonic Broadcast	7	800-528-0601	panasonic.com/dvcpro
Pathfire	27S		pathfire.com
Pinnacle	21S,23S	877-733-5846	pinnaclesys.com
Pixel Power	79		pixelpower.com
Probel	85	+441189866123	pro-bel.com
Quartz USA	87	888-638-6745	quartzus.com
Radyne-Com Stream	65	602-437-9620	radn.com
Rohde & Schwarz	15	888-837-8772	rohde-schwarz.com
SES Americom	29S	800-273-0329	ses-amicom.com
Solid State Logic	47	212-315-1111	solid-state-logic.com
Sony Business Systems	51-62		sony.com/xdccan-dvd
Sony Electronics	17S,19S		sony.comm/professional
Sony Professional	27		sony.com/luma
Sundance Digital	34	972-444-8442	sundancedigital.com
SYPHA	92		SYPHAonline.com
Thomson Broadcast	13,6-7S		thomsongrassvalley.com/newsproductions
Utah Scientific	21	801-575-8801	utahscientific.com
Videoframe	90		
Videotek	67	800-800-5719	videotek.com
Visual Circuits	75	800-800-5533	visualcircuits.com
Wheatstone Corporation	IFC	252-638-7000	wheatstone.com
360 Systems	63	818-991-0360	360systems.com

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
ARCinfect@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
jbanda@wrightsreprints.com

LIST RENTAL SERVICES

Marie Briganti, Statistics
(203) 778-8700 x146
(203) 778-4839
primedia@statistics.com

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

BROADCAST ENGINEERING February 2004, Vol. 46, No. 2 (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. Canadian Post Publications Mail Agreement No. 40597023. Canada return address: DP Global Mail, 4860-2 Walker Road, Windsor, ON N9A 6J3. POST-MASTER: 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. © 2004 by Primedia Business. All rights reserved.

Cutting corners, cutting profits

BY PAUL MCGOLDRICK

We seem to have become a nation of corner cutters. From the people who think the best way to drive around a corner is to drive across it, to the students who happily, and stupidly, lift the materials for their reports — or their college entry essays — directly from other people's efforts. For some reason, cutting corners has also replaced the very different task of cutting expenses in many areas of business, including broadcasting.

There have been some really dangerous examples of that over the years. If a roofing contractor quotes a job using one type of material, then cheats you by actually doing the work with something inferior, the worst scenario is probably that the life of the roof will be shortened. If a tower manufacturer does the same thing the results can be catastrophic, as I have seen happen in places like Nigeria, Iran, Libya and Burundi.

The consequences of improperly bypassing interlocks can also be fatal. There are some things that you have to do when building and installing transmitter equipment that the operator should not have to do during regular maintenance. But thinking you know what you are doing should lead you to be extra careful, so that you think through all the possibilities. For instance, I remember a capable engineer being tossed across a transmitter hall after assuming that an output tuning capacitor had been discharged — because it should have been. It hadn't — that was the problem. Or an occasion in Saudi Arabia where a

high-power vapor-cooled SW transmitter had a leak somewhere above the final and, with all the interlocks disabled and the doors opened, a technician turned his back on the transmitter, forgot where he was and stepped back. An arc was drawn from the plate supply through him to the holding tank. Both people were burned,

but lived. Another man didn't when he was phasing up two 250kW generators together and closed an oil circuit breaker at the wrong moment.

Another example is the audience bleachers in a studio in Chicago, where a section had not been bolted up properly. A pile of children ended up in a collapsed pile of materials. Putting yourself in danger by cutting corners is one thing, but putting a lot of kids in such danger would personally keep me awake at night.

And despite training and retraining, how many times has a mobile news unit raised its antenna pole into power lines because they were cutting corners by not going through a checklist? Would you remain a passenger on an airplane if you knew the pilots hadn't gone through their checklist?

We also see corners cut in equipment: obvious features left off that should have been offered, the use of components outside the data sheet

specification ranges, the use of a component that exhibits an unspecified characteristic (very popular) or the use of inferior components when the supply chain is challenged by high demand. And the quality of equipment can differ from one piece to another. It used to be said that you should



While we are all still in resolution-making mode, let's resolve to solve fewer of our perceived problems by cutting corners.

not buy a vehicle that came off the production line on a Monday morning or a Friday afternoon. I've never seen a broadcast equipment manufacturer with that problem, but in the very nature of business in the United States, there can be definite quality issues with equipment that is pushed through assembly to meet the numbers at the close of a month, a quarter, or a fiscal year. When that happens and the product becomes a warranty (and reputation) issue, cutting corners becomes a profit-eating problem.

While we are all still in resolution-making mode, let's resolve to solve fewer of our perceived problems by cutting corners, and to keep a sharp eye out for suppliers or colleagues that do.

BE

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



Send questions and comments to:
paul_mcgoldrick@primediabusiness.com



View an online product demo whenever you see this logo.

www.broadcastengineering.com

MVP™

Multi-Image Video Processor



Experience the Dawn of Evertz MVP™ ...The One to Watch!

The Most Advanced and Comprehensive Multi-Image Display System Today!

NAB2004 - Booth #SU11827

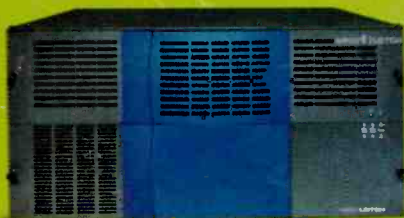
Tel: 1-905-335-3700 Toll Free 1-877-995-3700 www.evertz.com





TAKE CONTROL OF SIGNAL PROCESSING IN EVEN THE HARSHTEST CONTENT ENVIRONMENT.

NEO™/6800+ Processing with NAVIGATOR Control



A Winning Video Processing Team for Your Integrated Content Environment (ICE)

NEO and 6800+ Give You an Integrated, Cost-effective System with Unprecedented Control:

- Reduce operational costs: Navigator's extensive control and monitoring capabilities allow unsurpassed views of your processing systems—from a single module to racks of equipment in multiple locations—saving you time and resources.
- Flex your processing options: A wide range of products in both NEO and 6800+ allows processing of analog and digital signals, and provides compatibility with SD, HD, fibre optics and more.
- Design your system to fit your needs: The 6800+ and NEO platforms allow you to design a cost-effective, high-quality solution that is easy to configure and operate.

Put this team to work in your Integrated Content Environment (ICE):
www.leitch.com/6800+ice and www.leitch.com/neo+ice

Get a free ICE poster at www.leitch.com/poster

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

 **LEITCH.**
www.leitch.com