

The BroadcastEngineering

DigitalReferenceGuide

A supplement to *Broadcast Engineering* magazine - DECEMBER 2007

YOUR #1 RESOURCE FOR
PRODUCTS
AND
SOLUTIONS

NEWS 11:00
NEWS 22 NEWS
KIE WINTERS
JOHN THORNTON
plan steams ahead
build new recreational
250,000 boost
manufacturer

THU	FRI	SA	SUN
74	75	76	76
50	51	52	

HWY 17 - 10:10



D-12: Compact Enough for OB Powerful Enough for Breaking News



The D-12
Digital Audio
Control Surface

- mixing router based topology
- 5.1 surround sound plus 3 stereo masters
- COMPACT – 32 faders – 53" wide/32" deep/9" high
- router based source/destination selection
- paging channel strips – 64 channels on 32 faders
- scalable – up to 64 input faders
- routable mixes
- event storage and recall
- eight stereo subgroup mixes
- eight stereo sends
- eight mix-minus outputs (can be expanded)
- four DCM faders (digitally controlled groups)
- Bus-Minus (w/TB & solo) on every input (direct out)
- pan/bal, blend, mode, EQ/dynamics on every input
- delay inputs or outputs (frames or milliseconds)
- fullscale digital peak and VU metering
- two studios, CR and HDPN/Studio 3 monitors
- talkback communication (programmable)
- mix follows talent / logic follows source
- 12 user-programmable switches (comm, salvos, triggers, etc.)
- automatic failsafe DSP card option
- automatic failsafe CPU card option
- redundant power supply option
- switched meters with system wide access (including all console inputs and outputs)
- dedicated master, group and DCM faders (no fader sharing)
- motorized faders
- pageable fader option
- dedicated LCD display per function (EQ, Pan, Dynamics)
- multiple surfaces can share I/O

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FS1 rear panel

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AJA
VIDEO SYSTEMS

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THE #1 RESOURCE FOR PRODUCTS AND SOLUTIONS

In today's fast-paced world, getting accurate information and doing so quickly is critical. Sometimes, you don't want to wade through 30 pages of Yahoo! or Google or other search engine pages to find that perfect video encoder or IP router. Besides, isn't it irritating to see a search engine display a page full of vendors claiming to sell the exact product you need, but on closer examination, you realize that companies like ebay, FXHome.com or Merrill-Legal.com probably aren't really in the professional video encoding business?

To help *Broadcast Engineering* readers in their quest for accurate and reliable information, we created this Digital Reference Guide. This guide provides thorough coverage of more than 40 product categories and 500 companies supplying the professional products you need for your television station, production studio, cable system or audio/video facility.

In addition, this information is available in both print and web form. This combined solution permits you to browse through pages of targeted information, complete with photos, phone numbers and information on the key companies you need. Or if you prefer, this same information is available in an easy-to-use electronic version at our web site: www.broadcastengineering.com.

Brad Dick

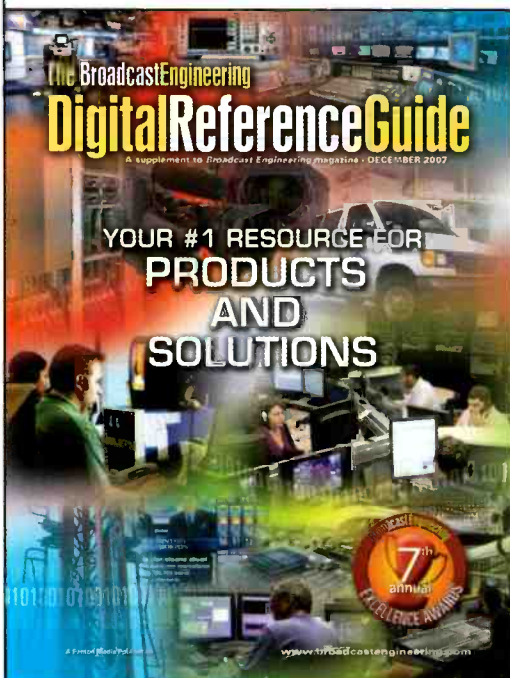
Brad Dick
Editorial Director

READ VOTE WIN



You choose the winners of the *Broadcast Engineering Excellence Awards*.

See page 60 for this year's entries, and look for the March NAB issue to find out who the winners are!

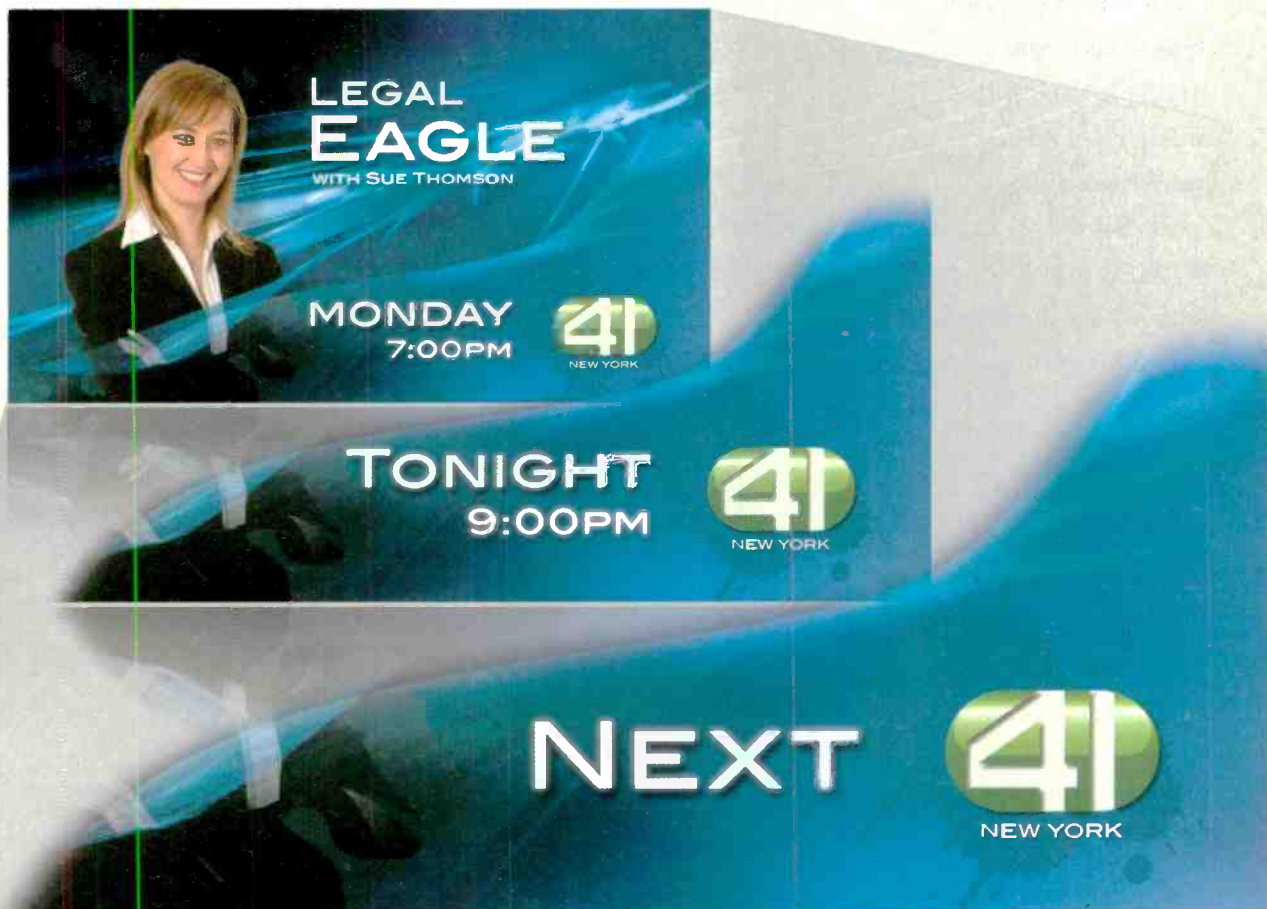


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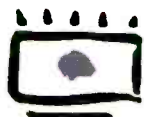
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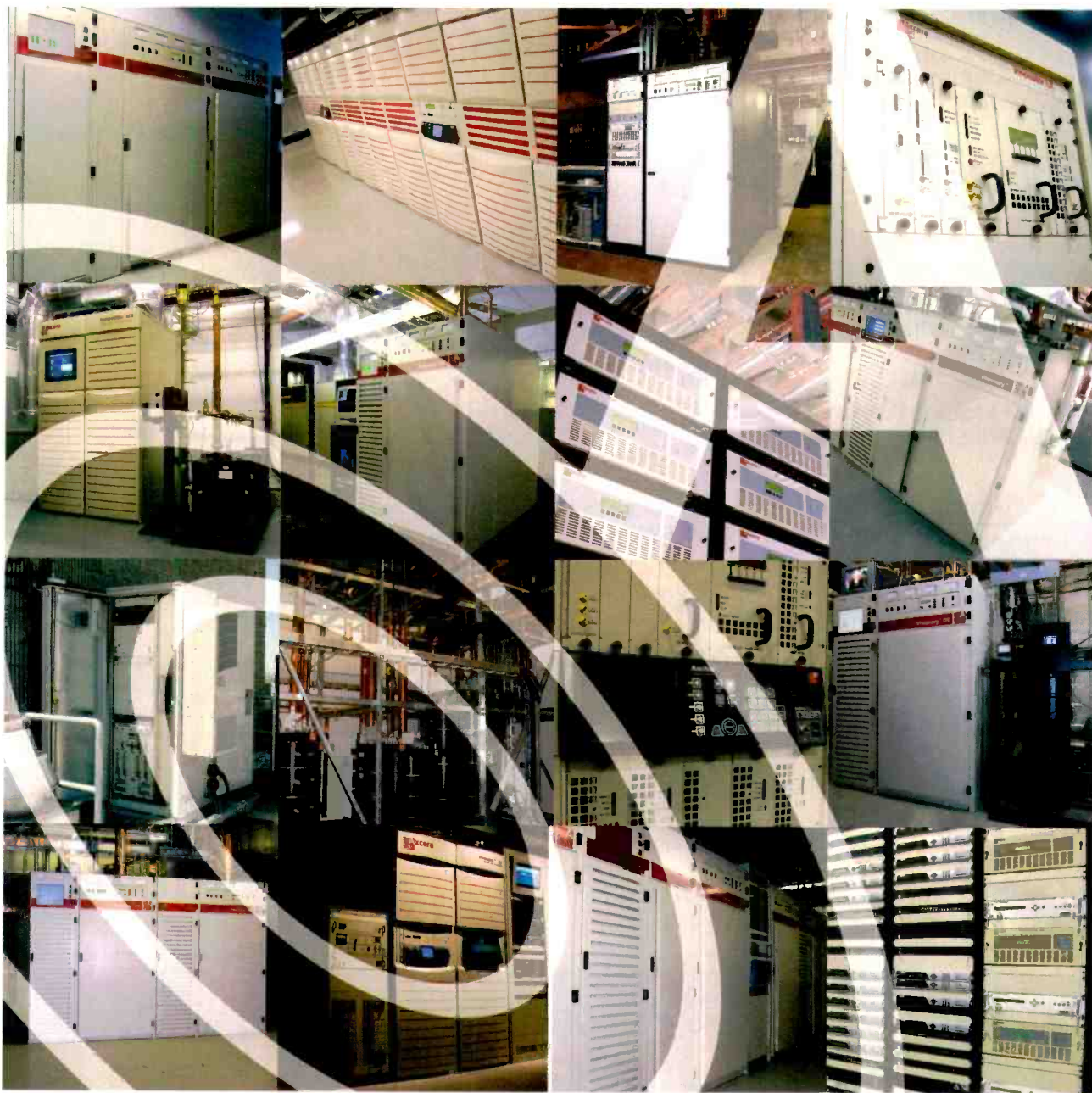
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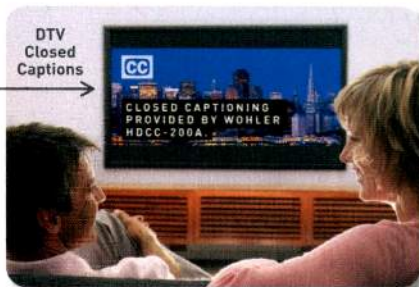


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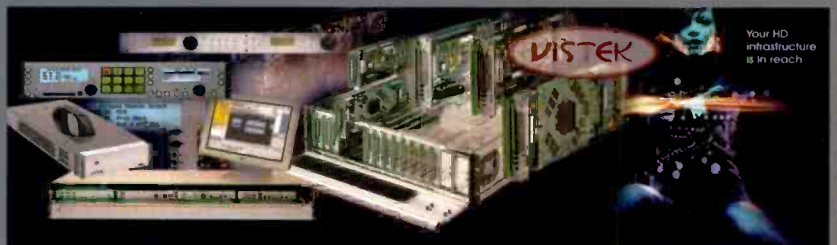
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PRODUCT DIRECTORY

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Studio Network Solutions
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360 Systems
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Video Technics, Inc.
404-327-8300

VTRs (VIDEO TAPE RECORDERS)

Media Concepts
918-252-3600

Panasonic Broadcast Europe
49 611 235 0

Studio Exchange
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TV Pro Gear

Videomagnetics
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WIRE, CABLE & CONNECTORS

AUDIO CABLE

ADC TELECOM
800-366-3891

Anixter
800-264-9837

Aviom, Inc.
610-738-9005

Belden
800-235-3361

Clark Wire & Cable
800-222-5348

Components Express
800-578-6695

Gepco Intl., Inc.
800-966-0069

Nemal Electronics Intl.
800-522-2253

Pomona Electronics

ProCon Digital Systems
800-631-0868

Whirlwind
800-733-9473

Wireworks
800-642-9473

AUDIO CONNECTORS

ADC TELECOM
800-366-3891

Fischer Connectors
800-551-0121

Gepco Intl., Inc.
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Neutrik USA
732-901-9488

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Wireworks
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FIBER OPTIC CABLING

ADC TELECOM
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Axon Digital Design BV
888 919 9379

Belden
800-235-3361

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800-827-8823

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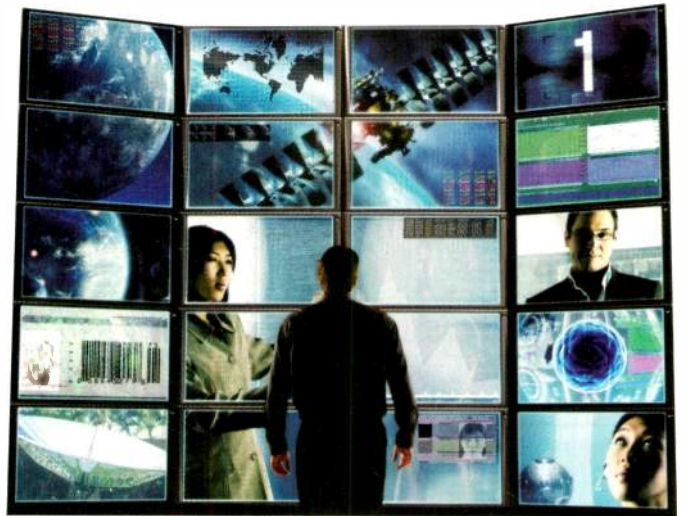
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Anixter
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CANARE CORP. OF AMERICA
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Anixter
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Components Express
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Fischer Connectors
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Gepeco Intl., Inc.
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Neutrik USA
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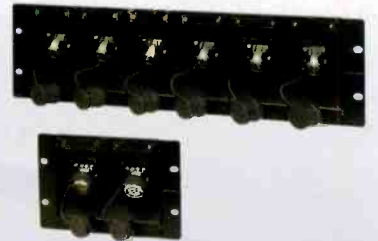
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We'll announce the winners in the March 2008 issue. Award plaques will be presented to the winners at the spring NAB convention in Las Vegas.

Brad Dick

Brad Dick
Editorial Director

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AARP broadcast facility renovation opens up the views and keeps an eye on future needs



In the AARP 12,000sq-ft facility, the group wanted the equipment to represent forward thinking, and with the exception of two studios, the entire plant was rebuilt.

The association wanted upbeat colors, special wall materials, special light fixtures, and for everyone to be able to see what was being done in all the control rooms, and yet when necessary, have privacy. The answer: glass with a light switch! An added benefit is that smart glass saves costs for heating and cooling and lighting, as well as avoids the cost of installing and maintaining motorized light screens or blinds.

AARP selected equipment with long-term growth and interoperability in mind. The NVISION routing system, the core of the technical operations center, is built using NV8256-Plus digital video router, NV7256-Plus synchronous AES router, NV5128 analog video router as well as RS-422 data and time-code routing. The NV8256-Plus router along with all plant wiring is fully capable with 3Gb/s SMPTE 324 1080P video. Euphonix Max Air audio platforms, Sony MVS8000 switcher systems and Barco video walls driven by Evertz MVP processors are used in the production control rooms.

The two studios use Sony HDC-950 series HD cameras. HDW-750 cameras are used for field use. All video production is shot and edited at 1080i, but AARP can dub and transcode any format. Harris NEXIO servers and X75 format converters support ingest control of 24

channels of HD and SDI. The Sun Microsystems StorageTek SL8500 modular library provides long-term storage of all media assets. An Avid Interplay DAM system is combined with 10 Media Composer Adrenalines DNxHD 145 on the Symphony Nitrus system and the StorageTek for long-term storage connected by Flash-Net to the archive operating system.

The entire plant is interconnected with Evertz fiber optics. Clear-Com's Eclipse Matrix and Cellcom digital wireless intercom system wireless headsets are used for communication throughout the facility. The Avocent KVM platform links 48 user locations and 64 platforms. This overlay software allows any terminal within the system access to any connected platform.

The technical plant is supported by an 80KVA UPS with fifth-order harmonic filtering supported by a 500kVA generator. Power is monitored remotely in and out of house. HVAC, chilled water and lighting are all dual system and remotely monitored as well.

The electronics were designed by the AARP engineering department in VidCad for ease of change and documentation capability. No raised floors were used anywhere. All cable distribution is on overhead cable trays fitted with accessible hinged custom covers that have magnetic catches for easy access.

With AARP's renovated facility, everything is possible and on the tour to the rest of the users in the building. ■

Category

New studio or RF technology — station

Submitted by

Lawson & Associates Architects

Design team

AARP: Mark Slimp, dir., radio & TV prog.; Bob Martindale, mgr. TV production; Bill Western, chief radio & TV eng.; Dennis Felton, proj. mgr.

Lawson: Bruce Lawson, principal; Carlos Madero, tech dir.; Susan Stine, designer

DSI: Andrew Prager, sr. project eng.

Eastboard Consols: Steve Goldberg, principal

Technology at work

Avocent KVM platform
Avid

Interplay DAM
Media Composer
Adrenaline sys.

Symphony Nitrus
Barco monitor walls
Cellcom wireless
headsets

Clear-Com Eclipse Matrix
intercoms
Euphonix Max Air digital
audio sys.

Evertz
Fiber-optic distribution
MVP processors

Harris
NEXIO server platform
X75 converters
NVISION serial HD router
Sony MVS8000 switcher
Sun Microsystems
StorageTek SL8500



Indonesia's Indosiar extends its signal reach with a new high-powered antenna

Category

New studio or RF technology — station

Submitted by

Jampro Antenna

Design team

Jampro: Doug McCabe, COO; Dane Jubera, sr. eng.; Aaron Callahan, RF eng.

Technology at work

Jampro
JUHD broadband high-power UHF panel antenna
RWCC UHF combiner/splitter
Proline 6in rigid transmission line



After you build the tallest, most powerful TV broadcast tower in all of Indonesia, you want to crown the achievement with a far-reaching, impacting antenna. You also want the signal leaving the transmitter to flow cleanly 400m above with minimal impedance through a finely matched combining-transmission system.

These are the reasons why Indosiar (PT Indosiar Karya Media Terbuka), one of Indonesia's largest TV networks, recently relied on Jampro Antennas of Sacramento, CA, to engineer and commission a UHF broadband antenna system. The new system supports 320kW of input power for four analog TV channels and multiple DVB-TV channels, to be launched in the coming years.

The challenges facing the Jampro design team were considerable, starting with the 1300-plus-ft antenna tower placement in the capital city of Jakarta, a necessary height for the network to even begin to acquire the desired coverage. Indonesia, spread over an area almost three times the size of Texas, is an archipelago consisting of more than 17,000 islands. Compounding broadcasting problems are difficult atmospheric and topographical conditions due to a hot, humid, tropical climate and mountains reaching 16,000ft.

Indosiar's engineering team had been relying on Jampro for many years for antenna

solutions and accepted its recommendation to use the company's JUHD broadband high-power UHF panel antenna to transmit the new channels. This antenna comes DTV-ready for UHF bands IV and V. The flexibility of this modular design allowed various azimuth and elevation patterns to be configured, and by using its optional beam tilt and null fill, the elevation pattern was shaped to achieve maximum coverage. Bright orange fiberglass radomes were installed to protect the panels against the elements, assure peak performance and dominate the skyline with a symbol of Indosiar's market leadership.

The transmission system was equally important to achieve the objective coverage. A Jampro RWCC four-channel UHF balanced combiner and output splitting systems were installed, and more than 1mi of Jampro 6in Proline rigid transmission line and components were used.

Indosiar's engineering department was delighted with the coverage results. Field tests far exceeded signal strength expectations and reached households well beyond the ranges anticipated. Moreover, bright orange panels now loom high above Jakarta, confirming Indosiar's No. 1 position in the country's TV market. ■

WBTW-TV Myrtle Beach bureau goes digital and automates multimedia news



Media General's WBTW-TV, News 13, in Florence, SC, built a new two-story building for its Myrtle Beach, SC, bureau 70mi away, which had outgrown its facility. This new facility will become the station's primary hub for newsgathering and live production. Professional Communications Systems (PCS) was appointed to integrate a wide selection of new systems to provide up-to-date digital capabilities.

Because local newscasts had been produced in both Florence and Myrtle Beach, the legacy analog production system was relocated to swing space above the new studio to allow local programming production to continue with minimal disruption. The control room was re-assembled, tested and turned over to the Myrtle Beach staff after only five days, during which all local news content was produced in Florence.

In addition to creating a physical plant that serves as a community point of pride, new systems were designed to streamline production of multiple local newscasts and support continued news leadership in the region. New systems include a Grass Valley Ignite automated production system with programmable features to provide a more consistent on-air image for the broadcast audience. Ignite capabilities allow the creation of programming elements ranging from simple camera shots and mic control to complex effects and graphic element recall through its communications links with the ENPS system.

The Ignite system also can access a variety of typical remote support feeds delivered to the station through traditional newsgathering technologies or satellite delivery, as well as the final packaged outputs from a new Aurora NLE system, acquired from Grass Valley by PCS.

Thirty-seven channels of incoming feeds from both local and national sources are managed by an RF distribution system, in lieu of more expensive and complex routing. Producers, editors and writers can easily view these signals on traditional monitors in multiple locations.

A Miranda Kaleido-X multiviewer system permits concurrent, comprehensive monitoring of critical feeds between the Myrtle Beach newscasts and the Florence master control playout systems, displaying multiple signals in user-configurable layouts. This provides switcher setup confirmation at a glance toward the dual plasma displays, which the management deemed more cost-effective than a traditional monitor wall with individually dedicated monitors.

The design provides efficient sharing of a high volume of information among the area's two daily and two weekly Media General newspapers; their online outlet, www.snow.com; and the physically separated locations of station operations. Plus, it allows for coordinated QC and supplemental coverage capability of high profile events, such as local elections and extreme weather conditions, when additional reporters and producers may be needed. ■

Category

New studio or RF technology — station

Submitted by

Professional Communications Systems

Design team

WBTW: Michael Caplan, station mgr.; Scott Johnson, chief eng.

Media General: Ardell Hill, SVP op. & eng.; Mark Turner, VP tech & interactive media; Ken Breeden, dir. of facilities development

PCS: Tim Sloan, VP eng.; project mgr. & design eng.; Eric Mertens, design eng.; Troy Pazos, install mgr.

Technology at work

ADC Pro Patch panels
Blorder Tongue RF headend distribution

Evertz
5600 master clock
5600 auto changeover

Extron converters
Harris X75 synchronizers
Miranda

Kaleido-X multiviewer
Vertigo XG CG

Motorola DSR 4520-X
Panasonic TH-50PH9UK
Scientific Atlanta D9850 satellite receivers

Thomson Grass Valley Aurora NLE
Concerto router
Ignite production sys.

K2 media server
Kayak DD-2 switcher
Tilogy IP intercom sys.

Wohler VAMP2-SDA,
MON4-2W-HR monitors



WCAX's 24/7-manned transmission facility powers northeastern U.S. market

Category

New studio or RF technology — station

Submitted by

Harris

Design team

WCAX-TV: Theodore J. Teffner, VP eng.

Pearson Associates: Ed Pearson; Gerry Marshall

GVW Architects: Frank Guillot

Technology at work

Caterpillar 1000kW generators

Harris

PowerCD tube transmitter

Sigma solid-state transmitter

Platinum solid-state transmitter

HT-20LS tube transmitter

Ranger solid-state transmitter

eCDi remote monitoring and control system

Rohde & Schwarz

NW7090V solid-state transmitter

NW7340V solid-state transmitter

Textronix T&M gear



The transmitter facility for WCAX-TV, the CBS affiliate for Vermont's Burlington/Plattsburgh market, is one of only a handful of 24/7-manned facilities in the United States. The WCAX-owned facility is also unusual because it houses digital transmission systems for three other local affiliates: NBC, ABC and FOX.

Located on Mt. Mansfield in the resort town of Stowe, VT, the existing WCAX analog transmission building was torn down, with the new facility planned around the concrete shell. Three distinct areas comprise the facility: one for digital main and backup transmission systems, one for older analog transmission systems and an office area that provides a quiet place for engineers to communicate with the studios and monitor the health of the transmission systems.

The Harris PowerCD UHF tube transmitter, in a dual-cabinet configuration, features a dual-exciter design with Harris Apex digital exciters for maximum redundancy. Harris custom designed a dual-cooling system to separate the cooling of the transmitter's power amplifier chains into independent heat exchange systems.

For its analog channel, the station uses a Harris Platinum Series VHF transmitter in a dual-cabinet configuration. Installed in the older area of the facility, it will be removed after the analog shutoff, creating space for two FM stations.

Harris hung the filtering and RF systems ahead of the transmitter installation. WCAX

built a combiner system for the PowerCD and the Harris Sigma UHF transmitter for the NBC affiliate. The two stations, with different directional patterns, share a dual-antenna system fed by 6-1/8in and 3-1/8in transmission lines.

The PowerCD transmitter provides several key benefits. Its multicollector IOT tube design helps to reduce the facility's enormous electrical costs, allowing the ROI to be achieved in four to five years. It also reduces the noise level within the facility through special features. Most UHF transmitters feature a thyatron crowbar circuit. This is an overload circuit that dumps all the high voltage energy to the ground when tripped — and makes an enormous bang similar to a sledgehammer on an anvil. The PowerCD's multicollector tube design eliminates the thyatron crowbar circuit, allowing the transmitter to protect itself in a more graceful manner.

The Harris eCDi control and monitoring system integrated into the PowerCD transmitter adds the final touch. WCAX engineers use eCDi to navigate the screens and parameters from a quiet desk in the separate office area. It also provides additional fault logging and parameters for deeper system monitoring than is possible from the front-panel GUI.

The facility is in its final stages of preparation for analog sunset. The team is moving the microwave systems from the analog to the digital side, and come early 2009, all but a few hints of the facility's analog past will have disappeared. ■

A plan for all seasons: Historic WCCO-TV brings city lights, accessibility to public



By 1956, seven years after its on-air debut, Minneapolis' WCCO-TV was drawing lunch-time crowds outside its studio windows, on which the weatherman would write the day's forecast while those gathered watched themselves on the monitors. This inventive take on technology and a desire to connect with its public have survived to the present day. In the last 18 months, the CBS-owned-and-operated station has inaugurated a reconfigured newsroom and two redesigned broadcast studios that feature innovative architectural- and lighting-design technology conceived to take full advantage of its downtown setting.

First to be completed was the Nicollet Studio, which runs alongside the city's central pedestrian mall. As a backdrop to the anchor desk, an expansive glass wall was angled into the building's western facade, with additional windows fronting the adjacent weather center. Normally, lighting a set subject to significant levels of daylight requires treating the windows with gels or other color-temperature-correcting materials, which can tint or mirror the surface and make it difficult for onlookers to see through the glass. Because WCCO was determined to preserve maximum visibility into the building, a motorized triple-roller system using Rosco N.3 and N.6 neutral-density filters was devised for the windows. To harmonize with the lighting conditions,

Brightline SeriesONE (S1.4) DMX-dimmable studio fixtures were selected and lamped with daylight-temperature (5600K) Osram Studioline lamps. The electrical and thermal efficiency of the 4 x 55-W fluorescent technology enabled the station to avoid the need for additional HVAC resources despite the increase in ambient sunlight.

Next, WCCO turned to an even more challenging makeover of another facility — a much larger, enclosed studio that abutted a grassy plaza on the east side of the complex. For the Plaza Studio, the design team proposed opening the plaza to the public (complete with an outdoor LED screen showing current programming) and "opening" the studio wall to the plaza. This opening uses more than 1000 sq ft of glass set in Minnesota limestone, with the panels behind the main anchor desk alone more than 15ft wide and 18ft tall. Neutral-density filters were again deployed, but because of the need to shoot both evening and daytime shows under potentially volatile light conditions, Brightline custom-engineered its SeriesONE fixtures to feature digitally addressable dual-circuit ballasts, so that a fixture could be configured simultaneously with both daylight (5600K) and incandescent (3200K) lamps. A Horizon-A PC-based lighting-control system stores multiple cues to match changing color-temperature and level requirements on set. ■

Category

New studio or RF technology — station

Submitted by

Brightline

Design team

WCCO-TV: Gary Kroger, dir. of eng. & operations; Mike Marrone, head floor dir./stage mgr.; Todd Megrund, floor dir./stage mgr.; Steven Richardson, floor dir./stage mgr.

Brightline: Sam Cercone, managing partner; Dan Glass, lighting eng.

Nicholas Hutak Lighting Design: Nicholas Hutak, lighting dir.

Beecher Walker

& Associates: Lyle Beecher, AIA, principal/CEO

Technology at work

Aitman ODEC outdoor ellipsoidal fixtures

Brightline

SeriesONE, 4 x 55-W, dual-circuit, DMX-dimmable fixtures

Control screens and intensifiers

Multifixture racks and hangers

Daktronics 10mm outdoor LED display

Horizon-A PC-based lighting-control system

Osram Studioline 5600K and 3200K 55W lamps

Rosco N.3 and N.6 neutral-density filters and scrim



WGBH transitions from vintage A/V studio to serial digital facility for PBS, local TV

Category

New studio or RF technology — station

Submitted by

The Systems Group

Design team

The Systems Group:

Belinda Binkley, dir. proj. oper.; Chris Butler, installation supervisor; Chris Gefken, proj. mgr.; Paul Rea, assoc. proj. eng.; John Zulick, sys. eng.

WGBH: Michael Foti, dir. eng.; Joe Pugliesi, maintenance supervisor

Technology at work

Evertz

MVP multi-image display processor
X-1201 series routers

Harris

ADC automation
Air Client
Global Media Transfer
Media Client
VTM & TVM test equipment

Ikegami HTM monitors

Masstech MassStore

Samsung 460P LCD displays

Thomson Grass Valley

Apex AES router
Concerto TC & control router

Encore control system

K2 media client and server system

Maestro master control switcher

Modular products

Trinix SDI SD/HD router



Photo by Andy Washnik

In May 2005, WGBH-TV broke ground on its new facility in Brighton, MA, the first step in the station's attempt for a smooth transition from its vintage analog A/V plant in Allston, MA, to a new serial digital facility. Located outside of Boston, WGBH produces about one-third of PBS' prime-time programs, and serves the New England area with seven local and one national channel.

The workhorse of its new master control room is the Thomson Grass Valley Maestro, because the project called for a master control switcher with internal branding, audio store and character generation. Matched with a Thomson Grass Valley Trinix SDI router, Apex AES router and Encore control, the front end of the Maestro switcher was completed.

Thomson Grass Valley's new K2 media server and client platform was chosen for ingest and play-to-air servers. The system is configured with 14 channels of SD air/protect and two channels of HD air/protect, with dedicated channels for ingest and QC playout. The system has a total of 7.5TB of online storage (about 120 hours of content per channel) with the ability to push and pull to nearline and offline storage through a Masstech MassStore asset management/storage system. The MassStore nearline system itself has a total of 4TB of storage. The Masstech is also linked to a Sony PetaSite SAIT tape library for an additional 50TB of offline storage.

The Harris ADC provides automation. The high volume of ingest and playout required a dedicated ingest device server with redundant playout. Three ingest rooms were designed with Harris Media Clients to perform ingest and evaluation. Harris VTM series rasterizers and TBC and FS control panels give complete control over A/V adjustments. Genelec speakers and an Ikegami HTM series multiformat color monitor complete the experience.

The master control room allows operators to control and monitor all of the eight outbound channels. The main monitor wall consists of six Samsung 46in LCD displays. They are driven by an Evertz MVP multi-image processor that allows operators to view any of its 56 sources in any combination and size, along with fault monitoring. The front console is used for playlist monitoring through Harris' Air Client. A quad video card is used to spread the list among four VGA monitors, allowing easy viewing of upcoming events. The control panels for Maestro and the Evertz bypass switchers are also available to the operators with a full QC station. The rear console is used for ingest and schedule review. The operators have access to Harris Air and Media Clients, giving them the ability to review upcoming events, schedule records and ingest last-minute content. Both the front and rear consoles monitor nearline and offline file transfers through Masstech's user interface. ■

WTXF-TV undertakes a complete building renovation while remaining on-air



WTXF-TV wanted to stay on-air while replacing every inch of its 80,000sq-foot building in downtown Philadelphia. The renovation would mean removing every wall and finish; replacing the roof and existing electrical service; creating a two-story space; and installing satellite uplink platforms, a new technical core, studios, master control, media prep area and in-take, 20-car interior garage, dual 225kVA UPS's, and a 1500MW generator.

Key elements were decided early on based on cost and necessity. The electrical switchgear for two services were set in the basement along with the new generator and two UPS rooms. A street studio and parking in the building for the ENG vehicles set the first floor, along with reception and HR. The new evening studio needed to be placed on the third and fourth floors to accommodate the clear spans required for the 5000sq-ft space.

The general manager, accounting and sales occupy the fourth floor, with the evening studio, newsroom, an edit and production control room occupying the third floor. A second production control room, equipment room, master control room, engineering offices and promotion occupy the second floor.

In the first phase, the street-front studio was completed to clear out a portion of the basement for new electrical service, and the third and fourth floors were renovated. Next, the

remainder of the first and second floors were completed. When the second floor equipment room was finished, the original basement equipment room was demolished, and the basement was completed as the last phase.

On the roof are multiple satellite platforms and two stand-up locations with downtown Philadelphia backdrops. Having a roof reduces the number and size of mechanical spaces in the building. Much of the rooftop equipment feeds the studios and the third and fourth floors.

Another goal was to open up the creative process. An opening in the floor between the third and fourth floors allows the sales, traffic and accounting areas to overlook the newsroom and edit areas. The equipment rooms are filled with glass walls for touring visitors and staff.

For the street studio, an isolation slab was poured for the floor, and multiple glass layers insulate the space from noise and reduce glare. The structure was replaced to create as much height as possible for the ductwork to serve the room.

The third-floor studio required the removal of three columns. Two redundant mechanical units serve the space. All of the walls are designed to isolate and acoustically treat the surface of the walls. The connector strips feed to a fourth floor dimmer room to minimize the wire runs. The bathrooms on the third and fourth floors were moved to accommodate the two-story studio. ■

Category

New studio or RF technology — station

Submitted by

Lawson & Associates Architects

Design team

WTXF: Bob Simone, gen. mgr.; Steve James, VP of eng.; Mark Toub, eng. mrg.

Lawson: Bruce Lawson, principal; Carlos Madero, tech dir.; Susan Stine, designer

Beck Associates: Paul Kast, project mgr.

Eastboard Consoles: Steve Goldberg, principal

Keating Building Corporation: Brack Huffman, project mgr.

Technology at work

Asco transfer switch
Barbizon lighting grid
Caterpillar 1500kW generator
Data Aire computer room units
Eastboard console
GE switchgear
IAC acoustically controlled doors & windows
Kinetics vibration isolation floors
Luxar by Glastrosch studio nonreflective glass
MGE UPS
Tate raised floor
Trane
Building control sys.
Chillers
Rooftop units



BCA, CNA protect Luxembourg cultural assets with a single content storage solution

Category

New studio technology
— network

Submitted by

Front Porch Digital

Design team

BCE: J. Lampach, overall architecture; J. Jungels, hardware infrastructure; J-M Gacher, software integration; G. Feinen, workflow; S. Heiles, automation

CAN: J-M Spartz, requirements and architecture

Front Porch

Digital: Nicole Jacquemin, overall architecture; Marc Wharmby, proj. management; Roger Kesteloot, integration

Technology at work

Avid MediaStream server

Axon Synapse converter

Front Porch Digital

DIVArchive content storage management

Miranda Imagestore master control

Sony

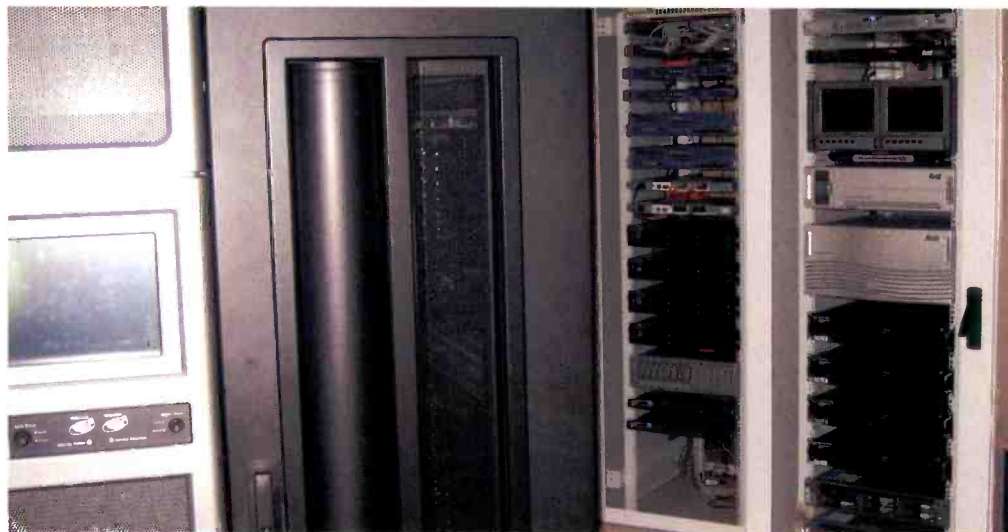
VTRs and monitoring

Sun/StorageTek taped archive storage

Tektronix monitoring

Thomson Grass Valley router

TSL monitoring



Luxembourg's Centre National de l'Audiovisuel (CNA) stores all of the country's audiovisual resources into one digital archive. It then makes those resources available to broadcasters and researchers, as well as the general public via the Web. The archive protects the country's audiovisual heritage, generates new material for the community and promotes Luxembourg internationally.

In 2001, Luxembourg's national broadcaster, Broadcast Centre Europe (BCE), began reviewing the management of its own archive. Because all of BCE's content eventually is archived at CNA, it seemed a natural solution that the two organizations might eliminate needless duplication efforts, increase efficiency and better serve the public by collaborating to share infrastructure and management resources. Working together, CNA and BCE designed a system that links their two sites, 12mi apart, and combines essential functions between them. To do this, the organizations used the content storage management functionality of Front Porch Digital's DIVArchive, with intersite communication and transmissions managed by the company's DIVAnet.

This solution, completed in 2007, represents the first time a single content storage management system has been deployed to serve multiple requirements at two different sites. In addition to meeting legal obligations

to keep a record of all broadcast material in the national archive, CAN and BCE's strategy provides content replication, disaster recovery and business continuance in the event of problems at either site. At CNA in particular, the system provides content management for the archive, library and Web-serving operations, thus facilitating research for on-site users and for the public via the Web.

In the infrastructure, DIVArchive and DIVAnet technologies reside between the automation systems and the deep storage, managing file transfers and the recording of operations. Disk storage is prohibitively expensive for an archive as big as CNA's, so project planners opted to go with a nearline approach that combines disk storage and tape archive storage, provided by Sun/StorageTek. The storage technology is based on 8500 cassettes, with potential storage for 8.5PB of material. As the archive at CNA grows, BCE likewise expands its own capacity to maintain full replication of both sites. While the collection of material is continually growing, the physical space required to house the digital archive is about one-tenth the size of what was needed for the original material.

In a short time, the organizations created a facility that offers new revenue sources from archived material saved to the CNA Web site and ensures continued operation of both facilities in the event of failure at either. ■

An elaborate network supports live simultaneous feeds from the XV Pan American Games



Following five years of preparation, Rio de Janeiro, Brazil, hosted its biggest sporting event in July 2007. The XV Pan American Games kicked off in the city's new Maracana Stadium. A continental version of the global Olympic Games, the competition has been held every four years since 1951. Athletes compete in 34 sports spanning 16 days. In all, 5648 contestants from 42 American nations competed in front of a potential 1 billion global viewers, with live coverage originating from 16 different locations. An elaborate network was designed to support live simultaneous feeds from 10 geographically dispersed events. Some events required multiple feeds.

Network Electronics began working with its Brazilian distributor, Libor, in August 2006 to design and supply a system based on the company's Flashlink fiber-optic transport platform to accommodate situations requiring a mix of HD and SD gear and long-haul transmission.

The International Broadcast Center (IBC) provided a signal for major broadcasters around the world. Observation of the entire system in the IBC was accomplished via Network Electronics' GYDA. The monitoring and control device furnished signal diagnostics and module configuration through a user-friendly Web interface as well as via SNMP control, enabling signal transport products

to be controlled, configured and monitored remotely. This was a major achievement for such a diverse configuration. Feeds were received and checked in master control, enabling problems to be anticipated.

Dark fiber was used for HD, while the SD long-haul transmissions were achieved with Network Electronics' DWDM optical multiplexing solution, which supported four simultaneous feeds on the same fiber. In the case of the dark fiber, changeovers and redundancy were provided. Each feed was transmitted in parallel on two different fibers on different routes to the changeover on the receiver side.

Five of the 16 event sites were within the convention center. The remaining 11 were scattered around the city. Tough conditions, including elevated temperatures and a rugged outdoor environment, were commonplace. Network's MOT-BOX frame proved up to the challenge. The rugged, mobile transport enclosure houses all Flashlink optical transport, signal processing and distribution cards including WDM/CWDM. For some of the locations, the MOT-BOX frames were integrated into the fiber network. Because of a lot of attenuation, +5dBm lasers were used.

Network Electronics also supplied additional Flashlink optical transport gear that connected several of the venues and broadcasters. The GYDA multiframe system controller drove all the equipment. ■

Category

New studio technology
— network

Submitted by

Network Electronics

Design team

Network Electronics:
Cameron Francis, CEO,
United States; Bob
McIntier, technical
specialist; Daniel Diniz,
regional mgr., Latin
America

Technology at work

Network Electronics
HD EO/OE converter
SDI time division mux/
dmux
Analog audio de-
embedder
DAC-SDI composite/
component video D/A
converter
GYDA multiframe
system controller
MOT-BOX mobile
transport housing
N-BOX rugged
housing
DWDM optical
multiplexing



FOX SPORTS Australia meets multichannel bandwidth demands with expanded SAN

Category

New studio technology
– network

Submitted by

SGI

Design team

Premier Media Group, Australia: Michael Day, chief eng.; Andrew Bradley, on-air projects mgr.; Tony Scanlan, CTO
SGI: Michael Cocks, account mgr.; David Honey, professional services consultant; Mike Grayson, customer services

Technology at work

Ardendo ingest and asset management applications

SGI

Altix XE servers
InfiniteStorage TP9700
Sony PetaSite archive



To meet anticipated bandwidth and archive demands for two new 24/7 television channels, Premier Media Group, operators of FOX SPORTS Australia, in Sydney, New South Wales, needed to expand its storage area network (SAN). With four popular 24/7 existing channels — FOX SPORTS 1, FOX SPORTS 2, FUEL TV and HOW TO — as well as interactive services, Premier Media Group planned to launch two more — FOX SPORTS 3 and FOX SPORTS NEWS — to add more international sports and international sports news.

Premier Media Group accesses 25 to 30 remote feeds to generate an average of 20 hours daily of live sports on its three main channels while editing and airing a huge variety of sports-related programming. The extra load of two new channels meant lots more FTPs coming and going, lots more storage and lots more library space needed.

Since early 2004, the backbone of Premier Media Group's complete digital infrastructure for end-to-end D10/MXF operation are SGI InfiniteStorage systems and SGI ingest and transmission servers running Ardendo applications. The original SGI solution was purchased to overcome the workflow restrictions of tape-based ingest. Due to SGI's highly scalable architecture, Premier Media Group has, in the interim, been consistently adding to its infrastructure to support live ingest and

broadcast, SAN, archive and library management needs.

Engineers considered other server clusters but decided on 18 SGI Altix XE servers when their own tests showed that the SGI servers running Dual Core Intel Xeon processors transcoded 2X faster than other systems under consideration with the same Intel Dual Core Xeon processors. Equally important was that the dual-core SGI systems work well with Linux because Ardendo runs on Linux.

In preparation for the new channels' launch, the company expanded its SGI InfiniteStorage Shared Filesystem CXFS based SAN with 4Gb Fibre Channel fabric and an SGI InfiniteStorage TP9700 system. The SGI SAN, with the Ardendo suite of ingest and asset management software tools for content management, now totals upwards of 33TB. The Sony PetaSite archive, which has now almost doubled in size to more than 530TB, interfaces to 10 nonlinear editing systems, the existing traffic system and TV automation.

Since the new installation and successful launch of the additional two 24/7 channels, Premier Media Group reports that the SGI scalable architecture continues to consistently deliver a robust flow of easily accessible digital information ranging from television broadcast ingest, archive, edit and transmission to any data — all of which can be processed in the wink of an eye in day-to-day production. ■

Televisa improves efficiency with a new seamless, integrated workflow



Grupo Televisa, S.A., one of the world's largest Spanish-language media corporations, this year streamlined its broadcast operation. The organization dramatically improved efficiency by implementing an automated, fully tapeless workflow system across its two facilities, Chapultepec and Santa Fe, both located in Mexico City. In collaboration with systems integrator AM Tecnología (AMTEC), Televisa spent many months in planning, design and installation before the new state-of-the-art operation went on the air in fall 2007.

At its Chapultepec broadcast technology center, Televisa produces news and other programming and broadcasts three national channels and one local channel. The facility has a streamlined, futuristic look that reflects its high-tech efficiency. The Santa Fe facility produces reality shows and other programming, and ingests commercials for playout.

At the core of Televisa's new infrastructure are an Omneon MediaGrid active storage system and five Omneon Spectrum media servers. The 24TB MediaGrid system at the Chapultepec facility acts as a central nearline repository for content, storing finished material that is subsequently moved to Spectrum servers for playout and to a Tedral media asset management system for archive. The MediaGrid system also provides edit-in-place storage for multiple Apple Final Cut Pro editors.

Four of the Spectrum server systems are located in the Chapultepec facility, with two designated for main and mirrored playout, the third for archiving and the fourth for ingest, primarily of long-form content. Each of these servers includes 16 SD channels and one HD channel, configured for a variety of functions including preview, high-res quality control, ingest and playout. The fifth server was installed at the Santa Fe facility for ingest of commercials that are then transferred under the control of Aveco Astra automation over a private fiber-optic network to the main mirrored playout servers at Chapultepec. Televisa uses Snell & Wilcox Memphis encoders to ingest content and commercials in HD format.

The new tapeless workflow replaced an outdated system whereby content was ingested from VTRs and live feeds and then stored on video servers for playout as needed. A particular challenge of the renovation was transferring more than 10,000 files from legacy servers to the new systems. To accomplish this, Televisa deployed the Omneon MigrateTool.

Televisa has deployed the most advanced and reliable technology in its Mexico City facility. Through the entire content life cycle, it has created a seamlessly integrated workflow. In the future, the availability of assets and ease of repurposing for new platforms will enable it to take advantage of new business opportunities as they emerge. ■



Category

New studio technology
— network

Submitted by

Omneon

Design team

Televisa: Armando Medina, technical dir.; Jorge Cosío, technical mgr.; Edgar Gallegos, technical mgr.

AM Tecnología (AMTEC): Andres Martinez, general dir.; Roberto Martinez, technical dir.; Alejandro Juarez, technical mgr.;

Omneon: Tom McCarthy, regional sales mgr.; Frank Lima, sys. eng.; Bruce McKay, sys. eng. mgr.

Technology at work

Apple Final Cut Pro editors

Aveco Astra automation
Omneon

Spectrum media servers

MediaGrid active storage system

Snell & Wilcox Memphis encoders

Tedral media asset management



WOSU at COSI combines education, entertainment and HD broadcasting

Category

New studio technology
— network

Submitted by

Communications
Engineering Inc.

Design team

WOSU: Tom Rieland,
general mgr.; David
Carwile; dir., planning
and business initiatives,
associate dir.

CEI: David Giblin, VP
and general mgr.; Tom
Hackett, proj. mgr.;

Burt Hill Architects

Technology at work

Avocet AMX5010-AM
KVM matrix

Barco OverView displays
Chyron HyperX HD/SD CG
Cisco Catalyst 144-port
gigabit IT switch

Euphonix Max Air audio
console

Evertz

Fiber and modular
terminal gear
MVP-40 multidisplay
processor

Image Video TSI-1000
tally processor

RTS Cronus intercom
Sony

HDC-930 cameras
MVS8000 switcher

TBC custom furniture
Tektronix SD/HD

waveform monitor

Telecast SHED

Thomson Grass Valley
K2 HD video server

Turbo iDDR



In early 2005, WOSU, the Columbus, OH-based PBS member station, signed an agreement with Center for Science and Industry (COSI), a popular science center, to construct a digital, HD media facility within the 320,000sq-ft COSI building.

WOSU's plan was to construct a TV production center that would engage visitors with interactive displays, plus work with and complement the station's main studio at the Fawcett Center several miles away.

The project was challenging because the media center would not only be used as a cutting-edge production facility, but also as the focal point for a variety of public activities. The space would have to be visually appealing, compelling and accessible. The project would have to meet the budget requirements of a PBS station. The media center, covering 12,000sq-ft, would include an HD production control room, TV studio, HD edit systems with shared content, a combination exhibit/studio space and several media viewing areas.

The center was completed in 2007 and serves as multimedia studios and community space. It includes a media literacy lab for digital media and technology activities coproduced with COSI. Visitors can watch live productions and participate in a wide variety of workshops and interactive exhibits.

The facility features complete digital functionality with studios, control rooms and pro-

duction areas for TV, radio and Internet technologies. A unique part of the facility is the system's multiplexed connection by a single fiber-optic link to WOSU's Fawcett Center, enabling simultaneous broadcasts, communications and control from both locations.

The station brought in Communications Engineering, Inc. (CEI) to handle the design, integration and equipment installation for the new center. A key component of the facility is the 2000sq-ft Battelle Studio, which produces TV programming and airs live events. The studio is separated from the adjacent TV exhibit area by a movable, six-panel wall with windows that allow visitors to watch as programs are being produced. The wall can be removed to create a space for special events.

The TV exhibit allows visitors the opportunity to explore the art and science of television production through multilayered video that can be modified by using digital effects and the use of chroma and luminance keying.

The video control room has a large window that offers a view from the exhibit area. The adjoining audio control room looks into the TV studio. A camera shading room is located next door. The facility can accommodate three nonlinear edit suites with shared content storage. Fiber drop points throughout the building enable live broadcasts from any exhibit area, making it a 320,000sq-ft HD production studio. ■

New HD studio capstones CMC's migration to an any format, anywhere facility



Denver-based Comcast Media Center (CMC), a unit of Comcast Cable, provides a content solution for TV networks, independent producers and advertisers.

Upgrading the CMC's 6400sq-ft studio presented the engineering team with some significant challenges. First, they needed to maintain support for on-air studio clients tied to the core SD infrastructure. Second, they had to repurpose and relocate an existing SD control room while building the new HD studio.

Planning and preparation was the key to successfully redeploying the existing SD control room through a series of engineering efforts that took place well in advance of the actual move. As a result, the engineering staff was able to rebuild the SD control room and bring it back as a fully functional studio in only two weeks.

To meet customer demand for supporting multiple formats, the team chose four new Sony HDC-1500 HD cameras, including a 4:4:4 dual link version capable of shooting 1080p 60. Two of the cameras have large lens build-up kits that are supported by Vinten Quattro 3 pedestals and are equipped with Canon Super 25x lenses with QTV LCD teleprompter systems.

Sony was the choice for the 3.5 M/E, multiformat MVS-8000A switcher, five HDW-M2000 HDCAM VTRs, an SRW-5000 HDCAM SR VTR, and Luma and BVM series professional monitors. At the heart of the system is a Har-

ris 256 x 256 Platinum router. While capable of meeting future growth, the frame was loaded with 64 x 64 HD-SDI cards and 64 x 64 AES cards.

The team decided to wire the entire router and terminate all of the I/Os to ADC 32 position HD patch bays. This allows for an easy transition for future expansion. The HD router was interfaced with an existing Thomson Grass Valley 7000 SD router to provide cost-effective monitoring and SD routing.

With the new studio, 5.1 surround sound was a necessity. The digital audio work surface is a Lawo MC₂66 console. It features 64 x 64 AES I/O and an additional 48 x 48 analog I/O. The system is expandable and capable of 7.1 surround sound mixing.

The studio accommodates multiple HD video and audio formats and resolutions. Up/down/crossconversion was built into the system using a variety of products, including four Harris X75 HD frame syncs, one Teranex upconverter and Dolby encode/decode products. Due to the variants of formats, trilevel sync was designed to be easily patchable either system wide or device independent.

The control room monitoring can be made customer specific using Miranda's K2 dual head multiviewer system displayed on two Samsung 57in LCD flat panels.

The new studio is designed to meet the needs of an ever-changing content landscape. ■



Category

New studio technology
— HD

Submitted by

Comcast Media Center

Design team

Comcast Media Center (CMC): Robert Baker, mgr., eng.; Rich Rivera, mgr., sys. integration; Paul Catterson, dir., eng.; Tom Wise and Judy Bandstra, eng.; Jerry Gambill, Chris Frazier and Ed Crillo, techs; Robert Meacham, cameras; Bruce Swanson, audio, communications
5280 Broadcast: Tony Roccanova

Technology at work

Canon HD lenses
Chyron HyperX CG
Evertz
Master sync/TSG
caption encoder/
decoder
Harris
Platinum router
X75 HD frame sync
Lawo
MC₂66 audio console
Wireless mics
Miranda Kaleido K2
multiviewer
Sony
MVS-8000A switcher
HDC-1500 camera
HDW-M2000/20 VTR
BVM monitors
Luma monitors



GLOBO upgrades production studios to support HD telenovela transmissions

Category

New studio technology
— HD

Submitted by

TV GLOBO

Design team

Carlos César Abrahao, tech. supervisor; Luiz Carlos Abrahao, tech. mgr.; Fernando Araújo, oper. mgr.; Marco Cheriff, oper. supervisor; Marcelo Guerra, lead proj. eng.; Nelson Nicolini, proj. eng.; Mauricio Felix Vasconcellos, proj. mgr.; Flavio Vilarinho, int. supervisor;

Technology at work

ADC audio patches
Belden audio cables
Canare cables/patches
Canon XJ/HJ-22x lenses
Clear-Com intercoms
Evertz
MVP display
7700 Series routers
Harris
6800+ monitoring
NEO multiviewer
Platinum router
Ikegami HDK-79EXII
Image Video tally
Sennheiser microphones
Sony
HD camera
Switcher
BVM monitors
Luma monitors
Tektronix
TG700 video generator
WFM7100 waveform monitor
Vinten Quattro pedestal
Yamaha DM 2000



The Brazilian network GLOBO TV is known for its production of telenovelas, which dominate primetime viewing. Telenovela is a form of melodramatic serialized fiction produced and broadcast six days a week (a yearly average of 200 episodes each) that attract a broad audience and command the highest advertising rates. GLOBO does not only produce for the local market but also exports its telenovelas worldwide.

With a huge production complex in Rio de Janeiro (CGP), GLOBO has heavily invested in quality and technology, the most important pillars to support its success.

In January 2007, GLOBO upgraded its old SDI studios using a brand new technology based on SMPTE-424/425M, a standard which expands upon SMPTE 259M (143/270/360Mb/s) and SMPTE 292M (1.485Gb/s) providing bit rates of 2.970Gb/s (3G). These bit rates allow the broadcast of 1080/60p 4:2:2 and 1080/60i 4:4:4 formats.

The project's main purpose was to prepare the infrastructure for 3G technology, so the network invested in cables, patches, routing switchers and modules that were already compliant with SMPTE-424M. In the coming years, the network will continue to upgrade equipment including cameras, production switchers and some monitoring systems. In the meantime, GLOBO produces both in

SDI (SMPTE 259M) and HD-SDI (SMPTE 292M).

Each studio is comprised of four control rooms (technical, video and lighting, production and audio) with five new cameras; four fiber-optic external lines; tape and tapeless recording for postproduction; a multiviewer system, providing operational flexibility to the monitor walls; UMD and tally system; new microphones; and a new wireless communication system that offers mobility and additional network managing (SNMP), which supports the whole system. Many design changes were also introduced in the four technical areas, which were fully dismantled and rebuilt.

The telenovela production could not stop, however, and the integration time window had to be minimized. To achieve this goal, a mobile unit was used while the studio was being refurbished, and a war room was mounted for pre-integration, systems testing and configuration.

In August 2007, GLOBO TV started producing the first HDTV telenovela in the new studio. At the official beginning of DTV transmissions in Brazil, in December 2007, the telenovela will be the first HD program transmitted by GLOBO. ■

KMBC-TV, KCWE-TV find new digs in Kansas City for SD, HD simulcasting



In 2002, Hearst-Argyle's KMBC-TV and KCWE-TV in Kansas City, MO, began construction of a new 51,000sq-ft facility, which went on the air in the summer of 2007. Broadcast Building Company handled construction management, and Beck Associates performed the systems integration.

The new facility allows the stations to broadcast two TV and two Web channels while simulcasting all programming in SD and HD. The two stations broadcast three-and-a-half hours of KMBC's locally produced HD news each day, as well as quickcasts for the Web site. KMBC was one of the first stations to broadcast its news in HD in the No. 31 U.S. TV market.

Only about 15 percent of the old equipment moved to the new space. A good portion of the stations' syndicated programming content is uplinked from Hearst's Orlando, FL, operation. At the new facility, the content is transcoded by a Masstech MassMedia Box and then pushed to Harris video servers; it's then played back to air by a Harris automation system. Currently, locally produced content such as news is acquired on XDCAM and played back to tape for playback to air. The transition to file-based, server operation is a work in process.

The infrastructure is built around Utah Scientific UTAH-400 and UTAH-200 routing switchers. Playout of the channels is man-

aged by two Utah Scientific SD-2020 master control processors. The company developed a master control panel to maximize operator flexibility in the event of a breaking news story. The MC-400 panel makes it easy for a user to bypass automation control when necessary. Its optimized flexibility makes it useful as a low-cost emergency backup for the production switcher.

All signals within the facility are routed through the UTAH-400, including playout of programming via the SD-2020s, which provide a full range of mixing and keying functionality, and drive all the switching and routing functions within the station's master control room. IP connectivity throughout the facility is certified 1Gb/s and is carried over Cat 6e cable. The 10Gb/s backbone connecting the routers is carried over fiber.

For transmission, the stations use Harmonic MV500 and MV100 encoders for both HD and SD channels. Most of the broadcast is in SD, so the stations use an SD master control switcher, which enables cascade routing of the HD channels. Once the video is encoded, it is routed to ProStream multiplexers via IP connection. The system generates a combined ASI stream that is sent over an MRC digital microwave and demultiplexed at the transmitter site. The stream is simultaneously sent via fiber to the transmitter as a backup STL. ■



Category

New studio technology
— HD

Submitted by

Utah Scientific

Design team

Gates Service Group
FX Group
Rees Associates
BBC Construction
Management

KMBC/KCWE: Martin Fautell, VP of eng., Hearst-Argyle Television; Wayne Godsey, president and general mgr., KMBC-TV; Jerry Agresti, dir. of eng.; Edward King, chief eng.; Hank Palmer, IT mgr.; Jeff Maloney, eng. supervisor

Technology at work

Avid NewsCutter with Adrenaline and Isis
Harris/Leitch
NX-4000 and -3600 series video servers
Terminal equipment
ADC automation
Masstech MassMedia Box
Sony
XDCAM cameras
MVS-8000G switcher
HDC1400L HD cameras
Utah Scientific
UTAH-400 and UTAH-200 routing switchers
SC-4 control system
MCP-400 MC panels
SD-2020 MC processors
Wheatstone D-10 digital audio console



KYW-TV enjoys peace and quiet at its new tapeless, file-based HD facility

Category

New studio technology
— HD

Submitted by

Front Porch Digital

Design team

KYW-TV: Rich Paleski, dir. of op. and eng.; Marc Musgrove, chief eng.; Brad Risch, op. mgr.; Michael Colleran, general mgr.; Robin Magyar, station mgr.; Susan Schiller, VP/news dir.

Ascent Media: Steve Vitale, proj. mgr.; Dave Liptak, design eng.

Staubach: Bob Telepak, construction crew
Hillier Architecture

Technology at work

Barco monitors
Evertz MVP monitor display
Front Porch Digital DIVArchive
Harris X75 synchronizers
Omneon Spectrum media servers
Panasonic AK-HC 930 studio cameras
Sony XDCAMs
Spectra Logic LT03 library
Thomson Grass Valley Aurora edit suite
Utah Scientific HD/SD-2020 master control processors



On April 2, 2007, Philadelphia's KYW-TV (CBS 3) broadcast its 11 o'clock news from the station's new 120,000sq-ft facility. It was one of the nation's first all-HD TV stations built from the ground up, and was designed and constructed in less than 10 months.

The facility is also home to WPSG-TV, a CW station. KYW produces five-and-a-half hours of news per day in addition to sports specials and charity fund-raisers. When the station's lease was up, the engineering team saw an opportunity to build an efficient, scalable facility that would also be a pleasant place to work. The team knew this would require a different model for storage and workflow than the SD model, which would soon be overwhelmed by the density of information HD carries.

KYW has been successful in meeting its goals. The newsroom is quieter, and people are less inclined to run. A reliable, tapeless, file-based workflow, along with thoughtful workstation placement, means staff members no longer suffer last-minute panics in an effort to find misplaced videotape. They also no longer sprint down hallways burdened with arm loads of tape cassettes when they're trying to make a deadline.

Key to the success is the digital workflow anchored by Front Porch Digital's DIVArchive content storage management system, which works with Thomson Grass Valley's Aurora

editing suite and a Spectra Logic LTO3 library, to enable fast, easy desktop identification and retrieval of digitally stored and archived clips. The station's digital archive also takes up a lot less space than a traditional archive. About two years of archived content can be stored in the equivalent of two racks. KYW still maintains a legacy archive and library room, ingesting content into the digital system as needed. Master control is based on Utah Scientific HD/SD-2020 master control processors, with a Barco monitor wall driven by Evertz MVP monitor displays.

KYW is all HD-SDI in that all signals travel as SMPTE 292M with embedded audio. SD signals are upconverted via Harris X75 synchronizers and later downconverted as necessary for SD transmission. The facility uses Omneon Spectrum servers for program and commercial playout. Acquisition is performed via Sony XDCAMs in the field and Panasonic AK-HC 930 studio cameras.

The stations occupy 100,000sq-ft on a single floor, so the 100m limit for transmitting an HD-SDI signal through coax cable presented a challenge. This was met by locating the central rack room in the center of the facility, minimizing the distance signals travel to the routing switcher. Technical areas were chosen as logical locations for signal reclocking. ■

Newseum in Washington, D.C., features 500 years of news history



The Newseum in Washington, D.C., is one of the most technologically advanced museums in the world, featuring 250,000sq-ft of hands-on exhibits, theaters and studios. The new facility combines 500 years of news history with the latest in newsgathering capabilities.

The task of designing, integrating and installing the wide array of broadcasting and audiovisual equipment was handled by Communications Engineering Inc. (CEI). One of the key challenges for this project was the need to install the systems while the 643,000sq-ft, seven-story building was under construction.

The master control room was challenging because it not only acts as the control center for managing all aspects of the facility's systems, but also it is a primary attraction for visitors. The room needed to be functional as well as aesthetically suitable for the museum.

The room features 18 equipment racks and nine 50in Barco rear-projection cubes controlled by an Evertz MVP multi-image display processor. From here, operators can control the video and audio that is displayed throughout the facility, including the content on more than 160 touch screens in interactive kiosks. CEI supplied hundreds of PCs and worked with Evertz to build a special bidirectional fiber-optic device that could handle 1920 x 1200 resolution, RS-232, USB and audio for managing the kiosks.

The master control room, with three large consoles, also handles broadcasts coming into the building and will be the center for the facility's IT systems. Four robotic cameras placed inside and outside are operated from the master control room as well.

A main focal point is a 22ft x 40ft Barco high-res modular LED display. It is mounted on a lift that can be raised or lowered 30ft depending on the type of event taking place. Images displayed on the screen are played out from the master control room.

CEI also built two identical HD production control rooms with adjoining audio control rooms for two broadcast studios. The TV studio is expected to be used for public affairs and news programs by major TV networks.

A second, smaller studio features a backdrop of the U.S. Capitol. Eight Thomson Grass Valley HD cameras can be used in any combination in the studios. SMPTE fiber was installed in the studios to provide flexibility for a variety of productions and cameras.

CEI also built four Avid HD edit rooms plus a multipurpose room that serves as an Avid suite, screening room and audio post-production room. A central equipment room contains servers for the 12 SD and 36 HD channels of content being played back throughout the facility. An ingest room enables the intake of content in a variety of formats. ■



Category

New studio technology
— HD

Submitted by

Communications
Engineering Inc.

Design team

CEI: Raef Alkhatat, proj.
mgr., dir. of eng.
Newseum: Bud O'Connor,
dir. of eng.

Technology at work

Avid DNA HD edit suites
Barco OverView displays
Canon Digi Super HDTV
lenses
Christie DW3K DLP
projectors
Chyron Hyper X CGs
Doremi
Nugget video players
ORCA-422 encoders
Elo TouchSystems touch
screens
Euphonix MaxAir mixers
Evertz MVP display
processors
Forecast consoles
Front Porch DIVArchive
Ikegami HDL-40C HDTV
cameras
Sony SRW-5500 HDCAM
VTRs
Tektronix WFM700A
multiformat monitors
Thomson Grass Valley
K2 HD servers
Kalypso HD switchers
LDK6000 HD cameras
Vista Systems Spyder
video processors
Wohler MON2-3W/HR
monitors



VERSUS simultaneously builds production, post facilities for HD NHL broadcasts

Category

New studio technology
— HD

Submitted by

VERSUS

Design team

VERSUS: David Coulombe, broadcast eng.; Paul Koopmann, dir. of eng.; William Kunz, dir. of IT; Stephen Nikiforow, IT analyst; Jasper Veldhuis, broadcast eng.

Technology at work

Avid

AirSpeed
DNxchange
Interplay
Media Composer
Adrenaline HD/SD
Symphony Nitris
Unity ISIS shared storage system

Evertz

7700 multiframe w/ VistaLink
MVP/VIP multi-image display units

EVS

XT2 server
XFile software

Riedel

Artist 128 intercom systems
Connect Solo phone interfaces

Solid State Logic C100

digital broadcast audio console

Sony

HDC1500L HD cameras
HDCAM
MVS8000 HD switcher
XDCAM VTRs



About three years ago, VERSUS (formerly OLN) was a budding TV network based out of a small post-production facility in South Norwalk, CT. In October 2005, following the acquisition of the NHL and launch of an aggressive re-branding campaign, VERSUS began construction of a 25,000sq-ft HD post-production facility in a harbor-view office building located in downtown Stamford, CT. Three months later, the waterfront media center became the post-production hub for many of the network's flagship events, including the NHL, Tour de France, America's Cup, rugby, professional bull riding, Mountain West/PAC 10 College Football and field sports. By the close of 2006, the ambitious network had not only cultivated its own engineering department, but began plans for a premier HD production studio. With a steadfast commitment to position itself as a leader in sports entertainment, VERSUS set out to achieve in three months what would normally take at least twice as long, even under optimal conditions.

Design of both the 25,000sq-ft post-production facility and the new 18,000sq-ft production facility was conducted entirely in-house by the VERSUS engineering and IT staff. The engineering department, comprised of director of engineering Paul Koopmann and broadcast engineers David Coulombe and Jasper Veldhuis, handled all aspects of fa-

cility layout, broadcast equipment selection, rack elevations and wire drawings. Director of engineering Paul Koopmann, director of IT William Kunz and IT analyst Stephen Nikiforow designed and implemented the facility's expansive IT infrastructure.

Building construction was completed in late August, leaving five weeks to wire and configure the central machine room, data center, production control room, transmission monitoring stations and audio room, as well as terminate the interconnect between the new studio and the existing post-production space. The studio was also constructed during this time, which included the erection of an aluminum truss and a complete set rebuild and relighting.

Cabling and system integration were the joint efforts of the VERSUS engineering staff and Tim O'Rourke and Greg Kashuba from HB Communications of North Haven, CT. The crew worked around the clock for 35 days, including one day during a power outage, where the team ran cables by the glow of a few work lights running off a small generator.

At 6:30pm on Oct. 3, after a dizzying five-week schedule, VERSUS' first HD NHL studio broadcast flooded outbound transmission lines. By the end of the first night, the VERSUS engineering team had not only completed the project on time, but pulled off a flawless first broadcast. ■

New WFAA HD facility gives visitors storefront view of broadcasts



WFAA-TV/DT is catching attention with its new street level studio set against the glitzy backdrop of Victory Park, an energized new section of downtown Dallas.

The Belo-owned TV station constructed the glass-walled facility on the south side of the plaza outside American Airlines Center (home to the NBA's Dallas Mavericks and the NHL's Dallas Stars), which is about one mile away from the station's main control room. The new 4000sq-ft studio includes five new Thomson Grass Valley HD LDK 4000 cameras, a colorful HD news set and a Thomson Grass Valley C2IP camera control system.

The new facility opened in January 2007 and began HD broadcasting of local news a month later on WFAA-DT. The Victory Park studio provides visitors with a storefront view of WFAA's live morning and evening newscasts as well as the local talk show "Good Morning Texas."

The TCP/IP-based C2IP Ethernet camera control system offers a two-way connection, giving the station's technical staff the ability to shade and focus the cameras at Victory Studio from its remotely located control room at the station. Fiber-optic connections provide almost unlimited bandwidth.

The C2IP system enables unlimited remote operation for all the LDK 4000 cameras at WFAA. The camera control system offers

Ethernet-based control using standard IP networking as well as multiple control points per camera. This includes variable matrix control, fine skin-detail adjustments and installation adjustments, which all directly control the cameras' internal menu settings.

Camera and production settings are often saved as digital files on standard USB storage media, which can either be e-mailed or easily transported as necessary. When setting up a production, technicians simply load the settings into the OCP panel.

A variety of pre- and post-event broadcasts, along with its daily morning show, are produced in the new studio, with the signal transmitted via fiber across downtown to WFAA's main control room. These camera signals are combined with commercials, graphics and other production elements with the station's Kayak HD production switcher.

There are even HD cameras located at various locations atop Victory Park to provide live shots and to capture the crowds. These overhead shots are often fed to HD projection screens located along the Victory Park plaza and incorporated into the station's coverage.

In order to maintain a consistent look for its locally produced programs, WFAA has installed another five LDK 6000 cameras in its existing production studio, which are also fed into the Kayak HD switcher. These also are set up remotely with the C2IP system. ■



Category

New studio technology
— HD

Submitted by

Thomson Grass Valley

Design team

WFAA: Stewart Aller, IT; Tommy Baugh, asst. dir. of tech.; David Boyd, asst. dir. of tech.; David Johnson, dir. of tech.; Randy Mclean, IT; Tom Alexander, Doug Blichm, Richard Doyle, Don Guemmer, Dave Hunn, Kelly Moore, Melissa Rasmussen, Johnny Stigler, Ray White, maintenance

Broadcast Construction Services: Ron Rentfrow, construction & proj. coord.

Technology at work

Apple G5 editing workstations (w/Final Cut Pro HD)
Avid Thunder servers
DMX lighting control
Entertainment Technologies lighting dimmer strips
Evertz signal conversion
Harris Inscribe Ticker branding
Thomson Grass Valley C2IP camera control
Kayak HD switcher
LDK 4000 HD cameras
M-2100 HD MC system
Vizrt HD graphics system
Weather Central LIVE graphics system



WLS-TV first and only station in Chicago area to broadcast local news in HD

Category

New studio technology
— HD

Submitted by

Snell & Wilcox

Design team

Emily Barr, pres. & GM; Kal Hassan, VP & dir. of eng.; Joe Trimarco, dir. of ops.; Craig Strom, asst. dir. of eng.; Dennis McGuire, tech. maint. supervisor; Tim Osterman, tech. construction supervisor; Tom Hebel, VP creative svcs. & programming; Lisa Clingan-Cruz, graphics dir.; Jennifer Graves, VP & news dir.

Technology at work

Apple Final Cut Pro with HD I/Os
Avid Adrenalin HD units and Unity ISIS
Canon
HD lenses
DT-150/HD Canobeam
Evertz MVP HD/SD multi viewer processors
Free Space Optical link
Ikegami HDL-40-720P box cameras
Panasonic
AK-HC1500 720p/60 HD box cameras
HD LCD displays
Snell & Wilcox Kahuna HD/SD production switcher
Sony HDC1000 and HDC1500 1080p/720p HD cameras
Thomson Grass Valley 3500 HD server



WLS-TV, ABC7 Chicago, viewed its move to HD as an opportunity to gain an important competitive edge in the market, to give viewers an amazing television experience and to showcase the station as the place for the latest technological advances. Taking on the task of systems integration, the station's engineering team dedicated months to integrating HD capability across the broadcast facility. The result represents the first and only station in the Chicago area to broadcast local news and programming in HD.

The station's move to HD included a commitment to working in 16:9 across news, weather and traffic. Early on, the station set up a special training facility at the studio, which helped staff become familiar with the subtle visual differences between 4:3 and 16:9 content. Now, ingest, editing and playback are performed in 16:9, making the upgrade a comprehensive shift to widescreen programming. This preserves the continuity of broadcasts and provides an HD feel even for material not acquired in or upconverted to HD.

A Snell & Wilcox Kahuna SD/HD multi-format production switcher enables smooth integration of SD content into HD programming without concern for format compatibility or the need for external conversion gear. The Kahuna sits at the heart of WLS-TV news and production, its 11RU electronics serving

two identical control rooms, each of which is equipped with its own console.

WLS-TV HD news is created through Thomson Grass Valley newsroom automation run in 16:9 mode, as well as desktop editing with Avid Media Browse. In the programming department, five Adrenalin HD systems and a 16TB Avid ISIS system support development of HD promos and programming.

The facility's State Street Studio is equipped with Sony HDC1000 cameras and a series of remote cameras. One of these, an Ikegami HDL-40 camera situated atop the Macy's building more than a block away, delivers images of the studio and street using Canon's Canobeam Free Space Optics System.

A Weather Central 3D Live HD system incorporates Landsat images, matched with aerial photography of the Chicago area, along with a Curious software map system that provides satellite imagery in the background for weather reports.

Even traffic reports have gone HD. Five Panasonic AK-HC1500G HD cameras capture video from the Sears Tower and the John Hancock building, where a sixth captures time-lapse SD video in a 16:9 aspect ratio. Because the station's nine microwave sites now support HD content, the newsroom is able to acquire live shots from the new Chopper 7 HD helicopter, as well as from upgraded ENG vans. ■

Waterman Broadcasting delivers high-quality programming to its audience



Back in December 2006, Waterman Broadcasting, which owns WBBH-TV (NBC) in Fort Myers, FL, WVIR-TV (NBC) in Charlottesville, VA, and has a Local Management Agreement with Montclair Communications' WZVN-TV (ABC) in Fort Myers, supplemented its ENG production with JVC's GY-HD100 ProHD cameras. Today, WZVN-TV uses JVC's GY-HD250 as its primary studio cameras.

WZVN-TV's goal was to redesign its studio to give it a fresh, new look and provide a high degree of functionality and flexibility. The station's engineering, IT, production and marketing departments worked with The Express Group to design a set specifically for the 16:9 aspect ratio. The set also had to stand up to the scrutiny of HD cameras.

Effectively shooting the new semicircular set would be impractical with only floor cameras. After examining options closely, the station operators decided that drop-down ceiling cameras could fill in the shots that they couldn't get with the floor cameras. Telemetrics agreed to build the custom ceiling robot-

ics, and the GY-HD250 cameras proved to be a perfect fit.

The lightweight, compact size and video quality of the cameras, along with the robotics system, has allowed WZVN-TV to create a highly dynamic news studio. The studio has three floor televators, which can pan, tilt, raise and lower. The CCU functions for the cameras are also done by the Telemetrics system. The station has two additional pan-and-tilt GY-HD250 cameras that can be lowered from the ceiling using custom-built Telemetrics hardware.



Category

New studio technology
— HD

Submitted by

Waterman
Broadcasting/Montclair
Communications

Design team

The Express Group:

George Andrus
**Waterman
Broadcasting/Montclair
Communications:**
Bernie Barnes, eng.;
Dan Billings, dir. of eng.;
Mathew Gaige, eng.;
Lori Grimaldi, marketing/
design; David Hall,
marketing/design; Bob
Hannon, prod.; Samantha
Howard, IT; Bill Maranto,
eng.; Jeff Mayer, prod.;
Kevin Scovell, eng.

Technology at work

Brightline 1.4D lighting
JVC GY-HD250 cameras
Panasonic
PTDW5000UL DLP
projector
TH-50PH9UK flat-panel
displays
Samsung
HL-56187W displays
HD-57178W displays
Telemetrics camera
robotics
Telescript FPS-200
prompters



YES Network goes on-air as the first 24/7 HD regional sports channel

Category

New studio technology
— HD

Submitted by

Ascent Media

Design team

YES Network: John McKenna, dir. of eng.; Jack Kestenbaum, dir. of technical op.

Ascent Media: Kurt Liddi, VP, eng.; Dave Linick, proj. mgr.

Technology at work

- Barco fDR+70-DL rear-projection displays
- Calrec Sigma audio console
- Canon Digisuper 25x lenses
- EVS XT-HD editor
- Miranda Kaleido X multiplexer
- NV5128 HD router
- NV9000 control system
- Omneon Spectrum server
- Snell & Wilcox Kahuna HD switcher
- Sony BRAVIA monitors
- HDC-1500L cameras
- Sundance Titan automation



When YES Network, home of baseball's New York Yankees and basketball's New Jersey Nets, contracted with Ascent Media in late 2006 for the creation of new studio and origination facilities, the goal was straightforward: The network wanted to be the nation's first 24/7 HD regional sports channel in time for the 2007 baseball season.

The resulting facility — a 3500sq-ft studio, 2500sq-ft control room and master control suite in Ascent Media's Stamford, CT, complex — incorporates the latest in HD production and surround audio technology and equipment. Connected via fiber and satellite links to Yankee Stadium, Continental Airlines Arena in New Jersey and the WFAN radio studios in New York, the new facility provides YES with the highest quality video, and greater audio quality and flexibility.

The challenges included delivering the highest quality and most consistent surround audio experience from U.S. stadiums and arenas. The need to accommodate up to six channels of audio into the four-channel capability of certain HD equipment, inconsistency among venues in the use of Dolby E compression and multiple variations in the configurations of audio tracks of backhaul feeds all required a creative approach. The team needed to simplify audio preproduction for the more than 100 live remote events produced by YES.

The solution involved creating a single track layout within the studio and origination facility. This ensures that telecasts are populated with the necessary audio elements for surround sound with or without Dolby E compression. The solution supports all incoming audio configurations with robust interoperability within the production environment.

A flexible virtual monitor wall, consisting of a Miranda Kaleido X multiplexer and Barco rear-projection displays, replaces standard CRT monitors. Production teams can create and resize monitors as needed, providing a flexible, visually-accessible view of current feeds and upcoming videos. Additional subsets of the monitor wall are composited for display on a Sony BRAVIA in the audio control room and at two EVS editing stations.

Three pedestal and one jib-mounted Sony HDC-1500L cameras enable multiformat HD and simultaneous SD output. The cameras are equipped with Canon Digisuper 25x lenses. YES also employs a Snell & Wilcox Kahuna HD switcher with 4M/E, three EVS nonlinear HD editors with 18 channels of capacity, an NVISION 128 x 128 routing switcher and a Calrec Sigma audio console. Sundance Digital Titan automation and Omneon server play-out in master control completely automate the on-air origination process, including the insertion of network IDs, tickers, commercials and local advertising cue tones. ■

GemsTV launches U.S. operations from a new state-of-the-art facility



In April of 2006, GemsTV approached Burst with its intention to build the organization's first broadcast production facility in the United States. At the time, the company broadcast its live auction programming solely from its production studios in the UK on Sky A and Sky B. Ten months after its preliminary meeting with Burst, GemsTV was broadcasting 20 hours of live programming per day from a new, state-of-the-art production facility in Reno, NV.

GemsTV is an integrated manufacturer and TV home shopping retailer of colored gemstone jewelry. The company sells its own handcrafted gemstone jewelry directly to customers primarily via television through a reverse auction system.

In the spring of 2006, GemsTV was looking for an integrator to help it construct a studio to enter the U.S. TV home shopping market. It needed a studio that could accommodate live auction broadcasting, equipment and employees. And it needed it quick. Although it was April, GemsTV's goal was to launch the station prior to the Christmas retail season.

GemsTV constructed a temporary studio that was operational by December, while Burst designed and built the master control and live studio facilities. The new studio was operational by mid-February.

Burst designed a traditional live studio facility that airs 20 hours of live program-

ming per day, seven days a week. The system is designed to meet a fast-paced production environment with virtually no breaks in the schedule.

Graphics presented an unusual twist in that auction prices change very quickly and are tied to a live inventory database. Coordination between the on-air product and inventory is instantaneous.

The most interesting challenges, however, involved communicating with technical personnel in the UK. The production system was loosely based on a successful analog PAL system in Redditch, England, but had to meet U.S. SDI specifications. Burst personnel visited the UK facility and studied workflow, confirming many engineering assumptions with the engineering staff there.

Burst also provided an innovative low-power, low-maintenance lighting package, complete with lighting design services from Lighting Services to assure a quality image.

GemsTV started its U.S. operation from the ground up, and 18 months later, with a fully operational studio designed and built by Burst, GemsTV is now a major player in the jewelry home shopping arena. With its new state-of-the-art studio, and a strong, continually expanding customer base, GemsTV is headed for a prosperous future. ■



Category

New studio technology
— non-broadcast

Submitted by

Burst

Design team

GemsTV: Mike Johnson, COO; Dan Bryant, eng. mgr.

Burst: Doug Houston, VP sys. integration; Scott Barella, VP eng.; Tom Norman, sr. design eng.; Dave Stengel, sr. proj. mgr.; Letha Koepf, admin. proj. mgr.

Technology at work

Canon
7J20X8.5KRS lens
J22EX7.6BIRSE lens
Cartoni pedestals
Chyron Hyper X graphics
Clarity 46in Baycat LCDs
DNF Shot Box control
Harris
Integrator router
6802 series terminal frames and modules
LG 42in plasma displays
Masstech Off Air Logger
Miranda Kaleido Alto
RTS/Telex Zeus intercom
Sony
DXCD50 triax cameras
DSR1800A DVCAM VTRs
TANDBERG encoders
Tektronix waveform and vector display
Thomson Grass Valley
Kayak switcher
K2 servers
Yamaha DM1000 V2 audio console



First Baptist Church of Glenarden adds live production and broadcast capabilities

Category

New studio technology
— non-broadcast

Submitted by

Communications
Engineering Inc.

Design team

First Baptist Church of Glenarden: Pastor John K. Jenkins, Sr.; Tom Pope, audiovisual dir.; Deacon Stanley Featherstone, church admin.; Jac Cooney, consultant
CEI: Joe Strobel, sr. proj. mgr.; Tim Bailey, sr. design eng.

RCI Sound Systems

HH Architects

RJC Designs

Technology at work

AMX control system
Apple Final Cut Studio
Barco

Encore processor
OverView displays

Canon HDxs lenses
Chyron Duet LEX
Clear-Com Eclipse
DPI HIGHlite and TITAN
Draper Cineperm screen
Evertz MVP display
Harris Leitch Integrator
Hitachi Z4000W cameras
Microboards CD recorder
Omneon Spectrum server
Panasonic DVCPRO
Rimage 555201-200
Ross Video

ADA-7801 DA
OverDrive control
Synergy 3 switcher

Yamaha PM1D and
DM2000 mixers



In September 2007, the First Baptist Church of Glenarden (FBCG) built a new 205,000sq-ft structure that would feature state-of-the-art live production and broadcast capabilities inside a theater-style sanctuary capable of seating 4000 attendees.

Key production system goals for the new facility were to provide high-quality coverage of the services and events; enable fast, efficient distribution of recorded services in various formats on a large scale; and enhance the worship experience of the attendees and home viewers.

The church hired Communications Engineering Inc. (CEI) to design, integrate and install a network-quality live production facility. CEI also partnered with RCI Sound Systems to provide a concert-grade sound system, and with RJC Designs, which developed the original system concept and preliminary design.

The full-scale production facility can handle all types of events and can be used by both professional engineers and volunteers. A production control room, a dedicated audio production room with voice-over booth and three nonlinear edit suites are all located within the main production area. A second identical audio production room is located high in the rear skybox of the church's sanctuary.

The audience experience is enhanced by two 22ft 16 x 9 Draper rear-projection screens located directly above the performance plat-

form and illuminated by two DPI video projectors. The alignment and placement of the screens and projectors was especially challenging due to many client design changes to this area of the building. The team successfully overcame the challenges that this presented and provided the maximum image allowed by the building constraints.

The broadcast production system provides tremendous event flexibility, with more than 130 connection panels strategically located throughout the facility. The facility's worship center can send and receive signals from its ministry center located several miles away via bidirectional fiber-optic link. This interconnection also provides the church with access to the Verizon AudioVisual Operations Center, which allows easy access to send or receive signals anywhere in the world.

The church leaders wanted to make recorded services available to attendees immediately after the services, so CEI designed and implemented a large duplication center. The system can generate 100 DVDs and 300 CDs within 10 minutes of the end of a service or event. Future cabling is already in place to expand these capabilities as required.

To enable use of the system by volunteers or other nonprofessionals, key production and media-related functions can be performed via an AMX control system with custom touch panels throughout the facility. ■

National Geographic's digital workflow simplifies stock footage licensing



National Geographic Digital Motion, the archive and stock footage licensing agent for all National Geographic Television film and video, wanted to transform its analog video archive and licensing business into a streamlined digital workflow. It has more than a century's worth of moving images from around the world, and new footage, much in HD, arrives all the time. The company's key requirement was the ability to store content and deliver content to the Web in uncompressed formats to maintain the highest possible quality.

National Geographic designed the system and selected the various components. For storage, it contacted OSSI, an SGI channel partner, who suggested SGI InfiniteStorage as the major storage and file-sharing component. SGI engineers suggested SGI InfiniteStorage CXFS shared filesystem and SGI InfiniteStorage arrays to optimize delivery of rich-media content and seamlessly support a variety of complex transactions.

One of the biggest challenges was the amount of data that would be brought into the system. When National Geographic encodes video, three different file formats are created at the same time: uncompressed, MPEG-2 and MPEG-1. The uncompressed data alone is about 100GB per hour.

National Geographic encodes its tapes into an asset management system backed with

34TB shared over two SGI InfiniteStorage TP9300 systems and a later-added additional 35TB of storage on a SGI InfiniteStorage 4000 system. The SGI storage is where National Geographic operators catalog the clips with key words and push them out to an external Web site to allow customers to preview the content and determine their purchases. Once licensed, that content is played out via the SGI SAN and made available in multiple formats, including NTSC, PAL or DVD as before, and now files over FTP. National Geographic will soon be able to encode clips in HD and offer customers all high-definition formats.

SGI CXFS met National Geographic's criteria to support multiple operating system formats. Windows is its primary platform, but it also uses Macs with Apple Final Cut Pro. The SGI storage is divided into four file systems — two simultaneous encodes to CXFS, with each system encoding the three video streams plus some additional audio, and two transcode stations on CXFS. SGI CXFS is connected to the asset management system using Windows nodes. Archive of MPEG-2s and uncompressed QuickTime files is handled by a 900TB Sony PetaSite, with eight tape drives running an SGI CXFS client. National Geographic has purchased two more encode stations and two more transcode stations and upgraded the Sony PetaSite, ensuring a seamless cutover to HD in the near future. ■



Category

New studio technology
— non-broadcast

Submitted by

SGI

Design team

National Geographic Digital Motion: Phil Spiegel, dir. archives and cataloging; Scott Galczynski, mgr., projects and services; Scott Norcross, tech. ops. mgr.; Kyle Knack, sys. eng.

SGI Professional Services: Zsolt Ferenczy, sys. eng.

OSSI: Brian Hurd, account mgr.

Technology at work

Brocade 4900 Fibre Channel switch

SGI

InfiniteStorage 4000 RAID storage array (35TB)

InfiniteStorage TP9300 Fibre Channel storage array (34TB)

InfiniteStorage CXFS shared filesystem licenses

Origin 350 SAN server
Sony PetaSite storage system



New York University enlarges Department of Journalism with new facilities

Category

New studio technology
— non-broadcast

Submitted by

The Systems Group

Design team

New York University:
Kenny Lee, proj. mgr.;
Lisa Huntington, dir.
of space planning and
mgmt.; Brooke Kroeger,
dept. chair; Marcia
Rock, dir. of news and
documentary; Adrian
Mihai, broadcast ops.
mgr.; Mike Napolitano, IT
administrator

The Systems Group:
Joe DiFrisco, proj.
mgr.; John Zulick, proj.
eng.; Juergen Kircher,
installation supervisor;
Anton Mittag, test eng.

Technology at work

Audioarts D-75 radio
console
Avid
Airspeed servers
Media Composer
editing system
Newscutter editing
system
Unity ISIS media
storage system
Chyron Duet Micro-X CG
Harris Leitch
Integrator router
Modular products
Hitachi cameras
Ross Synergy production
switcher
RTS/Telex
Cronus intercom
matrix
BTR-800 wireless PL



Photo by Andy Washnik

New York University had been planning to relocate and enlarge its Department of Journalism — now found at 20 Cooper Square, New York City — for several years. The Systems Group was contracted to consult on and then integrate the technology used within the new facility. The 1500sq-ft television studio was designed for typical production, such as recorded newscast and talk shows. It is outfitted with three Hitachi cameras for normal production along with a single Sony robotic camera for smaller events. The studio also holds a Digital Displays iVision HD projector teamed with a 10ft retractable screen to be used for presentations and screenings.

A production control room provides the basic needs for news production. Along the front console, the students sit as director, assistant director, technical director and audio operator. This console houses the Comrex phone hybrid control, the Sony robotic remote control, Ross Synergy switcher control surface and a legacy Mackie audio console with its accompanying compressors and equalizers. Seated at the rear console are the student positions for producer; graphics operator, who controls the Chyron Duet Micro-X CG; and media operator, who has access to the Avid Airspeed servers for record and playback. The rear console also seats the technical manager, who is a faculty member and the instructor of the class. Through a

KVM system, he or she has the ability at this position to look at any of the configurations and production computer systems. This person also oversees camera shading and quality control through a Videotek rasterizer.

The radio studio has one main operating position with an Audioarts D-75 audio mixing board and supporting audio equipment. Alongside the main operator are three guest positions. Simulated radio newscast and talk shows are viewed from the newsroom's adjoining window. The projector within the newsroom can display a POV camera above the Audioarts console to allow the main class body to view operations while receiving instructions. The newsroom also acts as an extension of the radio studio with the addition of a broadcast service panel. This allows additional mics and audio feeds into the audio mixer for larger class participation.

The plant contains multiple editing workstations in an open plan, so that students with print, online or broadcast interests can use them interchangeably for multimedia projects as well. These workstations, consisting of Avid Newscutters, fill a large open commons area as well as project areas. The workstations allow access to actual up-to-date news stories through ENPS and Pathfire joined to an Avid ISIS media storage systems. The ISIS is managed by NYU's faculty assigning students the needed storage for their individual projects. ■

KEYE-TV upgrades its highly customized legacy system with VCI autoXe



One of the biggest challenges a station can face is taking an existing DOS, highly customized legacy system and replacing it. This is exactly what KEYE-TV had to do this past year in upgrading its facility from the CBS Group-W-designed TMRT system.

There were the usual considerations like master control features, functionality and scalability. Additional system requirements for KEYE included content delivery integration and satellite integration. But, the true test of a system would be its flexibility to integrate and comply with a workflow that was already highly customized.

After an exhaustive search, KEYE found not only everything that it needed, but everything that it wanted in the autoXe automation system from VCI Solutions. "The master control functionality and flexibility is there — and then some. I'm a computer-oriented person so when we started talking about SQL, SOA and true relational databases, I knew the system was carefully thought out with a true understanding of what today and tomorrow's broadcast environment was going to be like," said George Todd, KEYE maintenance engineer.

A few of the capabilities that the team at KEYE really likes are Video Spy, logging capability, vertical and horizontal view of the delivery manager, and the versatility of the workstations because they can do all jobs.

Dusty Granberry, director of broadcast operations and engineering for KEYE related that he really wanted to modernize the automation architecture with a system that incorporates true relational functionality. "Many companies talk about how their automation product can be installed and work seamlessly with an existing system, but once you start working with them, you find that there are a lot of extra steps to go through. As we all know, this increases number of hours in working with the system and the room for error," said Granberry.

Aside from the enhanced functionality, one of the true selling points of autoXe to Granberry is that operators are able to "jump right in and use it because of the intuitiveness of the graphical user interface. They were even working with it during the demo." This significantly reduced the amount of training and re-upstart time for the station.

KEYE master control workflow transition to the new autoXe automation was seamless and easy to achieve because of the well-thought-out and integrated approaches for many functions, but especially the content and satellite delivery. "In developing the autoXe architecture, we always kept in mind that the system has to be reliable and functional in any fast-paced broadcast environment. We're pleased that we've been able to deliver on those goals for KEYE," said John Price, director of product marketing, VCI Solutions, Automation Division. ■



Category

Station automation

Submitted by

VCI Solutions

Design team

KEYE: Dusty Granberry, dir. of broadcast op. and eng.; Art Smith, chief eng.; George Todd, broadcast eng.; Javier Jimenez, IT mgr.; Mark Soto, master control supervisor

Technology at work

CompuSat satellite control
Harris Leitch Lydia CG
Panasonic DVCPRO HD video server
Pathfire
DMG Server Connect
DMG Automation Connect
Omneon Spectrum server
Telestream FlipFactory
Utah Scientific
HD/SD-2020 master control
SqueezeMax effects
UTAH-400 router
VCI autoXe automation



WFSB-TV-DT's new facility accommodates disparate video and audio formats

Category

Station automation

Submitted by

The Systems Group

Design team

The Systems Group:

James Tome, sr. eng.; Bob Sharp, eng./PM; John Meusel, sr. PM; Rachel Pomerantz, proj. eng.; Bruce Giuriceo, test eng.; Jose Morales, integration supervisor; Trissa Dudzinski, proj. coord.

WFSB-TV: Victor Zarrilli, dir. of eng. and facilities; Mark Gordon, asst. chief eng. of ops.; Larch Purinton, Ed Longley, David Patterson, Nando Cialfi, Mark Healy, Joseph Petrolito, Richard Aude, broadcast engineers; Jim Gorham, creative svcs. dir.

Meredith: Joe Snelson, dir. of eng; Mike Rehm, corp. dir. of facilities

Technology at work

Evertz MVP multi-image display processing

Harris ADC 100 automation

Thomson Grass Valley Aurora Ingest, Edit, Browse software
Encore monitoring
Trinix router

Concerto router

Acappella router

Ignite integrated production

Maestro MC switchers



Photo by Andy Washnik

After 46 years in its downtown Hartford, CT, building known as Broadcast House, WFSB-TV-DT decided to move its facilities to the suburb of Rocky Hill. Two project challenges were clear: first, the need to design a central routing platform that would accommodate the disparate video and audio formats, and second, a concise means of setting up control rooms and studios with the necessary production resources.

The facility infrastructure is centered on an SD or HD-SDI capable router with embedded audio. All widely-used devices or signals are converted to conform to this standard. Many remote cameras connect by external analog circuits, are routed through an analog video router, and converted to digital through a pool of composite decoders. A third router solely serves production set monitoring. Each of these routers is linked together through the use of encoders, decoders and HD upconverters to allow reuse of sources in any format. A Thomson Grass Valley Encore's tie-line manager provides intelligent routing between the video formats and physical routers. In the end, the engineering quality control positions are easily able to look at HD sources, SD sources, and decoded analog sources through test equipment capable of all SDI formats.

WFSB's production requirements provided a unique challenge for the team. Two identi-

cal Grass Valley Ignite-based rooms were built for scripted productions. A third traditionally-designed production room was built for larger complex productions. Each control room could, in turn, use one or both of the studios.

The complexity created by this interoperability posed questions of how to easily manage delegation of switcher aux busses to on-set monitoring, assignment of mixer mix-minus outputs to field IFB circuits, routing of program return audio and video monitoring to the studios, tally of cameras and on-air lights, and control of other common production resources (CPR). The solution rested largely in using the TSI1000 hardware built by Image Video. Its ability to retrieve cross-point data from routing systems and production switchers, expandable GPI interfaces, customizable control panels, and textual display capabilities made it an ideal choice. By means of a few push buttons and based on the status of particular router cross-points, the system determined through a series of customized, sophisticated logic statements how CPR should be assigned. Router cross-points are directly controlled, and GPI interfaces command all other systems. An interface to the Evertz MVP provides status information displays to users. The operations staff is able, without engineering assistance, to set up control rooms for live or recorded productions. ■

WFSB opens multimillion-dollar dream facility to streamline hectic workflow



Meredith's CBS affiliate WFSB-DT began broadcasting from its new 60,000sq-ft Rocky Hill, CT, HD-SDI plant in June, calling it a broadcast production dream come true. The new facility features all aspects of the production process on the first floor, streamlining a "hectic" workflow that formerly included four floors in a 46-year-old building.

The infrastructure includes two studios, three control rooms, a master control room, machine room and the news and promo departments, all located close to each other. The rooms feature a wide variety of Thomson Grass Valley equipment, including nine Aurora Edit SC and XT news editing systems, four K2 media servers, a shared redundant HD and SD K2 system for master control, four M-Series iVDR servers, two Ignite HD automated production systems, robotic SD cameras and a Kalypso SD switcher. Panasonic DVCPRO is used in the field.

Twelve edit systems (three working on Avid Media Composer Adrenaline and NewsCutter systems) share more than 3TB of network-attached shared storage array, which is networked to the K2 servers in master control to easily transfer completed spots to the K2 air servers. Thomson Grass Valley NewsBrowse software allows producers and reporters to search clips and make rough cut edits from their desktop before sending an EDL to one of

the edit bays for finishing.

This tapeless news environment produces more than seven hours of news content per day, in addition to content for the station's Web site and a dedicated news/weather channel that is multicast on its digital spectrum.

Four K2 servers are shared between three control rooms. Two of the rooms are tied to the Thomson Grass Valley Ignite systems while a third handles traditional production with a Kalypso HD switcher and a large monitor wall. All of the control rooms can be accessed from each other, making for a very flexible production architecture.

The Ignite HD systems are being put on the air in stages, with the station's noon newscast, talk shows, live teases and its digital channel cut-ins now all being produced with it.

Signal distribution is managed with several Thomson Grass Valley routers. The first is a 256 x 256 Trinx router moving SD and HD video with embedded audio around the plant. The others are two smaller Concerto 128 x 128 routers, one for SD video and embedded audio and the other for analog video signals. Encore software ties the systems together and makes them perform as a single matrix that can handle both SD and HD signals. There's also a Harris ADC automation system tied to a Maestro SD/HD master control switcher. Newsroom Solutions' Newsticker HD is being used to brand all streams. ■



Category

Station automation

Submitted by

Thomson Grass Valley

Design team

Meredith Corp.: Mike Rehm, corp. dir. of facilities; Joe Snelson, dir. of eng.
WFSB: Richard Aude, eng.; Nando Cialfi, eng.; Mark Gordon, asst. chief eng. of oper.; Jim Gorham, creative services dir.; Mark Healy, eng.; Ed Longley, eng.; David Patterson, eng.; Joseph Petrolito, eng.; Lerch Purinton, eng.; Victor Zarrilli, dir. of eng. & facilities

Technology at work

Avid
Media Composer
Adrenaline
NewsCutter
Harris ADC automation
Newsroom Solutions
Newsticker HD
Thomson Grass Valley
Concerto router
Ignite automated
production system
Ignite SDC cameras
K2 media servers
Kalypso SD switcher
Maestro HD master
control
M-Series intelligent
digital recorders
NewsBrowse
software
News Edit SC, XT
editing workstations
Trinx router



WFUM-TV builds new broadcast operations center at the University of Michigan

Category

Station automation

Submitted by

Sundance Digital

Design team

WFUM-TV: Wayne Henderson, dir. of eng.; Phillip Brown, eng. supervisor; Mike Saunders, op. supervisor; Paul Manning, staff eng.
Roscor Corp.
Engineering Group
Sundance Digital: Casey Thi, proj. mgr.; Hamid Lehri, on-site eng.; Mike Lynch, training eng.; Ty Atherholt, dir. of sales, Eastern region

Technology at work

Active Power 65 kVA flywheel-based uninterruptible power supply
Evertz AC3 processors
Harris Leitch
IconMaster switcher
Integrator Gold router
Panacea A/V routing
Omneon
Spectrum server
MediaGrid storage
Sundance Digital
Titan automation
Intelli-Sat automated satellite ingest
TitanSync/SQL server system redundancy
Archive Manager
Launch Box control panel
Utah Scientific AVS1B router



To get from a tape-lugging analog facility to fully digital, automated, tapeless multichannel HD at WFUM-TV called for good planning, patience, ingenuity and some unique, cost-saving engineering solutions. As the PBS member station licensed to the Regents of the University of Michigan in Flint, MI, funding arrives intermittently and is never enough to do major projects all at once. Fortunately, the station made the transition in smart phases.

When announced that the station would move into the new William S. White Building on the university's campus, WFUM began working with architects. This project came on the heels of a new transmission facility build-out that included a new antenna, analog and digital transmitters, and new studio to transmitter link equipment.

The 8000sq-ft facility could only be located on the fourth floor and have 30ft ceilings and support studios. As a top floor, the station was subject to HVAC rooftop noise and vibration. The solution: build-in a vibration joint running from ground to roof through the entire building to isolate the studios.

In 2003, with a grant from the C.S. Mott Foundation, WFUM constructed the control room and outfitted two studios, but had insufficient funds for new equipment. Then the station had a great idea. An unused single-mode fiber trunk ran from the old facility to the university's campus. After getting permis-

ion to use it, the station linked the on-air control center at the old facility to the new studios, and began using them for production and live broadcasts.

In late 2005, grants from the C.S. Foundation and the Department of Commerce PTFP for new equipment were awarded. At the core, Sundance Digital Titan automation handled playlists for analog, SD and HD channels as well as routing for an educational network. Unexpected savings happened by cleverly interfacing Titan with an old Utah Scientific AVS1B router to distribute and route video over the fiber-optic education network. Another money-saving idea was to install new Evertz AC3 processors and upconverters in the main busses between the Harris HD IconMaster switcher and the Integrator Gold router. The processors automatically sense SD and upconvert to HD. WFUM also bought an Omneon MediaGrid archive storage system and integrated it with Titan.

The station wanted to enable unattended operation with close monitoring, allowing staffers to remotely monitor from laptops with the ability to access systems. Now, staffers are freed from on-air operations and have shifted to local production.

On Oct. 29, the station cut to its new HD broadcast operations center successfully, just in time to handle the live Flint mayoral debate that night. ■

Pittsburgh's WQED-TV becomes first and only HD broadcaster in its tri-state region



Pittsburgh's WQED-TV, the first public broadcaster in the nation and home of "Mister Rogers' Neighborhood," is now the first and only HD broadcaster and production center in its tri-state region, thanks to a major renovation of master control and editing, as well as all-new audio and video control rooms. WQED has been transmitting in HD since 2002, but prior to this upgrade, the broadcaster was only able to transmit PBS's HD feeds.

The first phase of the renovation, brought online in December 2006, comprised new Miranda master control and editing facilities. In the second phase, completed in April 2007, two dusty rooms in which superannuated equipment had been accumulating for 15 years were gutted and built out — one for HD audio and one for HD video control rooms. The systems integrator for the project was AZCAR.

Tying the new facility together is a Utah Scientific UTAH-400 routing switcher, handling both SD and HD signals for a total of six channels, four on the air and two over IP — a simulcast and a local production called WQED's Neighborhood. The UTAH-400 (144x144 frame loaded 16x16 HD and 48x48 SD), managed by a Utah SC-4 Control System, routes signals to the Miranda master control, which can access any of the crosspoints on the Utah router. The SC-4 Control System

represents an upgrade from Utah's SC-3, enabling WQED to take advantage of new features, including enhanced and simplified GUI applications.

Besides being the region's public broadcaster, WQED serves private clients. As a result of the major renovation, WQED can offer a complete HD package, from field shooting to editing to studio production and graphics. The first project to take advantage of the new HD facility was "Jennifer," a series of 27 half-hour shows produced for the local ABC affiliate about making life easier for moms juggling work and family. Deadlines for delivery of that project meant that the build-out of the two new control rooms had to be completed in a mere 90 days.

As a broadcaster, WQED focuses on community-based programming, including a half-hour nightly news magazine and minority affairs program, "Black Horizons." Popular PBS series produced by WQED include "American Soundtrack," "All-American Documentaries" and "America's Home Cooking."

Still in the works is a plan to dismantle an analog control room and convert it to HD. When that is complete, WQED will replace the chassis of its UTAH-400 router with a larger one, a simple operation because Utah equipment is designed to be incrementally expanded with minimal disruption to operations. ■

Category

Station automation

Submitted by

Utah Scientific

Design team

WQED-TV: Paul Byers, dir. of eng.; Dick LaSota, eng. staff; Mike Laver, eng. staff; Jerry Cobbs, eng. staff; Don McCall, eng. staff

AZCAR USA: John Humphrey, Greg Abel, Dave Coopey

Texolve: Mike Gianutsois, pres.; Jeff Barnes, sound design

Technology at work

Alesis 24-track audio recorders
Dolby E and AC-3 processing
Evertz signal generators
Genelec audio monitors (set up for 7.1 surround sound)
Harris graphics system and rasterizer
Miranda master control, graphics automation and processors
Sony switcher and monitors
TANDBERG satellite receivers
Utah Scientific SC-4 Control System
UTAH-400 routing switcher
Videotek testing equipment
Yamaha audio consoles



Ascent Media installs bicoastal automation solutions to support its growing business

Category

Network automation

Submitted by

Sundance Digital

Design team

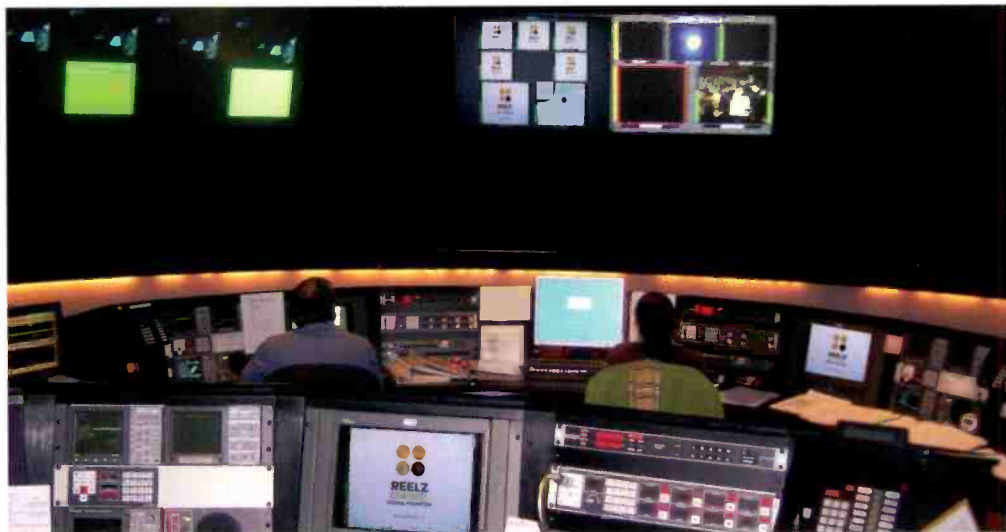
Ascent Media: Kurt Liddi, VP eng.; Heather Bianco, VP op.; David Linick, proj. mgr.; Dan Keenan, proj. mgr.; Ken Breitenstein, mgr. of automation

Sundance Digital:

Emerson Ray, dir. of strategic account sales; Ty Atherholt, dir. of sales, Eastern region; Luis Munoz, proj. mgr.; Casey Thi, service mgr.; Rick Stora, product mgr.

Technology at work

Front Porch/StorageTek archive system
Harris IconMaster MC switcher
Omneon Spectrum media network server
Sundance Digital Archive Manager
DataMover
DDMS file software
List processors
NewsRecorder
SIDON device control
Titan automation
TitanSync automation



When the additional demands of new business hit Ascent Media, it was time for a bicoastal upgrade. The organization offers broadcast, cable and satellite network distribution solutions from Stamford, CT, and Burbank, CA. The East Coast Network Origination Center (NOC) has handled distribution for the YES Network, A&E Television Networks and the NFL, and recently added the NHL Network. The West Coast NOC distributes the "Classic Arts Showcase," a free cable TV program, and added ReelzChannel, a cable and satellite network, to its roster.

The new networks meant that an infusion of advanced, scalable and reliable technology was needed to provide the highest quality transmission service that caters to high-profile sports and entertainment channels. The dynamic nature of sports networks typically requires individual live master control rooms, while entertainment programming needs more efficient multichannel operations.

Ascent Media opted to unify each origination center under the central control of a robust automation configuration. In the end, it chose nearly identical, but individually operated, fully redundant, multichannel Sundance Digital Titan automation solutions.

The new automation systems enabled Ascent to add channels easily to Titan as its roster grew. Recently, an additional three chan-

nels were added for agile, on-demand stations to accommodate live events as needed.

Each highly scalable configuration drives an Omneon Spectrum server and Harris IconMaster master control switchers for branding. Sundance Digital's MediaCacher was installed in both locations to efficiently and robotically cache content from tape to the servers.

Although the Titans are near mirror images of each other, some individuality was required to maximize efficiency. The spontaneous nature of the sports networks serviced by Stamford's playback center required a system responsive to real-time, last-minute playlist changes due to game timeouts, rain delays and the like. Sundance Digital's NewsRecorder was installed to achieve the live ingest of sporting events for server-based playback.

In Burbank, Titan drives a Front Porch/StorageTek archive system that is an important component of the entertainment-centric ReelzChannel and "Classic Arts Showcase."

In Stamford, each channel operates from its own master control room. In Burbank, the networks are managed in a multicustomer room. Both facilities are multicustomer installations and require significant scalability.

The new automation solution cost-effectively increases Ascent's existing platform to accommodate additional customers without needing to purchase a new automation system each time business grows. ■

CNN's new mobile news bureau takes HD election coverage on location



CNN first used a mobile news bureau to cover the presidential campaign in 2004, which was a 1980 tour coach. Though crude in design, with folding tables and virtually no connectivity, its potential for much more was obvious. In 2005, CNN decided that a fully customized conversion could provide a premier workspace and give the connectivity that had been missing from the previous coach.

David Bohrman, CNN's Washington bureau chief and senior VP, wanted to create a multiuse platform that would provide a combination HD studio, satellite transmission center and newsroom with an editing suite. The project required contributions across several disciplines. Frontline, a builder of satellite transmission trucks, provided overall project management and installation of the broadcast electronics. Parliament Motor Coach provided coach interior outfitting and chassis modifications.

The interior was divided into two distinct sections. The front area provides space for the combination newsroom and studio. It features 18 workstation positions capable of providing power, Internet access and communications for each correspondent or producer. When needed, the workstations can be stowed, making way for the interview studio. An integrated makeup space is adjacent to the Final Cut HD edit station. The edit suite

houses multiformat ingest VTRs and is integrated with a 17TB, multichannel XSAN for clip storage and playout. Eleven HD monitors provide access to the onboard CATV system, DSS system, off-air signals or the HD router. A 5.1 surround-sound system is also available.

The rear houses five equipment racks for the broadcast transmission center. The broadcast systems comprise a four-path HD digital transmission infrastructure, a 128-port intercom system, several audio mixers and a variety of terminal equipment and patching. The IT data switching system can connect via satellite, or in a variety of different hard-line configurations. The large I/O panels on both the street and curbside allow the system to connect via DS1, DS3 or ADSL. WiFi distribution is available inside and outside the coach.

When completed, the bus was first deployed in July 2007 to Charlestown, SC, where it played a major role in the CNN/YouTube debate. The newsroom and editing facilities were the focus of activity as producers and anchor Anderson Cooper selected video questions submitted by YouTube users. During the debate, the video questions were played off the bus' server system while the satellite dish fed the program back to CNN in Atlanta.

CNN's willingness to think outside the norm in broadcast vehicle design illustrates its commitment to deliver the highest quality news reporting to its affiliates and viewers. ■



Category

Newsroom technology

Submitted by

CNN/Frontline
Communications

Design team

CNN: David Bohrman, Washington bureau chief and sr. VP; Matt Speiser, Washington deputy bureau chief; Tu Vu, VP, broadcast eng. and sys technology

BEST: Tom Bentz, resource mgr.; Nathan Payne, assoc. sys. admin. **Frontline**

Communications: Doug McKay, national sales mgr.; Jeff Steele, sys. eng. mgr.; Robert Donovan, sr. design eng.; Claudio Araoz, design eng.

Parliament Coach: Mike Costello, production mgr.; Ben Cummings, electrical eng.; Paul Tudor, eng. mgr.; Patty Willet, interior designer; Rick May, assistant general mgr.

Technology at work

Apple
OS X servers
Mac Pro stations
X RAID
Final Cut Pro
Building4Media FORK
Evertz VIP-12 multiviewer
Harris Leitch Panacea
MCL Twin 400W Phase
Combined KU HPA
RTS Cronus intercom
Vertex 18SMK4L antenna



TV GLOBO shares news content over broadband network with Intelligent Tool

Category

Newsroom technology

Submitted by

TV GLOBO

Design team

Embratel: Mauricio Cardoso, proj. lead; Manoel Feteira, proj. eng.; Marcel Sadok, proj. eng.

Floripatec: Karlos H. Budag, proj. eng.; Vicente Rossi, proj. lead

GLOBO TV: Leonardo Cabral, proj. eng.; Carlos Fernandes, proj. eng.; Gustavo Marra, proj. eng.; Marcelo Souza, proj. eng.; Márcio Trajlezer, proj. lead

Technology at work

Accept DS240

Blackmagic Design

DeckLink

Extreme PCI Express

Cisco

Catalyst 2950 switches

Catalyst 2970 switches

2801 router

Dell

PowerEdge 1800

PowerEdge 2800

PowerVault 220S

Power Connect 6024F

Digital GS8000

Nokia IP330



Because Brazil has continental dimensions, news is the key tool to integrate all regions of the country and is the main GLOBO production, with a total of 58,000 hours per year produced by 3000 journalists.

GLOBO's newscast schedule is divided into local and network newscasts from morning to evening. Each affiliate produces up to 13 hours of weekly news for its districts and sends content to network headquarters to be broadcast.

Traditionally, content was exchanged via microwave or satellite links in real time, which means booking complexity and limited time windows in expensive communication channels. But since July 2007, GLOBO and its affiliates have operated a customized system to exchange off-air news content using IP technology over a robust and private broadband network.

This Intelligent Tool shares the content produced by each affiliate based on 24/7 operations. All participants are able to search, select, watch low-res content (LR=WM@256Kb/s) and retrieve high-res files (HR=WM@4Mb/s). The system provides security settings for protecting confidential information and defines rights management for content usage. Each affiliate can automatically manage the files' download priority according to its program guide. Other important features include archive control, partial retrieval,

customized reports and peer-to-peer sharing between affiliates.

The system architecture is comprised of an SQL redundant central database, a redundant central DNS Web server, workstations and MPLS network technology.

All content shared in the new system is available 24/7 over a reliable private network with firewall and cryptography protections, which equates to three times the savings when compared with the booked and rented A/V satellite or microwave links.

The application has a user-friendly Web GUI for the journalists, who can watch the low-res clips before asking for the high-res content, which is transferred at least two times faster than real time. ■



Rede Record starts spreading the news in São Paulo with new exhibition center



In September, Brazilian TV network Rede Record launched its latest TV Record 24/7 news channel, originating from a new facility in São Paulo that features an impressive exhibition center and a digital, shared-storage infrastructure.

This tapeless production environment — complete with a large storage area network (SAN) and an extensive Thomson Grass Valley digital news system — enables the network to produce more news and entertainment content faster than it could with tape, and prepares it for HD broadcasting planned for the end of the year, when several TV networks in Brazil will begin broadcasting in HD.

Reinaldo Gilli, director of engineering and operations at Rede Record, led a team that designed and implemented the new facility. The equipment initially supports SD production, but is upgradeable to HD.

Tightly integrated with an AP ENPS newsroom computer system, the massive news production SAN with 11TB is linked via GigE to numerous seats of Thomson Grass Valley Aurora Edit, Ingest, Browse and Payout software. At the heart of the secure SAN is a Thomson Grass Valley K2 media server and media client system with the capacity for 20 input and 12 output channels. This enables Rede Record's engineering team to be flexible in how it allocates bandwidth, both internally and for direct payout to air.

Working in a highly collaborative workflow, Rede Record's producers and editors simultaneously have access to 850 hours of SD media clips from any desktop in the building. The system has been implemented with a media management and archiving system from Front Porch Digital, making the search and retrieval of content fast and easy. The system also includes an IBM LTO tape library with four drivers for more than 8000 hours of near online digital news archiving.

The network has also installed a full complement of 3-D graphics and virtual studio technology from Orad Hi-Tech Systems.

In addition to the complete DNP workflow, Thomson Grass Valley equipment is also installed in the master control room of the facility. This is supported by a Thomson Grass Valley Concerto Series HD (128 x 128) router, Jupiter router control system, a Maestro HD branding and master control system, two mirrored K2 HD media servers and a number of fiber-optic and signal conversion products from the GeckoFlex modular line.

The network is also using Grass Valley NetCentral software for SNMP-based facility monitoring, which allows it to diagnose system problems from any location on the facility's digital network. Harris automation is the playout software used to control the HD master control and K2 video server. ■



Category

Newsroom technology

Submitted by

Thomson Grass Valley

Design team

Reinaldo Gilli, dir. eng. & cper.; Luiz Carlos Cardamone de Matos, news oper. mgr.; Anderson Moura, IT mgr.; Clóvis Itamar de Almeida Rabelo, editor in chief; Antonio Carlos Sobrinho, mgr. eng.

Technology at work

AP ENPS
Front Porch Digital
DIVArchive
Harris automation
IBM LTO library
Orad Hi-Tech Systems
graphics and virtual studio
Thomson Grass Valley
Aurora Browse, Edit, Ingest, Payout software
Concerto HD router
GeckoFlex modular line
Jupiter router control
K2 HD media server
Maestro HD branding and MC system



The Systems Group, Tribune leverage technologies, technical experience

Category

Newsroom technology

Submitted by

The Systems Group

Design team

Tribune: Chris Hutchins, mgr. ed. tech., Tribune Broadcasting; Artie Johnson, dir. broadcast services, WNOL/WGNO; Rich Kittilstved, dir. eng., WXIN/WTTV; Steve Zanolini, dir. oper. and eng., WNOL/WGNO
TSG: Christian Dam, sr. sys. eng.; Matt Marino, integration supervisor; Paul Rogalinski, sr. proj. mgr.

Technology at work

WXIN:
Evertz MVP and 7700 Harris ADC-100
Marconi 200BX ATM NVISION NV5128 switcher
Thomson Grass Valley K2 servers
Trinix/Encore router
VertigoXMedia graphics
WGNO/WNOL:
AP ENPS
Avid
Unity storage
Deko1000 graphics
Canopus transcoding
Eastboard consoles
Evertz MVP, VistaLink MRC
Twinstream STL
DAR-12 ENG
RTS/Telex ADAM
Thomson Grass Valley
DNP system
SDC-3110N cameras



Photo by Andy Washnik

After the devastation to New Orleans by Hurricane Katrina, local broadcasters scrambled to get their facilities back online. Tribune Broadcasting responded by moving master control functions to sister station WXIN-TV in Indiana, and trunking the air feed to the New Orleans transmitter sites via ATM. Meanwhile, WGNO/WNOL found itself moving its news operation three times to stay on the air. Then, it was time to rebuild.

The Systems Group (TSG) worked with the Tribune Indiana and New Orleans engineering teams to integrate a master control facility in Indiana's Regional Operations Center (ROC), and to plan, design and build the New Orleans news operation with architect Janson Design Group. TSG built the ROC in 2006, and space and interconnect for a second master control room was planned. Build-out of the WGNO/WNOL master control room included integration with existing ROC core systems including a Thomson Grass Valley XP-based Media Area Network, NVISION MC switcher, Evertz MVP multiviewer, VertigoXMedia branding and Masstech distributed ingest/prep automated storage for station group-wide syndicated and commercial media distribution. Within three months, the new MCR replaced temporary facilities in Indiana, and attention was focused on the local news operation.

The facility includes a large open newsroom, studio with attached weather center, control room, 12 post suites and a newscenter where all transmission operations are monitored and controlled. The core of the facility is centered around a Thomson Grass Valley digital news production system with six news edit suites equipped with Aurora Edit SD workstations, eight record channels of an ingest station-controlled K2 server and 16 channels of bidirectional production server sources, news production and on-set monitoring.

The newsroom includes an assignment desk with an attached EJ ingest station, ENPS on all desktops and extensive CATV and A/V-over-IP. The newscenter allows for centralized control of and feeds from a dozen ENG sites and remote cameras for local news, traffic and POV acquisition using Troll control, as well as SNG, Pathfire and off-air media management. Payout from the DNP, as well as camera robotics, video switching, audio mixing and on-air graphics, are all controlled via Ignite control automation with ENPS rundown interface. Live newscasts and local advertising spots can be fed linearly. Snipe graphics/animations and other media files can be sent via IP over ATM, WAN and satellite to the ROC and other Tribune stations. Media loading and control of on-air branding engines at WXIN are accessible for snipes and local commercial insertion from the WGNO/WNOL newsroom. ■

WLEX-TV upgrades to HD while continuing day-to-day operations



As the NBC affiliate for Lexington, KY, WLEX-TV Channel 18 is the No. 1 source for local news in the east-central Kentucky region. To meet the needs of its growing viewership, WLEX renovated its broadcast facility to upgrade to HD and migrate its newsroom system to ENPS.

The design goal was straightforward: convert to HD using the existing building — including racks, control rooms and edit rooms — while continuing operations. Rapid completion of the facility was critical because WLEX wanted to launch its HD newscast in a matter of months.

The new WLEX broadcast facility features seven Harris NEXIO XS NX3600HDX servers — each supporting integrated, software-driven up/down/crossconversion for format transparency and true shared storage access — for news and commercial ingest and playback. The servers attach to a NEXIO SAN comprising three racks of 16 300GB storage drives each.

After acquiring the SD news feed using a Panasonic P2 field camera (50Mb/s at 16:9), Harris Velocity NX HD promotions and craft editors are used for news, promotion and commercial editing using legacy material from DVCPRO25, P2 and various news feeds. Velocity NX allows for real-time multicamera editing, color correction and multiple resolutions on the same timeline. The NEXIO XS server then upconverts the signal to HD for playback. The SAN also features NEXIO Rundown Manager as the MOS

gateway, linking WLEX's ENPS newsroom computer system with the NEXIO XS servers; the NEXIO PlayList application for sequencing and playing to air; and NEXIO Ingest Control Manager, which supports scheduled recording of line feeds and instant, ad hoc recordings to capture breaking news events.

WLEX worked through a myriad of challenges — from managing the multiple, simultaneous installs to scheduling the necessary training sessions. The old news set had to be demolished to accommodate the new newsroom set and lighting scheme, and a temporary news set had to be designed and constructed to accommodate demolition and installation. All of these tasks had to be accomplished while keeping critical equipment operational and without jeopardizing daily operations.

Several innovations were key to the success of the design: the mounting of two robotic cameras from the lighting grid in the studio and newsroom; the modification of a 2GHz microwave system to pass 16:9 for live news reports; and the use of a Harris Platinum router with the EDGE interface to the Grass Valley 7000 router.

Today, WLEX is reaping the benefits of its new HD SAN. The station went on the air with HD news on April 26, 2007, after only four months. All of WLEX's locally produced news and programming is now broadcast in HD, and the station is also producing and airing many local commercials in HD. ■



Category

Newsroom technology

Submitted by

Harris

Design team

WLEX: Sean Franklin, oper. mgr.; Tony Michalski, eng.; Brian Settle, eng., Sam Gordon, eng.

Cordillera

Communications: Andy Suk, VP of eng. & oper.

Harris Broadcast

Communications: Brad Torr, dir., key accounts

Technology at work

Chyron HyperX graphics
Evertz

MVP monitoring
Namedropper HD

Fujinon lenses

Harris

IconMaster

IconStation

Platinum router

Velocity NX editors

NEXIO XS servers

Newsroom Solutions

Freedom HD graphics

Panasonic

P2 field cameras

Studio cameras

Ross Synergy 4 switcher

Tekskil prompters



Rachael Ray's new 9000sq-ft studio cooks up delectable sights and sounds

Category

Post & network production facilities

Submitted by

EUE Screen Gems/Solid State Logic

Design team

EUE Screen Gems:

George Cooney and Chris Cooney, studio principals; Thorpe Shuttleworth, exec. VP; Mitchell Brill, head of corp. dev.;

King World: Rich Cervini, VP; Alan Blacher, lighting design

Shaffner/Stewart: Joe Stewart, set design

Showman Design

Technology at work

Avid

Adrenaline workstations

ISIS storage array

Thunder MX triple-channel still store

Pinnacle Deko 3000 CG

Solid State Logic C100 digital audio console

Sony

BVP-900 and 950

cameras

HDS-X3700 serial

digital router

DME-5000 DVE

DVS-7350 digital video

switcher

DVW-A500 and M2000

VTRs

MAV-555 video disks

MSW-M2000 decks



King World Productions' "Rachael Ray" is a bona fide syndication hit. And studio landlord EUE Screen Gems Studios in New York City couldn't be happier. The show is taped in a sophisticated 9000sq-ft studio that EUE created specifically for "Rachael Ray" in its 125,000sq-ft four-floor Midtown Manhattan complex.

The EUE design team worked with Rich Cervini, vice president of production and technical operations for King World, to make a home for "Rachael Ray." Timing was critical. In a mere three months — from demolition to first shoot day — the original Studio 6A and its control room were gutted and refitted with all digital equipment, new lighting equipment and an innovative, rotating audience platform.

The new control room features a Sony 3.5 M/E DVS-7350 digital video switcher (32-input with 13 aux busses), two Sony DME-5000 DVE units and 64 PatchAmp SDV/HD serial digital video DAs with analog test outputs. For confidence monitoring, there are several 14in and 20in Ikegami CRT monitors with SDI inputs and Leitch VTM-3100 SD LCD-based waveform and vectorscope rasterizers.

Stereo audio for "Rachael Ray" is recorded on a 48-input C100 digital console from Solid State Logic, with multiple ties to an elevated production bridge, where a Yamaha M7CL console is used to drive the speakers in the audience. The SSL board was chosen for its flex-

ibility, which includes the ability to record full surround sound (5.1 channels).

Numerous HD-compatible DAs from PatchAmp and audio jackfields from ADC support the studio's traditional SD and analog infrastructure. The audience seating platform employs multiple floor-mounted speakers that capture audience reactions and are often incorporated into the overall mix. Sixteen mics positioned directly above the audience are mixed by a Mackie 1604 board as a sub-mix, and then routed into the SSL C100.

Four editing suites with Avid Adrenaline workstations (three for show segments and a fourth for on-air promos), along with four Apple G5 workstations, are networked to an Avid ISIS storage array that enables editors to share clips and retrieve elements digitized into the system. Daily roll-ins are handled directly from tape or are ingested into an Avid Thunder server. Six Sony DVW-M2000 Digital Betacam recorders are used for program and ISO record, as well as one DVW-A500 and one MSW-M2000 (IMX) for playback. Graphics are generated with a dual-channel Pinnacle Deko 3000 CG.

King World has tentative plans to move the show to HD sometime after 2008. Because of preplanning and current equipment choices, the upgrade will only involve the installation of new HD cameras, a new HD production switcher and an HD-capable router. ■

Library of Congress' National Audio-Visual Conservation Center



In Culpeper, VA, the Library of Congress' new Packard Campus of the National Audio-Visual Conservation Center (NAVCC) houses the world's largest and most comprehensive collection of films, TV programs, radio broadcasts and sound recordings. It contains underground storage for this entire collection — 5.7 million items — on 90mi of shelving, along with extensive modern facilities for the acquisition, digitization, cataloging and preservation of all audio-visual formats.

The Library of Congress began planning for the NAVCC about 10 years ago. One of the primary goals was the digital duplication and storage of all the items that would be kept at the campus. The Library of Congress hired Communications Engineering Inc. (CEI) to handle the installation and integration of all the equipment. CEI began working on the project in August 2006.

CEI was challenged with handling the wide range of formats that the original materials used, many dating back to the 1800s. This meant acquiring many types of equipment for playback — often very old machines that needed refurbishing — as well as all other conversion equipment, and building several screening and playback rooms.

Special consideration of the playback equipment had to be given in the construction of the playback rooms, such as creat-

ing extremely stable environments for audio turntables. Compressed air had to be supplied for the numerous quad videotape machines throughout the building. In addition, the reference levels for the variety of playback and recording equipment had to be closely checked and maintained.

The long distances within the facility's space and limited conduits for cable required extensive use of fiber and multiconductor cabling. The large amounts of electricity required for all the equipment and the heat created meant that power and HVAC upgrades were needed.

CEI constructed seven audio conversion rooms and three video conversion rooms, featuring a variety of playback equipment that will be maintained, repaired and calibrated by CEI technicians. Sophisticated acoustic materials were installed in the rooms to allow engineers to carefully monitor and control the recordings as they are replicated. The facility became operational in September 2007.

The campus now has extensive capabilities and capacities for the preservation reformatting of all audiovisual media formats and their long-term safekeeping in a petabyte-level digital storage archive. The NAVCC includes 415,000sq-ft, 35 climate-controlled vaults for sound recording, safety film and videotape, and 124 individual vaults for more flammable nitrate film. ■

Category

Post & network production facilities

Submitted by

Communications Engineering Inc.

Design team

CEI: Herman Reynolds, proj. mgr.

Library of Congress, NAVCC, Packard Campus — Motion Picture, Broadcasting and Recorded Sound

Division: Steve Nease, CTO; Allan McConnell, supervisor, audio and video preservation lab

Technology at work

Ampex VPR-3 recorders
ATC active monitors
AutoPatch Modula series 4 routers
Barco RLM H5 projectors
Broadcast Pix Slate 2100 switcher
Crestron MC2W control
Cube-Tec Quadriga
Dolby DA-20 processor
Evertz distribution amp, converters, master sync and time generators
Harris Videotek VTM-4100 monitors
Kinson film projectors
Leader LV5700A monitors
Maselec MTC-2 mixers
NVISION NV8256-Plus routers
Simon Yorke turntables
Sony Betamax recorders
Studer A807 recorders
Tektronix 1750A test monitors



NBA Entertainment doubles production and storage capacity for HD ingest and archiving

Category

Post & network production facilities

Submitted by

SGI

Design team

NBAE: Mike Rokosa, VP eng.; Keith Horstman, VP, digital media mgmt. sys.; Dana Stone, dir., digital media mgmt.; Andrew Surfer, dir., sys. eng.

SGI: Bill Buhro, media solutions architect; Dale Brantly, sys. solutions architect

Technology at work

SGI

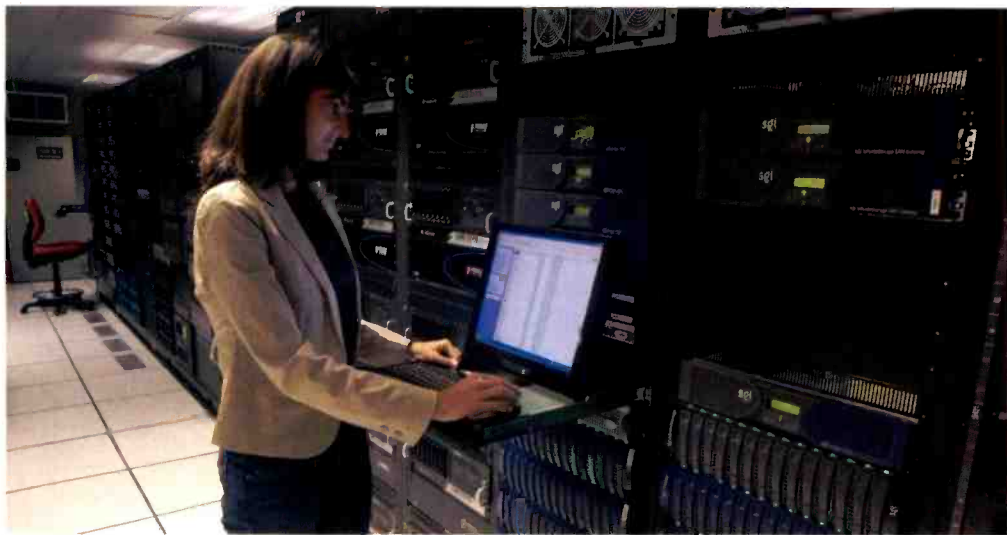
Altix 450 servers
Altix XE240 servers
CXFS shared filesystem

Data Migration Facility
Digital Mass Storage Engine

InfiniteStorage 4500
InfiniteStorage 10000
InfiniteStorage NEXIS 1000 NAS

Snell & Wilcox Asteroid SD/HD MPEG-2 MXF encoders

StorageTek SL8500 6000 LTO tape library



NBA Entertainment's (NBAE) all-digital, centralized media production and asset management facility in Secaucus, NJ, has been fully functional for more than a year. In the past year, the all-digital, SGI-integrated workflow has allowed the NBAE to capture, catalog and store every play as it happens in real time. The SAN, based on an SGI InfiniteStorage CXFS shared filesystem, provides real-time storage for high-res online editing systems while handling low-res proxy and cue management using NBA-written applications. During daily broadcast production, the NBAE ingested more than 45,000 assets into the system over the last year, storing about 30,000 hours of content, or a little more than 1.5 petabytes of data. Those assets are a combination of all of last season's live NBA games and field material, plus historic content.

The volume of asset ingest is significantly more than SGI or NBAE anticipated in the initial system design, which was conceived as having at least two years of built-in growth capacity. The NBAE originally planned to take up to seven years to get the entire archive, dating back to 1946, into digital format. In order to take better advantage of the workflow improvements, the NBAE has accelerated its library conversion. Doubling the size of the media management system, where material is ingested into the SGI storage using Snell &

Wilcox iCR encoders, will allow for as many as 100,000 assets to be ingested annually.

To meet this directive, a second 3000-slot StorageTek SL 8500 robot system is being added, which will take the NBAE's total nearline capacity to 6000 LTO data tapes and significantly improve workflow by moving data into the system quicker and retrieving data more rapidly. The Fibre Channel fabric is expanding from 128 ports to 192 ports, and the system is migrating from SGI's legacy technology to three SGI Altix 450 systems, each with 16 Intel Itanium 2 processors and 16GB RAM per processor, running Novell SUSE Linux Enterprise Server 10. This doubles the capability of the SAN from 16 concurrent feeds to 32 concurrent feeds. An additional SGI InfiniteStorage 4500 system with 16TB of storage is being added to the existing spinning disk storage.

The NBAE's low bit rate, browsing content capabilities are being upgraded to an SGI InfiniteStorage NEXIS 1000 NAS system driven by SGI Altix XE240 servers with Intel Xeon processors, and 250TB of SGI InfiniteStorage 10000 storage. The 250TB represents about six seasons' worth of content, and will allow much more low-res content directly online.

The doubling of production and storage capabilities will also impact the next level of expansion — instituting remote ingest and payout via a planned private NBA network to the individual team locations. ■

New Century Production's NCPX HD truck: An evolution in design



The latest New Century Productions (NCP) mobile sports production truck features a stunning flat-screen monitor wall in the production control room and innovative design and technology. Completed Aug. 20, the 53ft expanding drop-deck trailer is the first in a series of HD units for NCP, which produces football, baseball and basketball events for national networks.

Diversified Systems spearheaded the engineering and integration of the unit. The seasoned team delivered a high-quality vehicle on the short, 11-week timeline. Diversified Systems created a unique solution to provide NCP with an advanced system using the latest technology that optimizes the limited space available within the unit. A single-level HD routing system means everything from monitors to external connector panels can be addressed on one router.

The choice to use a single HD router, versus several smaller ones, resulted in significant cost savings. NCP also saved money because it eliminated costs associated with conversion of HD devices to the standard routing level.

The monitor wall is a key feature of the new truck. Space and weight restrictions were paramount for Diversified Systems when designing the monitor wall concept. The team employed flat-screen monitors, effectively saving 1ft of space in the production control room. The absence of racks required to hold traditional CRT screens was another space saver.

Additionally, cabling was cut to length to save weight. The completed wall is 160in wide and features 43 20in Samsung LED monitors and three program preview monitors from TV Logic.

Engineers also eliminated CRT monitors in the video room, instead choosing 20in LCD monitors driven by Evertz, which offer added flexibility in the tape area. Using a single HD router and all HD monitors means that every source in the unit captures true HD images, as opposed to the SD representation. The main video router offers 288 inputs and 736 outputs for added flexibility — any monitor in the unit can be driven by any source.

Diversified Systems relied on ADC for all patching solutions to support the signal flow. ADC also provided future proofing. The result is a scalable system that can evolve with technology. The audio and video products are designed for exceptional signal response, and Diversified Systems didn't experience a single failure on its mobile units with the ADC patches. For audio, the engineers installed a semicustom patch bay, and at NCP's request, used a hidden normalizing technique to wire audio portions in the most effective physical way, which allows for higher density wiring.

With the first NCPX HD truck completed, Diversified Systems is already at work on several new vehicles. ■



Category

Post & network
production facilities

Submitted by

Diversified Systems

Design team

New Century Productions: Mike Mundt, VP of eng.; Jack Pakkala, EIC
Diversified Systems: Duane Yoslov, VP; Alan Bourke, project mgr./lead eng.; Jay Park and Davin Clem, design eng.; Walt Thomas, install supervisor

Technology at work

ADC video, audio and data jackfields
Calrec Alpha Bluefin
Canon lenses
Chyron HyperX² CG
Evertz
Terminal gear
Processing gear
VIF multiviewers
EVS
XT2 server
Xfile software
Multicam LSM
SpotBox payout
Harris X75 converter
NCP X HD trailer
Panasonic VTRs
RTS ADAM intercom
Sony VTRs
Thomson Grass Valley LDK 8000 mk II
Kalypso HD switcher
Utah Scientific router
Vinten tripods



New Century Productions' NCP X gives sports broadcasters what they want

Category

Post & network production facilities

Submitted by

Utah Scientific

Design team

Diversified Systems:

Mike Mundt, Jack Pakkala

New Century Productions:

Alan Bourke, Davin Clem

Technology at work

Calrec Alpha Bluefin audio console

Evertz 7000 series converters

EVS

Production servers
XFile software

Thomson Grass Valley
Kalypso production switcher

LDK 8000 digital cameras

Utah Scientific

UTAH-400 routing switcher

SC-4 control system



New Century Productions (NCP) debuted its newest truck, the NCP X, in Anaheim, CA at a Los Angeles Angels baseball game in August 2007. The 53ft expanding trailer is fully HD and SD capable, offers clients a monitor wall that can display as many as 166 individual sources. The wall is composed entirely of flat-panel LCDs, which are used throughout the truck; the only CRT monitors on board are the match monitors used by the video operators.

Designed by Mundt, the truck was integrated at Diversified Systems in Santa Clara, CA, to meet the specifications of a national sports broadcaster's baseball coverage. The truck has been at work on college and NFL football games, but it will be pressed into service for MLB coverage in spring 2008.

The production room in NCP X uses a drop-deck frame to increase the amount of vertical space for the production monitor wall, allowing for an additional row of monitors. As the floor steps down toward the front of the room, it opens up the space and makes the area feel larger than a conventional production room. The room is built around a Grass Valley HD Kalypso production switcher and can seat 12 people comfortably.

NCP selected a UTAH-400 routing switcher for its multiformat capability, size, reliability and compactness. In addition, the UTAH-400 offers the advanced control capabilities of

Utah's SC-4 control system. The routing system aboard NCP X is two linked router frames composed of a 288 x 704 HD video frame and a 288 x 288 AES audio frame. Seventy-two inputs and 104 outputs on the AES frame are equipped with analog audio converters.

Router control panel assignments vary from show to show. Utah's new UCP-48 and UCP-MM/A control panels offer self-legending LCD displays for each button, eliminating potential confusion and increasing the number of sources available to an individual operator. And because all of the configuration set-ups associated with a particular even can be saved, most of the truck can be reconfigured for a particular client at the touch of a computer icon.

For recording and playback, NCP equipped NCP X with pullout trays so specific tape decks can be mounted to meet client preferences. Production servers from EVS handle most replays. Clients carry their own production elements, highlights and whole shows on the EVS XFile transportable disk drives that enable quick loading of clips and production elements for use right there or for highlights later.

NCP chose the Calrec Alpha digital mixing desk with Bluefin technology for maximum audio power in a small space. The Calrec audio console is equipped with 480 channel-processing paths packaged as 162 stereo and 156 mono channels, allowing up to 78 full 5.1 surround channels. ■

WVU incorporates collaborative workflow to stay ahead of the game



The Television Production Department at West Virginia University (WVU) is a busy operation, turning out more than 50 “Mountaineer Magazine” and “Mountaineer Jammin” programs per year for the Mountaineer Network, which is syndicated and carried by several TV stations in the region. These and a full schedule of live Mountaineer Network game coverage of football, basketball and other sports and campus activities keep the WVU team at full tilt. WVU needed to streamline the operation and move toward an integrated, file-based workflow that offers straight forward media sharing to keep up with demand.

Each of the edit suites were standalone units, and valuable time was wasted digitizing tapes and waiting for materials. That changed when WVU installed an EditShare system with 36TB of storage. The NAS solution is optimized for post-production workflows, offering software tools such as Avid project sharing that maximize collaboration for multiuser environments.

WVU’s system is composed of two EditShare servers connected via 10GigE to a HP ProCurve switch. Each server chassis is loaded with 24 750GB drives with room to grow. The drives are configured in RAID5, providing optimal redundancy without sacrificing a large amount of storage. From the HP switch, each of the production suites and workstations is connected to one of the 96 available 1Gb. The engineering department also has access to the EditShare stor-

age and production material, and everyone has access to Internet, e-mail and office services for a streamlined work environment.

The old WVU workflow was frustrating. Footage had to be digitized multiple times into the different edit suites before editors could work on their individual projects. Now, the material is digitized once and it’s accessible on the EditShare to everyone. Production of this year’s WVU basketball special DVD highlighted the improvement. For each sport, WVU cuts an annual highlight DVD. In the past, a whole season’s worth of footage had to be digitized before even starting editing the project. This year, the entire season was all already available to editors thanks to EditShare. They were able to start the creative process immediately, cutting production time by half, and the product was measurably better.

EditShare’s straightforward operation and the added built-in protections make it easy to use. It’s impossible to accidentally overwrite or delete files with EditShare. WVU has allocated shared spaces on the EditShare to include audio, graphics and animations to allow others to see and preview different aspects of works in progress. Another big improvement from the EditShare installation was the ability for WVU to extend editing capability to include desktop systems. In addition to the original five Avid suites, the EditShare also connects 15 additional Adobe and Avid desktop editing systems, conveniently located in the producers’ offices. ■



Category

Post & network
production facilities

Submitted by

Editshare/West Virginia
University

Design team

West Virginia University:
Fred Marsteller, mgr. of
communications eng.
EditShare: Andy
Liebman, pres. & founder
Channel Wolves: Grant
Carroll, chief tech. officer

Technology at work

Adobe
Photoshop
After Effects
Illustrator
Avid
Adrenalin
Mojo
Canon XL1
Corel
Paint Shop
CorelDRAW
EditShare storage system
GenArts Sapphire
Plug-ins
HP ProCurve switch
NewTek LightWave 3D
Panasonic
DVCPRO
P2
DVX100
HVX200
Sony Betacam SP



Greene HD Productions builds niche market with HDTV production mobile

Category

IPTV and mobile technology

Submitted by

Ross Video

Design team

Brian Greene, CEO/producer; Stephanie Pittman, exec. asst.; Samuel Thomas, editor; Trent Johnson, editor

Technology at work

Apple server/editing system (Final Cut and 24TB storage space)

Canon lenses

Leader rasterizer

Miranda monitor wall

Ross Synergy 1.5 MD switcher

Sony

HDCAM Series 700 and 900 cameras

MSU 700 camera control

Yamaha 56 channel audio mixer (with Pro Tools)



Greene HD Productions in Arlington, TX, decided after building a prototype from a 1998 converted coach to build a luxury HDTV production mobile from scratch, starting with a Prevost XLII 45ft mobile. Teaming up with Marathon Coach, its design goal was to offer comfort for VIPs and the work crew by offering a good working/living environment, which then contributed to saving on wasted time. This was achieved by offering as many as 12 HD cameras, two advanced edit stations, in-motion editing, tapeless recording environment, stadium seating in the production room, an audio mixing cabin, fiber-based HD-SDI cable, a producer's lounge, a full galley/full bath, and sleeping quarters for up to four crew members. This not only saves on transportation and hotel costs, but allows the crew to work on the next event while in motion as the mobile is fully functional, parked or moving.

Greene HD Productions was able to trim a three-week edit cycle down to three days. It was able to do a complete post production on any project, including color correction, and provide a finished HD master on HDCAM or any format specified by the job. Its editing capabilities are immense. Its TD is also its editor, which benefits the editing process by shaving time off the edit cycle. Another benefit is the ability to continue working while mov-

ing, which allows time to preset the cameras, switcher and Miranda monitor wall for their next event. They only have to show up and set up their equipment.

The advantages of Greene HD Productions having more than three years to work on the prototype is that it was able to find out what clients, crew and VIPs liked and didn't like. It was able to decide that for the mobile, it made sense to go with Ross Video's Synergy 1.5 multidefinition digital production switcher. It is full featured, takes up little space and is MD. Engineering-wise, it is user-friendly.

To reduce production costs and improve workflow, it ISO'd most or all of the camera feeds onto an uncompressed tapeless HD server system. Greene HD Productions went with a server custom-made by Apple Computer for the mobile unit. There is no need for tapes, and it has a high storage capacity of 24TB.

While Greene HD Productions is building a niche market, it did have a challenge to overcome: how to keep the equipment cool. The servers generate 20,000 BTUs of heat. It couldn't vent outside, and it designed the compact space on purpose. It spent months trying new ideas and finally found the right solution to properly cool the equipment room.

In May of 2007, Greene HD Productions went into full production, leaving it with little downtime. ■

NBC Universal overhauls its IPTV distribution system at its NYC headquarters



NBC Universal receives more than one hundred remote feeds to its headquarters in New York City. In the past, these signals were distributed via an analog closed circuit Cat 5 system used for monitoring purposes by the news and sports production staff. This Cat 5 system was available only in key production areas, and every channel of the 850MHz plant was occupied.

Recently MSNBC moved to 30 Rock with an additional 50 new remote feeds that needed to be monitored throughout the facility. Adding to the existing analog system was out of the question. A digital cable (QAM) technology was considered; however, this would require a new digital cable-ready TV or set-top box for every user, a logistical and financial challenge. An IPTV approach operating on the corporate LAN allows all users equal access to content using existing PCs, regardless of the location in the facility.

The system was designed for 200 SD channels, with plans to add more SD and HD channels in the near future. Because bandwidth was a critical factor of the design, we choose H.264 (MPEG-4) compression. Operating each service at about 1.7Mb/s yields sufficient quality for monitoring purposes yet occupies a reasonably streamlined profile in the GigE backbone.

Careful planning of our network infrastructure was required. The IPTV traffic shares the same facilities and pipeline as the rest of our

corporate data, including e-mail, Web browsing, archiving and various other production tools. We could not afford to disturb any of these. A large task was ensuring that every switch and router was enabled for multicast (IGMP) traffic. We are fortunate that backbone was previously upgraded to GigE so bandwidth to each switch was not considered an obstacle.

The benefit of multicasting is that bandwidth is not occupied on a local network segment unless a request for a service is made by a user. No matter how many users on a segment request the same service, that service doesn't require any more bandwidth than the initial request.

NBC chose an enterprise-class encoding system with blade-based processors. Software decoders on the PCs include a browser-based version provided by the vendor that supports multiple, simultaneous decoder windows, as well as a channel guide that can be managed centrally. Care must be taken to use adequate PC hardware to support multiple decoders such as dual-core CPUs with sufficient RAM.

We have also deployed dedicated IPTV set-top decoders for users who need to view services on a dedicated video monitor. The STBs require a dedicated connection to the LAN but require little additional support once activated.

NBC Universal can distribute monitoring video services with far greater reach and flexibility than could have been provided by a conventional cable TV system. ■

Category

IPTV and mobile technology

Submitted by

NBC Universal

Design team

NBC Universal: Rob Goldfarb, dir, distribution and affiliate projects; Shadrach Kisten, mgr, eng. & info tech; Bharat Ananthakrishnan, on-air apps. mgr. (TAM); Colin Campbell, enterprise networking architect
Optibase: Eli Garten, Manager, technical marketing and professional services

Technology at work

Amino AmiNET130 STBs
Cisco 6500 series switches
Optibase
MGW 5100 encoding
EZ TV server
Cluster manager

COMPANY DIRECTORY

A

Ac-cetera

Pittsburgh, PA
Tel: 800-537-3491
Web: www.ac-cetera.com

Accom

Menlo Park, CA
Tel: 650-328-3818
Web: www.accom.com

AccuWeather, Inc.

State College, PA
Web: www.accuweather.com

Acorn RF

South Casco, ME
Tel: 866-407-2266
Web: www.acornrf.com

Acrodyne Industries

Elmira, NY
Tel: 800-523-2596
Web: www.acrodyne.com

Active Power

Austin, TX
Web: www.activepower.com

ADC TELECOM

13625 Technology Dr.
Eden Prairie, MN 55344
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Toll Free: 800-366-3891
Fax: 952-917-1717
E-mail: bill.fuesz@adc.com
Web: www.adc.com
Contact: Bill Fuesz

Adrienne Electronics

Las Vegas, NV
Tel: 800-782-2321
Web: www.adrielec.com

Adtec Digital

Nashville, TN
Tel: 615-256-6619
Web: www.adtecinc.com

Advanced Test Equipment Rentals

San Diego, CA
Tel: 888-404-2832
Web: www.atecorp.com

Advanced Broadcast Solutions

Kent, WA
Tel: 206-870-0244
Web: www.advancedbroadcastsolutions.com

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Web: www.aja.com
Contact: SIs.

Alcatel

Plano, TX
Tel: 800-252-2835
Web: www.alcatel.com/microwave

Analog Way

New York, NY
Tel: 212-269-1902
Web: www.analogway.com

Angenieux

Totowa, NJ
Tel: 973-812-3858
Web: www.tccus.com

Anixter

Glenview, IL
Tel: 800-264-9837
Web: www.anixter.com

Antenna ID Products

Glenmoore, PA
Tel: 610-458-8418
Web: www.antennaid.com

Anton/Bauer, Inc.

Shelton, CT
Tel: 800-541-1667
Web: www.antonbauer.com

Apple

Cupertino, CA
Web: www.apple.com/finalcutstudio



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A.R.G. Electrodesign, Ltd.

Cirencester, Gloucestershire, United Kingdom
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Web: www.arg.co.uk

AR Products/Guy Cable Vibration Control

Lexington, MA
Tel: 781-862-7200
Web: www.arproducts.org

ARRI, Inc.

Blauvelt, NY
Tel: 845-353-1400
Web: www.arri.com

Artbeats

Myrtle Creek, OR
Tel: 800-444-9392
Web: www.artbeats.com

Ascent Media Systems & Technology Services

Northvale, NJ
Web: www.ascentmedia.com/systems

Associated Press/ENPS

Washington, DC
Tel: 800-821-4747
Web: www.enps.com

Astro Systems

Baldwin Park, CA
Tel: 626-336-7001
Web: www.astro-systems.com

ATCi

Chandler, AZ
Tel: 480-844-8501
Web: www.atci.com

ATI-Audio Technologies

West Berlin, NJ
Tel: 800-922-8001
Web: www.atiaudio.com

Audemat-Aztec

Miami, FL
Tel: 305-249-3110
Web: www.audemat-aztec.com

Audio Accessories

Marlow, NH
Tel: 603-446-3335
Web: www.patchbays.com

Audio-Technica U.S., Inc.

Stow, OH
Tel: 330-686-2600
Web: www.audio-technica.com

Audiolab Electronics, Inc.
Roseville, CA
Tel: 800-624-1903
Web: www.audiolabelectronics.com

Auralex Acoustics, Inc.
Indianapolis, IN
Tel: 317-842-2600
Web: www.auralex.com

AUTOCUE GROUP, LTD.
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Mitcham, Surrey
CR4 4DG United Kingdom
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Fax: +4420-8684-4869
E-mail: info@autocue.co.uk
Web: www.autocue.com
Contact: Richard Satchell, Sls. Dir.

Autocue Systems, Inc.
Charlotte, NC
Tel: 704-377-1496
Web: www.autocue.com

Autodesk
Montreal, PQ, Canada
Tel: 800-869-3504
Web: www.autodesk.com/me

Autoscript
London, United Kingdom
Tel: +44 20 7538 1427
Web: www.autoscript.tv

AVEC
Finleyville, PA
Tel: 412-429-2000
Web: www.aveceng.com

Avid Technology
Tewksbury, MA
Tel: 800-949-2843
Web: www.avid.com

Aviom, Inc.
West Chester, PA
Tel: 610-738-9005
Web: www.aviom.com

Avitech Intl.
Redmond, WA
Tel: 800-284-8324
Web: www.avitechvideo.com

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Lawrence, PA 15055
E-mail: info@axcera.com
Web: www.axcera.com
Contact: Mike Rosso, Vice President, Sales

Axon Digital Design BV
UDENHOUT, Netherlands
Tel: 888 919 9379
Web: www.axon.tv



AZCAR
Canonsburg, PA
Tel: 888-873-0800
Web: www.azcar.com

Azden
Franklin Square, NY
Tel: 800-247-4501
Web: www.azdencorp.com

B

B&H Photo Video
New York, NY
Tel: 800-947-9928
Web: bhphotovideo.com

BAL Broadcast, Ltd.
Newcastle, Staffordshire, United Kingdom
Tel: +44 247 6316500

Band Pro Film & Digital, Inc.
Burbank, CA
Tel: 818-841-9655
Web: www.bandpro.com

Barco Visual Solutions, LLC
Duluth, GA
Tel: 770-218-3200
Web: www.barco.com

Barix AG
Zurich, Switzerland
Tel: 866-815-0866
Web: www.barix.com

Baron Services
Huntsville, AL
Tel: 256-881-8811
Web: www.baronservices.com

Bauhaus Software, Inc.
San Antonio, TX
Tel: 210-212-7530
Web: www.bauhaussoftware.com

Baystor
Apollo Beach, FL
Tel: 888-229-7867
Web: www.baystor.com



Beck Associates
Pflugerville, TX
Tel: 888-422-8600
Web: www.becktv.com

Behringer USA
Bothell, WA
Tel: 425-672-0816
Web: www.behringer.com

Belar Electronics Lab., Inc.
Devon, PA
Tel: 610-687-5550
Web: www.belar.com

Belden
Richmond, IN
Tel: 800-235-3361
Web: www.belden.com

Bella
Burbank, CA
Tel: 818-563-9500
Web: www.bella-usa.com

Benchmark Media Systems, Inc.
Syracuse, NY
Tel: 800-262-4675
Web: <http://www.benchmarkmedia.com>

Berkeley Nucleonics
San Rafael, CA
Tel: 800-234-7858
Web: www.berkeleynucleonics.com

Bescor Video
Farmingdale, NY
Tel: 800-645-7182
Web: www.bescor.com

beyerdynamic - USA
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Tel: 800-293-4463
Web: www.beyerdynamic-usa.com

Bittree
Glendale, CA
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Web: www.bittree.com

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Blackmagic Design

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Web: www.blackmagic-design.com

Bluefish444

South Melbourne, Victoria, Australia
Tel: +61-39682-9477
Web: www.bluefish444.com

Bluefish444

Boston, MA
Tel: 866-314-7785
Web: www.bluefish444.com

Blueline Tech.

Lewisville, TX
Tel: 866-905-2583
Web: www.bluelinetech.com

Bock Audio Microphones

Las Vegas, NV
Tel: 702-365-5155
Web: www.soundeluxmics.com

Bogen Imaging, Inc.

Ramsey, NJ
Tel: 201-818-9500
Web: www.bogenimaging.us

Bosch Communications Systems

Burbank, CA
Tel: 877-863-4169
Web: www.rtsintercoms.com

BOXX Technologies

Austin, TX
Tel: 512-835-0400
Web: www.boxxtech.com

Brainstorm Multimedia

28008 Madrid, Spain
Tel: +34 91 549 50 03
Web: www.brainstorm.es

Brick House Video

Hampshire, United Kingdom
Tel: +44 (0) 1962 777733
Web: www.brickhousevideo.com

Brightline

Bridgeville, PA
Tel: 724-457-0717
Web: www.brightlines.com

Broadata Communications

Torrance, CA
Tel: 800-214-0222
Web: www.broadatacom.com

Broadcast Software Solutions

Atlanta, GA
Tel: 800-273-4033
Web: www.broadcastsoftware.tv

Broadcast Microwave Services

Poway, CA
Tel: 800-669-9667
Web: www.bms-inc.com

Broadcast Pix

Billerica, MA
Tel: 978-600-1100
Web: <http://www.broadcastpix.com/>

Broadcast Video Systems

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Tel: 905-305-0565
Web: www.bvs.ca

BUF Technology

San Diego, CA
Tel: 858-451-1350
Web: www.buftek.com

Burle Industries

Lancaster, PA
Tel: 800-827-8823
Web: www.burle.com

Burlington A/V Recording Media & Equipment

Oceanside, NY
Tel: 800-331-3191
Web: recordingstore.com

Burst Electronics, Inc.

Albuquerque, NM
Tel: 505-898-1455
Web: www.burstelectronics.com

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Web: www.calrec.com
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Complex

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San Fernando, CA 91340
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E-mail: bctv@cusa.canon.com
Web: www.canonbroadcast.com
Contact: Gordon Tubbs, Dir.

Carl Zeiss Optics

Burbank, CA
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Web: www.digiprimes.com

Cartoni USA

North Hollywood, CA
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Web: www.ste-man.com

C-Cor

Centennial, CO
Web: www.c-cor.com

Celco

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Web: www.celco.com

Century Optics

Van Nuys, CA
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Web: www.schneideroptics.com

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Web: www.chiefnfg.com

Christie, Div. MarathonNorco Aerospace

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Web: www.christiecorp.com

Christie Digital Systems, Inc.

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Web: www.christiedigital.com

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Web: www.cinegy.com

Cinekinetic

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Web: www.cinekinetic.com

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Web: www.clarkwire.com

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Clear-Com

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Web: www.clearcom.com

Cobalt Digital, Inc.

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Web: www.cobaltdigital.com

Communications Engineering

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Web: www.commeng.com

Communications Specialties, Inc.

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Web: www.commspecial.com

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New York, NY
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Components Express

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Web: www.componentsexpress.com

Comprompter News and Automation

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Computer Prompting & Captioning

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Comtek, Inc.

Salt Lake City, UT
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Consoles, IncForecast

Dear Park, NY
Tel: 800-735-2070
Web: www.forecast-consoles.com

Consumer Electronics Assn.

Arlington, VA
Web: www.cesweb.org

Controlware Communications Systems, Inc.

Neptune, NJ
Tel: 732-919-0400
Web: www.cware.com

CPI, Satcom Div.

Palo Alto, CA
Tel: 650-846-3803
Web: www.cpii.com/satcom

CPI, Eimac Div.

Palo Alto, CA
Tel: 800-414-8823
Web: www.eimac.com

Creative Media Products, Inc.

Chapel Hill, NC
Web: www.cmpsales.com

CRISPIN CORP.

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Fax: 919-845-7766
E-mail: welisten@crispincorp.com
Web: www.crispincorp.com
Contact: Brian Gleason



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Cyradis Technology Group

Aurora, ON, Canada
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Web: www.cyradis.com

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da Vinci Systems

Coral Springs, FL
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Web: www.davsys.com

Da-Lite Screen

Warsaw, IN
Tel: 800-622-3737
Web: www.da-lite.com

Daily Electronics

Vancouver, WA
Tel: 800-346-6667
Web: www.dailyelectronics.net

Dalet Digital Media Systems

New York, NY
Tel: 212-825-3322
Web: www.dalet.com

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Singapore, Singapore
Web: www.dayang.com

DAZ Productions, Inc.

Draper, UT
Web: www.daz3d.com

Dedotec USA

Cedar Grove, NJ
Tel: 973-857-8118
Web: www.dedolight.com

Delec

Buttenheim, Germany
Tel: +49 9545 440-0
Web: www.delec.de

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Farmingdale, NJ
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Dielectric Communications

Raymond, ME
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Digigram

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Web: www.digigram.com

Digital Design Group

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Web: www.digitaldesign-group.com

Digital Rapids

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Web: www.digital-rapids.com

Digital Vision

N. Hollywood, CA
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Digital Vision

Solna, Sweden
Tel: +4673-3552-602
Web: www.digitalvision.se

Digital Alert Systems, LLC

Oracle, AZ
Tel: 520-896-0303
Web: www.digitalalertsystems.com

Digital Broadcast

Gainesville, FL
Tel: 352-377-8344
Web: www.digitalbroadcast.com

Directed Perception

Burlingame, CA
Tel: 650-342-9399
Web: www.dperception.com

Discount Video Warehouse

Mt. Prospect, IL
Tel: 800-323-8148
Web: www.dvonline.com

Diversified Systems Intl.

Kenilworth, NJ
Tel: 908-245-4833
Web: www.divsysinc.com

DK-Technologies America, Inc.

Felton, CA
Tel: 800-421-0888
Web: www.dk-technologies.com

DMT USA

West Deptford, NJ
Tel: 856-423-0010
Web: www.dmtonline.us

DNF Controls

Sylmar, CA
Tel: 818-898-3380
Web: www.dnfcontrols.com

Dolby Laboratories, Inc.

San Francisco, CA
Tel: 800-33D-OLBY
Web: www.dolby.com

Doremi Labs

Burbank, CA
Tel: 818-562-1101
Web: www.doremilabs.com

Drastic Technologies

Toronto, ON, Canada
Tel: 416-255-5636
Web: www.drastictech.com

DSC Laboratories

Mississauga, ON, Canada
Tel: 905-673-3211
Web: www.dsclabs.com

DVC Digitalvideo Computing GmbH

Herrsching, Germany
Tel: +49-8152-93010
Web: www.digitalvideo.de

DVS Digital Video, Inc.

Burbank, CA
Tel: +49 511 678070
Web: www.dvsus.com

D.W. Electrochemicals, Ltd.

Richmond Hill, ON, Canada
Tel: 905-508-7500
Web: www.stabilant.com

E

e-mediavision.com

Hounslow, Middlesex, United Kingdom
Tel: 44 208 755 2014
Web: www.e-mediavision.com

E2V Technologies

Elmsford, NY
Tel: 800-DIA-LEEVE
Web: www.e2v.com

Echolab

Billerica, MA
Tel: 978-715-1020
Web: www.echolab.com

EDCOR Electronics

Carlsbad, NM
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Web: www.edcorusa.com

EDIROL

Bellingham, WA
Web: www.edirol.com

Editware

Grass Valley, CA
Tel: 530-477-4300
Web: www.editware.com

EEG Enterprises

Farmingdale, NY
Tel: 516-293-7472
Web: www.eegent.com

Efficient Antenna Systems, Inc.

Clear Lake, IA
Tel: 800-666-9531
Web: www.easisat.com

ELBER S.R.L.

Levi (GE), Italy
Web: <http://www.elber.eu>

Electronic Script Prompting

Willowbrook, IL
Tel: 630-887-0346
Web: www.prompting.com

Electronic Visuals

Woking, Surrey, United Kingdom
Tel: 01483771663
Web: www.electronic-visuals.com

ELECTRONICS RESEARCH, INC.

7777 Gardner Rd.
Chandler, IN 47610-9219
Tel: 812-925-6000
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Web: www.eriinc.com
Contact: David White, Sales Engineer

Electrophysics

Fairfield, NJ
Tel: 800-759-9577
Web: www.electrophysics.com

Electrorack Enclosure Products

Anaheim, CA
Tel: 800-433-6745
Web: www.electrorack.com

Electrosonic

Minnetonka, MN
Tel: 952-931-7500
Web: www.electrosonic.com

Enco Systems

Southfield, MI
Tel: 800-362-6797
Web: www.enco.com

Energex Batteries

Plainview, NY
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Web: www.energexbatteries.com

Ensemble Designs

Grass Valley, CA
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Web: www.ensembledesigns.com

Ensequence

Portland, OR
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Web: www.ensemble.com

Envivio

San Francisco, CA
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Web: www.envivio.com

ESE

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El Segundo, CA 90245
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E-mail: ese@ese-web.com
Web: www.ese-web.com

Euphonix

Palo Alto, CA
Tel: 650-855-0400
Web: www.euphonix.com

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Web: www.evertz.com
Contact: Orest Holyk

EVS Broadcast Equipment

Ougree, Belgium
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Web: www.evs.tv

Extron Electronics

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Web: www.extron.com

Eyeheight Ltd.

Watford, Hertfordshire, United Kingdom
Tel: 866 469 2729

F

Faraday Technology Ltd.

Newcastle, Staffordshire, United Kingdom
Tel: +44 178 2661501
Web: www.faradaytech.co.uk

Fast Forward Video

Irvine, CA
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Web: www.ffv.com

Fischer Connectors

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Flash Technology

Franklin, TN
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Web: www.flashtech.com

Floral Systems, Inc.

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Web: www.floral.com

Fluke

Everett, WA
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Web: www.fluke.com

Focus Enhancements

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For-A

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Tel: 352-371-1505
Web: www.for-a.com

Fortel DTV

Duluth, GA
Tel: 800-530-5542
Web: www.fortelDTV.com

Frezzi Energy Systems, Div. of Frezzolini Electronics, Inc.

Hawthorne, NJ
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Web: www.frezzi.com

Front Porch Digital

Louisville, CO
Tel: 303-926-5871
Web: www.fpdigital.com

Frontline Communications

Clearwater, FL
Tel: 727-573-0400
Web: www.frontlinecomm.com

Fuji Film USA, Inc., Recording Media Div.

Valhalla, NY
Tel: 800-755-3854
Web: www.fujifilmusa.com

Fujinon

Wayne, NJ
Tel: 972-385-8902
Web: www.fujinon.com

G

Gee Broadcast Systems

Basinstoke, Hants, United Kingdom
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Gefen

Chatsworth, CA
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Web: www.gefen.com

GE/Intl. Fiber Systems

Newtown, CT
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Web: www.ifs.com

GENESIS NETWORKS

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New York City, NY 10119
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Fax: 212-962-1610
E-mail: bneal@gen-networks.com
Web: www.gen-networks.com
Contact: Brittany Neal, Mktg..Bus. Dev. VP

Gennum, Video Products Div.

Burlington, ON, Canada
Tel: 905-632-2996
Web: www.gennum.com

Gepeco Intl., Inc.

Des Plaines, IL
Tel: 800-966-0069
Web: www.gepeco.com

Gerling & Associates

Sunbury, OH
Tel: 740-965-2888
Web: www.gerlinggroup.com

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Glidecam Industries

Kingston, MA
Tel: 800-600-2011
Web: www.glidecam.com

Globalstor Data Corp.

Chatsworth, CA
Tel: 818-701-7771
Web: www.globalstor.com

Graham-Patten Systems

Grass Valley, CA
Tel: 888-622-4747
Web: www.gpsys.com

Grass Valley, Inc.

Nevada City, CA
Tel: 800-547-8949
Web: www.thomsongrassvalley.com

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Toll Free: 800-231-9673
Web: www.broadcast.harris.com

Harrison by GLW, Inc.

Nashville, TN
Tel: 615-641-7200
Web: www.glw.com

Hewlett-Packard, Rack & Power Infrastructure Group

Houston, TX
Tel: 800-786-7967
Web: www.hp.com/go/infrastructure

HHB Communications

Simi Valley, CA
Tel: 805-579-6490
Web: www.hhbusa.com

Hi Tech Systems

Basingstoke, Hants, United Kingdom
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Web: www.vtrcontrol.com

HM Electronics, Inc.

Poway, CA
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Web: www.hme.com

Holophone

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Horita

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Web: www.horita.com

Hosa Technology, Inc.

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Web: www.hosatech.com

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Web: www.hotronics.com

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Web: www.iconixvideo.com
Contact: Linda Weaver, Sls.

IDX System Technology

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Web: www.idx.tv

IFS GE

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Web: www.ifs.com

Ikegami

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Image Video

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Imagine Products

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Web: www.imagineproducts.com

Innovision Optics

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Intelsat

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Interlink Equipment Brokering

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Iptek

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ISIS Group

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Web: www.isis-group.com

J

Jampro Antennas, Inc.

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Web: www.jampro.com

JBL Professional

Northridge, CA
Tel: 818-895-3403
Web: mgander@harman.com

JDSU

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Web: www.jdsu.com

JVC Professional Products Co.

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Tel: 800-526-5308
Web: www.pro.jvc.com

K

K-Will

Torrance, CA
Tel: 949-553-9701
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K5600, Inc.

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Web: www.k5600.com

KAE

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Web: www.kaecorp.com

Kathrein Scala Div.

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Web: www.kathrein-scala.com

Keywest Technology

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Klein+Hummel USA

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Klotz Digital Audio Systems, Inc.

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Web: www.klotzdigital.com

Knox Video Technologies

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Konan Digital, Inc.

Glendale, CA
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Kramer Electronics

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KTech Telecom

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Web: www.lairdtelemedia.com

Larcan USA

Lafayette, CO
Tel: 303-665-8000
Web: www.larcan.com

Lawo North America

Toronto, PQ, Canada
Tel: 888-810-4468
Web: www.lawo.ca

Leader Instruments

Cypress, CA
Tel: 800-645-5104
Web: www.leaderusa.com



Leightronix

Holt, MI
Tel: 800-243-5589
Web: www.leightronix.com

Lightware, Inc.

Denver, CO
Tel: 800-211-9001
Web: www.lightwareinc.com

Linear Acoustic

Lancaster, PA
Tel: 888-292-3117
Web: www.linearacoustic.com

Link Electronics, Inc.

Cape Girardeau, MO
Tel: 573-334-4433
Web: www.linkelectronics.com

Link Research

Tolpits Lane, Watford, United Kingdom
Tel: +44-1923-474 060
Web: www.linkres.co.uk

Listec Video

West Palm Beach, FL
Tel: 561-683-3002
Web: www.listec.com

Litepanels, Inc.

North Hollywood, CA
Tel: 818-752-7009
Web: www.litepanels.com

Logitek Electronic Systems

Houston, TX
Tel: 800-231-5870
Web: www.logitekaudio.com

Lowel Light

Brooklyn, NY
Tel: 800-334-3426
Web: www.lowel.com

LS Telcom AG

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Tel: +49-7227-9535-600
Web: www.lstelcom.com

L-3 Communications Electron Devices

Williamsport, PA
Tel: 888-861-1843
Web: www.l-3com.com/edd

Luxology

San Mateo, CA
Web: www.mod03d.com

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M Klemme Technology

Vista, CA
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Web: www.mklemme.com

MagicBox, Inc.

Corvallis, OR
Tel: 541-752-5654
Web: www.magicboxinc.com

Markertek Video Supply

Saugerties, NY
Tel: 800-522-2025
Web: www.markertek.com

MARSHALL ELECTRONICS, INC.

1919 E. Maple Ave.
El Segundo, CA 90245
Tel: 310-333-0606
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Fax: 310-333-0688
E-mail: sales@lcdcracks.com
Web: www.lcdcracks.com

Martinsound

Alhambra, CA
Tel: 800-582-3555
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Masstech Group, Inc.

Richmond Hill, ON, Canada
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Web: www.masstech.com

Masterclock

St. Charles, MO
Tel: 800-940-2248
Web: www.masterclock.com

MATCO

MATCO
Los Gatos, CA
Tel: 800-348-1843
Web: matco-video.com

Matrox Electronic Systems, Video Products Group

Dorval, PQ, Canada
Tel: 800-361-4903
Web: www.matrox.com/video

Maxell

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Tel: 800-533-2836
Web: www.maxellpromedia.com

MCG Surge Protection

Deer Park, NY
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Web: www.mcgsurge.com

Medea

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New York, NY
Web: www.liveshots.com

Media Computing

Cave Creek, AZ
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Web: www.mediacomputing.com

Media Concepts

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Tel: 918-252-3600
Web: www.mediaconcepts.tv

Mediaproxy Pty., Ltd.

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Web: www.mediaproxy.com

Micro Communications

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Web: www.mcibroadcast.com

MicroFirst

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Tel: 201-651-9300
Web: www.microfirst.com

Microwave Radio Communications

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Tel: 978-671-5700
Web: www.mrcbroadcast.com

Microwave Service Co.

Haverhill, MA
Tel: 978-556-0970
Web: www.microwaveservice.com



Middle Atlantic Products, Inc.

Middle Atlantic Products

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Web: www.middleatlantic.com

Miller Camera Support

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Web: www.millertripods.com

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Web: www.miranda.com

Miteq

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Web: www.miteq.com

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Web: www.mixedsignals.com

Modulation Sciences, Inc.

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Web: www.modsci.com

Modulus Video

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Tel: 408-245-2159
Web: www.modulusvideo.com

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Web: www.mohawk-cable.com

Motorola

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Tel: 800-225-9446
Web: www.motorola.com/iptv

Moviola

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Tel: 800-468-3107
Web: www.moviola.com

MTI Film

Hollywood, CA
Tel: 401-831-1315
Web: www.mtifilm.com

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Video & Fiber Optic Systems

Multidyne Video & Fiber Optic Systems

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Web: www.multidyne.com

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Web: www.myat.com

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N Systems, Inc.

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Web: www.nsystems.com

Narda Safety Test Solutions

Hauppauge, NY
Tel: 631-231-1700
Web: www.narda-sts.us

National TeleConsultants

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Web: www.ntc.com

NaturalMotion, Ltd.

Oxford, United Kingdom
Web: www.naturalmotion.com

ND SatCom

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Tel: +49-7545-939-7100
Web: www.ndsatcom.com

Nemal Electronics Intl.

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Web: www.nemal.com

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Web: www.network-electronics.com
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Web: www.sennheiserusa.com

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Fax: 530-265-1021
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Contact: Doug Buterbaugh, Director of Sales

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Web: www.omnibus.tv

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E-mail: sales@opticomm.com
Web: www.opticomm.com
Contact: Allon Caidar, Bus. Dev. VP

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Web: www.panasonic-broadcast.com

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Pebble Beach Systems

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Web: www.pharos-comms.com

Pipo Communications

Hollywood, CA
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Web: www.pipo.cc

Pixel Corps

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Tel: 415-495-4775
Web: www.pixelcorps.com

Pixel Instruments

Los Gatos, CA
Web: www.pixelinstruments.tv

Pixelan Software

Bellingham, WA
Tel: 360-647-0112
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Pixelmetrix NA

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Tel: 866-749-3587
Web: www.pixelmetrix.com

Planar Systems, Inc. (formerly Clarity Visual Systems)

Beaverton, OR
Tel: 866-475-2627
Web: www.planarcontrolroom.com

PNY Technologies

Santa Clara, CA
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Web: www.pny.com/products/quadro

Pomona Electronics

Everett, WA
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Prime Image

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Web: www.primeimageinc.com

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Fax: 631-549-5141
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Web: www.pro-bel.com
Contact: Terry Barnum, US Sls.

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Professional Communications Systems, Inc.

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Web: www.pcomsys.com

Propagation Systems, Inc.

Ebensburg, PA
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Web: www.psbroadcast.com

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Quantel

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Web: www.quantel.com

Quintech Electronics

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Web: www.quintechelectronics.com



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E-mail: salesteam@qustream.com
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Rack Release Systems

Arcadia, CA
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Web: www.rackrelease.com

Radian Communication Services

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Tel: 905-339-4059
Web: www.radiancorp.com

Radio Frequency Systems GmbH

Hannover, Germany
Web: www.rfsworld.com

Radyne

Phoenix, AZ
Tel: 602-437-9620
Web: www.radn.com

Rane

Mukilteo, WA
Tel: 425-355-6000
Web: www.rane.com

Replica Technology

North Collins, NY
Tel: 716-337-0621
Web: www.replica3d.com

RF Central

Carlisle, PA
Tel: 717-249-4900
Web: www.rfcentral.com

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E-mail: sales-us@riedel.net
Web: www.riedel.net
Contact: Michael Descoteau, Sls.

Rohde & Schwarz

Columbia, MD
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Web: www.rohde-schwarz.com/usa

Roscor

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Tel: 800-843-3679
Web: www.rosacor.com

Roscor Interlink

Mt. Prospect, IL
Tel: 800-524-9982
Web: interlink.rosacor.com

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Web: www.rosacor.com

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Web: www.rosacor.com

Roscor Wisconsin

Milwaukee, WI
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Web: www.rosacor.com

Ross Video, Ltd.

Iroquois, ON, Canada
Tel: 613-652-4886
Web: www.rossvideo.com

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Spokane, WA
Tel: 800-270-7050
Web: www.s2one.com

Sabre Towers & Poles

Lansdale, PA
Tel: 800-369-6690
Web: www.sabrecom.com

Sachtler

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Tel: 888-284-6836
Web: www.sachtler.us

SAMMA Systems

New York, NY
Tel: 212-738-9417
Web: www.sammasystems.com

Sandeann Industries

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Web: www.sandeann.com

ScheduALL

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Web: www.scheduall.com

Schneider Optics

Van Nuys, CA
Tel: 818-766-3715
Web: www.schneideroptics.com

Scientific-Atlanta

Lawrenceville, GA
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Web: www.scientificatlanta.com

Scopus Video Networks

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Web: www.scopus.net

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Web: www.screen.it
Contact: Gianluca Baccalini, Mr.

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Sioux Falls, SD
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Web: www.sencore.com

Sennheiser Electronic

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Web: www.sennheiserusa.com

Serious Magic

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SES Americom

Princeton, NJ
Tel: 800-273-0329
Web: www.ses-americom.com

SF Video

San Francisco, CA
Tel: 800-545-5865
Web: www.sfvideo.com

SGT

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Web: www.sgt.eu

Shepherd Systems, Inc.

Monterose, CA

Shook Mobile Technology, LP

Schertz, TX
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Web: shook-usa.com

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Web: www.shotoku-usa.com

Shotoku Broadcast Systems

Torrance, CA
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Web: www.shotoku.tv

Shure

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Tel: 800-257-4873
Web: www.shure.com

Sierra Automated Systems

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Web: www.sasaudio.com

Sierra Design Labs

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Sierra Video Systems

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Signal Transport

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Sintel - Systems Intl.

Tampa, FL
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Reading, Berks, United Kingdom
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Web: www.softel.co.uk

Software Generation

Southampton, United Kingdom
Tel: +44-238-0233322
Web: www.sgluk.com

Solid State Logic

Begbroke, Oxford, Oxon, United Kingdom
Tel: 44 1865 842300
Web: www.solid-state-logic.com

Solid State Logic

New York, NY
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Web: www.solidstatellogic.com

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Sony Creative Software, Inc.

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Sound Devices

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Soundfield USA

Las Vegas, NV
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Web: www.soundfieldusa.com

Spencer Technologies

Burbank, CA
Tel: 888-246-4127
Web: www.spencer-tech.com

Staco Energy Products

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Web: www.stacopower.com

Stagetec

Berlin, Germany
Tel: +49 951 972 25 25
Web: www.stagetec.com

Stainless, Inc.

Irving, TX
Tel: 972-550-9500
Web: www.spectrasite.com

Stainless LLC

North Wales, PA
Tel: 800-486-3333
Web: www.stainlessllc.com

Stantron

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Statmon Technologies

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Steadystick GmbH

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Web: www.moviestick.de

Stratos Intl.

Chicago, IL
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Seattle, WA 98121
Tel: 206-956-0544
Fax: 206-956-0570
E-mail: sales@streambox.com
Web: www.streambox.com
Contact: Tim Heiner, Director of Sales

Studer USA, Harman Pro North America

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Web: www.studer.ch

Studio Exchange

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Web: www.sundancedigital.com
Contact: Rick Stora, Product Manager

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Switchcraft, Inc.

Chicago, IL
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Symetrix Audio

Mountain Terrace, WA
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Web: www.symetrixaudio.com

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Web: www.synthesysresearch.com

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Web: www.syphaonline.com

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Systems Wireless

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Web: www.swl.com

T

T-Systems Media & Broadcast

Freiburg, Germany
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Web: www.t-systems-mediabroadcast.com

T.Z. Sawyer Technical Consultants

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Web: www.tzsawyer.com

TAI Audio

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TASCAM

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Teamcast

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Techni-Tool, Inc.

Worcester, PA
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Web: www.techni-tool.com

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Tektronix

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Television Systems, Ltd.

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Telex Communications

Burnsville, MN
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Web: www.telex.com

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Terayon Communication Systems

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Thales Components

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Thomson Content Security

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360 Systems

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TV Magic

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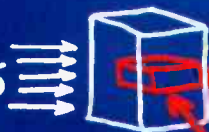
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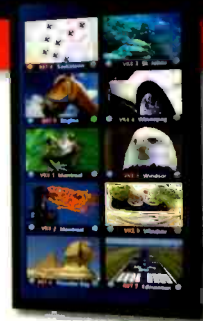
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