A supplement to Broadcast Engineering - December 2002

Broadcast Engineering®

THE JOURNAL OF DIGITAL TELEVISION

Buyers Guide and Web Reference 2003

A PRIMEDIA PUBLICATION

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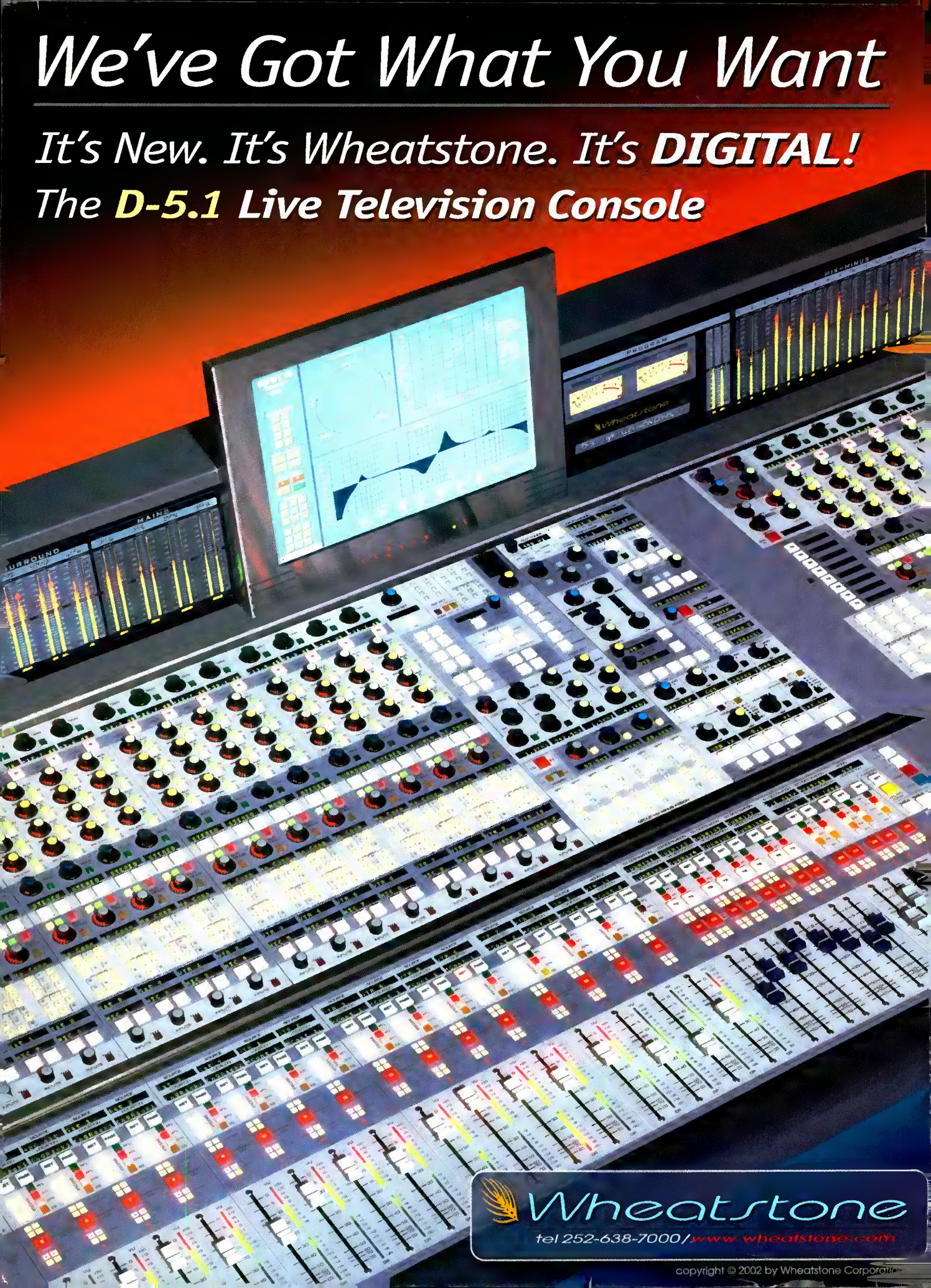

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BroadcastEngineering

This year's newly designed *Broadcast Engineering Buyers Guide* is packed with even more information than last year. The "Product Directory" section features hundreds of listings divided into categories to make it easy to find the product you need for your digital transition. Phone numbers are included with these listings for easy reference.

For detailed contact information on more than 400 manufacturers and dealers, including Web addresses, turn to the "Manufacturers/Dealers Addresses" section on page 85. If it's systems integration services you need, systems integrators are grouped together on page 97.

The Excellence Awards are back and even stronger this year. Turn to page 45 to view this year's entries. Seeing how these companies handled the challenges associated with their new facilities may give you ideas you can implement in your own projects.

Vote for your favorite installation at our Web site, www.broadcastengineering.com. We'll announce the winners in our March issue and award plaques to the winners at NAB2003. Readers that vote online will be eligible for a drawing of *Broadcast Engineering* T-shirts.

Laura Collins

Laura Collins,
associate editor

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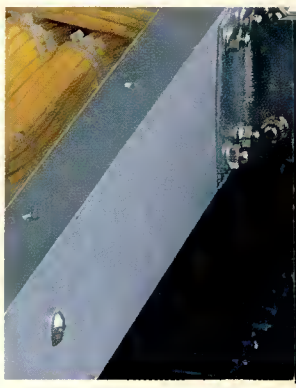
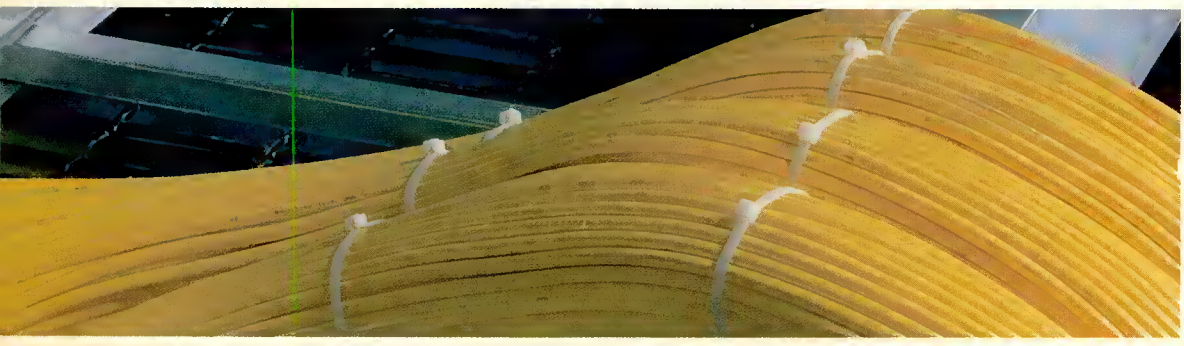
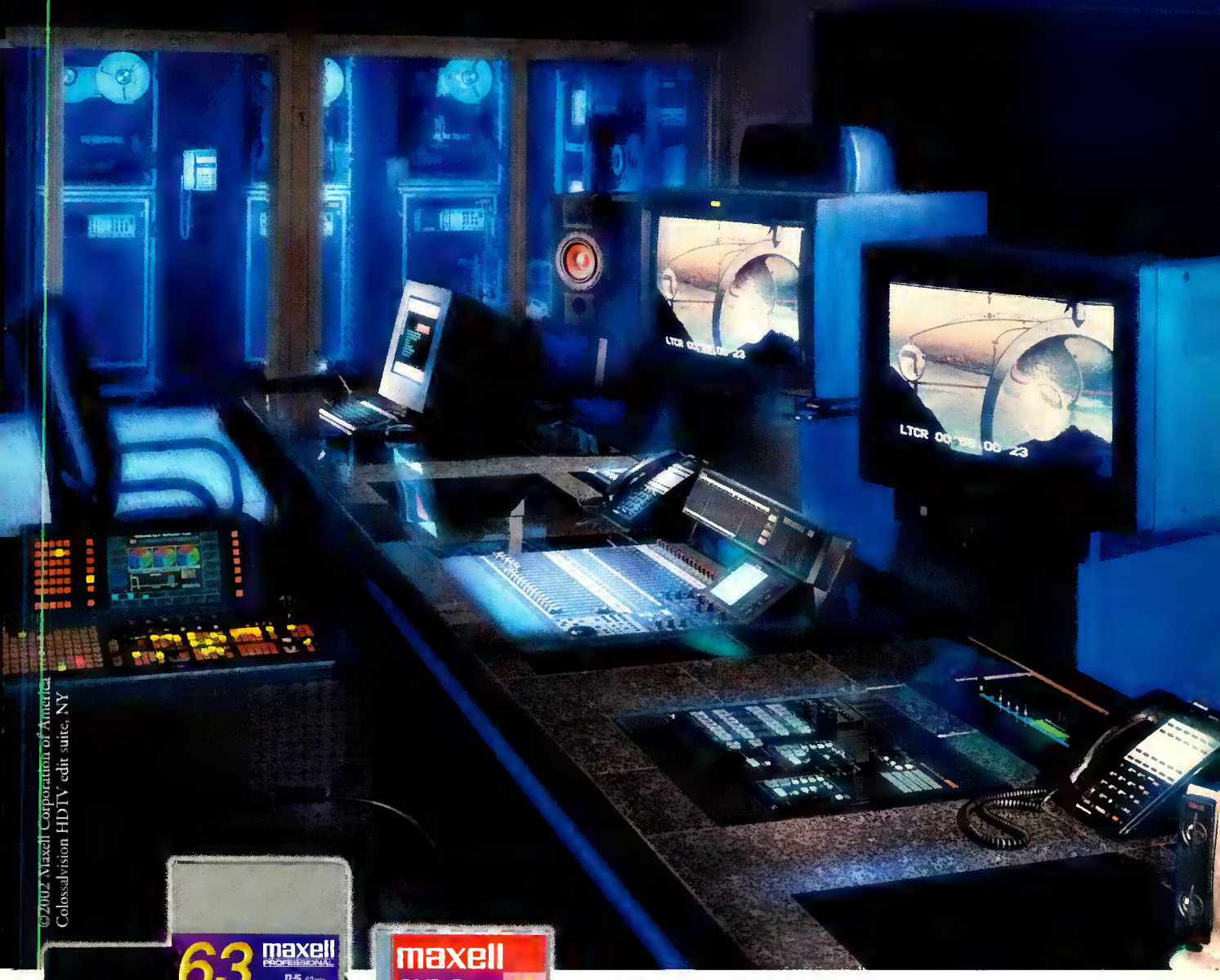




ON THE COVER: (clockwise from top left) MER-2 1024x1024 serial component digital router at Echostar in Cheyenne, WY (photo courtesy AZCAR); cabling at Echostar's Cheyenne facility (photo courtesy AZCAR); Dielectric's TUV-M dualband antenna; portion of a headend using Minerva Networks products; Solid State Logic's Avant Film/Post Plus digital console at Soundtrack's Studio F (photo by Dave King).

What company creates advanced media for the new and emerging technologies?



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Product Index

In this section, main categories and subcategories from the Product Directory are listed alphabetically to take you right to the page you need for the product you want. The main categories are highlighted in red. The page numbers on subcategories will take you to the first page of the main category they are listed under (ex. speakers are listed under Audio Accessories). □

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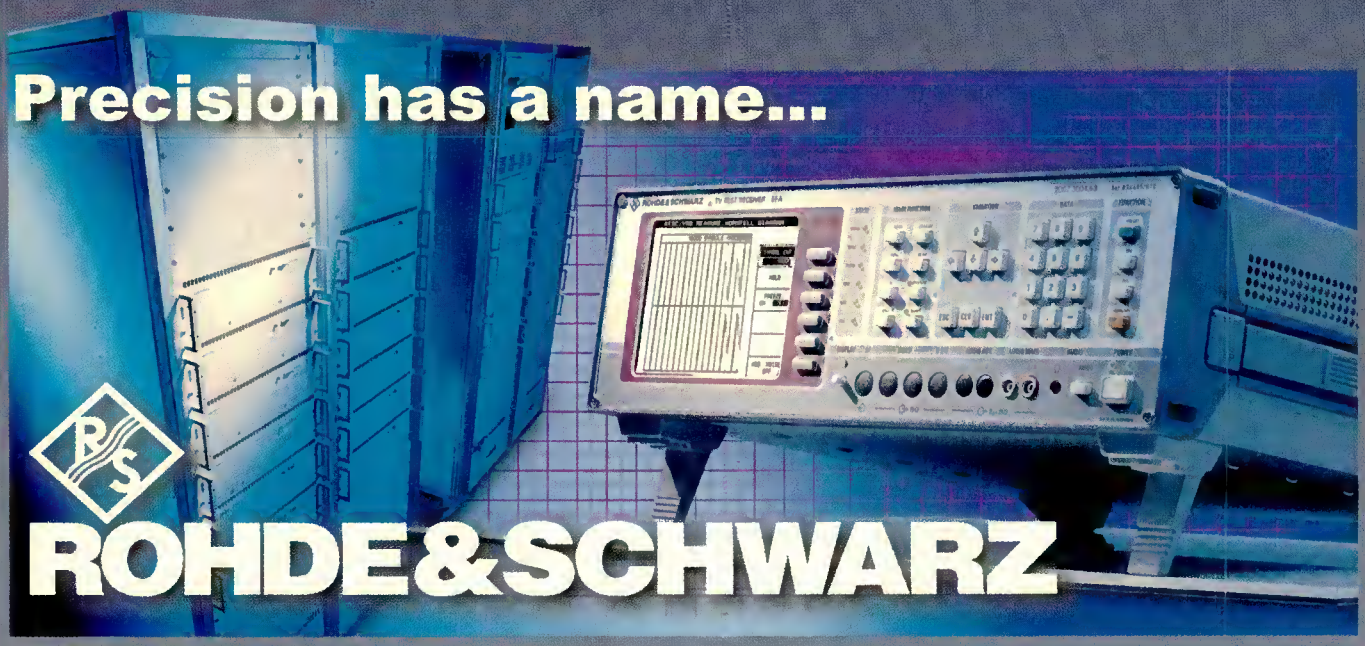
Web: www.bms-inc.com



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sci-worx GmbH
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Summit Audio
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Teklogic
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Roscor
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Teklogic
818-610-3527

TeraTek Software
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360 Systems
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Audio Routing

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Aphex Systems
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ATI-Audio Technologies Inc
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Audioarts Engineering
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SDA 8400 rack-mount stereo DA

Auditronics
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AutoPatch
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ADC-24; DAC-24

Benchmark Media Systems
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DK-Audio A/S
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ESE
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Fairchild Semiconductor International
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FOR-A
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Hotronic
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Image Video
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Kae
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Kings Electronics
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Klotz Digital America
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Chameleon 64i switcher; Chamleon 256 HB switcher

Kramer Electronics
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ShooTView
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Sigma Electronics
717-569-2681; 866-569-2681

Snell & Wilcox
408-260-1000; 800-827-4544

Stagetec
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Nexus Star digital router

Teklogic
818-610-3527

TeleCast Group AS
+47 33 44 72 00
NTP 625 and NTP 677 audio systems

Telford Technical Research
+44 1932 564 063

Thomson Grass Valley
530-478-3000; 800-824-8949
7500 WB wideband routing matrix

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801-575-8801
Utah-400, Utah-300, Utah-200

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AIRO content manager

Omneon Video Networks
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Omnibus Systems
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ParkerVision
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PVTV station for news; PVTV Studio News; PVTV Learning

Quantel
203-972-3199
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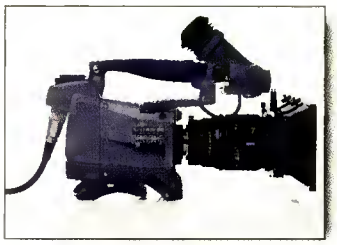

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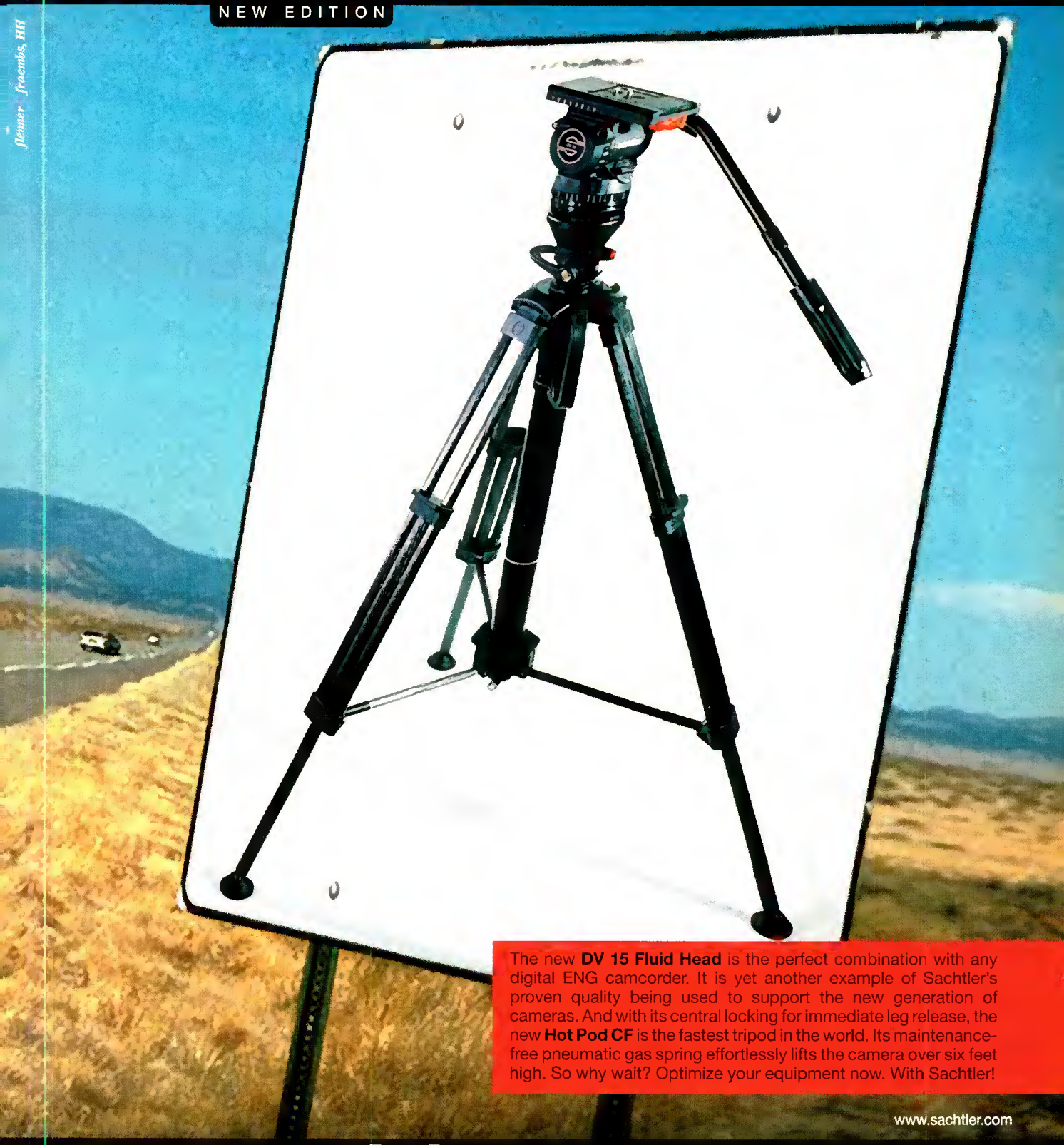

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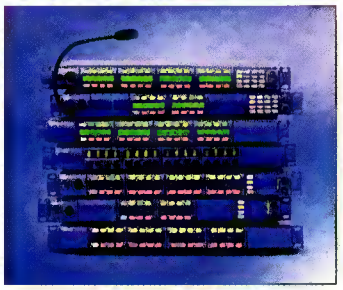

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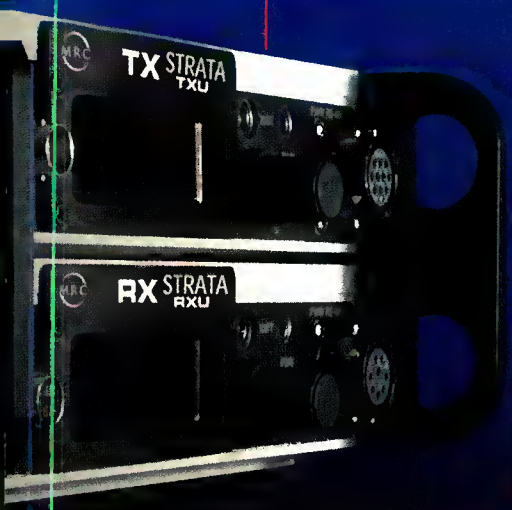

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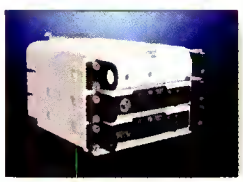

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BitPack-SD pre-mastering workstation

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DVC Digitalvideo Computing GmbH
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Laird Telemedia
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Access TV/interactive VOD/broadband services delivery system

Logic Innovations
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Medea
818-597-7645; 888-BYMEDEA
Streamraid RAID array

Media Computing
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Miranda Technologies
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Allégro range of streaming encoders/servers

Omneon Video Networks
408-585-5100; 866-861-5690
MediaServer; Media Server system

ParkerVision
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PVTV Station For News

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RTI
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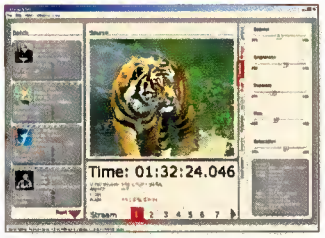
Thomson Grass Valley



Aqua

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Aqua Internet encoder

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Skyscraper interactive

Video Design Software
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ViewCast
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Vsoft
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Zapex Technologies
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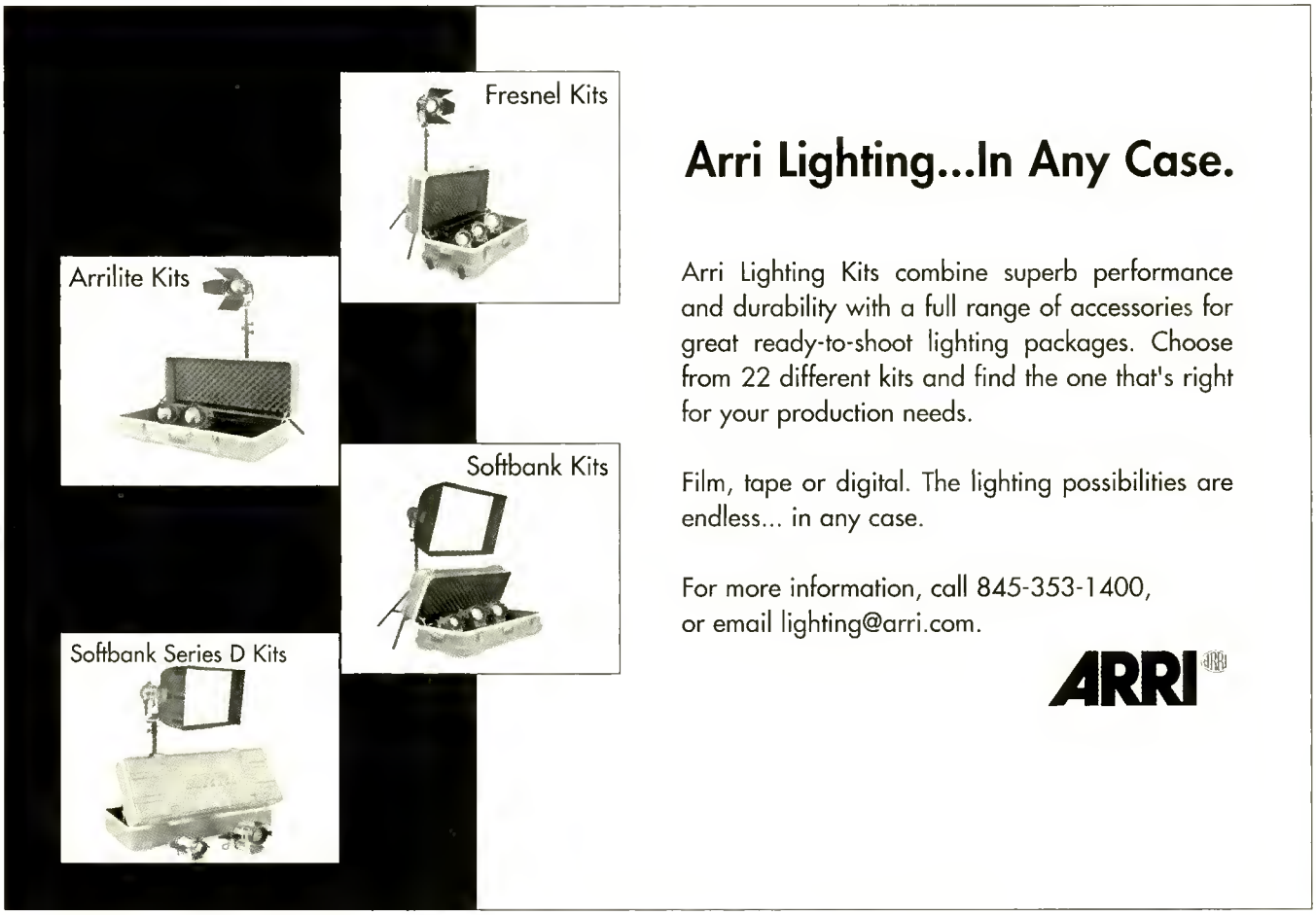

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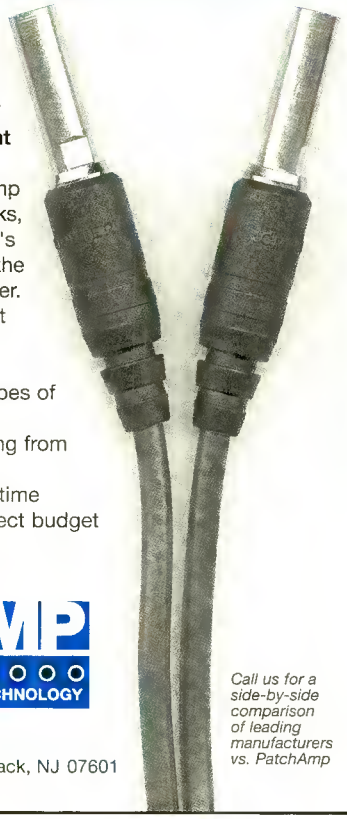

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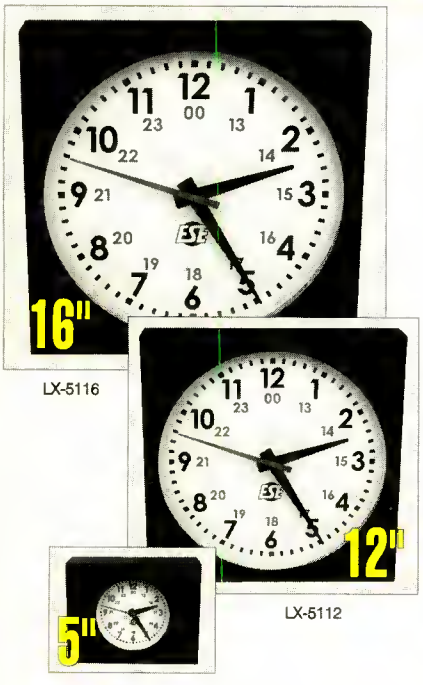

LX-5116

LX-5112

LX-5105

The LX-"5100" Series can read Time Code (ESE, SMPTE/EBU & ASCII), as well as operate as Stand-Alone or Impulse Clocks. These clocks are loaded with many features, here's just a few...

FEATURES:

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- Time Zone Offset
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CPI – Satcom Division
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Data Check
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Dolby Laboratories
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DSC Labs
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Avenue 5400 and 7405

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Extron Electronics
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Gepco
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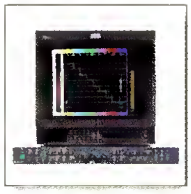
Hamlet Video International



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DigiScope

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Holaday Industries
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Ktech Telecom
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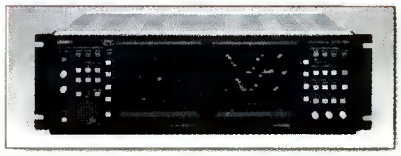
DVM-100 opt 25 8-VSB professional reference receiver

Leader Instruments



LV5170D
714-527-9300; 800-645-5104
LV5170D HD/SD waveform

LeCroy
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Leitch
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5 PG-1313N NTC master sync pulse generator

Magni Systems
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Rane
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Product Directory

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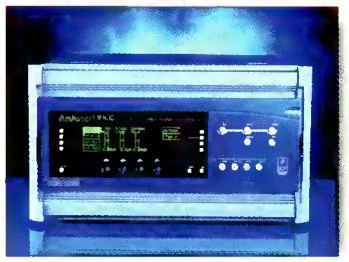

Archangel

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Softel USA
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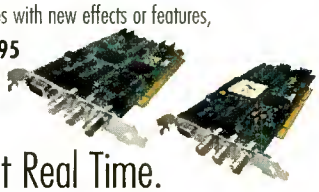

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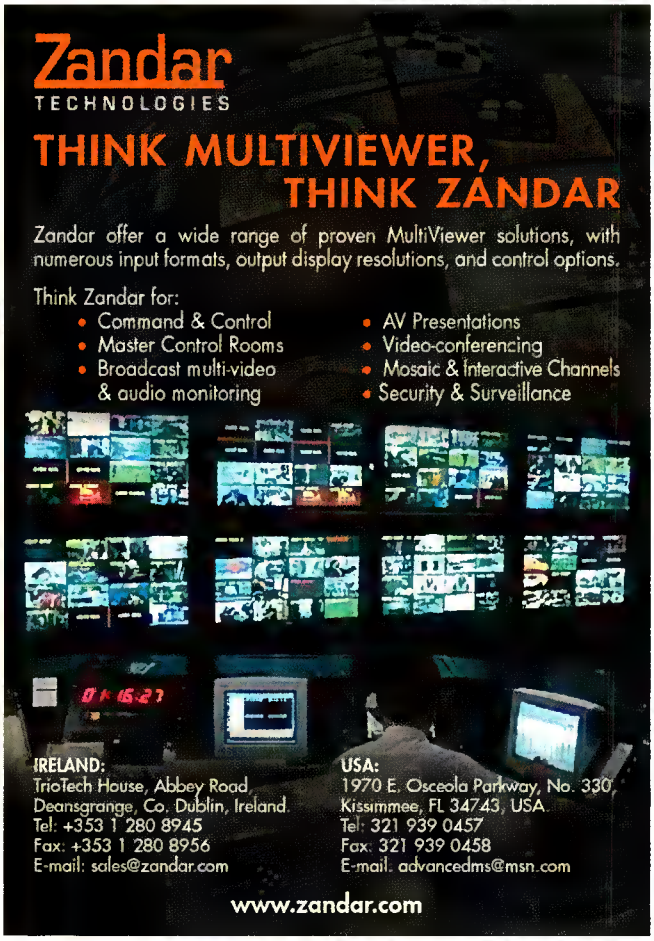

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Omneon Video Networks
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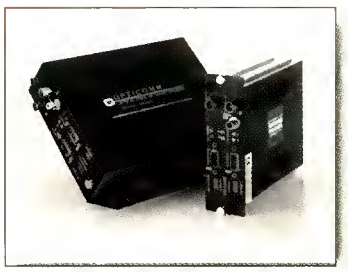

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SGI (Silicon Graphics Inc)
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sci-worx GmbH
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Teranex
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TV One Multimedia Solutions
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Videotek
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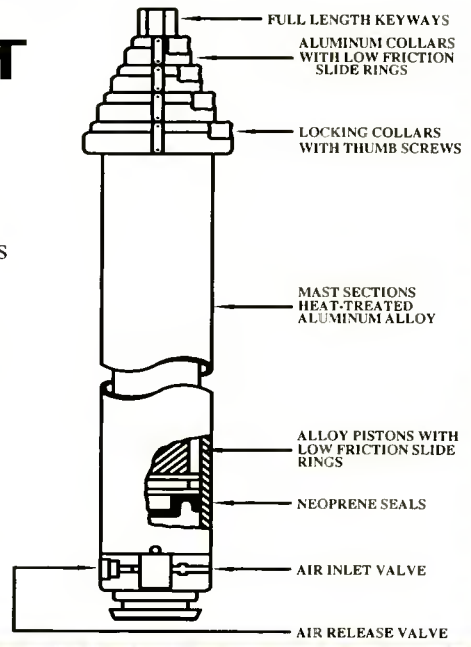

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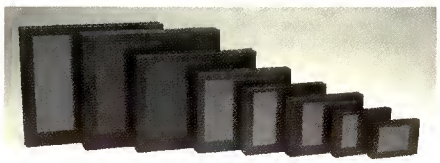

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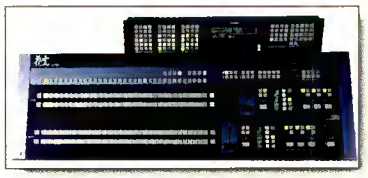

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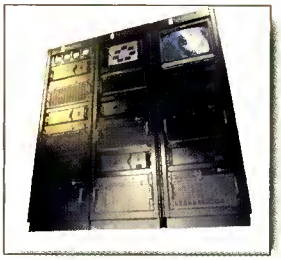

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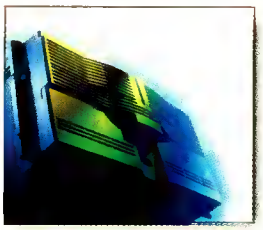

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2nd Annual Excellence Awards

34 top facilities
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Readers vote and win

2nd Annual Excellence Awards

We're proud to present the second annual *Broadcast Engineering* Engineering Excellence Awards. These awards recognize innovation, quality design and construction of production and broadcast facilities. This year's entries include 34 examples of leading-edge facilities from around the world. From audio to TV to satellite , these facilities represent some of the best work of today's top systems integrators and equipment manufacturers.

Broadcast Engineering readers will help select this year's winners . You are encouraged to review the facilities highlighted here and then go to the *Broadcast Engineering* Web site and vote for your favorite installations. Go to www.broadcastengineering.com, click on the *Engineering Excellence Awards* icon and vote for your selections.

When voting, consider how well the systems integrator and facility exhibit the following design and application issues:

- Originality/innovation of new or existing techniques
- Complexity of the project
- Presentation, visual attractiveness
- Meeting owner/client goals

Readers win, too!

Readers who vote and then enter their e-mail address will be eligible for a drawing of *Broadcast Engineering* T-shirts. Only one entry per reader please. To be eligible for the T-shirt you must provide an e-mail address.

Readers can vote until Jan. 20, 2003. The winning facilities will be announced in the March 2003 NAB preview issue of *Broadcast Engineering* and the **Engineering Excellence Awards** will be presented to the winners at the NAB convention.

So read, vote and win!

Brad Dick

Brad Dick, editorial director

This Year's Entries

WCNY-TV 47
KUVO-TV 49
KPSP-TV 50
NBC's ShareCasting system 51
WHKY-TV 52
CanWest Global 53
Telefutura operations center 54
HAWK-TV 55
WHRO-TV 57
Cisco Systems 58
KICU-TV and KTVU-TV 59
WEWS-DT 61
EBU Washington 62
KASN-TV 63
The XM Satellite Radio System 64
CNN International 65
WWSB-TV 66
Danish Broadcasting 67
WAGM-TV 68
WJLA-TV and NewsChannel 8 audio 69
RNC's NY command center 70
WBBH-TV 71
ABC Nightline 72
Telecentro/RNN - Dominican Republic 73
WCAX-TV 74
Turner Entertainment Networks 75
WCBD-TV 76
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KMEX-TV 78
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Starz Encore Group 80
WALA-TV 81
MTV Networks' Central Facilities 82
France Télévisions Publicité 83

WCNY-TV

With the broadcast industry continuing its move toward DTV implementation, Syracuse, NY-based WCNY had some vendor and implementation decisions to make – quickly. Faced with a Nov. 1, 2002, deadline to provide a DTV feed to the local cable operator, WCNY made the decision to work with Leitch to implement a turnkey DTV system with Leitch's AgileVision at the core. In a record four-day installation, commissioning and operator training deployment, WCNY was able to successfully meet its deadlines for a demonstration to its board of directors and for provision of its DTV cable feed.

WCNY needed a system that would allow it to transmit its multiple-channel, standard-definition content from 6 a.m. to 7 p.m., as well as the PBS network's high-definition feed after 7 p.m. Requirements included local HD logo overlays for branding purposes and storage of off-satellite HD feeds for later playback and branding. The multiple-channel SD content consisted of two feeds from the PBS satellite network feed and one locally generated NTSC feed that was to be MPEG-2/ATSC-encoded and statistically multiplexed with the other SD content. With future plans to encode more local content and originate data broadcasting applications, WCNY needed an extensible platform that would allow expansion in a seamless fashion.

Leitch's AgileVision system was chosen for its ability to help WCNY achieve its objectives in an operations-friendly and straightforward way. Because the system allows for processing of SD and HD signals while they are still in the MPEG-2 compressed domain ("flow through MPEG-2 master control"), WCNY was able to avoid a costly investment in SD and HD decoders, traditional baseband video master control switchers and routers, MPEG-2 real-time encoders, and re-multiplexing systems. Additionally, given the multiplexed nature of MPEG-2 signals, the station cabling was reduced dramatically in comparison to a traditional baseband system.

With the AgileVision industrial- and defense-grade platform, real-time MPEG-2 encoders and over 1.5TB of storage were integrated natively onto the 9RU rack-mount platform. The combination of flow-through MPEG-2 master control and the integrated nature of the AgileVision system ("DTV in a box") enabled WCNY to avoid considerable complexity, capital investment and operational expenses, and ultimately accelerated "time to air" on a constrained budget.

Along with the AgileVision system, WCNY deployed the following additional systems in preparation to go on-air with DTV: Leitch's NEO platform, which includes the 8x1 SDI and HD-SDI NSM-8x1SHD routing switcher, and a Sencore HD decoder with ASI input for monitoring purposes.

Public broadcasting was introduced to central New York on Dec. 20, 1965, when WCNY-TV signed on the air. Today, WCNY operates three FM stations and a 24-hour cable channel in addition to its WCNY-TV station.

Leitch provides design, development and distribution of high-performance audio and video infrastructure to the professional video industry.

Design Team

WCNY:
- John Duffy, vice president of engineering
- Ernest Darrh, engineering technician
- Steve White, engineering technician
- Terry Long, engineering technician

Leitch:
- Robert Millis, engineering and project manager
- Brent Lyon, customer support

Equipment List

- Leitch AgileVision system
- Leitch NEO 3RU infrastructure platform
- Sencore HD decoder

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KUVO-FM

Administrated by the non-profit corporation known as Denver Educational Broadcasting, KUVO-TV reflects its commitment to cultural diversity. The multicultural programming, outreach and public service are geared to emphasize the Chicano/Hispanic experience. Located at 89.3 on the Denver dial, the station provides healthy doses of Salsa, Latin and Blues music with its core being contemporary and classic jazz.

Known as Denver's "Jazz oasis in the city," the station is one of only nine full-time jazz stations in the nation. While a National Public Radio affiliate for fifteen years, KUVO has grown both in listener support and technologically.

The station has taken the long-standing premise of live jazz being the core of their programming. A bi-monthly offering, Performance Studio, presents jazz artists and trailblazers in live studio performances. From pianist/composer Billy Taylor and the Dirty Dozen Brass Band to the new guard of Medeski Martin and Wood, KUVO is outpaced in sheer number of studio performances only by Boston's WBGO. Recently, KUVO completed a full digital plant conversion including a Nautel transmitter, Logitek Numix digital consoles, Shiveley antenna, a Harris digital microwave and an Omnia FM Veris processor from Cutting Edge among its major components.

In addition, Neumann microphones have been a significant part of the station's on-air sound for many years, according to Mike Pappas, KUVO's chief engineer. It was on the suggestion of an associate that KUVO tried the KMS 105 for live broadcasts.

Pappas and the KUVO staff were so impressed with the KMS 105 that it soon replaced another industry standard microphone used by their on-air announcers for the past 10 years.

KUVO records all of its live performances via Genex Direct Stream Digital recorder and Midas Venice 320 console. These recordings are compiled into a "best of" compilation CD and are used as premium member donation incentives. Pappas emphasized that the necessary support from national and regional artists is what keeps the station going.

The KUVO commitment to quality programming and on-air sound is reflected in its extensive collection of both Neumann and Sennheiser microphones. Neumann KM 184s find duty on guitars along with M 147s on reed instruments. M 149s are often used on vocalists, while U 87ai's and 105s are used for announcers.

TLM 103s are also part of the house microphone complement. As for instruments, the station has used the Neumann KU 100 dummy head to mic drums and has been delighted with the results. Other Sennheiser mics include five of the recently introduced MKH 800s, MKH 20s on drum overheads and MKH 60s on saxophones. Sennheiser HD 25 and HMD 25 headphones are used extensively for studio monitoring and live remotes. In the pursuit of the natural and open sound characteristic of the world's best jazz recordings, the station does not use limiters or compression on their live recordings. Preamps, however, play a significant part and are all designed by Mike Grace.

While having this arsenal of Neumann and Sennheiser microphones stretches the budget of the non-profit station, Pappas pointed out that no other microphones provide the level of performance and reliability both the station and the artists demand.

KPSP-TV

KPSP-TV Channel 2 set aggressive goals from its very inception, and Sundance Digital has been instrumental in helping to reach them. When the station in Palm Springs, CA, made the decision to go from start-up to full CBS affiliate in less than six months, Sundance, along with systems integrator Digital Systems Technology, based in Irwindale, CA, was able to ensure that it met its aggressive Sept. 2, 2002, deadline to go on-air.

KPSP management knew that while time was a heavy factor, allowances could not be made for reliability or quality because viewers' positive first impressions of the new station would be critical to its early ratings success. As such, the choice of Sundance Digital's FastBreak automation, a robust, scaleable and frame-accurate controller of video servers and other station peripherals, played a key role in ensuring that the station's initial on-air look would be the best it could be. Furthermore, choosing FastBreak early in the planning stages helped the design team flesh out the rest of the station's technical backbone.

This was the first installation of FastBreak Automation with the new Thomson Grass Valley Profile in its Media Area Network (MAN) configuration. The system has two ingest stations – one in master control and the other in the traffic department. It uses one main Air Station and one ListSync, a redundant backup for the primary Air Station, along with an Intelli-Sat feed scheduling and record system. The various elements are connected to a central SQL database, assuring a smooth workflow from ingest to playout.

As currently configured at KPSP, FastBreak controls two Profiles with a total of 12 channels. However, should KPSP find it necessary to expand the system, it can be upgraded by simply adding workstations for ingest and play-to-air.

Also included in the KPSP setup is Sundance's MediaCacher, which interfaces with FastBreak to efficiently and automatically cache content from tape to the video server.

KPSP was a greenfield installation: The building, equipment – and the people – were all new. To ensure that KPSP's staff would be comfortable with the automation system when the time came to go on-air, Sundance Digital engineers went on site for the initial commissioning and operator training long before the station's air date, and even returned for additional brush-ups and last-minute training during the week KPSP went on-air.

With the help of Sundance Digital and Digital Systems Technology, KPSP hit its deadline and is now a full-service CBS affiliate broadcasting a full slate of network programming, including CBS's NFL football package, as well as four hours of daily local news and arts/entertainment programming.

Sundance Digital is a provider of cost-effective, high-performance broadcast automation solutions, based in the metropolitan Dallas area.

Design Team

Sundance Digital:
- Robert C. Johnson, president
- Eric Harrington, director of engineering

David Gray, chief engineer, KPSP engineering

Digital Systems Technology:
- Dwight Crumb, vice president of engineering
- Ken Stanton, project manager/logistics
- Janet Crumb, project manager/crew
- Andre Pappas, CAD designer

Equipment List

Sundance Digital FastBreak automation
Sundance Digital ListSync
Sundance Digital Intelli-Sat
Sundance Digital MediaCacher
Thomson Grass Valley Profile servers

NBC's ShareCasting System

The NBC hub-spoke project features three hubs, 13 spokes and service in seven of the top ten markets. The NBC Television Station Division has led the way into the future of TV broadcast operations by demonstrating that substantial savings in operational costs can be achieved using a centralized business model, while still maintaining the localized flavor and content necessary for the highest possible market ratings. The success of the hub-spoke project has led NBC to schedule expansion of the system, adding KNTV, San Jose and multiple Telemundo stations to the system.

NBC carefully studied the viability of centralcasting to streamline operations and reduce capital expenses. Operational savings resulted from maximizing staff efficiency and streamlining the material workflow. Capital expense savings occurred because only three new hub facilities had to be equipped with digital equipment instead of each of the spokes.

After researching available automation solutions, NBC chose Florical ShareCasting because it easily controls equipment spread out across multiple sites (the hub and each spoke) as one cohesive system, yet allows for easy local control for breaking news stories. Florical also provided superior reliability by deploying two separate fully independent systems, so if one system fails (due to multiple system failures), the other independent system is right there in step for immediate protection.

At the NBC hub sites in New York, Los Angeles and Miami, the Florical ShareCasting originates all programming and commercial breaks for the individual TV stations. Content is stored in two separate Thomson Grass Valley Media Area Network (MAN) storage arrays for redundancy protection. The individual program streams are transmitted to the spokes using E2V Technologies (formerly Marconi) ASX-1000 and ASX-200BX broadband switches for passthrough to the transmitter, as is done in traditional centralcasting.

Unlike traditional centralcasting, the Florical ShareCasting solution enables the NBC spoke stations to share control and sourcing with the central hub. At the spokes, late-arriving commercials and local promotions are stored on a local video server using the MediaFiler media preparation system and are inserted into the program stream using a local routing switcher under automation control from the hub.

The ShareCasting Multi-Time Zone software enables all schedules to run from the hub in their own local times while the control software executes time-based commands to video servers and switchers based on Universal Coordinated Time.

AirBoss Editor Workstations add or drop material from commercial breaks during newscasts or breaking news cut-ins from the studio control room or the newsroom at the local station. ShareCasting's Zero Timing software provides programming flexibility by seamlessly mixing material from the hub and spoke within the same break.

Design Team

Richard Wescott, NBC TVSD
Dave Bondanza, WVIT-TV
Deborah Grevoy, WCMH-TV
Paul Russel, WTVJ-TV
Steve Angelovich, NBC
Steve Vitale, AF Associates
Jim Moneyhun, Florical Systems
Jeff Gierhart, Florical Systems

Equipment List

Florical ShareCasting system:
- AirBoss on-air presentation
- MediaFiler ingest to servers
- MediaTimer program segmenting
- MediaMaster asset management
- ShowTimer satellite acquisition

Thomson Grass Valley Media Area Network and routing switchers
E2V Technologies ASX broadband switches
TANDBERG Television multiplexing equipment

WHKY-TV

When Tom Long, Jr., director of engineering at WHKY, began planning for the station's transition to digital broadcasting, he wanted a solution that utilized the existing broadcast tower, and he needed to replace WHKY's older NTSC antenna. He'd thought about a pair of side-mount antennas but was concerned about the weight and exceeding the tower's windload. He contacted Andrew's broadcast division about their TRASAR traveling wave antenna.

Fortunately, Andrew was developing a lighter weight, lower windload TRASAR model, the TRASAR LT, which offered the same high performance and advanced design technology as the original. When Long called, the TRASAR LT was still on the drawing board, but Andrew worked with WHKY-TV to deliver a swift solution, and the new antenna was installed in July 2001.

The TRASAR LT antenna solved the problem of poor reception and limited coverage of households in the densely populated Charlotte broadcast area. Combining over-air and cable, WHKY-TV now reaches 715,000 households and 1.7 million people.

Along with the TRASAR LT, Andrew also installed a second antenna for WHKY-TV, a side-mount ALP antenna for high-definition broadcasting on digital Channel 40, WHKY-DT. Long said that installing both antennas at the same time enabled them to minimize downtime and take their first step in the transition from analog to digital broadcasting. WHKY-DT's digital antenna went on-air on April 6, 2002.

Long noted that despite optimistic estimations, all-digital broadcasting isn't likely to be the norm until 2020 or 2030, so it was important for WHKY-TV to have an upgrade solution to meet both analog and digital requirements in the future. He said that he anticipated WHKY-TV would still be operating their analog facility for many years to come, which is why they invested in the TRASAR LT antenna.

The antennas were installed back-to-back, so WHKY-TV was able to realize significant cost savings by using its existing tower without compromising weight and windload restrictions. Andrew engineers used proprietary modeling software to create a peanut-shaped pattern for each antenna with built-in nulls to prevent interference between antennas and the mast. In addition, the use of Andrew HELIAX high-performance coaxial transmission line to feed the ALP digital antenna proved to be a cost-effective solution. According to Long, the decision to use HELIAX cable reduced the cost of installation by 50 percent. With its expanded bandwidth, WHKY-TV is now well positioned to respond to future broadcasting requirements and the programming needs of its viewers.

Design Team

WHKY:
- Tom Long, Jr., director of engineering
- Tom Long, Sr., general manager
- Jeff Long, station manager

Andrew:
- Scott Martin, senior product line manager
- Jim Heard, account manager, broadcast/satellite systems

Equipment List

- TRASAR LT antenna
- HELIAX transmission line
- ALP antenna

CanWest Global

CanWest Global Communications is an international media company that serves as Canada's largest publisher of daily newspapers, and owns, operates and/or holds substantial interests in newspapers, conventional television, out-of-home advertising, specialty cable channels, radio networks and Internet portals in Canada, New Zealand, Australia, Ireland and the United Kingdom. Fireworks, the company's program, production and distribution division, operates in several countries throughout the world.

CanWest Global Toronto's main audio control room recently underwent a significant expansion as part of a larger project to enhance the organization's live news capabilities. Global News' strong commitment to live news quickly determined that a stronger audio console was needed to support the growth.

CanWest Global's operations and engineering were challenged with replacing a dated analog board to accommodate the increased requirements and anticipate the growth of news services including a morning show and increased network responsibility. A Wheatstone TV-80 audio console was selected, bringing the number of Wheatstone consoles purchased by CanWest Global to five.

Challenges included limited time and space allocation. Additionally, the major market broadcaster had to remain on-air during construction, which was achieved with a side-by-side temporary console while the old one was removed. The cutover had to be seamless, thus an unusual and effective strategy was formulated. Using Styrofoam and cardboard, the staging department fabricated a duplicate control room, including equipment.

The console was placed in the "mock" studio so operators could train in a realistic environment, familiarize themselves, address operational issues and minimize the learning curve prior to going live. The "mock" environment also afforded the opportunity to maximize the design of the room and perfect the layout before anything was bolted down and wired in the new studio.

The TV-80's dedicated IFB mix-minus busses were very attractive features for the significant increase in live news production. The upgrade resulted in a huge live news element including a helicopter, microwave trucks, satellite trucks and fiber hook-ups. Six to 10 live remotes are now produced in each half-hour program, and the TV-80's ample mix-minuses give reporters the ability to communicate with the station, as well as hear each other. This feature strengthens the reporters' participation in the newscast, which is an invaluable tool for a news-intensive broadcaster in the highly competitive Toronto market.

The TV-80 offers a true broadcast console that offers a sturdy mechanical design without crowded real estate issues. The console is extremely operator-friendly and has lived up to expectations.

Design Team

Jim Peck, Wheatstone
CanWest Global:
- Bob Burns, director of technical services
- John McEwen, technical producer
- Henry Brown, chief audio operator
- Mark Walewski, manager of engineering facilities and planning

Equipment List

Wheatstone TV-80
AVP Bantam audio patch panel utilizing over 500 jacks
RTS/Telex telephone interfaces
Stereo DBX compressors
760 Tektronix audio monitor and Tannoy speakers with Hafler power amplifiers

Telefutura

operations center

Univision Communications, with its rapidly growing Hispanic market, expanded its operation with the purchase of the USA station group and the launch of the Telefutura Network. Telefutura contracted The Systems Group (TSG) to design and integrate their Miami broadcast operations center (BOC) within an eight-month window. The new BOC creates and distributes media to Telefutura's 42 station groups (23 owned-and-operated stations and 19 affiliates) across 27 markets nationwide.

To compile programming to support 24-hour broadcast, the Telefutura facility required extensive post-production and graphic generation capabilities. The post-production area was comprised of linear edit rooms, nonlinear edit rooms, graphics rooms, voice-over rooms and an audio post-production room. The linear rooms were outfitted with 12-input Snell & Wilcox Magic Dave switchers, a two-channel Chyron character generator, a Sony BVE 2000 edit controller, Videotek color corrector and Sony Digital Betacam tape decks. The nonlinear edit rooms utilized four Avid nonlinear systems with a Yamaha O2r audio console and local audio sources. The graphic rooms were powered by Macintosh G4 computers containing varied graphics programming. Nonlinear-based post-production rooms contained local media storage and were able to share media files via Avid's Unity file server system.

Operationally, a highly efficient workflow model was created. After elements are put together in the post-production support area, the media is transferred to one of the four media preparation/acquisition stations, which were designed to perform high-resolution ingest to the file server, playlist compilation, color correction, captioning insertion and the creation of a tape backup. Some of the support gear includes an Nvision AES subframe router to allow for individual AES channel manipulation, and Snell & Wilcox CPP-100 SDI noise reducers/MPEG pre-processors. Once the media is reviewed and ingested it becomes available for integration into the automation playout list. Three respective time zones are driven by a dedicated playout list with each zone switched through a Thomson Grass Valley M2100 master control switcher configured with two channels of AES audio. The air path was designed with a highly redundant architecture, with each playout path utilizing a pair of Thomson Grass Valley XP video servers for main and redundant video playback to assure minimal downtime.

The technical areas of ingest, post production, media prep and master control were designed with maximum flexibility. The internal audio and video routing systems allow plant operators to share media resources quickly and efficiently.

Through diligent planning and proper equipment selection, an extremely flexible and cost-effective BOC was produced using prevailing technologies.

Design Team

Telefutura:
- Fernando Portela, director of engineering
- Jose Boveda, vice president of engineering and broadcast technology
- Cisco Suarez, director of operations

The Systems Group:
- Joseph Policastro, project manager
- Adam Semcken, senior project engineer
- Greg Williams, integration supervisor
- John Vasilenko, project coordinator

Eric James, senior associate, Gensler

Equipment List

Thomson Grass Valley:
- SMS7500WB video router
- SMS7500NB audio router
- SMS7000 analog audio router
- PVS1024 Profile XP video server
- M2100 master control system

Harris automation

HAWK-TV

West Long Branch, NJ's Monmouth University faced a decision in 1999 about what to do with its campus television and radio broadcast facilities. At the time, the radio and TV stations operated out of separate buildings, and both facilities were in desperate need of improvements.

In response, the university decided to construct a new multipurpose facility, which would bring the television and radio studios together under one roof and provide necessary upgrades. Today it's called the Jules L. Plangere Jr. Center for Communication and Instructional Technology (CCIT) Building, a new, state-of-the-art, educational broadcast facility that opened this school year to returning students.

Monmouth's most important objective was to create an environment that was first and foremost an educational facility, while at the same time functioning as a full-service television facility in its own right.

The hub of the CCIT television facility is the master control room. This room features a custom master control console designed by Harris. The hub also includes a Panasonic DVCPRO studio editing VTR with digital still and slow-motion playback and high-speed 60x search, and one 14-inch and two eight-inch Sony monitors with rack-mounts.

The production room features a Ross Synergy 1 digital production switcher with 16 digital inputs, 100-event memory and chroma keying. The production room also includes a Chyron Duet LE character generator and a Harris custom-designed production control console, which includes TD, producer, audio desk, audio rack and 6RU turret to match.

Another distinctive feature of the CCIT Building is that there are 18 remote locations throughout the building where students can go "live" and broadcast back to the master control room.

Among these in-house remote locations is an area known as the "videowall." Designed to be used for the studio's entertainment report, the videowall consists of nine, 42-inch NEC plasma flat screens. The wall is both PC- and video signal-compatible and connects with a JBL two-way powered speaker system.

Each of the rooms in the television studio also features Harris custom-built furniture and consoles designed at the Harris Pacific Design Center in California and built at Harris' Cincinnati facility. The furniture is created with flexibility, durability and style in mind.

To fulfill the project vision set out by the university, the Harris, Einhorn Yaffee Prescott and Costello Maione Schuch teams had to focus continually on tight timetables, unsurpassed product quality, workmanship, maintainability and effective documentation. The result is a facility that will be an educational resource for many years to come.

Design Team

Monmouth University:
- Chris Cavallaro, media lab supervisor
- Robert Cornero, AVP, campus planning and construction
- Chad Dell, assistant professor
- Donna Dolphin, associate professor
- Don Swanson, communication department chair

Harris:
- Belinda Binkley, project manager
- Lance Feder, TV systems lead engineer

Costello Maione Schuch:
- Christopher J. Maione, partner
- Tom Licameli, senior design engineer
- Brent Natiello, CAD designer
- Andrea Pizzimenti, project assistant

Einhorn Yaffee Prescott:
- Michael Buesing
- Chris Gaylord
- Kent Johnnson

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WHRO-TV

WHRO, the community-liscened public broadcasting station in Norfolk, VA, for over 40 years, wanted to take advantage of one of the most important and under-utilized features of digital television – the ability to dynamically change the nature of the ATSC transmission and channel mix to suit the time of day. Their new master control and technical plant originates 12 channels including a five-channel HD/SD ATSC multiplex. WHRO wanted to provide high-quality, HD television during prime time, and provide multiple standard-definition and datacasting services for targeted audiences during the rest of the day.

Among the facility's many innovations are those included to allow the dynamic reconfiguration of the DTV multiplex. Considerations had to be taken to make sure receivers and the viewing audience would not be confused by the dynamic changes in the multiplex.

During the day while WHRO broadcasts four channels of SD programming and datacasting, the HDTV program is not turned off. Instead, the HDTV channel transmits still images and graphics promoting the HD service and providing details of the evening's program schedule. Statistical multiplexing is used to combine the desired full-motion programming with low-bandwidth "barker" channels in a single ATSC transport stream.

At night, when the HD and one of the SD channels transmit full-motion video, the other SD channels are maintained and transmit information pages.

WHRO teamed with Communications Engineering Inc. (CEI) of Newington, VA, who designed and installed the new facility.

The choice of equipment vendors centered around the flexibility and dynamic reconfiguration of the DTV multiplex. In the master control room the key elements were presentation switching/branding and monitor wall solutions capable of handling multiple channels from a single operator position. For on-air presentation WHRO selected the Miranda Oxtel series under control of Harris automation. For the monitor wall WHRO built a dual-display virtual monitor wall capable of displaying up to 12 SD and six HD signals using Miranda Kaleido processors into two Clarity Lion uXGA cubes. The ability to simultaneously display 4:3 analog, 16:9 SD and HD sources and dynamically reconfigure the monitor wall when the DTV mix is changed were key. Miranda iControl system management software performs supervision, alarm reporting and error logging of key system elements.

WHRO is presently broadcasting the five-channel ATSC transport. Its challenge now is to fine-tune both the encoding rates for the placeholder graphics and the full-motion video to maximize the quality of the signal that reaches the home.

Design Team

WHRO:
- Keith Massie, vice president, operations
- Bob Boone, chief engineer

CEI:
- Raef Alkhayat, senior project manager
- David Giblin, vice president/GM

David Horowitz, television consultant

Equipment List

Miranda Imagestore channel branding and Presmaster master control
Miranda Kaleido-K2 multi-image processor into Clarity Lion uXGA cubes
Harris automation
Omneon video server
Sony Petasite archive system
Sencore ASI server
Thomson Trinix router
Miranda Densité distribution amps
Miranda Imaging video interfaces
Miranda iControl system management
Harmonic DTV encoders and stat mux

Cisco Systems

Cisco Systems has added a complete broadcast and production facility to its San Jose, CA, headquarters. Designated as Building 8 in its complex, the facility is a completely new structure built from the ground up.

Digital System Technology (DST) was contracted as systems integrator for the facility and provided a full range of services including the design, consulting, engineering, equipment provision, integration and installation for a master control center, four broadcast control rooms, four production studios and several labs.

Cisco's need for the facility was twofold: as a marketing platform for its IP/TV solution line – a comprehensive network video streaming system for businesses, schools and government organizations; and for internal training purposes.

Here, Cisco has the capability to train clients, employees and customers worldwide, via multicast and unicast streaming, at a much lower cost than flying trainees to San Jose from all over the world. This results in an enormous cost savings for Cisco.

The heart of the system is rooted in the master control center, a 20x20-foot room that features 10 racks of equipment that tie together all operational aspects of the facility. To ensure that all required equipment would fit into the available space, DST designed exceptionally high racks to house the equipment. The primary core consists of PESA Tiger and Cougar routing and switching systems, which address SDI and NTSC video, plus AES and analog audio.

Each of the four broadcast control rooms (A, B, C and D) has its own adjacent production studio. Control A, at 20x20 feet, is the largest of the four control rooms, with an adjacent 35x45-foot production studio – also the largest of the four production rooms. As the facility's primary control room, Control A features a large Sony DVS-7150 production switcher as the centerpiece of the room amongst an assortment of production equipment from Pinnacle Systems.

The remaining three control rooms feature the same equipment, though Ross 210D production switchers were installed instead of the Sony switcher.

The adjacent production studios to Control B, C and D are roughly half the size of Control A's production studio, at 18x20 feet each. Generally, all four production studios feature similar equipment: Sony DXC-D35WT cameras with Fujinon Ah18x9.7 standard-definition lenses, with each room featuring multi-camera setups. Featured throughout the entire facility for communication purposes are numerous Sennheiser audio products.

The final leg of the integration process included two labs for equipment testing and training: one for the IP/TV solution line and one for Cisco's training development. DST installed a termination panel that allows for the movement of equipment into the labs as required. The labs themselves connect to various studios and production rooms for content creation that is later distributed via the Internet or recorded directly to tape.

Equipment List

PESA Tiger and Cougar routers
Pinnacle Systems DVEXtreme digital effects systems
Ross 210D production switchers
Sony DVS-7150 production switcher
Sony DXC-D35WT cameras
Fujinon Ah18x9.7 standard-definition lenses
Sennheiser EM 1046 and EM 3032 rack-mount receivers
Crest VX audio console
Cisco IP/TV 3425, 3424 and 3432 for multicast and unicast streaming

KICU-TV and KTVU-TV

KICU-TV, an independent station previously operating in its own San Jose, CA, facility, was recently relocated to KTVU-TV in Oakland to create a dual-station master control center. KTVU, a FOX affiliate, now operates along with KICU under one roof on a 24-hour dual-station operation schedule.

Digital System Technology (DST) served as systems integrator for the project, intended to maximize efficiency in local operations for Cox Broadcasting. The design criteria also called for multiple streams out of master control to accommodate future multicasting and centralcasting scenarios.

DST selected and specified the equipment for the project in a joint effort with KTVU to create an equipment package that met the needs of the expanded facility, as well as one that functioned properly with existing solutions. Three Thomson Grass Valley M2100 switchers serve as the heart of the dual master control center. The facility was designed as an N+1, which translates to the number of stations within the facility plus one backup for full redundancy. With both stations under one roof, the cost of backup equipment is halved, as the stations share the backup switcher.

The monitor layout of the master control center is the visual cornerstone of the room. Ken Manley, KTVU/KICU's director of engineering, developed the idea to use high-quality, 1080i HDTV-ready consumer televisions for the monitor wall and feed them with Evertz Quattro units to generate native HD resolution quad split displays. A layout of 12, 32-inch flat-face monitors provides the master control with a futuristic look.

However, what turned out to be arguably the most unique aspect of the facility also proved to be the most challenging. The monitors, though advertised as 1080i, appear to be 960i models (480p doubled). This displays a true 1080i signal in the 960i format, cutting off the top and bottom 60 lines of the image and losing 12 percent of the image.

The Evertz Quattro system, featuring a 7765AVM-4 SDI monitoring card to increase monitoring capacity, was initially designed to simultaneously accept and analyze four SDI signals with embedded audio, and provide one 1080i output. However, as the monitors appeared to be 960i, Evertz created custom 960i software for the monitors on only two days notice.

To further fail-proof on-air operations, a Leitch 16x16 switcher is situated at the point of final output. The signals generated from the M2100s are fed via the Leitch switcher into the on-air paths. Four different versions of each program stream were designed so the stations could feed the most suitable version of their programs to six various satellite and cable companies, as well as to their television transmitters (NTSC and DTV). In the very unlikely event that all three M2100s would fail simultaneously, sources can be routed directly to the Leitch switcher and put on the air for uninterrupted programming.

Design Team

DST:

Lan Merrill, lead project manager
Dwight Crumb, design engineer
Bill Hodson, project manager/lead installer

KTVU:

Ken Manley, director of engineering
Jim Wagner, technical services supervisor
Ed Cosci, director of technical operations

Equipment List:

Evertz 7765AVM-4 SDI monitoring card
Evertz 8085 CC translator
Grass Valley Group M2100 switchers
Leitch RCP-16x16 routing system
Leitch 16x8VA2 ingest router
Leitch DPS475 frame synchronizers

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WEWS-DT

WEWS-DT is one of 10 television stations owned and operated by the E.W. Scripps Company. Early in the DTV transition, Scripps made a decision to convert all of its stations to full-power digital as quickly as possible. Thanks to the Scripps Corporate commitment, WEWS-DT began operation on Sept. 4, 1999, despite the fact that the station was not required by the FCC to begin operation until Nov. 1 of the same year. The goal was to be an aggressive market leader and a flagship affiliate in digital television by airing all the ABC "Monday Night Football" games in HDTV in the 1999-2000 season.

At NAB2000 an ad-hoc committee of Scripps engineering managers reviewed the state-of-the-art transmitter offerings for future group purchases. After a detailed review of all major manufacturers, a consensus determined that Axcera had the most to offer in an expanding digital television market.

WEWS-DT received construction permit approval for a power increase to 870KW and ordered their 50KW average power Visionary DT series transmitter from Axcera in November 2001 for a January 2002 delivery. They also requested an authorization from the FCC to take WEWS-DT off the air for up to 30 days during the conversion. In order to minimize the off-air time of their digital signal, they began removal of the existing transmitter system to prepare for the arrival of the new system. There was a substantial amount of work required to complete the conversion.

Since the previous DTV transmitter was a single tube unit, the output RF system was simple. However, in order to achieve their full licensed power, it was necessary to install a dual-tube transmitter with a large waveguide system to combine the output of both tubes. As a result, it was necessary to reinforce the ceiling of the transmitter room in order to support the additional weight of the combiner system. To achieve this, they added a rolled-steel beam to the ceiling along with large steel plates to distribute the weight across the ceiling.

Additionally, with ceiling space constraints they were not able to hang a standard combiner/filter combination horizontally, so Axcera took advantage of the ceiling height and provided an e-plane RF system to meet this challenge. This type of RF system is configured vertically, rather than the more typical h-plane or horizontally configured system, so it worked well for their application.

Once the room was prepared, the Axcera service team began installation of the new transmitter system, which was on the air at full licensed power by March 1, 2002.

WEWS-DT was fortunate to have received digital allocation of Channel 15 as it is low in the UHF band and, therefore, provides the best coverage. Additionally, since it is not the lowest channel in the band, lower-sideband interference issues that plague Channel 14 allocations are avoided. The digital coverage is excellent, well beyond the five county areas covered by their analog signal.

The 50KW Axcera transmitter and the slotted UHF antenna at 800 feet on the tower perform exceptionally. They have received signal reports from as far away as Delaware County, OH, to the south and Toronto, Canada, to the north.

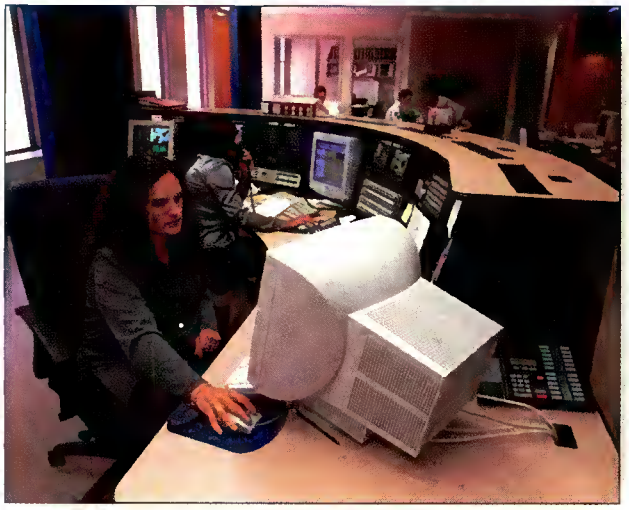
Design Team

WEWS-DT:

- John Workman, director of engineering
- Jim Baird, engineering manager
- Ric Harris, general manager
- Mike Doback, Scripps corporate director of engineering

Axcera:

- Don "Maxx" Thomas, Sr., field service engineer
- Kevin Wible, test engineer
- Jeff Heldman, applications engineer
- Paul Grzebik, regional sales manager



EBU Washington

The European Broadcasting Union, based in Geneva, Switzerland, decided in early 2001 to move from its long-time Washington bureau down the street to a building with more space appropriate for building a hub facility where all EBU members could cluster their unilateral facilities around the EBU, which would act as a central ingest and distribution for coverage of U.S.-based news for EBU members. The building was picked a scant five months before the move would begin, which required fast-tracking the design of the space and parallel design of the system needed to support multiple broadcasters.

AZCAR was selected to complete the design and installation. AZCAR designed a flexible, all-digital transmission system centered around one of the first installations of the GVG Thomson Concerto routing system under Encore control. The control system also is interfaced over the EBU's WAN circuits to EBU's Thomson Venus router in New York. Monitoring in the new facility makes use of a strategy of using virtual monitor wall processors (Miranda Kaleido) and VBrick video over IP to deliver signals from any portion of the facility to the desks of producers and transmission coordinators.

After a review of available editing solutions, EBU chose Leitch NewsFlash as the house standard and AZCAR prepared a system that would permit content to be recorded to servers where it would be instantly available to editing stations. Control of the ingest is done from production coordinator's desks and a central control area using networked computers and displays switched in a computer display router. By using this strategy the facility permits a minimum staffing level while maintaining the ability to control up to 16 outgoing feeds at the same time during peak news demand times. During special events the facility can be expandable on a temporary basis to handle any number of simultaneous outgoing feeds and the recording of multiple signals.

The facility also includes two small studios suitable for live or taped feeds. In these studios, each equipped with Ross chroma keyers, journalists can do live shots to Europe, or complete tops and tails for stories in progress. A remote-controlled "beauty shot" camera was installed across Washington for use as a live key background instead of using fixed artwork.

Immediately after the initial installation began, a national tragedy became an instant ramp up in need, when the Sept. 11 attacks required the installation of temporary expansion to handle a crush of literally thousands of unilateral transmissions to countries across Europe. The studios, editing and transmission capabilities were pressed to the limit and found to be a huge success.

Design Team

European Broadcasting Union:
- Tony Naets, head of news, EBU Geneva
- Olivier Hinnewinklel, bureau chief
- Bill Headline, project manager
- Jay Hahn, project engineer

AZCAR USA:
- Russ Rockwell, project engineer
- Marty Skoff, installation supervisor

Equipment List

- Leitch NewsFlash news editing stations
- Leitch VR440 server system (12 channels)
- Thomson Grass Valley Concerto routing
- Thomson Grass Valley Encore control system
- Miranda Kaleido G-2 virtual display processor
- Panasonic plasma displays
- VBrick video over IP system
- Leitch DPS-475AV frame synchronizers
- Ross CDK 104 mixer keyers
- Panasonic studio cameras
- Brightline studio lighting

KASN-TV

KASN-TV in Little Rock, AR, recently made the decision to replace their PYE TVT analog transmitter in conjunction with the installation of a digital transmitter for KASN-DT. Their decision was based on several factors.

First, obtaining repair parts for the PYE transmitter was becoming increasingly difficult. Second, the transmitter was very energy inefficient. In addition, it was unstable and needed constant attention. As well, the design called for using a common Andrew top-mount antenna for their analog Channel 38 and digital Channel 39. And finally, the N+1 situation with the old transmitter was not attractive.

The facility was dealing with an N+1 situation. The analog station was 5MW ERP, with an antenna input of 92KW, and the digital station was maximized at 1MW, with an input power of 19.1KW.

The engineering staff felt that their existing building was large enough to accommodate both an analog and digital transmitter once the old transmitter was gone for two reasons. First, the existing PYE was actually two transmitters running in tandem, which resulted in a large physical footprint. Second, the newer IOT transmitters were significantly more compact. The transmitter building was also remodeled and a covered concrete pad was added for the heat exchangers.

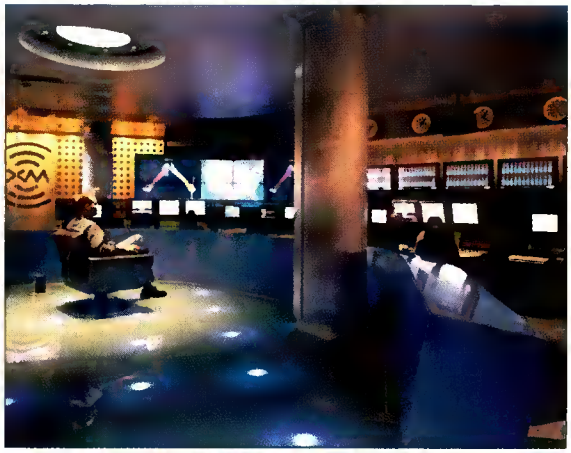
Some of the difficulties that the engineering staff faced included maintaining an on-air operation with the old transmitter while remodeling the existing building, adding an RF system and the installation of the analog transmitter.

Some of the innovations that were implemented in the new design included the N+1 system, new RF plumbing in the interior, a combined Channel 38 and Channel 39 top-mount antenna, and successful reuse of existing Andrew circular waveguide, which was broadbanded from the original Channel 38 to accommodate both channels 38 and 39.

The architectural considerations included a remodel of the existing concrete block structure, an addition of structural steel to support the interior RF system, the addition of a 20x30 covered area for heat exchangers and beam supplies for both buildings, and re-work of the existing HVAC system and re-routed ductwork.

Ai (formerly Acrodyne) served as the key vendor on the project, and they successfully met the goals that were outlined by the engineering staff and station.

The facility more than met its goals, and the stations are successfully on the air with new analog and N+1 digital. They have radically lowered the cost of their utility bills as compared with the old PYE transmitter. In addition, the on-air quality of analog has been much improved.



The XM Satellite Radio System

The XM Satellite Radio broadcast complex in Washington, DC, is a new concept in broadcast facility building, operations and control. The facility serves as the corporate headquarters for XM Satellite Radio, America's first national satellite radio service. From this broadcast complex – the largest all-digital radio facility in the United States – XM beams 101 channels of music, news, sports and talk programming to customers coast-to-coast.

Following substantial planning and research, XM selected a building in Washington, DC, that provided a large, raw space that could be transformed into a technologically advanced broadcast center. Though built in 1896, the all-brick building proved structurally sound and easily accessible from nearby Maryland, Virginia and the District of Columbia.

The 150,000-square-foot XM facility is equipped with 82 end-to-end fiber optic, all-digital radio studios and a large performance studio. Independent suspended studios with four-inch-thick, steel-clad structural panels seal out intrusive noise to provide complete acoustic isolation without compromising sound quality. Fiber optics and computer servers enable XM to produce digital-quality sound across all 101 channels. Two satellite dishes transmit programming to XM's orbiting satellites, "XM Rock" and "XM Roll," and the XM signal is then beamed to cars and homes across the country.

The studio design criteria required that the building be multifunctional, with studios of all configurations, as well as office space for more than 300 XM employees. XM's technical facility is comprised of a technical operations center (TOC), a broadcast operations center (BOC) and a network operations center (NOC), which together sustain the mix of radio programming, technology and satellite control needed to offer continuous digital-quality radio.

XM's operations and broadcast engineering team acted as systems integrator on the project, working with vendors and manufacturers in planning and building the facility. Modular and computer-aided design enabled planning of the entire facility before any physical construction began.

Because the buildout and technical infrastructure had to be completed in fewer than 12 months to meet XM's targeted on-air date, XM utilized modular studio construction to ensure on-time completion and consistent, repeatable acoustic performance from studio to studio.

XM combined key disciplines not traditionally used in radio. Among XM's innovations is the use of a large-scale automation system. Encoda Systems' Paradigm suite manages all of XM's audio channels and satellite uplink parameters. Encoda Systems' Channel Manager D-Series communicates to the Klotz digital audio routing matrix while interfacing each of more than 200 digital audio playback devices with each studio and remote origination source.

Each week, XM broadcasts more than 1500 hours of live programming, hosts artists and musicians from around the globe, and often serves as a venue for local community and government events.

Design Team

XM Satellite Radio:

Tony Masiello
vice president, operations

Ed Schwartz
director of broadcast engineering

Jaime Colon
manager of broadcast systems

Eric Hoehn
manager of broadcast operations center

CNN International

As part of its ongoing upgrade to an expanded, purely digital facility, CNN International sought a redesigned master control system to better facilitate regionalization, as well as accommodate its complex, ever-changing requirements. To this end, CNN International selected Leitch to provide five Opus master control switchers that, when used together with the Leitch Integrator router and Leitch VR server technology, provide a central control over video routing and server playback.

The central design criteria of the new CNNi facility mandated a flexible system that would allow for the origination of seven CNN International networks in a live news environment. CNNi required that any pod (network) must be able to control and view any of the other networks. Each pod needed to be the same design, as the staff of 33 master control operators each handle different regions in the room, and the pod similarity would make it easier to move staff around without concerns about workflow and equipment disruptions.

The Leitch equipment was chosen primarily because of its advanced architecture, the ability to network up to 16 Opus master control switchers together (each can be controlled and monitored at any other pod) and its easy upgrade to high definition. Furthermore, the addition of more networks to the pod system is very simple. These network architectural modifications necessitated CNNi's expansion of its existing space, including the demolition of a bank. Acoustical requirements dictated that the noise generated by the monitoring of all the independent networks must be limited, which led CNNi to go with an audio localizer sound dome to limit the amount of noise in the room.

CNNi now has consistent operational workflow at each pod and the ability to reconfigure monitoring at a pod based on what regions the operator is managing. The facility has proved to be easily expandable, in terms of adding regions, monitoring, additional sources, etc. The master control staff now has the tools it needs to effectively monitor both the quality of the feed and the commercial and programming content. Streamlining the pods has improved performance amongst the staff, as there is not a different learning curve for each individual region. Overall, CNNi's workflow consistency has improved significantly since the implementation of the redesigned master control.

CNN, a division of Turner Broadcasting System, an AOL Time Warner Company, is a respected and trusted source for news and information.

Leitch's Opus master control switcher includes 8:4:4 video processing and features eight channels of audio at 24-bit resolution.

Design Team

CNN International:
- Bob Hesskamp, senior vice president, CNN News Group operations
- Anne Woodward, director, technical operations
- Dave Silver, engineering director
- Matthew Holcombe, engineering manager

Leitch:
- Geoff Snell, product manager
- Greg Weot, regional sales manager
- Sim Kolliner, applications engineering manager

Equipment List

- Leitch Opus master control switchers
- Leitch integrator router
- Leitch LogoMotion
- Leitch 16x1 digital clean switch
- Leitch conversion equipment
- Snell & Wilcox conversion and standards conversion equipment

WWSB-TV

This year marked another notch in the successful launch of digital television as WWSB began broadcasts from its new, all-component digital facility in Sarasota, FL. For the Channel 40, ABC affiliate, this transition was its most technically sophisticated undertaking since WWSB began in 1971 as WXLT.

With over 23,000 square feet, WWSB, along with system integrator A.F. Associates, designed a completely server-based and fully automated installation that exemplifies the concepts of collaborative production and shared storage. WWSB's infrastructure has the Omneon Media Server as the core storage and networking platform, using installed partner applications from Sundance Digital and Pinnacle's Liquid purple. From ingest through editing and transmission, WWSB's single, centralized system has optimized the facility's overall workflow. With the Omneon server as the repository for an all-digital library of high quality content, they have eliminated unnecessary encoding and decoding steps in the production process.

By minimizing the physical handling of content and increasing the infrastructure's reliability, WWSB has reduced their operating costs without sacrificing quality. The Omneon system was chosen in part for its ability to expand incrementally. Channels can be added without the restriction of adding storage, and storage can be added without requiring channels to be added. The system currently has over 120 hours of storage capacity available online.

The server's ability to openly interface with applications and platforms, and its ability to work with all major digital video formats was another critical factor in the decision.

Ingest of syndicated programming is managed by Sundance Digital's Intelli-Sat. Commercials and program playout are managed by Sundance's FastBreak automation system, and news is managed by Sundance's NewsLink, which interfaces with the AP's ENPS system.

Once material has been ingested, multiple users can then simultaneously access and edit news packages and promos. The Omneon system permits direct transfer of DV material from storage to the target application without conversion (encoding and decoding) from the native compressed format. Completed segments are "printed" back to the server's directory and later integrated into sequences using Sundance's NewsLink.

With this new operational paradigm, the physical handling of material has been significantly reduced and the ability to work in a single format has dramatically improved WWSB's efficiency. From an economic standpoint, these two factors were the biggest advantages toward a truly time-efficient operation.

WWSB has outmaneuvered their competitors with an integrated and easily scalable operation.

Design Team

AF Associates:
- David Linick, project manager
- Bud Pearson, project engineer
- Bob Timpone, project engineer
- Marc Bressack, vice president of sales

Bill Hall, applications manager, Omneon
Chris Simpkins, applications developer, Sundance Digital

Equipment List

Omneon Media Server
Sundance Digital automation system
Philips LDK-100 triax cameras/DD-35-3 production switcher
Calrec C2 audio console
Thomson Grass Valley Venus 2001 router for 128x128
Leitch DPS-475 frame syncs, format converters
Tektronix sync generators and scopes
Miranda Oxtel Presmaster master control switcher
Pinnacle Liquid purple edit stations

WJLA-TV

and NewsChannel 8 audio

Allbritton Communications' challenges became opportunities when it combined two properties under one roof in September. WJLA-TV (Channel 7), Washington's ABC affiliate, and Cable NewsChannel 8, moved into a new 76,000-square-foot facility in Arlington, VA. Shared resources and close interaction between operations created numerous possibilities for personnel, business and production efficiencies.

The complex installation was accomplished in a phased approach, with NewsChannel 8 moving in first, closely followed by WJLA-TV. The facility was designed with separate studios and individual control rooms furnished with similar equipment. Wheatstone's TV-80 audio console, manufactured to enable stations with a strong local news commitment to deliver fast-paced, up-to-the-minute news, was selected to produce audio for both facilities, along with factory pre-wired harnesses that helped expedite the installation process. Wheatstone previously furnished Allbritton with numerous consoles, successfully serving the station group across many years.

NewsChannel 8, a 24-hour cable news channel serving Washington and its suburbs, opted to replace its aging console with the TV-80. Allbritton's extensive experience with Wheatstone's performance and support clinched the decision.

WJLA-TV – Allbritton's flagship station - moved their two-year-old TV-80 from its former location in the highly competitive Washington, DC, news market.

The TV-80's dedicated IFB mix-minus busses fit perfectly into the multi-station, news-intensive environment, providing logical paths for streamlining operations that will result in cost savings. The stations share a fleet of seven ENG and three satellite trucks. The mix-minus busses enable one truck and one reporter to cover the same story consecutively for both stations. Crews can also move between the two studios with no loss in audio transmission.

The TV-80 features all electronic switching to ensure the highest reliability and error-proof operation from a streamlined, economical and ergonomical package. Features include modular construction permitting component-level maintenance, LED illumination on every switch, an operator-intuitive eight-bus mix-minus system with external confidence feeds and talkback, and a master confidence IFB panel that can be linked to external tallies.

Allbritton's history with Wheatstone also furnished a cost-effective formula for successful training. Staff already experienced with the TV-80 trained colleagues, thus expediting the transition process.

Allbritton Communications owns and operates eight TV stations around the country – all ABC affiliates in markets from eight to 103.

Design Team

WJLA:
- Mark Olingy, director of engineering of Allbritton
- Will Seymour, Sam Jackson, Dave Weaver, Tom Hormuth

Jim Peck, senior applications engineer, Wheatstone

Carl Van Dusen, design engineer, Professional Products

Reese Associates:
- Ralph S. Blackman, AIA, project director
- Rob Genter, RID, project coordinator
- Song Chia, project designer
- Bethany Jackson, interior design

Equipment List

Wheatstone TV-80
Wheatstone Phase One prewire
ADC patch bays
ADC icon blocks

RNC's

NY command center

Rainbow Network Communications (RNC), a subsidiary of Rainbow Media Holdings and Cablevision, serves as the command center for Rainbow Media Holding's 19 origination channels, including AMC, Bravo and Fox Sports Net NY. RNC programming reaches more than 150 million people (aggregate) a day.

Communications Engineering Inc (CEI) of Newington, VA, assisted the RNC team in the design and engineering planning. The facility, located in Bethpage, NY, encompasses 46,000 square feet of technical space and 11,000 square feet of office space. The RNC opened in September 2001 following two full years of construction.

The challenge faced by the RNC facility design team in constructing the facility was developing a technical blueprint that would cover the existing needs and future expansion of the facility. The broadcast layout developed featured a combination of shared and customized technical resources designed to meet current and future requirements of the origination channels. The various needs of each channel were considered in order to differentiate between those channels featuring long-play programming and the channels allocated for the origination of more than 1700 hours of live sports programming each year.

Digital and analog feeds originated by RNC are transmitted to the rest of the world by on-site uplink/downlink earth station antennas for both C- and Ku-band satellite reception and distribution. RNC has 25 high-power amplifiers (HPAs) available to send transmissions to satellites such as SESAMC 1, C4 and Galaxy XI, among others. A robust fiber transmission mechanism provides high quality and reliable transport of analog, digital and HD signals from sports venues throughout the metropolitan area and world.

All signals pass through this massive control center transported over 20 routers featuring Thomson Grass Valley's component digital hybrid (standard definition and high definition) video routers, dual AES3 stream digital audio routers, analog composite video routers and four-channel analog audio routers.

A 40-foot-by-40-foot technical operations center featuring more than 250 color monitors on an 11-foot high monitoring wall, 26 rack bays (over 40 feet wide) and a dual-tier console with three additional consoles provides the centerpiece of RNC.

RNC features 12 live control rooms centered around sports and live content channels; two multichannel control rooms, each capable of handling five channels; two linear editing suites; five quality control rooms for content review; two central pre-production stations for encoding taped material; and four digital linear edit rooms. There are 22 master control suites, an HDTV master control suite and five edit bays.

Design Team

Rainbow Network Communications:
- Steve Pontillo, senior vice president and general manager
- John Barbieri, vice president of engineering
- Mike Malozzi, director of broadcast engineering
- John McMahon, director of broadcast engineering and technology

Communications Engineering Inc (CEI):
- John Wesley Nash, executive vice president and COO
- Jim Conley, vice president of engineering

Equipment List

Thomson Grass Valley routing systems
Thomson Grass Valley M2100 master control switches
Thomson Grass Valley Profile XP servers
Thomson Grass Valley Kalypso production switches
Louth automation systems

WBBH-TV

NBC-affiliate WBBH-TV, owned by Waterman Broadcasting Corp., had an NTSC tower that was 20 years old and didn't meet federal or local standards for wind loading. It wasn't economically feasible for the station to upgrade it. With an FCC digital deadline for channels 15 (WBBH-TV) and 41 (WZVN-TV), station management decided to construct a new tower and a new building for its digital transmitters.

The design for the Punta Gorda, FL, tower was based on ANSI EIA/TIA-222-F code. Contractors Kline Towers and Carolina Towers were chosen for their quality and experience in constructing tall towers. Contractor Owen Ames Kimball was hired to build a 2000-square-foot facility to house the station's transmitters and extensive RF transmission system.

One time-consuming task was convincing Charlotte County that a new tower was needed, but once it was approved, Waterman agreed to build the "replacement" tower and dismantle its existing tower by the NTSC cessation date.

For loading and RF loss considerations, coaxial and waveguide runs on the new tower were limited. Two platforms were specified, one at 450 feet and another at 1350 feet, each supporting equipment enclosures. Thirty-six-count, single-mode fiber, as well as a fifty-pair Telco cable, was run from the transmitter facility to the 450-foot platform, where it was broken out to patch panels, then carried to the 1350-foot platform where it terminated. Nucomm's V-Stream digital 7GHz STL radios were specified to be a fully redundant split system with hot-standby and antenna diversity switching between two six-foot Andrew antennas. Dual receivers were placed at 450 feet, and their 70MHz output was sent down the tower via fiber optic transmitters. The 70MHz demodulator then output the 310M to feed each of the ATSC transmitters' dual exciters. The analog 2GHz Nucomm FR6 digital-ready receiver was placed at the 1350-foot level, along with an NSI Superquad antenna system. This system was split also and the 70MHz signal delivered to the building in the same manner as the STLs. Along with eliminating a 1450-foot coax run, a significant signal level increase was realized at the ENG demodulator. The TSL was then output to the main STL antenna using the fiber in reverse fashion.

According to Dan Billings, Waterman Broadcasting's director of engineering, the system's most interesting feature involves transmitting the digital signals for the two stations from one location through one transmission line and antenna. The Andrew-designed RF system switches and combines signals from the WBBH and WZVN transmitters. The combined 54KW signal is carried through 7-3/16-inch MACXLine to the broadband panel antenna that produces 1MW ERP per channel. Combining both transmitters on one antenna is a practical solution for a complex application, with cost savings on line, antenna, tower and construction expenses. This also enables an optimum directional coverage pattern.

Design Team

Dan Billings, Waterman Broadcasting
Mathew Gaige, Waterman Broadcasting
Bennie Barnes, Waterman Broadcasting
Jean Lecordier, Kline Towers
Dawn Kazlauskas, Andrew
Bill Yorns, Thales
Bryan Cogswell, Thales
Rick Gutknecht, Owen Ames Kimball
Larry Kitchens, Carolina Towers

Equipment List

Andrew RF system, transmission line and antennas
Thales transmitters
Nucomm microwave radios
NSI ENG antenna and control system
Cummins/Onan generator/transfer switch
APC UPS system

ABC Nightline

The "ABC Nightline" staff had become used to dealing with an unusual problem... they would regularly "crash" long-form broadcasts. It was not unusual for them to produce a thirty-minute, all-tape, broadcast in a twelve-hour day. They would often work in six editing rooms with six editors cutting the broadcast, with everyone working off of shared material. But the days of passing tapes and screaming "I need tape 26 as soon as you're done" are over.

The staff has also worked to be able to re-purpose their material. At one point they were cutting five "Nightline" half-hours on "The Clinton Years" while doing a 90-minute version for "PBS Frontline."

They regularly edit long stories under the deadline pressure of a daily, hard news broadcast. Their greatest challenge has been to prove that the Avid system is fast enough to meet their deadlines.

A major goal has been to move the editors and producers into the digital 21st century, which would help give them the skills needed to keep pace with technology.

Nightline was fortunate in that their conversion to nonlinear editing was part of a complete renovation of the Nightline office area. Prior to this renovation/conversion, their editors utilized linear edit rooms in the main edit area. This resulted in producers running up and down stairs carrying armfuls of cassettes. Now the editors utilize new Avid edit rooms that are located within Nightline's space at the ABC Washington News Bureau. The edit rooms are almost twice as large as their standard bureau rooms. The producers are just steps from the editors, and the editors feel that they are much more a part of Nightline's operation.

The new Avid edit rooms are all digital; however, they can connect to the existing analog routing system, enabling them to take in analog satellite, microwave and tape feeds from the rest of the bureau.

Avid was involved in the initial installation of the system, but the majority of the work, including system design, installation, upgrading and maintenance was performed by ABC's Washington engineering staff.

The facility is currently accomplishing its goals splendidly. They are creating two separate 30-minute broadcasts for air every night, as well as producing material for other broadcasts and long-form projects. This is not to say that their initial conversion was flawless, though. They started this conversion in 1998, and were a little too ahead of the curve in terms of the hardware available at the time. Their initial goal was to have producers work at their desktops using browse-quality video, but they are still working to make that work to their satisfaction.

Equipment List

Avid:

- Unity for News server
- MediaManager
- NewsCutter
- iNEWS newsroom computer system

Telecentro/RNN – Dominican Republic

This new broadcast facility was a project begun by the Medcom Group over two years ago. The group planned to consolidate, upgrade and expand their media holding in the Dominican Republic, and this facility serves as their flagship operation, helping to meet Medcom's long-term broadcast needs.

To assist them in achieving their business and broadcasting goals, the Medcom Group selected AZCAR as their engineering system consultants, designers and integrators.

With its completion, the new facility helped make Medcom a player in the broadcast industry of the Dominican Republic.

The group's primary goals were to consolidate and expand their television broadcast interests in a common facility and management infrastructure; integrate state-of-the-art digital technology with SDI/AES signal distribution and server-based media storage facilities; provide a 24-hour news channel similar to CNN in content and presentation, which would enable them to expand their audience base in the Dominican Republic; and produce Spanish-language programming for satellite distribution to expatriate communities in North America.

The new plant incorporates a common master control center for the five independent television channels; Channel 27 (news); Channel 13; Channel 7; Channel 31 and Channel 57.

There is a common central equipment room incorporating the 256x256 central SDI/AES digital router, intercom, news and commercial servers, microwave and satellite equipment for transmission and reception, digital pulse, reference and master clock systems, and standards conversion equipment.

The central operations room contains digital and analog VTRs for playout and record operations and serves as an ingest area for the commercial and news server systems. A camera control center within the operations room provides camera operations for all RNN production studios.

The facility has four production studios. The largest studio serves the commercial production needs of Channel 13. A combination studio/newsroom has been incorporated specifically for production of news Channel 27. The newsroom contains a large Leitch server-based system consisting of 30 browse stations and nine nonlinear edit stations for ingesting and editing. The two remaining studios are primarily used for special additional news productions.

Also included in the design is a large common post-production and graphics center with a dedicated VTR ingest pool that serves the production requirements for the five program channels.

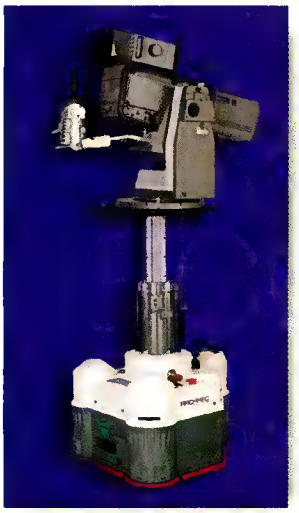
Design Team

Telecentro/RNN:
- Jose Miguel Baez, president
- Christophe Saladin, vice president, special projects
- Luis Guaba, technical director

AZCAR USA:
- John Warner, project manager
- Joe Langel, project lead engineer
- John Chyulia, project lead engineer
- Doug Waldron, installation supervisor

Equipment List

Philips/Thompson 256x256 SDI/AES/RS-422 central routing system
Leitch Velocity post-production and NLE system
Miranda Kaleido virtual monitor wall
Ross Synergy production switchers
Studer audio consoles
Leitch Opus master control switcher
Pinnacle Thunder server for stills and clip store
Ikegami studio cameras
Leitch NewsFlash news system with nine VR 465 NLEs and browse cutter



WCAX-TV

WCAX Channel 3 recently integrated a robotic control camera system comprised of two Radamec RP2A pedestals, three Radamec HK 436 pan/tilt heads, and a Radamec ARC 2000 touch control panel into a battery of equipment. The system supports four daily newscasts and two shows – "You Can Quote Me," and "Across The Fence."

The installation marks the station's first foray into robotics, and management was determined to choose a system that would transition as smoothly as possible. Radamec's ARC 2000 touch control panel (TCP) fit the bill. The TCP is comprised of a touch-screen monitor and user-friendly panel control unit (PCU) with an integrated 8x4 video matrix for operator preview and monitor switching. The TCP is capable of controlling up to eight cameras and provides a three-axis proportional joystick for control of pan, tilt and zoom, and an encoder for focus.

Movements of the RP2As, Radamec's free roaming robotic pedestals, are controlled by the ARC 2000. Designed to support any ENG/EFP or full-facility studio lens and teleprompter package, the RP2As use a two-level navigation system to provide both absolute and 'relative' positioning rather than referencing themselves to a home target studio floor position. This allows the RP2A to adapt to nearly any studio environment and offers smooth, controlled movement of floor position and pedestal height.

The WCAX system was designed for current needs and future considerations. The three compact HK436 pan/tilt heads eliminate the need to choose between conventional and virtual robotic applications. The breakthrough HK436 can be purchased in a standard configuration, without VR sensors, and upgraded in the field for virtual applications. WCAX chose the HK436s because they wanted the option to upgrade to virtual reality. The technology represents a major cost savings over traditional robotic systems that cannot be upgraded with virtual sensors.

The HK436 can be fitted with two high-resolution self-referencing encoders with DSP technology that detects the slightest movement of pan or tilt. These signals combine with measurements of zoom, focus and any other axes, and are transmitted to the studio VR system as serial data. The measurement electronics can be locked to video reference or polled by the VR system. Adjustable fluid dampers and brakes ensure smooth operation for manual control.

The heads, designed to ensure responsive control, precise repeatability and smooth, broadcast-quality movement, can support cameras, lenses and teleprompters up to 110 pounds and can be controlled by any Radamec control system. The head easily mounts onto all types of studio pedestals, and indeed, WCAX will be employing a legacy pedestal topped by a 436.

Design Team

Radamec:
- Bret Lukezic, vice president, U.S.
- Gerard Veihmeyer, technician, U.S.
- Brian Channell, project engineer, UK
- Dave Taylor, technician, UK

WCAX:
- Phil Scharf, production manager
- Keith Lawrence, studio engineer

Equipment List

Radamec:
- HK436 pan/tilt heads
- Mini head control unit
- Lens interface units
- PCU (panel control unit) touch control system
- Flat touch-screens
- RP2A robotic pedestals
- Height drive

Turner
Entertainment Networks

Turner Entertainment Network's 193,000-square-foot facility – part of the Turner Broadcasting System – handles 19 cable networks (channels) for both the U.S. domestic and Latin and South American markets, and has additional infrastructure capacity for well over 60 more. These new channels could include digital video, wideband high definition, stereo audio and Internet data.

Prior to this new facility, there was no router that could reliably handle this level of sophistication. So, Turner Entertainment Network (TEN) turned to a Thomson Grass Valley team to help them co-engineer a router that could handle the channels. This resulted in the Trinix digital video routing switcher and a faster version of the Jupiter facility control system.

The unique routing infrastructure at TEN enables deterministic switching, the ability to switch a large number of crosspoints quickly and frame-accurately, and to monitor the networks with Thomson Grass Valley NetCentral software, which supports SNMP and HTTP protocols. The key to the success of the TEN facility is a dual-path, fully redundant routing control infrastructure. This infrastructure, together with the front-accessible hot-swap modules for all active components in the Trinix routing switcher, allows TEN engineers to easily maintain the system in the unlikely event of component failure, providing a high level of security. Two automation systems, two switchers, two servers and two duplicate fiber-optic paths to the teleport support each of TEN's current 19 channels.

As further security against system failure, TEN has organized its 19 channels into four "pods" that consist of several of their entertainment networks grouped together, each with a larger network as the "anchor tenant." These pods are generally based on a programming genre. Each pod includes a 128x128 Trinix routing switcher and two Pinnacle MediaStream 900 server systems, and contains four master control rooms. The pods are purposely isolated from each other, so that a problem with a feed in one will not affect networks in any other.

The new serial digital plant also features a media operations center that serves as a common area for all of Turner's entertainment networks. It houses dozens of VTRs and a huge, 22TB EMC redundant central cache with an additional 22TB of redundant storage in two Asaca DVD Jukeboxes.

To handle its hundreds of video feeds, TEN has installed nine Trinix routers, eight configured at 128x128, and one at 256x256. While most audio is embedded with the video signals, a number of Venus routing switchers are deployed for separate audio signals.

The Trinix routing switcher is designed to support both SD and HD operations within the same frame, which was another requirement from TEN to ensure future expansion and to make the most of their significant investment in new technology. This expandability includes the possibility to build out 30 control rooms, with some rooms (like those in TEN's international pod) handling four channels each. By September of next year, all 19 channels will be operating out of the new building.

Design Team

TEN Network Operations Group
TEN Engineering Project Group
Turner Properties
HLW
KPS Architects
Turner Construction Company
AZCAR
TEN Migration Engineering Group
MCSi:
- Michael Wright, national project development director
- Joe Fiscina, senior project manager

WCBD-TV

On May 20, 2002, WCBD-TV (Channel 2), a Media General Broadcast Group NBC affiliate in Mount Pleasant, SC, began broadcasting from its uniquely integrated digital facility designed by Professional Communications Systems (PCS).

Located across from a South Carolina landmark, Patriot's Point, at the foot of the Cooper River Bridge, WCBD has been serving the metropolitan area of Charleston for more than 30 years. WCBD's production and broadcasting equipment was in serious need of updating and the station was still operating out of its original building, a World War II era Quonset hut. It was way past time for a change, and Media General decided that now was the time to move into a new facility and into the digital era at the same time.

Specific goals and parameters were established at the beginning of the project. Media General wanted WCBD to be the leader in the Charleston market and to be able to provide its audience with a broadcast signal technically superior to any of its competition from the most sophisticated broadcast facility in the region. Although WCBD won't initially originate high-definition television programming, the station did want the capability to repurpose HD. Moreover, with the proven efficiencies of digital technology in video production, transfer and storage systems, it made sense to make the new station an all-digital facility.

According to Glenn Thomason, director of engineering for PCS, the broadcast systems integrator approached the project as building an "operational utopia" instead of an "engineering jungle." By focusing on the operational needs of WCBD, care was taken to keep it simple to operate. The engineering complied with this approach while maintaining the very highest standard, Thomason said.

WCBD's operational staff is happy with this simple-to-operate, yet powerful and flexible system. They are also pleased with the redundancy that was built in to allow them to work around any potential equipment failures. The facility uses as much compatible equipment as possible to maximize the amount of status monitoring/reporting and remote control available at several locations. Enough expansion capability was included in the design at the outset of the project so that any expansion requirements in years to come can be implemented with limited equipment purchases and input from outside resources.

Professional Communications Systems is an audiovisual and broadcast systems integrator specializing in design, engineering facilities planning and project management.

Design Team

PCS:
- Glenn Thomason, director of engineering and project manager
- Ed Kothera, sales engineer
- R.A. "Tony" Stephens, vice president/general manager

Ardell Hill, senior vice president, broadcast operations, Media General
Richard Fordham, general manager, WCBD
Jack Becknell, chief engineer, WCBD

Equipment List

Thomson Grass Valley switchers, routers
Calrec audio console
Pinnacle servers, character generator and still stores
Panasonic DVCPRO cameras and decks
Miranda conversion and distribution equipment
Florical automation
ClearCom intercom

WJLA-TV

and NewsChannel 8 broadcast center

When Allbritton Communications decided to consolidate their flagship station, WJLA-TV7, and local cable news, NewsChannel 8, an innovative broadcast center was required to maximize the operational efficiencies anticipated through the use of new technology. The new integrated facility, located in Arlington, VA, boasts a state-of-the-art digital infrastructure and combines resources to support operations of both stations. The Systems Group (TSG) of Hoboken, NJ, began feasibility and consultancy work in 2001. WJLA chose to split the integration between TSG and Maryland-based Pro Products Inc. (PPI). TSG was tasked with the design and integration of master control, acquisition and the primary broadcast systems backbone. PPI built the studio, news and production systems.

The core systems of the facility included routing, intercom, broadcast LAN, MATV, reference head-end and distribution. Thomson Grass Valley provided 7500 series frames for SDI and 75Ω AES routing, and Venus matrices for time code and control routing. A Clear-Com Matrix 3 system and a reference head-end that includes a redundant GPS system were also core system components. To support systems that take advantage of Ethernet-based control and file-sharing, TSG implemented a fiber backbone throughout the facility utilizing HP Procurve switches. This, combined with an extensive KVM system by Raritan, also provided interconnection to the enterprise network for WAN and maintenance access from engineering desktops.

The current master control operation handles three regional feeds for NewsChannel 8, and analog and digital transmissions for WJLA, with capability to accommodate up to eight transmission paths. The master control environment is centered around a Harris automation system that controls the Leitch VR-440 servers used for playout, Thomson Grass Valley M2100 switchers and Encore routing control system, and Pinnacle Dekocasts for branding and DVE effects. Channel branding, time and temperature insertion, election results, school closings, breaking news, EAS and emergency weather alerts are processed by software from Business Technology.

Virtual monitor wall systems were implemented in the control rooms. The large Clarity rear-projection systems, combined with Evertz Quattro cards and VistaLink Pro SNMP monitoring software, gave operators audio and video confidence monitoring of all incoming and outgoing signals, while providing the flexibility for easy reconfiguration and future expansion.

Satellite operations and acquisition run from Harris automation. WJLA receives content from subscription service providers Pathfire and Digital Generation Systems. This content is ingested through automation into the Leitch VR-440 play-to-air servers. All incoming feeds are synchronized and processed by Leitch DPS-575 frame synchronizers prior to ingest and playout.

Design Team

WJLA-TV and NewsChannel 8:
- Robert Allbritton, president
- Mark Olingy, director of engineering and operations
- Will Seymour, executive engineering staff
- Tom Hormuth
- Dave Weaver
- Sam Jackson

The Systems Group:
- Scott Griffin, project executive
- Raoul Edwards, project manager
- Bob Degnan, senior systems engineer
- James Tome, systems engineer
- Mattias Allevick, integration supervisors
- Alex Blanding, documentation coordinator
- Trissa Dudzinski, project coordinator

KMEX-TV

Univision Network constructed a new headquarters building with space to include facilities for KMEX and KFTR, the outlets for Univision and Telefutura in Los Angeles. The site presented particular challenges, as it was located immediately adjacent to one of Los Angeles' prime freeways, but the new building was completed on time and KMEX went on-air as scheduled in the spring of 2002. BFA was chosen to manage the project and provided conceptual design services for the systems. AZCAR was selected for the detailed design and installation, which was completed in approximately four months from contract to commissioning. The facility is more than 25,000 square feet and required more than 8100 cables consuming more than 600,000 feet of wire.

The station incorporated a combination of existing analog and composite digital equipment from the previous KMEX facility, requiring thoughtful integration and design strategies. One new studio control room was included in the plan, and is equipped with a Thomson Grass Valley Kalypso video production center and Pinnacle Thunder and FXDeko for graphics, stills and clips. The control room is used to produce a Spanish-language newscast.

Design Team

KMEX Univision Television Network:
- Jim Smith, director of engineering
- Chris Homer, chief engineer
- John Brooks, project manager, BFA

AZCAR USA:
- Dan Siewers, project manager
- Michael Walter P. Eng, project engineer
- Adam Stoddart, installation supervisor

Equipment List

NVision routing, 2562 video/AES, 642 AES, 128-port machine control
Thomson Grass Valley M2100 master control switcher
Pinnacle MediaStream 700 video servers
Thomson Grass Valley Kalypso video production switcher
Accom DVEous digital effects
Pinnacle Thunder disk recorder
Pinnacle FXDeko
Avid Unity media network
Avid NewsCutter, Media Composer, Digital Studio
Sony Betacam and Panasonic DVCPRO VTRs

Two feeds are produced in master control, one using a conventional master control architecture, and the other using a Ross CDK 104 mixer keyer and Graham-Patten audio switcher to accomplish a simple and cost-effective master control for the Telefutura output from the facility.

The newsroom utilizes advanced workflow concepts. Avid supplied a major iNews installation, which is interfaced with an Avid Unity media network. Incoming feeds are ingested into the system, which includes four Avid NewsCutter nonlinear editing bays, as well as Media Composer and Digital Studio editing rooms for more complicated stories and other station programming. KMEX news also has additional edit facilities that use Final Cut Pro running on MAC G4 with a Firewire interface. Three linear tape-based editing suites complete the newsroom complement.

The facility has a very busy feeds record area for dubbing news feeds to tape and to Avid Unity through Pluto servers and an Avid Unity Control Air feeds record workstation. The area has six network feeds, 10 wild news receive paths, and four microwave paths.

WWNY-TV

WWNY-TV, a CBS and FOX affiliate serving the Watertown, NY, television market, has been casually upgrading its facility over the past few years from its analog beginnings to a digital future.

Unlike most television facilities, WWNY has enough space to accommodate changes without having to reconstruct existing setups or build additional space. When WWNY signed on as the local FOX affiliate, it could accommodate new digital equipment into existing master control space. The station added an Oxtel digital master control switcher as the centerpiece of its FOX operations. The CBS side of master control will be digitally upgraded shortly. WWNY currently uses an analog Thomson Grass Valley Master 21 switcher for its operations.

Just prior to launching its FOX operations, WWNY took a long look at its news production operations. With much of its staff moving on to retirement or new employment, and its legacy equipment aging to the point where manufacturer support had halted and parts were discontinued, station management decided to look into new options that would further its push toward a facilitywide digital upgrade. Their decision led to the acquisition of a ParkerVision PVTV News live production automation system for the control room upgrade.

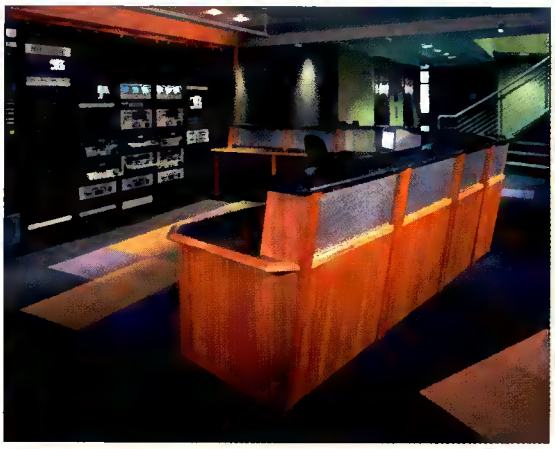
WWNY installed PVTV News directly alongside the legacy equipment it replaced. The positioning of the system allows the director to be near where he or she was seated during traditional news production, with a clear view of the Sony monitor wall in master control. Of the equipment replaced, most notable was a Thomson Grass Valley 200 production control switcher and a Sony MX2000 audio console, both nearing 20 years in age and long discontinued by their manufacturers. Though still functioning well, the cost-effectiveness of the PVTV News system far exceeds the cost of what it would have been to repair and/or replace the legacy systems.

ParkerVision's Digital CameraMan 3-CCD robotic pan/tilt cameras and a Digital Shot Director multi-camera control system also played a vital role in the upgrade, replacing the facility's aging analog newsroom cameras, and several camera operators who had left or were ready to leave the station. The facility was also able to establish relationships between PVTV News and existing video production equipment, most notably its Chyron dual-channel MAX and Aprisa 100 still store. PVTV News is integrated via serial port control with both systems to talk to and call up graphics for air as needed.

The addition of PVTV News came at about the same time the facility added a Thomson Grass Valley Profile server. Integrated with PVTV News, the Profile server digitizes stories and floats them into the system, eliminating the need to trigger decks to roll video for a particular story. The facility also added a Thomson Grass Valley Vibrant nonlinear editor that it will integrate with PVTV News in the near future. The integration will allow a user to edit packages for news programming and send them directly into the system.

Equipment List

Thomson Grass Valley Master 21 master control switcher
Oxtel master control switcher
ParkerVision PVTV News
Louth/Harris automation
Thomson Grass Valley Profile server
Thomson Grass Valley Vibrant nonlinear editing suite
Auto Sat satellite program acquisition system
Thomson Grass Valley 7000 digital router (32x32) and analog router (48x32)
Pinnacle Alladin Pro DVE/title deko
Chyron Aprisa still store
Chyron MAX (dual channel)



Starz Encore Group

Starz Encore Group moved into a brand-new facility and went on the air in January of 2002. The move consolidated the business and technical operations of the company, which were previously in two separate locations. The company is housed in a new 300,000-square-foot building located in the Meridian office park in southeast Denver.

Starz broadcasts 13 channels: Starz, Encore, Starz Theater, Black Starz, Starz Cinema, Starz Family, Westerns, Mystery, Action, Love Stories, True Stories, WAM and MoviePlex. All of these channels have east coast and west coast timezone feeds, which are distributed nationwide on three satellites. Five channels are uplinked as analog signals to the backyard C-band dish market. A total of 36 feeds originate from the facility.

In conjunction with the move to a new facility, a decision was made to upgrade the on-air operation from a semi-automated tape-based playout system to a fully automated, digital video server-based playback and transmission center. To facilitate this upgrade, a study of the operation and processes was made, system requirements determined, and RFPs were prepared and sent to automation, server and data archive vendors, as well as systems integration companies.

Over a period of several months, numerous systems and equipment proposals were reviewed and evaluated. The selected companies were Omnibus Systems (automation), Pinnacle Systems (servers), Sony (archive), Pinzone Engineering (uplink) and Beck Associates (systems integration). Wiring of the technical plant was on a severely constricted six-month timeframe in order to reach the on-air target date.

The broadcast center contains three automation systems, 12 playback servers, two ingest servers and one data tape archive system. A total of 52 lists are running around the clock on the automation system to control the broadcast ports of the primary and mirrored backup feeds. There are approximately 200 hours of storage per channel on disk, at a playback data rate of 15Mb/s. The channels/feeds are monitored by two playback operators and one supervisor. Three channels (six feeds) are configured for playback of Dolby Digital 5.1 surround sound. All materials on the server and archive contain three pairs of audio including English, Spanish (SAP) and Dolby Digital 5.1 or 2.0.

The uplink transmission facility contains four 9-meter transmit dishes and six 4-meter receive dishes. The transmission chain is designed with an automatic one-for-one redundancy on digital feeds and one-for-five redundancy on the analog feeds.

The facility went on-air on Jan. 21, 2002. In the first eight months of operation, discrepancies and outages were reduced by two-thirds in comparison with the previous tape-based system at the old facility.

Design Team

Starz Encore Group:
Ray Milius, Lonnie Scheele, Jim Porter, Kirk Trost, Ron Hill, Andy Pergeau, Randy Pike, John Ferguson, Kent Wallace, Jonathan Cote
Omnibus Systems:
Stan Kingett, Ben Frost
Beck Associates:
John Fitzrandolph, Terry Breay
Jerry Stooksbury, Pinnacle Systems
Randy Brigham, Sony Broadcast
Basil Pinzone, Pinzone Engineering

Equipment List

Omnibus Colossus automation
Avalon Archive Manager
Pinnacle servers
Sony Petasite archive
Nvision routing switcher
Pro-Bel routing switcher
Barco monitor wall and Hydra system
Motorola Digicipher II encoders
Vertex satellite dishes

WALA-TV

WALA-TV, an Emmis Broadcasting television station located in Mobile, AL, recently opened its new facility following a move from its longtime location in downtown Mobile. A FOX affiliate serving the Mobile and Pensacola, FL, markets, WALA also serves as a spoke station to the Emmis centralcasting hub at WKCF-TV in Orlando, FL.

Digital System Technology (DST) served as systems integrator for the new WALA facility. The new site called for a full analog-to-digital video upgrade and was designed as a centralcasting spoke station.

DST provided WALA with several groundbreaking systems. The first was a tapeless news environment created using a Thomson Grass Valley NewsQ Pro interface. The install marked the world's first NewsQ Pro tapeless news environment and allowed WALA news reporters to transfer stories directly onto a Thomson Grass Valley Profile server. This system, installed in the main production room along with a Thomson Grass Valley Vibrant editing bay for story editing, uses the NewsQ Pro setup to interface with an AP news system. NewsQ Pro tracks the stories and keeps the playlist current with the newscast rundown.

Story editing is also faster. Once on the Vibrant, the user can transfer a story to Profile as a fiber-optic file transfer for play to air, making the transfer faster than real-time. This provides both the advantages of nonlinear editing and the speed of linear editing. Six identical Vibrant news edit bays are located directly off the newsroom, along with three Discreet Logic nonlinear editing rooms: one main edit room, and two smaller rooms designed for production of promos and commercial spots.

The second groundbreaking solution was an interface designed by DST to automatically segment certain news feeds. Network news feeds come into the station via satellite, and a gap of several minutes appears between each story. For a fully automated process, DST developed an interface using Evertz Quattro systems to sense freeze frames between stories from network news feeds. The Evertz Quattro speaks to a CompuSat system, reads the frozen video as one story ends, stops recording and starts again at the beginning of the next segment. The story is then saved onto the Profile server.

With the Gulf of Mexico shoreline location of Mobile, corrosion of the patchbays due to the salty ocean air can became more of a reliability problem than the hardware. To address this issue, DST created a unique patchbay-like system in which three-pin Elco audio bulkheads were used to connect the audio portion of the broadcast system. Cables can be removed and plugged into different inputs for simple system reconfiguration.

Design Team

DST:
- Janet Crumb, project manager
- Dwight Crumb, lead design engineer
- Bill Hodson and Simon Shepherd, installation leads

WALA:
- Johnny Reece, complete design review
- Marty Draper, corporate design review

Equipment List

- Thomson Grass Valley NewsQ Pro
- Thomson Grass Valley Profile server
- Thomson Grass Valley Vibrant editing bay
- CompuSat satellite systems
- Discreet Logic nonlinear editing systems
- Wheatstone TV-80 audio console
- Mackie eight-bus 24-8 mixer
- Evertz Quattro quad-split monitors
- Thomson Grass Valley Venus router
- Thomson Grass Valley Zodiac production switcher
- Ross DSS-8024 switchers
- TANDBERG Television TT6010
- Sony BVP-950 studio cameras

MTV Networks'

Central Facilities

MTV Networks has grown substantially since its inception, and production requirements have increased with the channel's popularity. MTV's operational needs had grown to the point where much of the post-production and graphics work for the channel had been outsourced. In addition to third-party providers, MTV had built up a number of off-site suites and facilities. With these various resources, MTV managed to satisfy their extensive production schedule, though limited technical resources and difficult logistics created unique challenges for engineering and production staffs. Operating in such an expanded environment created inefficiencies in the daily routines and restricted the expeditious growth MTV required.

Focused on efficiency, MTV Networks made a decision to consolidate these facilities into their broadcast operations center at 1515 Broadway, where they could centralize staff resources and leverage the significant technical infrastructure MTV had created throughout the last decade. This reorganization required a large capital expenditure, which was recognized swiftly with the benefits of operational efficiencies and savings from the reduction of outsourced services. Since this facility was to serve all of the MTV Networks, it was important to create an image that was not identified with the branding of any one of the networks but would embody the innovative spirit and character of all the networks. The futuristic technical environment was inserted into the rough shell of the office building to create the feeling of a creative laboratory.

The new facilities, appropriately named "Central Facilities," are located on the 10th floor of the Viacom building and were constructed to provide MTV with a 25,000-square-foot centralized operations center for four online edit suites, 20 Avid nonlinear suites, multiformat duplication, fiber optic transmission and acquisition, 23 3-D digital animation/high-end rendering workstations, titling and paint stations, and maintenance facilities. A 3000-square-foot core equipment area provides a location for the system mainframes, including a multi-level 256x256 wideband routing switcher, a 64x64 intercom system, 20 A/V frame synchronizers for transmission services, more than 40 tape machines, the Avid Unity system hardware, and multiple quality control stations. MTV standardized on a combination of broadcast products to maintain cost-efficiency from a purchasing and ongoing maintenance perspective.

Staff relocation, office demolition and subsequent rebuilding of the technical spaces required the utmost attention in timeline coordination between MTV, The Systems Group, Kostow Greenwood Architects and the general contractor.

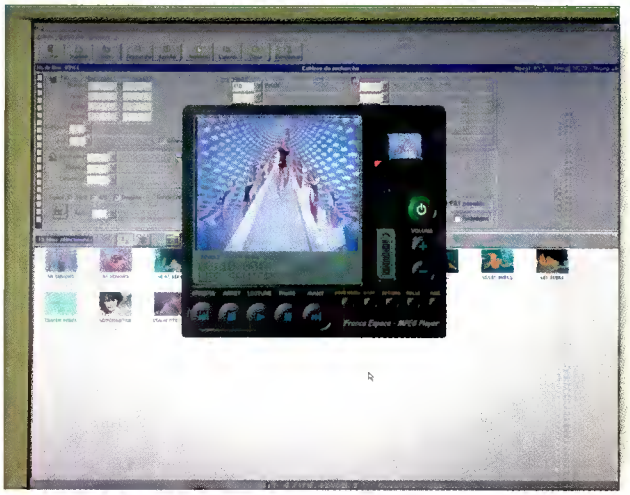
Design Team

Michael Bivona, director of engineering, MTV Networks
The Systems Group:
- Joseph Policastro, project manager
- Robert Gilmartin, systems engineer
- John Zulick, project engineer
- Darwin Clermont, integration supervisor

Kostow Greenwood:
- Michael Kostow, principal
- Charles Gustina, project manager
- Viola Rouhani, project architect
- Eric Heidt, architect
- Laura Dolph, interior designer
- Elora Cosper, interior designer

Equipment List

Leitch DPS frame synchronizers
Miranda VTR-100 conversion products
Avid Unity nonlinear edit systems
Ikegami video monitoring
RTS Intercom products
Audio Accessories patching products



France

Télévisions Publicité

France Télévisions Publicité (FTP), the advertising-production subsidiary of national broadcaster France Télévision, wanted to streamline its production process into one that was more cost-effective and efficient. A good portion of its costs involved creating videotapes of commercial spot segments, making dubs and transporting these dubs via courier to remote broadcast locations throughout the country. FTP wanted to digitally ingest commercial spot content, edit specific commercial break sequences, and deliver content directly from the central location to the transmission servers—allowing for last-minute schedule changes impossible with a tape-based system. They also wanted to develop an extranet for advertisers and agencies to view spots before air. Plus, they wanted to add the capability for advertisers and agencies to view a legal air-check online, up to eight days after broadcast, with a minute-by-minute graphical link to ratings of the program and the commercial from French audience research firm Médiamétrie. Early last year, Christophe Scherer, IT and technical director, took FTP digital.

With three main channels – France 2, France 3 (including local transmission sites) and France 5 – in addition to nine thematic channels, FTP chose SGI as the prime contractor to migrate to this centralcasting model. Scherer began with France 5. The solution designed by SGI is based on a hub-and-spoke model and similar to an edge-server architecture. It employs SGI Media Server for broadcast systems providing MPEG-2 ingest capabilities at the central facility in Paris. From there, video content is distributed as data files to smaller SGI Media Server systems, which provide playout services for the spots at the local transmission facilities. Connection to the SGI Media Server systems is via a private ATM network. As a free service to France Télévisions Publicité's customers, a 200TB Sony Petasite with a capacity of 35,000 30-second spots has housed all spots since the system went online. Because of the open networking capabilities of SGI Media Server for broadcast, FTP was able to utilize an existing network without purchasing hardware to convert physical interfaces.

FTP now uses an all-digital, disk-based architecture for commercial playout. It runs on an SGI Origin 3200 server with two Sony Petasites, Thomson Grass Valley Profile servers (which are being replaced by SGI Media Server for broadcast systems), SGI Origin 2000 servers, an SGI CXFS shared file system, SGI DMF (Data Migration Facility), and other support equipment.

With more than 35,000 commercial spots now in online or nearline storage, the FTP staff has access to the spots as data via a high-speed Ethernet network.

The system works so well that France 2 is currently testing its system and France 3 is scheduled for testing in April 2003.

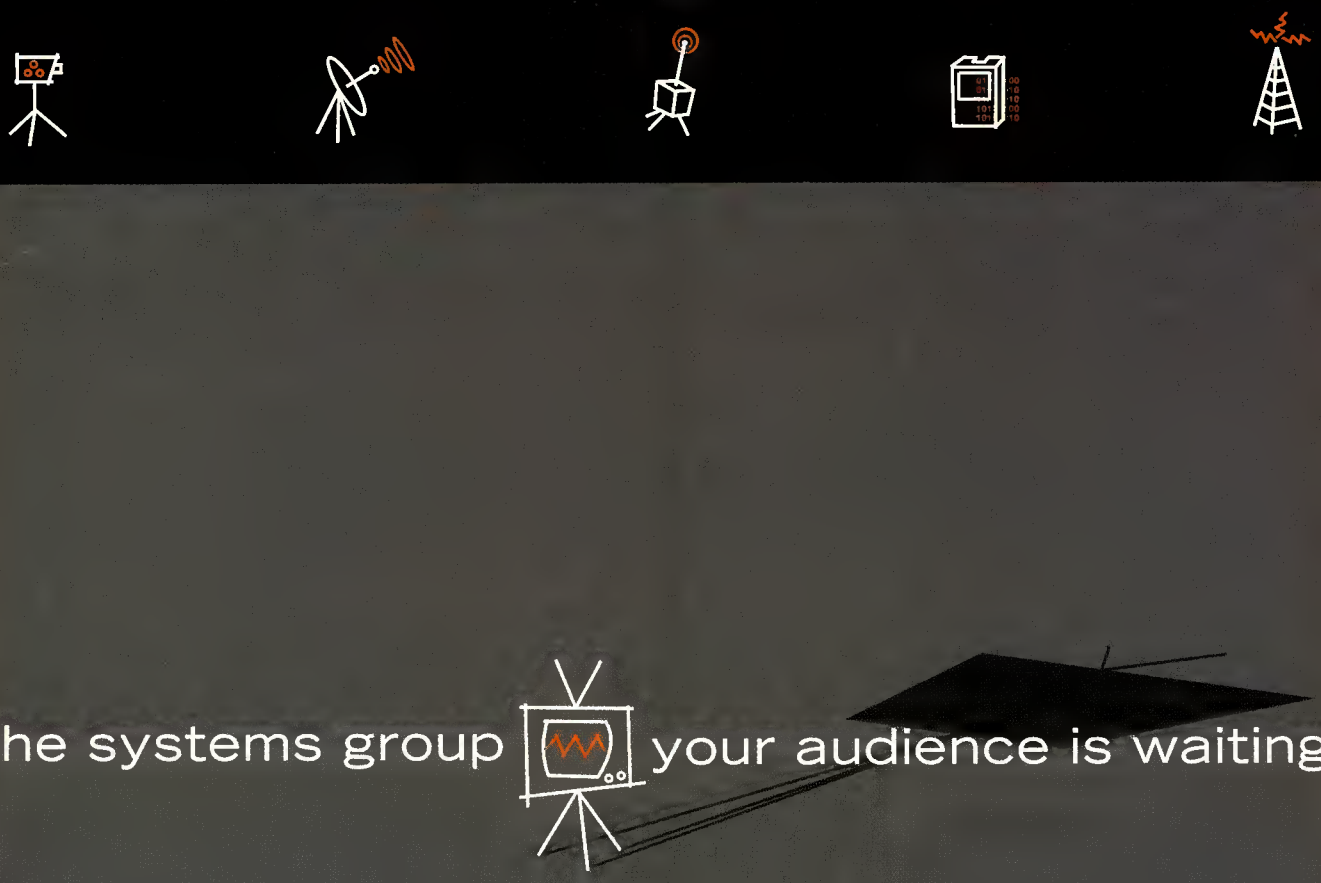
Design Team

FTP:
- Christophe Scherer, IT and technical director
- Nicolas Delaire, project manager
- Christine Bret, project engineer

SGI:
- Lionel Obry, system architect
- Manuel Ferreira, solution architect
- Frederic Guiot, solution architect
- Yannick Agaesse, project engineering
- Philippe Churlet, project engineering

Equipment List

- SGI Origin 3200 server
- SGI Media Server for broadcast systems
- SGI Origin 2000 servers
- Sony Petasite systems
- Thomson Grass Valley Profile servers
- SGI CXFS shared file system
- SGI Data Migration Facility (DMF) software



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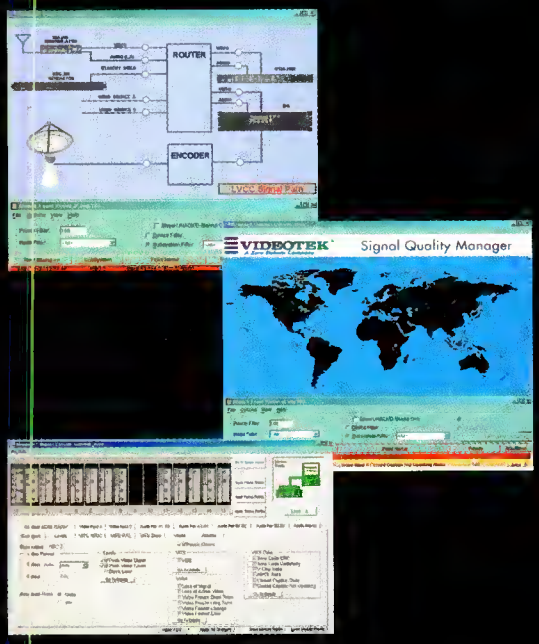

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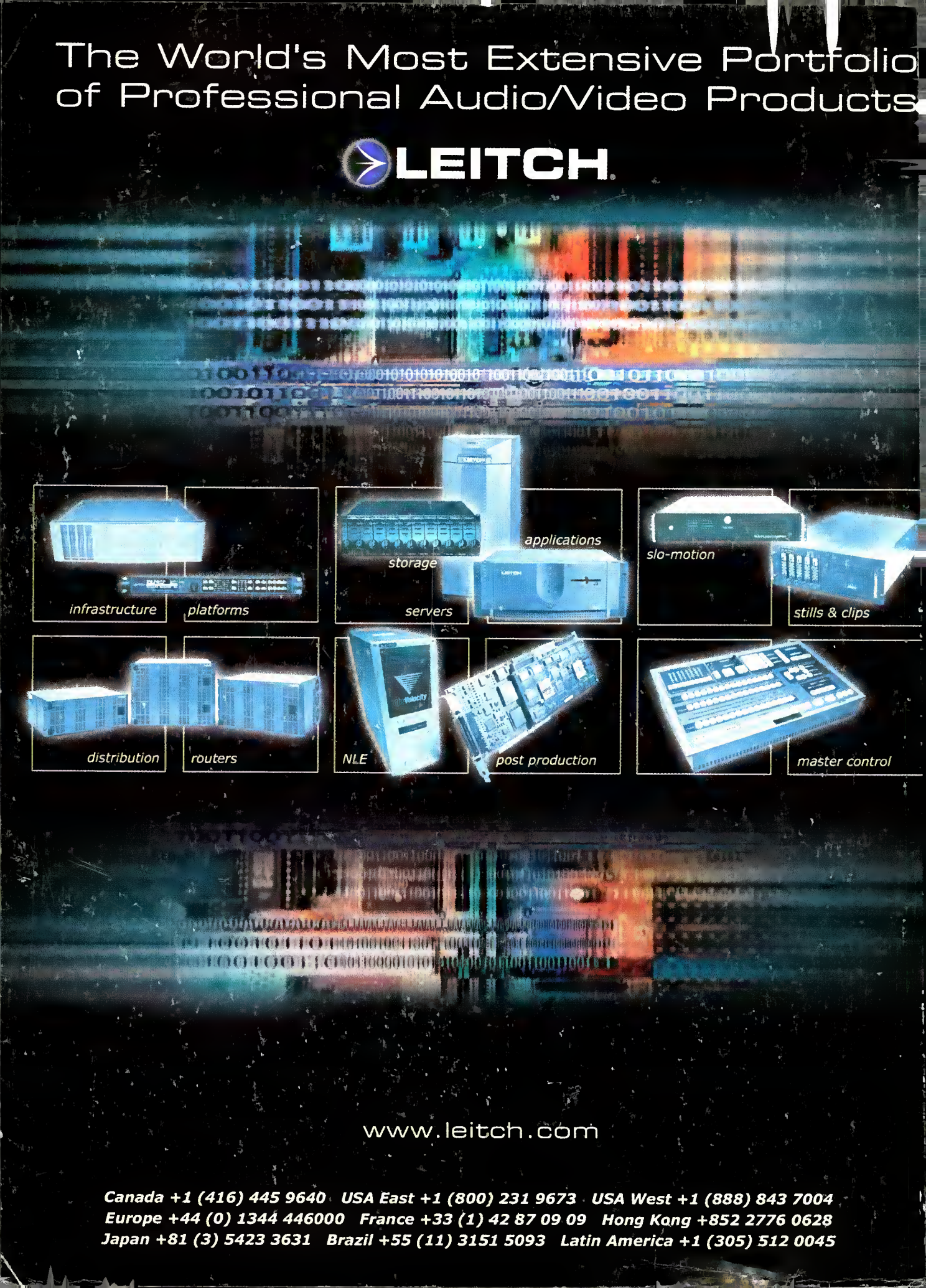

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