

# Radio

THE RADIO TECHNOLOGY LEADER

June 2007  
RadioMagOnline.com

## Facility Facelift

for  
Delmarva  
in Delaware



**THE  
PICK HITS**  
Of NAB2007

**FIELD  
REPORTS**

Sagean HDT-1  
and Wheatstone Bridge

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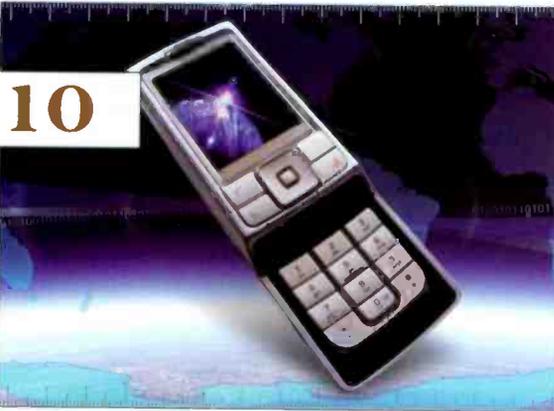
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Photo by Jim Peck.  
Cover design by Michael J. Knust.



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## Currents Online

Selected headlines from the past month.

### Clear Channel Launches Cell Phone Interactive Application

The effort begins in New York City for WHTZ-FM, WAXQ-FM, WKTU-FM, WVVPR-FM and WLTW-FM. Stations in Salt Lake City and St. Louis are next.

### SBE Presents RF Safety Course ➔

The course is designed for broadcast station personnel that need to have an understanding of RF safety issues and regulations. The course is being offered online.

### Mexico Considers Move to HD Radio

Mexico's federal telecommunications commission has proposed to allow radio stations along the country's northern border to voluntarily begin broadcasting with HD Radio technology.

### HD Radio Multicasts Reach Top 100 Markets

The formats have been decided for the HD2 multicast stations as part of the HD Digital Radio Alliance's coordination effort.

### Liebisch Joins Nautel as Regional Sales Manager

Gary Liebisch was most recently the product manager for AM and FM radio transmission products for Harris. Previously, he was a chief engineer and director of engineering for more than 20 years.

### Broadcasters Jointly File to Modify AM Rules

The AM Directional Antenna Performance Verification Coalition is comprised of 29 owners and consultants. The filing proposes several changes to update the AM rules.



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## Radio's real fix

**I**n the December Viewpoint I referenced the way that radio as an industry can ensure that digital radio is accepted and used by listeners. I basically said that every radio receiver needs to be a digital radio receiver; The consumer shouldn't have to choose between analog or digital radios. If they're all digital, the debate ends.

We're obviously not at that stage yet. What surprised me is that I received many comments countering that radio's future success is not reliant on digital radio, but rather on improving the programming choices being offered. One typical letter is in the Reader Feedback section of this issue on page 60.

A common theme focused on the current homogenous radio formats as the cause of radio listener erosion. Many of the comments long for the heyday of radio with big-name jocks and varied playlists, and note that installing digital transmission equipment will not help bring listeners back to terrestrial radio.

Let me start by clarifying one point. I never said that digital radio—whether it's HD Radio, FM Extra, DRM or any other system—on its own will fix radio. I offered the "do nothing" litmus test as a measure of the success of a digital radio roll-out. The purpose of digital radio has never been to apply a simple fix to radio broadcasting.

It's puzzling that the comments pit digital radio vs. content as an either-or choice. They are separate issues, and there's no reason to choose one or the other. We should pursue both. By developing and implementing a digital terrestrial transmission system, stations can offer enhanced services to listeners. These enhancements will allow terrestrial radio to keep up with other digital media technologies already in place.

But it doesn't stop there. Listeners will seek interesting content. What helps this effort is that digital radio on FM provides more opportunities to offer better programming.

Unfortunately, what I have heard on many multicast channels is not always compelling radio.

I appreciate the effort of the HD Digital Radio Alliance to coordinate formats on multicast channels to eliminate the possibility of five stations in a market launching the same format. Despite this, some of the multicast formats on the air are little more than place holders. Even worse, some of the multicast channels are not on the air reliably or are not being monitored for quality. The jukebox is turned on and left to operate on its own. The number of multicast listeners is a small percentage of a total listener base, but the early adopters can help publicize the new listening choices.

Digital radio isn't a singular option for radio's future. It's a tool to help radio maintain or recapture its importance in our listeners' lifestyles. Let's focus on the technology *and* the programming aspects of terrestrial radio, and use all the tools available to ensure the future success of radio.

### A special thanks

This is the last issue that will include the work of Kari Taylor, the senior associate editor of *Radio* magazine. Kari joined the magazine staff in 2002 and has been an important part of the editorial team. You have read her contributions in Sign Off and New Products every month, the Salary Survey every year, and some other features including the in-flight trans-Atlantic broadcast in the June 2006 issue.

Kari has taken a job with another publishing company and a publication that is not involved with broadcasting. I want to thank her for all that she has done for *Radio* magazine, and we all wish her well going forward.

*Chris Scherer*

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Mark Ericson and the WOKQ morning team, along with Steve Vanni from Technet, recently used ACCESS to deliver a three hour remote from the top of Mt. Washington. For mere mortals, this would have been an impossible task. The height, the weather, the distance—all conspired to prevent a successful remote. But because they carried ACCESS, they became real-world super heroes.

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## Personal-area networks

By Kevin McNamara,  
CNE

**M**ost of us use a Personal Area Network (PAN) in our daily routines in front of our desktop and notebook PCs. PANs are technically defined as any network used to communicate with other slave devices located close to a master device. The most common PAN might be the connection between a PC and another device such as a printer or scanner.

PANs are not limited to devices wired to each other; they can also be created through a Wireless Personal Area Network (WPAN.) The most common WPAN technology is Bluetooth. Bluetooth is a common way to connect cell phones to wireless headsets. Many new automobile manufactures include Bluetooth technology in models to integrate cell phones, GPS or digital audio players. The nice thing about Bluetooth-enabled devices is the ease of connection: once the devices are properly configured, they will recognize each other and start communicating once they are in range. Other technologies that support PANs are Ultra-Wideband (UWB), Zigbee and a futuristic application using the human body to pass electrical information. These all have specific industrial applications. Let's look at each of them.

### Bluetooth

In 1994, two engineers from Ericsson developed the initial implementation of Bluetooth. The IEEE, under the designation of 802.15.1, subsequently standardized the specification in 1998.

Bluetooth uses the Industrial Scientific and Medical (ISM) band in the 2GHz spectrum. This band is used for a number of applications, including wireless Ethernet technologies such as Wi-fi, as well as many other scientific and medical devices. The rules for operating in this spectrum require that communication be spread over 79 1MHz channels to make more efficient use of the spectrum. Overall, the bandwidth of Bluetooth does not exceed 1Mb/s. There are two primary methods to achieve this spreading across the permitted bandwidth:

1) *Direct Sequence Spread Spectrum (DSSS)*. The power is spread across the available channels to achieve wide bandwidth and reduce power.

DSSS might look familiar as it is typically used for 802.11x wireless Ethernet.

2) *Frequency Hopping Spread Spectrum (FHSS)*. The carrier is randomly sent on a (single) different channel. This method tends to be more secure due to the random nature of the hopping.

The power level of Bluetooth devices are typically limited to 1mW and yield a range of about 30 feet, however the specifications permit a power level up to a maximum of 100mW, which support communications in excess of 300 feet.

Bluetooth can also operate in either of two modes, circuit switched or packet switched, depending on the type of application for which it is used, i.e. voice or data. This flexibility allows the creation of a small complex network with other devices. As many as eight devices can be networked to form a piconet; additionally, as many as 10 piconets can be linked to form a scatternet.

A Bluetooth network is created by using a master device and as many as seven slave devices. The master polls all the active clients on the network sequentially. One characteristic that makes Bluetooth unique is that any host can become a client and vice versa.

### Ultra-wideband

UWB by definition is any RF technology that uses a bandwidth in excess of 500MHz or deviation greater than 25 percent of the center frequency. UWB technology was and continues to be used for impulse applications such as ground-penetrating radar and systems used by military and law enforcement to see behind walls. In the WPAN world, UWB forms the basis for the Wimedia specification.

While Wimedia is also intended to operate in a limited range, think of it as Bluetooth on steroids. Most notably it can operate legally in certain portions of the 3.1GHz to 10.6GHz range, permitting it to offer high bandwidths without the interference issues typical of the more crowded

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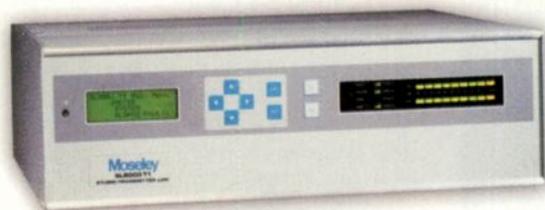


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2GHz spectrum. It is also compatible with current and emerging mobile telephony standards such as Wimax. Because of its ability to transfer data at speeds in excess of current Ethernet networks, but also support voice, video and data, Wimedia could ultimately replace Bluetooth.

## Zigbee

Zigbee was born from a later addition to the 802.15 Bluetooth specification called 802.15.4,

which created a specification for a low data rate, low power consumption and a more secure network device. In 2004, the Zigbee alliance, a group of over 100 companies, ratified the Zigbee 1.0 specification. While compatible with the former IEEE specification, it improves the functionality associated with applications such as industrial control systems, building/home automation and medical data collection.

Like Bluetooth, it operates in the ISM 2GHz band, but requires significantly less overhead in terms of software code requirements to create an application, hence a savings in power consumption and simpler implementation.

The Zigbee specification supports operation in one of three modes:

1) Router works similar to traditional Ethernet routers providing connections based on source destination requirements of the respective devices.

2) Zigbee Coordinator is required to form a Zigbee network. The coordinator could be viewed as similar to the Domain Name Server (DNS) in a large network, storing information about the other devices of the network.

3) Zigbee End Device is the simplest device on a Zigbee network. It can only communicate to a coordinator or a router, however it can not pass data through. This is used where a simple, inexpensive point-to-point connection is all you need.

## Other WPAN technologies

WPAN devices are not limited to various black-boxes. A German company called Ident Technologies has developed a technology called Skinplex, which permits the transmission of data using the human body as a medium. Basically, a person carries a device that uses his skin as the antenna. When he is in close proximity to a receiver, communications can be reliably achieved. One of the current applications for this technology is secure access to buildings, automobiles or other situations that require verification. The system operates at low data rates on a frequency of 195kHz. This is similar to the RFID systems found in most retail stores.

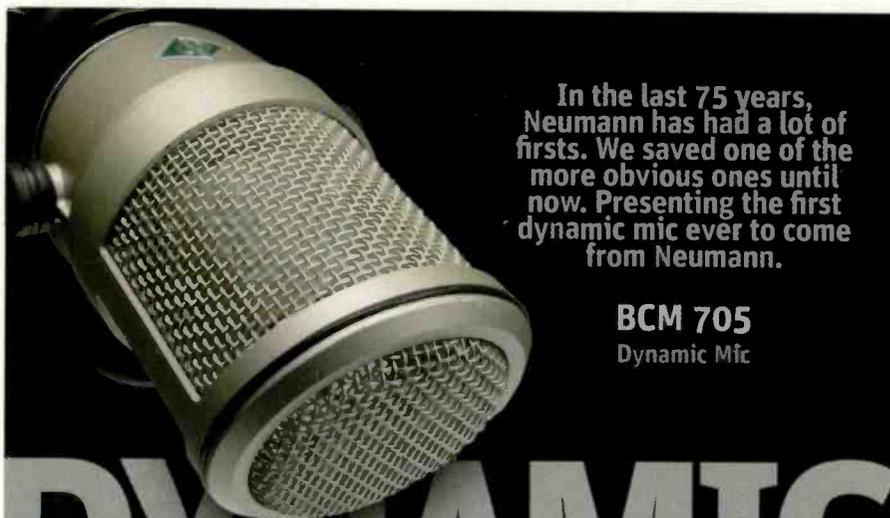
WPANs might present some interesting applications in a broadcast facility. Imagine a studio of WPAN-enabled devices where there are no wires, and where equipment could be moved from studio to studio without rewiring.



*McNamara is president of Applied Wireless, Cape Coral, FL.*

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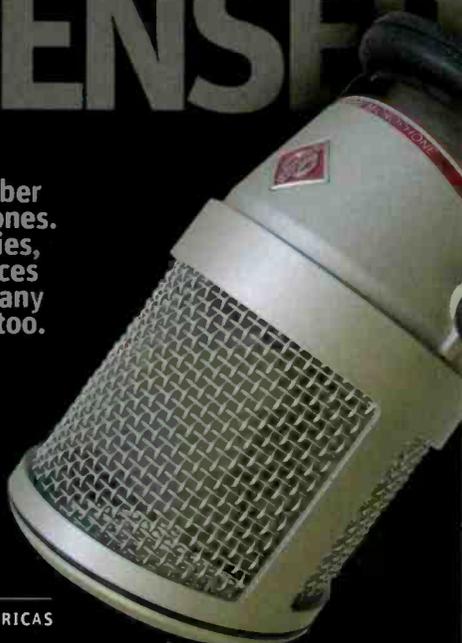
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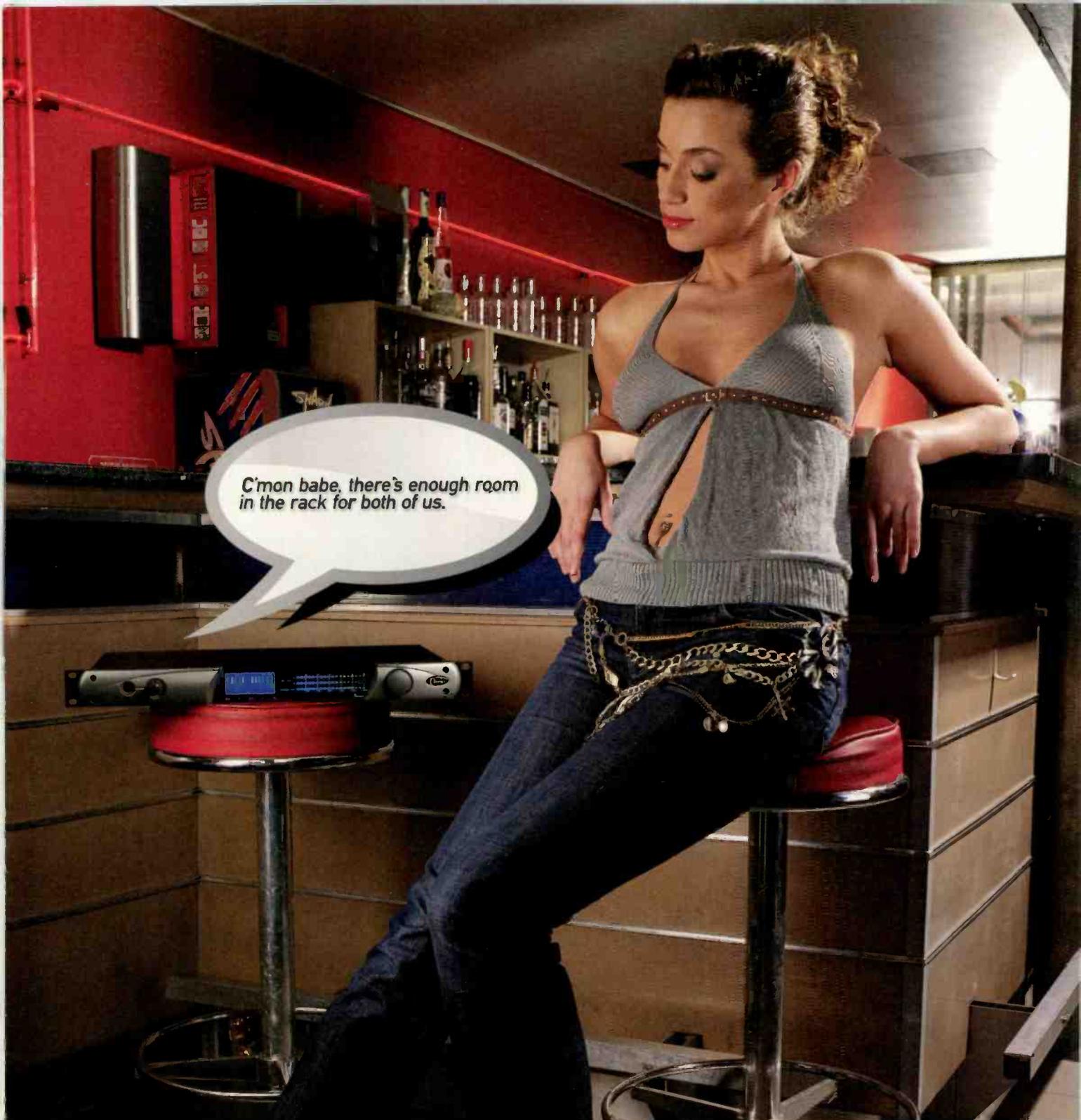
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## FCC acts on noncommercial applications, announces window

By Harry Martin

**I**n March the commission resolved 76 mutually-exclusive groups of noncommercial educational FM (NCE-FM) proposals involving 200 applications, some of which have been pending for more than 10 years. At the same time, the agency announced a filing window for new and major-change NCE-FM applications will be opened in October.

Under the system, applications are first compared under "fair distribution" criteria developed under Section 307(b) of the Communications Act and, if 307(b) is not dispositive, the agency looks to comparative "points," which are awarded on the basis of localism, media diversity and population coverage.

*307(b) Factors.* Section 307(b) of the Communications Act requires the commission provide for "a fair, efficient and equitable distribution" of broadcast spectrum among the various states and communities. A threshold decision under Section 307(b) occurs when only one application in a comparative group would provide a first or

"local" means that an applicant has a campus or headquarters or 75 percent of its board members living within 25 miles of the proposed community. Documentation of the basis of a "localism" claim is required.

- Two points are awarded to any applicant proposing service that does not overlap contours with any other station (including translators) in which the applicant, an officer, director or board member has an interest. The applicant's governing documents (by-laws, constitution or equivalent) must also include a provision to maintain such diversity on a going-forward basis. Special procedures exist for state chartered institutions, such as colleges, that may have a wide-area mandate, but will operate a station in one particular community. And similar provision is made for certain statewide educational networks, which are entitled to two points if they have overlapping contours with other related stations (a situation that would otherwise make them ineligible for these two points).

- One or two additional points are awarded for the best technical proposal—meaning proposed service to the largest population and area. Two points are available to an applicant proposing 60dBu service to an area and population at least 25 percent larger than the next best showing.

- If there is a tie on the basis of points, the deciding factor is the number of other radio station authorizations and applications attributable to each applicant.

*Window for New Applications.* A window for filing new and major change NCE-FM applications on the NCE reserved channels (Channels 201-220) will be open during the period Oct. 12 through Oct. 19, 2007. There are about 180 NCE-FM applications already pending, which were filed before the 2000 freeze. Those applications will have to be resubmitted electronically during the window and will be considered new proposals for cut-off purposes. 

### Dateline

Aug. 1 is the deadline for radio stations in the following states to file their biennial ownership reports: California, North Carolina and South Carolina.

Aug. 1 also is the deadline for stations in North Carolina and South Carolina with 10 or more full-time employees to file their mid-term EEO reports on FCC Form 397.

Aug. 1 is the date radio stations in the following states must place their annual EEO reports in their public files: California, Illinois, North Carolina, South Carolina and Wisconsin.

second NCE-FM service to at least 10 percent of the population (in the aggregate) within the proposed 60dBu contour, as long as the underserved population is at least 2,000 people. If only one applicant can do this, it wins on that basis alone. If two or more applicants meet the threshold Section 307(b) test, one of them can still win if it proposes a first NCE-FM service to at least 5,000 more people than any of the other applicants.

*Point system.* If Section 307(b) is not dispositive, the applicants in a comparative group are next compared under several categories, with points awarded as follows:

- Three points go to any applicant that is locally based and has been local for at least two years.

*Martin is a past president of the Federal Communications Bar Association and a member of Fletcher, Heald & Hildreth, Arlington, VA. E-mail martin@fhhlaw.com.*



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# A look back at **NAB2007**



## Once again, IBOC was the star of the show.

Another full week of sessions, meetings and exhibits filled the middle of April as broadcasters and equipment manufacturers and suppliers converged on the city that has been the host of the NAB convention continuously since 1991. The NAB touts that attendance, at 108,232, was the third-highest attendance of any convention ever. There's no doubt that the convention was huge.

As we have seen in previous years, the technology trend favored refinement and development rather than completely new introductions, but there was still plenty to see. We previewed many of the new product introductions in our March and April issues, and this month we complete the picture with even more introductions from the exhibit floor. Taking the spotlight on these new products are the Radio magazine Pick Hits which are now in their 23<sup>rd</sup> year. The original convention technology honor is still the most coveted.

We also bring the sights of the convention to you with highlights of pictures from the Radio magazine Photo Blog. The Radio magazine staff and contributors were armed with cameras to capture each day's images, which we posted online each evening.

The Radio magazine Photo Blog is now a familiar tradition, and we're proud to bring it to you every year. See more images online at [RadioMagOnline.com](http://RadioMagOnline.com).

A big part of the convention was digital radio. While this mainly focused on HD Radio, FM Extra and DRM were also present. And in keeping with the trend of the convention, even the digital radio technologies were showing technology refinements in the sessions and in the exhibits.

*Chris Scherer*

— Chriss Scherer, editor

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2007  
**PICK HIT**  
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THE RADIO TECHNOLOGY LEADER

Exclusive access to the  
top 15 new products  
from the convention

Reported  
by Kari Taylor,  
senior associate editor

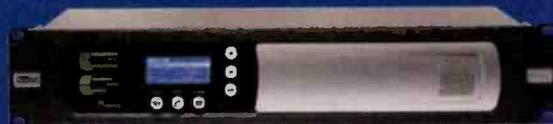
**D**uring and after a convention, everyone asks, "What was new at the show?" Here's your answer: the *Radio* magazine Pick Hits. These 15 new products were selected by a panel of eight radio broadcast engineers, who have a combined radio experience of 225 years. I know that you'll recognize at least a few of their names. We list them on page 20.

The Pick Hit Awards were first awarded in 1985, which makes them the original technology honor of the NAB convention, and this year's collection continues the tradition of recognizing technical excellence and innovation with a broad range of products and services.

## Talkshow system Telos Systems

**Nx12:** The Nx12 provides support for POTS, ISDN and Livewire audio-over-IP technology. The system is a self-contained, 12-line system that includes four hybrids. Available with analog or AES inputs/outputs, the system mixes callers down to two separate analog or AES feeds when the built-in outputs are used. Four hybrids remain present. The system includes echo cancellation for VoIP and cell phone callers. With two program-on-hold inputs and two analog or AES outputs, the system is capable of handling the telephone requirements for two stations simultaneously.

216-241-7225; [www.telos-systems.com](http://www.telos-systems.com); [telos-info@telos-systems.com](mailto:telos-info@telos-systems.com)



### What the judges had to say

- Four digital hybrids in one unit: great idea.
- Support for POTS and ISDN offers many potential options.

## Intercom monitor, talk panel Sierra Automated Systems



**ICM-32:** Designed for a variety of broadcast communications, the monitor features 32 separate talk/listen channels, each with a two-line/eight-character VFD display; dial-up listen and talk of any router system source or destination; and mixing of multiple sources for listen with independent volume control adjustment. Connectivity is via Internet, local LAN or directly to the SAS 32KD.

818-840-6749; [www.sasaudio.com](http://www.sasaudio.com); [sales@sasaudio.com](mailto:sales@sasaudio.com)

### What the judges had to say

- Provides the missing component of the router system.
- It fits several applications with the IP audio interfaces.

## IP audio codec APT

**Worldcast Eclipse:** The Worldcast Eclipse is a multi-interface, multi-algorithm audio codec that offers Ethernet, X.21/V.35 and ISDN ports providing access to a wide range of networks such as IP, leased line, satellite, microwave and dial-up. Broadcasters can also choose from coding algorithms such as standard and enhanced Apt-x, MPEG 1/2 Layer 2/Layer 3, MPEG 4 AAC, G.711 and G.722. The codec is designed with a DSP-based architecture. Enhanced 16- and 24-bit Apt-x are standard.

800-955-APT-X; [www.aptx.com](http://www.aptx.com); [info@aptx.com](mailto:info@aptx.com)



### What the judges had to say

- All the encoding algorithms and a plethora of connection options.
- Built-in bonding of four ISDN lines provides an ideal high-quality back-up path.

## TECHNOLOGY HONOR

### Central monitoring systems

Moving beyond basic facility monitoring, current monitoring and control systems are being used for functions beyond transmitter functions. Broadcast equipment and computer networks are only one part. Telco services, HVAC, security systems and almost any system can be monitored and controlled now, and systems from companies including Statmon, Evertz, Burk, Audemat-Aztec and Wit recognize this function.



**Audio processor  
Audemat-Aztec**

**Digiplexer 2/4:** This processor is also a full RBDS encoder, and a digital, stereo encoder. It allows I/O remote control and backup audio. The processor uses high-speed DSP to create

a stereo signal and radio data messages. With the Ethernet connection and the PC software, configuration is possible from anywhere in the world. The processor features a real-time clock for RBDS scheduling, two-band audio processing, 2 giga-flops of DSP power, clippers that run at 1.5MHz, LCD screen and Ethernet, USB and RS-232 ports, all in 1RU.

**305-249-3110**

[www.audemat-aztec.com](http://www.audemat-aztec.com)  
[contact@audemat-aztec.com](mailto:contact@audemat-aztec.com)



**What the judges  
had to say**

- This has everything: processing, RBDS and a hard drive for back-up audio.
- I can use this at some of my translator sites.

**The Pick Hits Judges**

**Bud Aiello**

Director of Engineering Technology  
National Public Radio • Herndon, VA

**Roswell Clark, CSRE CBNT MSCE**

Director of Technical Operations  
Cox Radio - Tampa • Clearwater, FL

**Don Danko, CBRE CBNT**

VP of Engineering  
Cincinnati Public Radio • Maineville, OH

**Jack Hoepfner**

National Director of Engineering  
Corus Entertainment • Winnipeg, MB

**Keith Smeal**

Director of Technical Operations  
Greater Media New Jersey • Windsor, NJ

**Jeff Smith, CEA CBNT**

President  
JRS Broadcast Engineering • Monroe Twp, NJ

**Dave Supplee**

Regional Engineer  
Cumulus Media • Millintown, PA

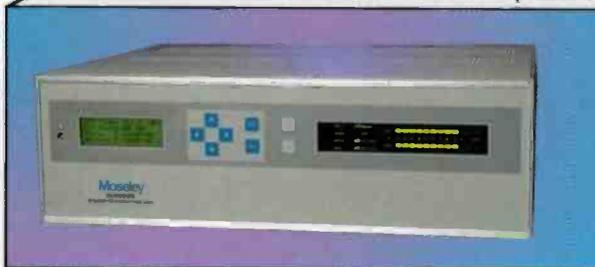
**Barry Thomas, CPBE CBNT**

VP of Engineering, Radio Division  
Lincoln Financial Media • Atlanta, GA

*Only the Pick Hit Awards reveal the names of the judges, who follow a fixed set of rules. The rules are listed on page 25.*

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 West Coast: 1-866-673-9267 Doug Tharp  
 Mid-West: 1-513-899-3036 Mary Schnelle  
 South-Atlantic: 1-770-632-1295 Art White  
 North-East: 1-315-623-7655 Jim Peck  
 South-West: 1-210-775-2725 John Lackness  
 Pro Audio: 1-877-640-8205 Ric Goldstein  
 Latin America: 1-760-650-1427 Lily Massari

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**Bob, Ernie, Matt or Mike**  
**HQ in Pineville, NC**



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[www.efronstudios.com](http://www.efronstudios.com)**

**Remote receiver  
 Burk Technology**

**Watchband:** Delivering station and market monitoring tools to managers, engineers and programming departments, this receiver provides stereo, phase and field intensity data, streaming audio and decoded RBDS to any PC with an Internet connection. Broadcasters can record audio streams for remote playback, as well as log audio metrics for review and analysis. Automatic logging routines allow station-to-station comparisons for the entire market. Logged RBDS



data reveals content on market stations.

**800-255-8090**

[www.burk.com](http://www.burk.com); [sales@burk.com](mailto:sales@burk.com)

**What the judges had to say**

- I needed something to log all our RBDS messages. This can do it.
- A good way to monitor lots of station parameters in the entire market.

**Flash memory audio player  
 Kowa**

**PX10:** This player is easy to start: insert a USB drive and play. Users can store audio by dragging and dropping on the PC screen. The graphical vacuum fluorescent display is bright and clear, showing the counter, level meter and content status. Its triangular-shaped aluminum enclosure makes it strong and lightweight. No moving parts, such as cooling fans and hard disks are used. Users can switch among six pages to access up to 300 audio files. Direct mode allows the user to choose any of the clips assigned to any of the 50 hot keys. A preset mode allows continuous looping.



**310-327-1913; [www.proaudiokowa.com](http://www.proaudiokowa.com)  
[pxinfo@proaudiokowa.com](mailto:pxinfo@proaudiokowa.com)**

**What the judges had to say**

- File loading is amazingly simple.
- The USB jack is a great use of an established storage medium.

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 Phone +49-2173-967 315  
 e-mail: [info@yellowtec.com](mailto:info@yellowtec.com)

## Cable connector Neutrik

**EMC-XLR:** The EMC-XLR is comprised of three-pole male/female XLR cable connectors with integrated LC-filters, which avoid the RD interference and LF noise. There is also a 360° shield contact on the female connector that ensures shielding and chassis contact. This connector can solve problems such as ground loops, RF interference and Pin 1 problems.

732-901-9488; [www.neutrik.com](http://www.neutrik.com); [info@neutrikusa.com](mailto:info@neutrikusa.com)



## Wireless audio interface JK Audio

**Daptor Three:** Using Bluetooth wireless technology, this interface connects to the user's cell phone like any other Bluetooth-enabled headset. The interface allows balanced and unbalanced connections to a cell phone or other products, such as a laptop, that allow a similar headset connection. Features of the unit include XLR balanced line input and output, and a 9Vdc battery.

800-552-8346; [www.jkaudio.com](http://www.jkaudio.com)  
[info@jkaudio.com](mailto:info@jkaudio.com)



### What the judges had to say

- It has incredible RF rejection.
- The common XLR has been given a useful upgrade.

### What the judges had to say

- It's far beyond a phone interface.
- The endeavor to do this with Bluetooth is a bold move.

## TECHNOLOGY HONOR

### Conditional Access for HD Radio

As HD Radio continues its roll-out, the technology continues to evolve and develop. Enhanced services are a promised function of the system, but realizing a return on the investment to deliver these services has been elusive. Conditional access from NDS, shown as a concept, is one of these enhanced services that stations can use to realize a return on their digital radio investment.

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[www.es-web.com](http://www.es-web.com)



### Warning enunciator Alert System

**Alert System:** Unlike other alert enunciators, when there are no alerts, this system does not remain dormant. This system can be synchronized to the Internet desktop or clock system to display time, it can display information for a kiosk, function as a digital signage system, or display telephone call screener information. The enunciator displays a picture image on a computer monitor when an alert is received. The system can store and display 20 screen images. Each of the screens can display a single picture or a picture slide show with as many pictures as wanted, changing the picture every one to 99,999 minutes, in order or randomly.

817-944-5903

#### What the judges had to say

- Finally, an incredibly versatile way to display multiple alerts.
- An elegantly simple solution to a common problem.



### Twisted pair products RDL (Radio Design Labs)

**Format-A:** Format-A twisted pair products send, receive and distribute audio via CAT-5 cable. Modules are available for mounting in walls, cabinets and racks. Sending and receiving modules are equipped with connectors and terminal blocks for standard -10dBV unbalanced and +4dBu balanced line levels, and standard microphone levels. Format-A uses one pair for power and three pairs for signals. Sending and receiving modules each use one pair, two pairs or all three pairs for audio signals. Single-pair products allow the installer to select which of the three pairs is used to send or receive the signal. Two-pair products are used for stereo audio. Three-pair products send and receive three separate signals, which may comprise three mono signals or microphone plus stereo line signals.

800-281-2683; [www.rdl.net](http://www.rdl.net); [sales@rdlnet.com](mailto:sales@rdlnet.com)

#### What the judges had to say

- The power inserter is just one of the practical elements.
- Lots of accessories and adapters in the system.



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## HD Radio monitor Day Sequerra

**M3:** The 2RU monitor provides three frequency-agile AM, FM and HD Radio multicast tuners, each equipped with analog and digital balanced outputs, streaming RS-232 PAD data outputs and six programmable dry, floating contact alarm relays—18 relays total. Each tuner stores 20 AM and 20 FM presets, decodes HD-1 through HD-8 multicast channels and displays signal strength, multipath, HD Radio PAD data and analog RBDS data. Indicators report HD locked, multicast present, delay bit set and tuner alarm. Audio output is uncompromised with an oversampled D/A converter driving Class A biased audio outputs. HD Radio stereo separation is better than 90dB, and THD+N is less than 0.005 percent.

856-719-9900; [www.daysequerra.com](http://www.daysequerra.com); [info@daysequerra.com](mailto:info@daysequerra.com)



### What the judges had to say

- An ideal way to monitor an HD-1, HD-2 and HD-3 in one box.
- This one stood out as a very functional tool.

### The Pick Hits Rules

1. Products must be new and not shown at a previous NAB spring convention. In some cases, distinguishing a new product from a modified older one is difficult. For "Pick Hits" purposes, a new product is one with a new model number or designation. Software, firmware and operating system updates are eligible, but the new revision must carry an obvious designation (1.0 to 2.0 for example) and the feature set must provide clearly identifiable changes or updates.
2. Products must have some positive impact on the intended user's everyday work. Judges search for equipment intended for use on a regular basis. Products should provide new solutions to common problems.
3. Products must offer substantial improvement over previous technology. Unique circuit architecture need not be included, but some new approach or application must be involved in the product's design.
4. The price of the product must be within reach of its intended users. The judges seek products appropriate to a wide range of facilities.
5. The products must be available for purchase within the 2007 calendar year. Equipment must be on display on the show floor, currently (or imminently) in production, and some type of product literature must be available. Judges take the exhibitor's word on availability dates. Products demonstrated in private showings do not qualify.
6. The Pick Hits Judges operate independently from one another and remain anonymous to everyone including other judges until the selection meeting. This ensures that the products chosen are truly representative of the industry, that the judges were not persuaded in any way, and that the entire selection process is as fair as possible. The judge's identities are published in the June 2007 issue.
7. The editorial staff of *Radio* magazine serves only as a moderator during the final selection process and has no influence or decision in determining the winners.

Only the Pick Hit Awards have an established list of official rules, unlike some other convention awards. Radio magazine believes that simply having the judges claim that a product is "nifty" is absurd.

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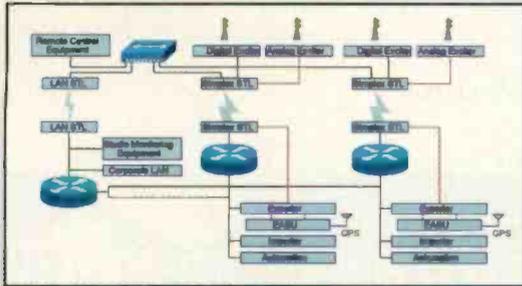
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**HD Radio STL**  
**Nautel**

**Reliable HD Transport:** This system features Clock Packet Tunneling that arranges clock packets to be sent during times when no data packets are using the STL bandwidth, facilitating a more accurate measurement of the STL throughput delay. Data rebalancing ensures continuous operation without dropout by creating a constant bit-rate stream, reducing instantaneous STL



bandwidth requirements. Its automatic E2X start-up sends the initial control packet only once.

207-947-8200; [www.nautel.com](http://www.nautel.com); [info@nautel.com](mailto:info@nautel.com)

**What the judges had to say**

- Adds another level of robustness to the HD Radio system.
- Provides a simpler, more cost-effective data link.



**Retrofit adapter Dialight**

**D264:** The D264 Series retrofit adapter allows for simple retrofit of a new LED beacon to an existing incandescent base, eliminating the need to fully dismantle the old fixture. Remove the top half of the existing incandescent light and the retrofit adapter securely mounts to the existing hinge. The adapter uses a socket-based electrical interface. Other features include interfacing with most existing fixtures and reducing retrofit time for an LED beacon to a fraction of what would be required for a complete fixture removal.

800-835-2370; [www.dialight.com](http://www.dialight.com)  
[info@dialight.com](mailto:info@dialight.com)

**What the judges had to say**

- Eliminates the costly replacement of the entire lamp assembly.
- Reduces the capital outlay when converting to LED lighting.

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**BOSTON, MA**

## Guy anchor rod ERI-Electronics Research

**Ultra Guy Anchor Rod:** This guy anchor features



a port to allow non-destructive ultra-sonic testing of guy anchor integrity, without soil excavation. It's noninvasive because there is no digging and nondestructive because there is no surface damage.

No temporary anchors are required. The equipment provides more detail than a visual inspection, including detection of stress cracks and internal flaws. The rod is Polyethylene sealed and anti-corrosive.

812-925-6000; [www.ERlinc.com](http://www.ERlinc.com); [sales@ERlinc.com](mailto:sales@ERlinc.com)

### What the judges had to say

- A well-designed upgrade to a common piece of hardware.
- Addresses a potentially costly problem to diagnose and correct.

## PCI sound card Audio Science

**ASI6585:** The ASI6585 is designed for use in an Axia Livewire IP-audio based radio broadcast automation system. It uses the Livewire protocol to record and play audio streams over a standard Ethernet network. The card provides eight play streams that are mixed to eight stereo outputs and eight record streams fed from eight stereo inputs. Choose from uncompressed PCM, MPEG Layer 2 and MP3 for recording and playback. Compression is handled by an on-board floating point DSP. MRXT multi-rate mixing technology allows streams of different sample-rates and formats to be mixed digitally. TSXT time scaling allows compression/expansion of playback streams in real time with no change in pitch.

302-324-5333; [www.audioscience.com](http://www.audioscience.com)  
[sales@audioscience.com](mailto:sales@audioscience.com)



### What the judges had to say

- Supports all the algorithms and features that the Axia driver does not.
- The on-board DSP handles all the processing instead of relying on the computer's CPU.

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Mt. Mansfield  
Vermont  
October 2006

by Kari Taylor, senior associate editor

## Audio mixer AEQ



**Bravo:** This console has been designed for small- and medium-sized radio stations. The Bravo features two program buses, four mic-line channels, eight dual stereo line inputs and a dual telephone channel with integrated telephone hybrids. Other features include cue bus with integrated loudspeakers and headphone outputs, and an amplified monitor output.  
**800-728-0536; www.aeqbroadcast.com**  
**sales@aeqbroadcast.com**

## CD/DVD/Data disc player Denon Electronics



**DN-C640:** Housed in a 1RU chassis, the player reads audio data from CD and DVD discs, as well as easy access to network playback capabilities. Compatible with most standard audio data file formats, the unit allows 20 hours of MP3 or similar audio playback from a CD, CD-R or CD-RW. The equipment allows disc playback that is unrestrained by the normal 80-minute CD-R time limit. Features include AES/EBU output, internal sample rate converter (32kHz, 44.1kHz and 48kHz), auto cue and  $\pm 12$  percent pitch control. The unit also features user-definable skip-back instant replay and frame accurate searching.

**630-741-0330; www.d-mpro.com; info@d-mpro.com**

## Conditional access NDS Limited

**Radioguard:** This technology enables pay-per-listen, opt-in and public service on the HD Radio platform. Broadcasters can offer more choices to their listeners, a broader selection of content and more segmentation opportunities for advertisers, all of which provide additional revenue-generating possibilities. The technology improves radio reading services for the blind, private channels for emergency operators and opt-in events sponsored by advertisers. The technology will encrypt content before it is transmitted over the airwaves, then decrypt it once the radio has received it and verified the entitlement rules.

**949-725-2500; www.nds.com**

## LED cluster lamps Ledtronics



**B3127 series:** These single-contact, 9mm, bayonet-based seven-LED cluster lamps can replace incandescent bulbs #6MB, 44, 47, 755 (5/6V), 24MB (24V) 313, 757, 1819, 1829 (28V) and 120MB, NE51H (120Vac). The lamps incorporate optical-grade epoxy and LEDs. A light-emitting angle of 50° is offered as standard; custom viewing angles are available. Choose voltages from 6Vdc, 24Vdc, 28Vdc, and 120Vac and 130Vac. The lamps draw between 8mA to 75mA of power. LED lamps last 30 to 50 times longer than the incandescent lamps, and their low-current, high-efficiency operation delivers power savings of 80 percent to 90 percent.

**800-579-4875**  
**www.ledtronics.com**

## Cable connector Wireworks



**AVHD3:** This connector offers as many as 240 coaxial connections or 230 balanced audio connections in 3RU, the AVHD3 features 24 precision coax contacts safely housed in a heavy duty connector. The unit comes with the tail necessary to connect directly to equipment in the rack. It is designed with cast metal connector frames and backshells, as well as gold contacts. No BNC interconnect cables or break-out boxes are required.

**800-642-9473; www.wireworks.com**  
**info@wireworks.com**

## AM audio processor Orban

**Optimod-AM 9300:** Useful for AM short wave, medium wave and long wave broadcasts, all processing is performed by high-speed mathematical calculations within Motorola DSP56367 digital signal processing chips. The processor's quick setup wizard walks the user through the setup process. A less/more knob customizes the processor's factory presets. Most of peak modulation control is performed within the five-band limiter, using multiband distortion-canceling clipping. An all-pass phase scrambler makes peaks more symmetrical to reduce clipping distortion and to allow better control of loudness. The analog input is buffered and immediately followed by an analog-to-digital converter. All processing takes place in the digital domain. The automatic gain controller compensates for operator gain-riding errors.

510-351-3500; [www.orban.com](http://www.orban.com)  
custserv@orban.com



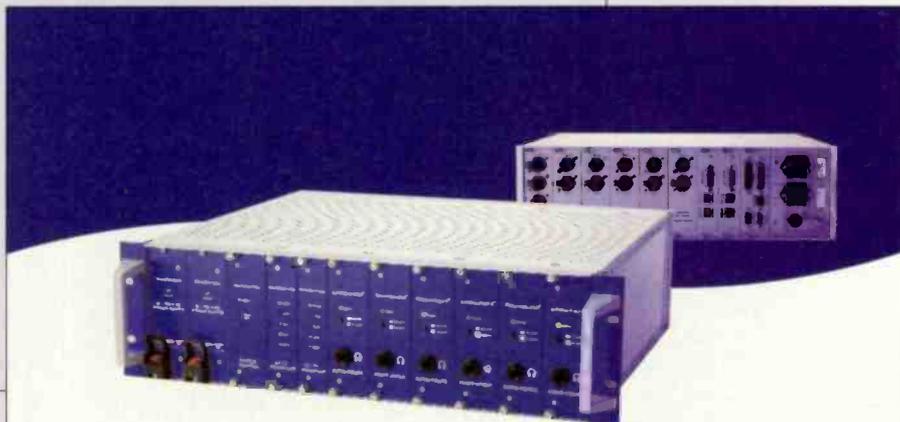
## Automated processing Minnetonka Audio Software



**Audio Tools Batch Pro:** Batch Pro provides an automated processing environment for many audio-related tasks including editing, encoding, plug-in processing and processing through external I/O. The system can configure any chain of audio editing functions, processors, plug-ins, external analog and digital units, as well as codecs. Users can control plug-in parameters through the native VST plug-in interface. Specify input files and file groups with automatic grouping options. Save input/output file settings and processing chains as jobs, and schedule jobs for execution. Monitor and control multiple job queues, and conditionally control processing based on audio formats or other parameters.

612-449-6481

[www.minnetonkaaudio.com](http://www.minnetonkaaudio.com)  
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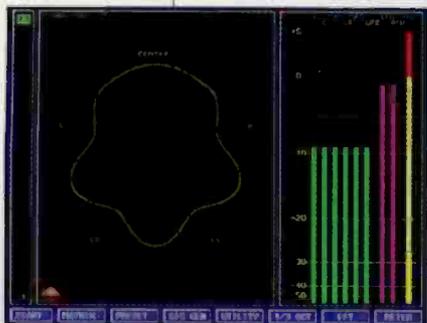
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**Display for audio meters  
DK Technologies**



**Star Fish:** This meter allows users to see what they are hearing when they are listening in surround sound. Based on the company's Jelly Fish display, the Star Fish displays an image of the acoustic audio levels as they are experienced by the listener. This information is provided

alongside the images already provided by Jelly Fish, which show audio levels supplied to the center, left/right and left/right rear speakers. The color of the meter's contour reflects the correlation between neighboring audio channels in the surround signal. The stereo downmix and the mono downmix can be displayed simultaneously with the surround sound signal.

+45 4485 0255; [www.dk-technologies.com](http://www.dk-technologies.com)  
info@dk-technologies.com

**Audio cue controller  
JL Cooper Electronics**



**Soundchest III:**

This controller plays MP3 files from a Compact Flash card. Use any computer and MP3-compatible software to obtain, record and organize sounds from any source. Thousands of MP3 sound effects are available and recording custom sounds is possible. Non-destructive editing features let the user control dynamic volume, panning and sound length. A 3.5mm jack is provided for attaching one or two external effect trigger switches.

310-322-9990; [www.jlcooper.com](http://www.jlcooper.com)

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DESIGN  
[www.violetdesignusa.com](http://www.violetdesignusa.com)

## Powered monitors JBL Professional



**LSR 4300:** The analyzer in this studio monitor (8"LF/1"HF, 150/70W bi-amplified) automatically compensates for problems caused by low-frequency standing waves and lack of sonic elbow room. PC and Mac software provides control of all parameters from a computer. A virtual monitor section with input switching,

master volume, mute and solo controls provides comprehensive control at the mix position. Analog inputs: XLR, 1/4" balanced, +4dBu, -10dBV. Digital inputs: AES/EBU XLR, S/PDIF RCA, data connections, Harman Hi Q Net Network, USB and RMC mic.

800-852-5776; [www.jblpro.com](http://www.jblpro.com); [info@jblpro.com](mailto:info@jblpro.com)

## Digital transmitter Broadcast Electronics

**FMI 50T:** The transmitter offers 50kW FM+HD Radio output with better than 55 percent overall efficiency. It includes the FXI FM+HD Radio exciter and ESP correction technology throughout the RF chain. The transmitter features patented folded half-wave cavity for better performance and efficiency. It provides low-level combined power levels of 28kW or less.

217-224-9600; [www.bdcast.com](http://www.bdcast.com); [bdcast@bdcast.com](mailto:bdcast@bdcast.com)

## Find the mic winner April issue

Congratulations to  
**Nic Sabatke**

of KCII-AM/FM, Washington, IA.  
His name was drawn from the correct  
entries for the April issue. He won a Heil  
PR-20 mic from Transaudio Group.



The mic icon was on the mic boom just  
below the E in Entercom

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**Linux-based automation  
Smarts Broadcast Systems**



**Skylla:** This multi-station, Linux-based automation system has been under development for several years. Skylla is suited for live, satellite automated and music on hard drive automated operations. The system interfaces to the Smarts Secgen Traffic System, the Digital Program Director Music selection system, and

many other music and traffic programs. Skylla is designed around a central processor unit that runs one station, and auxiliary audio heads that handle the audio stream for additional stations. One unit can handle many audio streams. Switching operations can be centralized, or can be handled by the individual audio heads in the system. Skylla can be operated or monitored via the Internet.

**800-747-6278; www.smartsbroadcast.com  
info@smartsbroadcast.com**

**Transmitters  
Crown Broadcast**

**FM150E, FM150R, FM150T:** The FM150 broadcast transmitter offers a frequency agile front panel, SWR metering from remote control and can control output power from a remote control. It is a stand-alone transmitter that is available in three configurations: the FM150E is a basic exciter with composite input only. The FM150T is good for the lower-power broadcaster, with its built-in audio processor and stereo generator. The 50 percent upgrade in power over the previous FM100 allows the end user to accommodate line loss without upgrading to the next higher-power Crown unit. The FM150R is the translator option with built-in receiver.

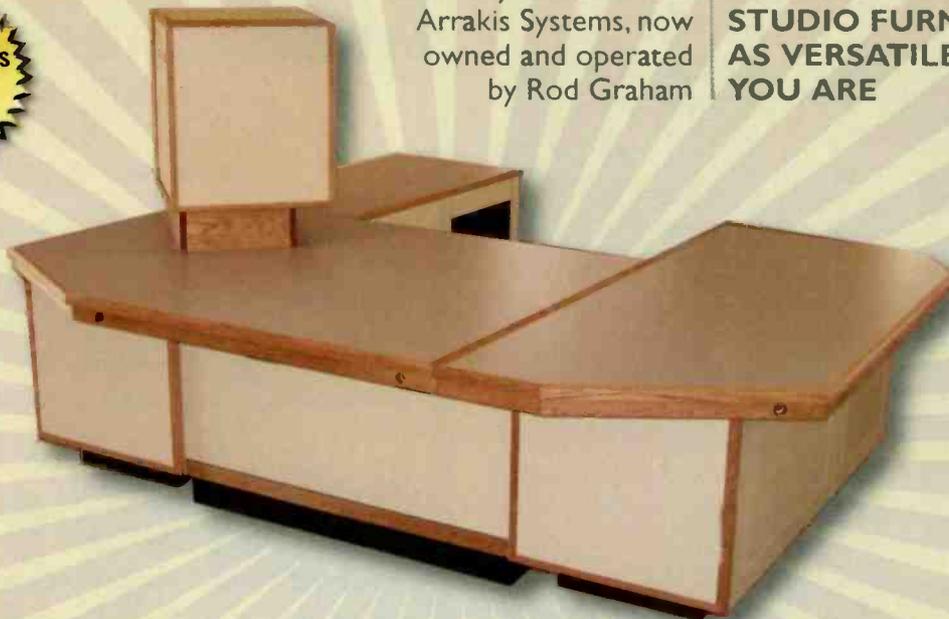
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## High-speed audio transport Aviom



**Pro 64:** A Pro 64 system can distribute audio without being restricted by the physical locations of inputs and outputs or the direction of the signal flow. In auto mode, as many as 64 channels (24 bits, 48kHz) are distributed throughout the network. Channels can be input anywhere in the system and output everywhere, regardless of network topology and layout.

610-738-9005; [www.aviom.com](http://www.aviom.com); [info@aviom.com](mailto:info@aviom.com)

## DRE digital FM receiver



### Digital Radio Express

**Aruba:** The Aruba receives any standard FM stereo broadcast, including DRE broadcasts on stations broadcasting DRE programs. Its digital optical output allows it to play digital directly into optical speakers, and eliminates noise associated

with normal speaker wiring. A USB port keeps the radio current as new features and benefits are introduced. The receiver can download updates over the Internet. The receiver operates on a 12V supply. Inputs include an F connector for antenna input jack, full-size smart card and USB connector.

408-956-8707; [www.dreinc.com](http://www.dreinc.com); [contact@dreinc.com](mailto:contact@dreinc.com)

## UPGRADES and UPDATES

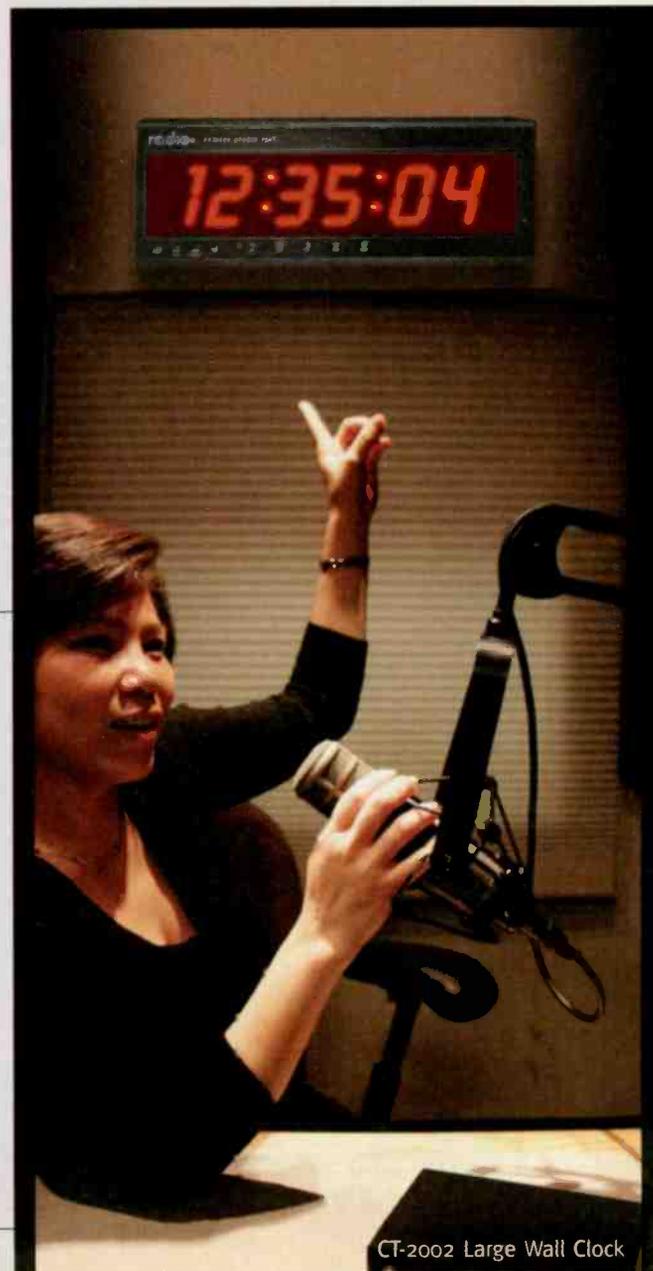
**Sonifex** has released V2.0 of the D:Scribe transcription software, which offers transcription from DVD VOB disks and CD ripping to WMA format. This software operates with the Net-Log audio logger. ([www.independentaudio.com](http://www.independentaudio.com))...

**Enco Systems** has released version 5.1d of its Digital Audio Delivery (DAD) system. The new system features a new user interface, metadata features and stronger music scheduling and traffic integration. ([www.enco.com](http://www.enco.com))...

**Merging Technologies** has released Pyramix Virtual Studio DAW 5.0. The update expands the system's I/O capability from 64 to 128. ([www.merging.com](http://www.merging.com))...

**Tieline** has added 3G wireless broadband cellular broadcast support through software modules embedded into its Commander codec. Two versions of the new modules are available to connect to HSDPA/UMTS/GSM frequency bands or CDMA EV-DO Revision A, 0 and IX networks. ([www.tieline.com](http://www.tieline.com))...

The **Sony PCM-D1** has an added accessory to accommodate XLR mic connections: the XLR-1 adapter. The adapter provides two transformer-balanced microphone inputs with switchable phantom power. ([www.sony.com/proaudio](http://www.sony.com/proaudio))



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**USB matrix switcher**  
**Broadcast Tools**

**ACS 3.2 USB:** The ACS 3.2 USB provides matrix audio switching of three stereo inputs to two stereo outputs. Input three is equipped with the Burr Brown Delta Sigma 8x over sampled USB codec that will operate with virtually any audio editing, recording or broadcast automation software at sample rates up to 48kHz and 16-bit resolution. Matrix switching allows any or all inputs to be assigned to any or all outputs. The ACS 3.2 USB may be controlled via front panel switches, contact closures, logic or the multi-drop RS-232 serial port. The switcher is also equipped with an eight-input GPI port and three-port GPO. Installation is simplified with plug-in Euroblock screw terminals.

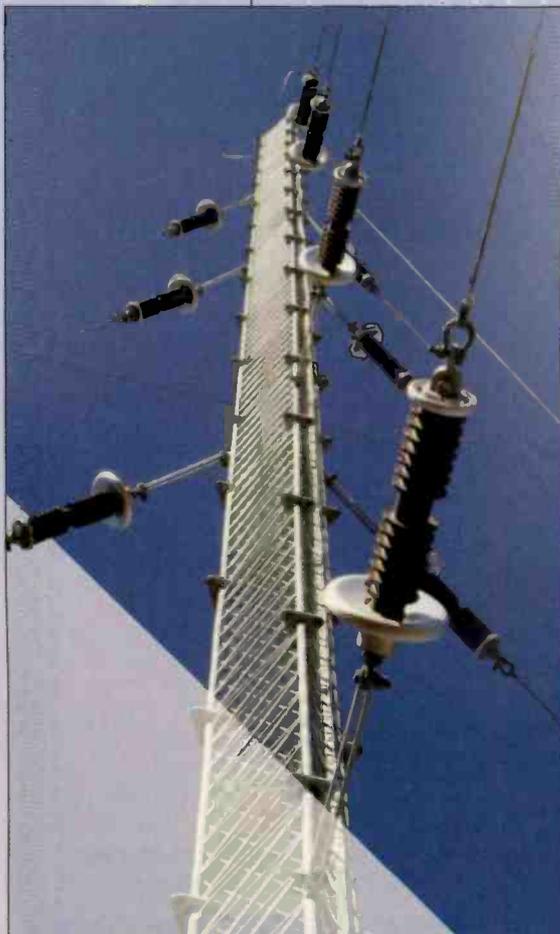
877-250-5575; [www.broadcasttools.com](http://www.broadcasttools.com)  
[btii@broadcasttools.com](mailto:btii@broadcasttools.com)

**Stereo headphones**  
**Beyerdynamic**

**DT 880 Pro:** The improved DT 880 Pro builds on the original 880 that was introduced in 2003. The DT 880 Pro features improved system equalization. It also includes a sturdy spring steel band design with increased contact pressure to provide the listener with a secure comfortable fit and the durability required for daily use. The semi-open design features a frequency response of 5Hz to 35kHz.



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## Condenser mic Audio-Technica



**AT2010:** Featuring the same 16mm low-mass diaphragm found in the AT2020 side-address studio condenser, this hand-held mic offers a fixed cardioid polar pattern that allows isolation of the desired sound

source. The mic can handle high SPLs (136dB) and provides a dynamic range of 113dB. The mic requires 48V phantom power via a mixer/console or by an in-line source. Output from the mic is via a low-impedance, three-pin XLRM-type connector. The mic measures 7.05" long, has a maximum body diameter of 2" and weighs 8.2 oz.

330-686-2600; [www.audio-technica.com](http://www.audio-technica.com); [sales@atus.com](mailto:sales@atus.com)

## Audio router, interface Broadcast Bionics

### Phone Box Solo:

This system is purely software driven, using SIP, VoIP or ISDN technology to digitally route calls to air via a standard Windows PC and sound card. The interface features call recording, editing and playback, advanced visual talk back, database logging, caller ID and black listing. Users can have as many as eight lines for a single hybrid studio system, with options to add call screening, remote control and extra hybrids.



+44 1444 473999; [www.phonebox.com](http://www.phonebox.com); [info@phonebox.com](mailto:info@phonebox.com)

## Bidirectional radio link Moseley Associates



**Event HD 5800:** The Event HD 5800 is a carrier class T1/E1/IP Ethernet radio link. When paired with the Starlink SL9003T1 it creates a high capacity bidirectional STL/TSL. The link's high payload capacity supports multi-station clusters. It's bidirectional to provide LAN extension, remote control, phone extension and backhaul audio for downlink or RPU. The unit consists of a software-defined indoor unit and outdoor unit. The 5800 radios are spectrum and data rate scalable, which enables greater flexibility in STL planning and future growth. The integrated T1/E1 and Ethernet interfaces allow for any combination of T1/E1 and IP packet data up to the maximum throughput.

805-968-9621; [www.moseleysb.com](http://www.moseleysb.com); [info@moseleysb.com](mailto:info@moseleysb.com)

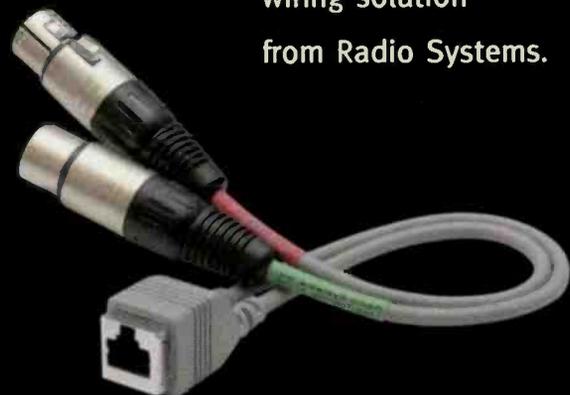
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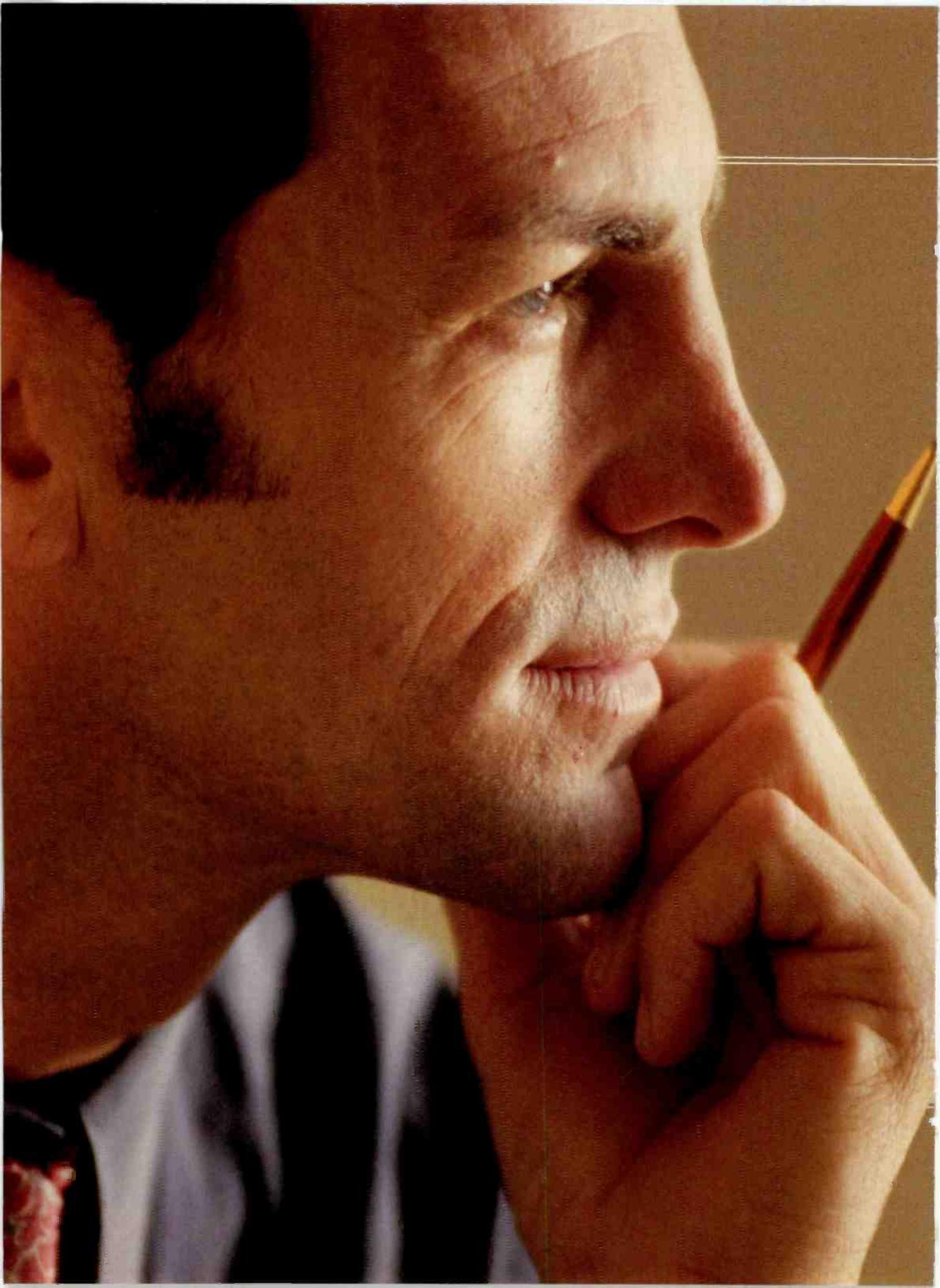


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**ADAC-2:** This converter supports two channels at 24-bit word length and 192kHz sampling rate. Three audio paths through the unit allow users to convert one stereo program from analog to digital, a second stereo program from digital to analog and a third digital audio program from one sample rate to another, all simultaneously and without interaction. The converter's A/D-D/A dynamic range is in excess of 100dB, THD+Noise is less than 0.001 percent and its sample rate converter is greater than 140dB. The converter includes selectable balanced and unbalanced analog inputs, transformer isolated AES3 inputs and outputs, S/PDIF digital audio inputs and outputs, optical inputs and outputs and word clock outputs for DAC and SRC sync.

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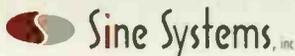
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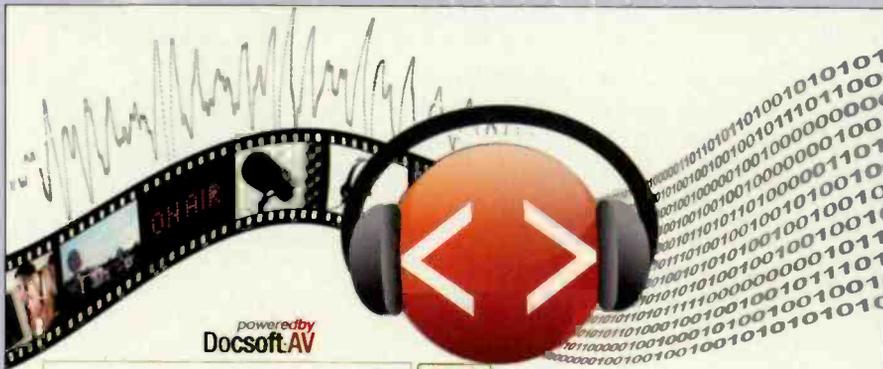
more information: [www.sinesystems.com](http://www.sinesystems.com)

**FM, HD Radio transmitters  
Nautel**



**V1, V3.5, V7.5, V15:** Each transmitter features a redundant modular design with hot-pluggable RF power modules and power supply modules. Each module has its own dc-powered cooling fan that is also on-air serviceable. The transmitters are combined with Nautel's M50 digital exciter for HD Radio. The M50 exciter continuously monitors RF output; its digital adaptive pre-correction circuitry dynamically optimizes performance to ensure compliance with spectral limits. V series transmitters provide user interfaces with an alarm system, 100-events log and on-board real-time clock. They can be remotely managed.

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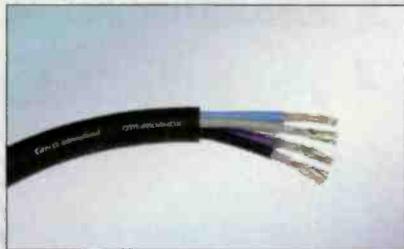


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**CAT-5 snake cable**  
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**CTS4504HDX:** This four-channel CAT-5 snake cable provides four elements of Gepeco CT504HDX four-pair CAT-5 UTP cables under an overall jacket. Each element features 24-gauge, solid copper conductors and an inner belt that preserves the critical pair spacing and geometry. For added strength and diameter, each four-pair UTP element has a second TPE jacket that is color-coded for easy identification. The outer jacket is constructed from a rugged TPE compound for durability and flexibility in hostile environments.

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**Mic**  
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**Handi Mic Pro Plus:** The pattern control of the mic is achieved by using a combination of materials for the large, low mass diaphragm and a special mixture of neodymium, iron and boron that provides a strong magnet structure. The phasing plug assembly features equally placed ports that sense audio from behind, entering them out of phase. Thus, the mic produces a linear cardioid pattern and reduces the proximity effect. The mic's frequency response is 50Hz to 18kHz. Its rejection is a 30dB rise at 180° off axis.

618-257-3000; www.heilsound.com

info@heilsound.com

In the May issue, the Field Report on the Whirlwind AES Qbox included an incorrect e-mail address for the company. The correct address is sales@whrlwindusa.com.

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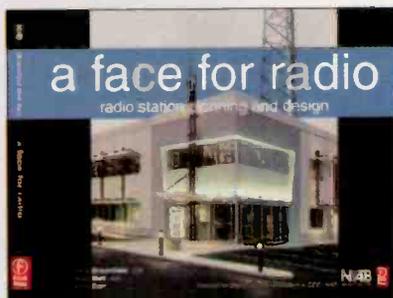
smthhs

**Station planning and design book**

**Elsevier/Focal Press**

**A Face for Radio:** This book explains the basic concepts of applicable architectural and interior design elements as guidelines for space planning; building infrastructure; layout schemes for offices and technical facilities; colors, materials and finishes; lighting; and scheduling. The book includes images and plans of the work of leading designers of radio broadcasting facilities in the United States and overseas, budgets and construction schedules for a variety of typical projects, and guidelines to follow for flexible programs that apply to radio stations of all sizes, from major market network affiliates to small independents.

781-221-2212; [www.elsevier.com](http://www.elsevier.com)  
usbkinfo@elsevier.com



**Nearfield monitor**

**Adam Professional Audio**



**A7:** The A7 features a 6.5" woofer that introduces a new cone material combining high rigidity and high internal damping with low weight. The speaker is powered by two 50W RMS amps (one per driver). The front panel sports a power switch and volume control. The rear panel houses controls for tweeter

level and two shelving filters for high and low frequencies. The unit also features balanced and unbalanced input connectors. Other features: two-way active bass reflex and a frequency response of 46Hz to 35kHz, ±3dB. Its dimensions are 7" x 13" x 11".

49 30 86300970; [www.adam-audio.de](http://www.adam-audio.de)  
info@adam-audio.de

**Codec**

**Musicam USA**

**Suprimax:** The codec is a multi-channel IP codec chassis capable of holding as many as 14 codec modules in 3RU. Specially designed for large broadcast networks in high-density applications, the codec permits the delivery of 14 stereo programs from one centralized location. The coding algorithm is user-selectable for each module from G.711 to uncompressed linear coding. The codec supports unicast and multicast IP operations.

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So just pick up a FlashMic and go.



**FlashMic**

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# The sights of **NAB2007**

As we have done for the last several years, Radio magazine once again published a daily photo blog during the NAB convention to capture the news, excitement and activity. Here are some of those images. View the rest online at [RadioMagOnline.com](http://RadioMagOnline.com) in the NAB2007 Photo Blog.



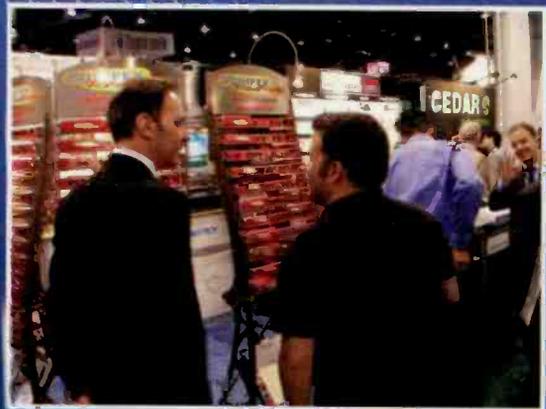
All aboard! The monorail is ready to whisk attendees to the convention center.



Some attendees get the latest information on Armstrong's transmitters.



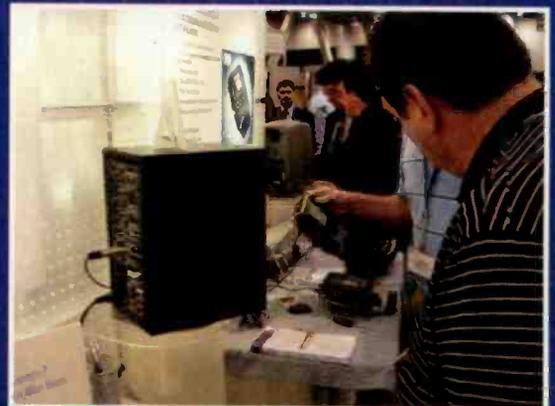
On Saturday, the Ennes session provided a full day of sessions under the topic of Everything Audio.



"We have a box for that." Sonifex shows its full line of audio devices in the Redbox line in the Independent Audio booth.



Kevin Webb (right) shows Sam Roffe the new features of the Tieline Imix G-3.



The convention provided a first look at the Comrex Access portable codec.



At the NRSC meeting on Saturday, Charles Morgan, long-time chairman of the standards-setting group, announced that he was stepping down. The group members applauded to show their appreciation of Morgan's efforts for the NRSC.



Bob Tarsio (center) of Broadcast Devices shows his audio switcher.



The Wheatstone Evolution-5 and its audio router backbone are outlined in full detail.

-  Broadcast Monitoring
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# The sights of NAB2007



RCS and Prophet Systems have merged to become RCS, and one highlight of the booth was the software demonstrations held throughout the day.



SAS showed the Dees Digital, a variation of the company's Rubicon with rotary faders built for Rick Dees.

Photos by Chris Scherer, Kari Taylor and Chris Wygal.



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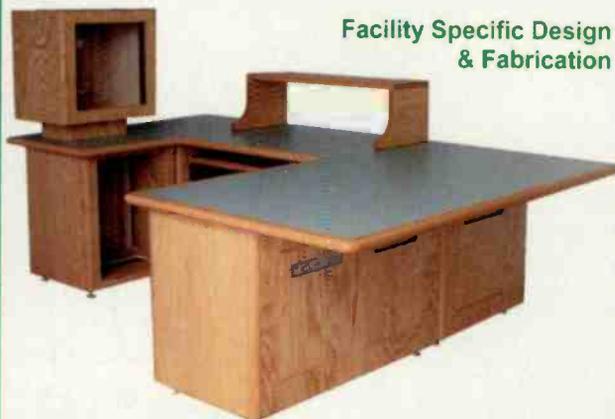
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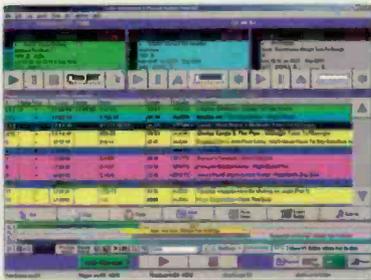
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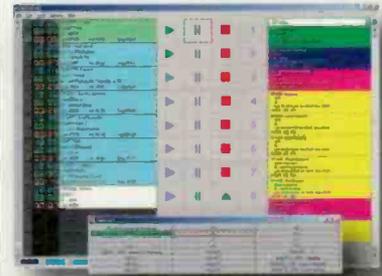
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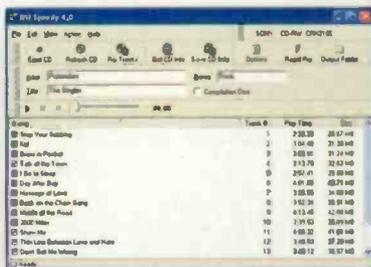
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# Facility

By Jeff B. Twilley, CBRE

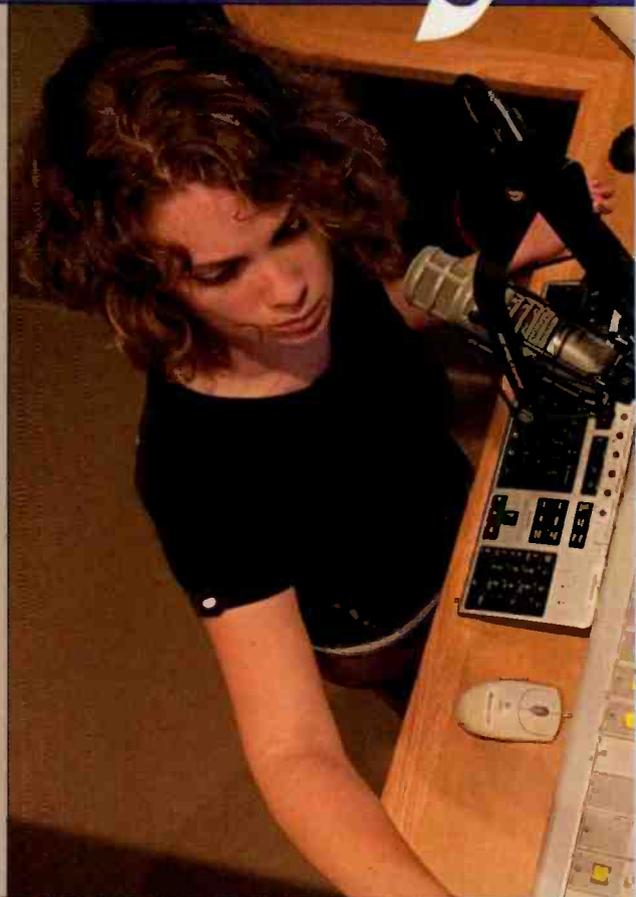
**R**ebuilding radio studios in today's demanding world can be challenging. Delmarva Broadcasting's Milford, DE, operation was no exception. With six new studios and offices, everything had to be coordinated to work in harmony and keep the station flowing. In the middle of the project was an HD Radio conversion, which also had to be handled accordingly.

WTHD, the first radio station in Milford, DE, was built in 1954 as a 500W, two-tower, daytime-only directional AM. The original building is still part of the studio/transmitter facility today. Since 1954, the complex has seen three additions attached to the original building. With the second addition completed in 1989, time had taken its toll on the old paneled walls. With an FM added in the 1970s and another in 2003, the need for additional space was vital. Delmarva Broadcasting purchased the Prettyman broadcasting stations in 1997 and has been planning the renovation ever since. In 2003, WXPZ (now WNCN) was purchased and moved into the old reel storage room in the already full building. This temporary studio existed for three years. In 2005, Delmarva Broadcasting finalized the plans for construction on addition number three, but local permits delayed the project for some time. In the fall of 2006, the addition was completed and ready for studio construction to begin.

## Design philosophy

Station management requested the studios to be one of the first things seen when a visitor walked in the entrance to reception. Let's face it, most people who listen to the radio want to see the person behind the microphone, not those of us behind the scenes. This meant that sound proofing the studios was critical. This also required that the installation of the windows looking into the studios be precise. Sound dampening drywall and wall isolation were incorporated into the design. Lightner Electronics helped get the studio wiring off the ground by assembling all the preliminary audio, network and telephone wiring. When it came to equipment needs, Jim Peck of SCMS provided assistance. He offered equipment research and all the last-minute needs that arose during the project.

**Cristian Tijerino in the WYUS-AM control room.**



Sabrina, mid-day host, is in the WNCL-FM air control room.

# Facelift

Careful consideration went into the planning of the HVAC systems used for the studios, which incorporate electronic air filters and humidity controls. This helps reduce static and dust. The ducts and air velocity for the system were all designed with sound proofing in mind.

My biggest challenge was keeping all aspects of the stations in operation during this entire process. This meant building the studios and moving existing operating equipment into them. The majority of the equipment installed was new, but a portion of the equipment had to be recycled. This meant some carefully planned pre-wiring and testing to keep down time to a minimum during the transition. Some existing consoles had to be refurbished by the manufacturer. One such console was for WYUS-AM, which was upgrading from an older rotary-fader console to a Radio Systems Millennium console. The use of current equipment required a new studio to be built so a previous studio's console could be sent back to the factory. A new audio server was purchased and set up in the new wing to help with the move. The first studio began broadcasting in January, and the work continued until all the studios were complete.

During the installation, proper grounding and lightning prevention measures were installed. A halo ground system was incorporated around the entire studio facility. This consisted of four-inch copper strap to bring everything together. All equipment was properly bonded to this system ground. Henry Power Clamps were used on incoming power lines. Polyphasic suppressors were used on incoming transmission lines. A Powerware system UPS was used to stabilize the power to all sensitive equipment. Sandman telephone suppressors were used on all phone lines.

Furniture was an important part of the new studios. We wanted a custom look with oak trim throughout. Management also wanted to stay away from the traditional battleship gray wherever possible. From the studios, to reception, to the jock office, Vince Fiola of Studio Technologies helped create the look we had been seeking. His eye for detail was a huge help.

An important part of the project was to move the Milford stations into an all-digital audio domain, or at least in part for WAFL-FM and WNCL-FM. I wanted to use as few—if any—digital to analog converters as possible. All wiring in the infrastructure was designed to carry digital audio so that was not a concern.

Gary John in the WAFL-FM control room.

# Facility Facelift

Audio Science 5044 digital audio cards were required in the Immediatouch on-air automation computers. These cards mated to the Audioarts D75 digital inputs well. From there, the audio path passes through a Broadcast Tools ADMS DAS 8.4 Plus audio switcher. This switcher combined with ADCS-III converters allowed us to integrate the analog EAS and studio sources. It also had digital outputs so it fit our need to keep the path digital unless an EAS source or another analog studio was needed for an emergency. From there it went to the digital inputs to the Optimods and then to the digital inputs of the BE HD Radio transmitter.

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**Production and voice tracking room.**

## Audio distribution

The Milford facility needed a better way to distribute audio throughout the building. The new studio build was a good opportunity to integrate a new type of system, such as the Audioarts IOC center and AE-Net Router. Conveniently, it also was a direct interface to the D75N consoles we were using. The benefit of the audio router system is that it simplifies the wiring and keeps everything in a centralized location.

One challenge during a complete renovation is what to do with the business staff during the office renovation. After the studios were built and the studio equipment was moved, the original portion of the building and its two former additions desperately needed an overhaul. But this would require removing all interior walls. Luckily, when Delmarva Broadcasting purchased WNCL in 2003, it used the transmitter site as studios and offices. This building is only five miles south of the main building and still houses the WNCL-FM transmitter. With a large amount of unused space available at this site, it seemed obvious to move sales and management there. With some paint and new carpet, it was as good as new. The one problem that had to be resolved was high-speed Internet and intranet service to this facility. With the use of a networked traffic and billing system, a stable system was a must.

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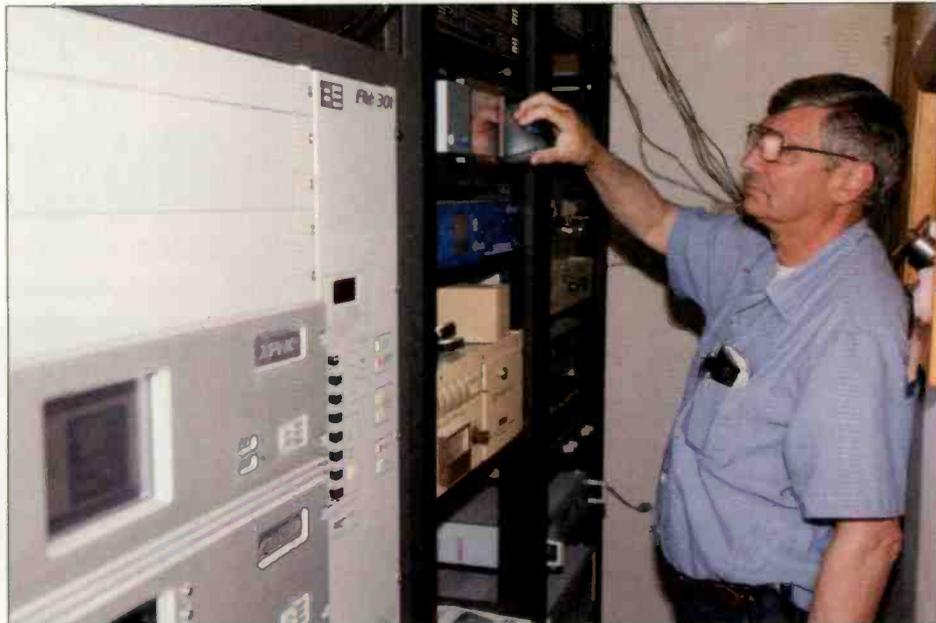
## Online Extra

More photos of the facility, including several in-progress views, are posted online at **RadioMagOnline.com**.

Neither cable nor DSL service was available in this area. A satellite service was tested but was not stable enough for our needs. What we had was a stable STL system in place between the buildings. With the addition of a Moseley Lanlink to our existing STL, we were able to get a reliable 1MB, bi-directional network system between the buildings. This had no reoccurring monthly charges and installation costs were low. This allowed us to keep everything networked.

We used custom-built guest turrets for the studios. We left these on rubber feet so they could be moved where they were needed most. These incorporated a network jack for any guest or co-host to access the Internet via a laptop, which is a welcome addition in today's studios. This was accomplished with a Neutrik RJ-45 insert into the XLR receptacle of the Broadcast Tools HR-1/AHR-2 mounting panel. This interface also includes the jock's choice of 1/4" or 1/8" headphone jack. This eliminated the age-old question to the engineering staff, "Do you have an adapter for my headphones? I lost mine."

The studio speakers are ceiling-mounted, and Steve Koehle of Lightner Electronics ran the wires inside the mounting pipes and connected them internally. At first



**Bill Blatz in the soon-to-be-expanded RF rack room with Broadcast Electronics FMI 301 FM+HD transmitter. Adjusting one of several new Urban audio processors.**

glance people ask "where are the speaker wires?"

Rebuilding the facility allowed us to take advantage of the most current technology, but it also allowed us to plan and apply an overall design philosophy to the entire facility. Thanks to the partners who provided their expertise, we were able to accomplish this goal.



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# Facility Facelift

## Meet the stations

WAFL-FM - Eagle 97.7 - Hot AC  
WNCL-FM - Cool 101.3 - Oldies  
WYUS-AM - La Exitosa - Spanish

WAFL currently broadcasts an HD Radio signal with an HD-2 installation scheduled for fall of 2007. WNCL and WYUS are scheduled for an HD Radio conversion in 2008.

*Twilley is director of engineering for Delmarva Broadcasting, Wilmington, DE.*

*Photos by Jim Peck.*

## Equipment List

Acoustics First sound panels  
Art SLA1  
Audemat-Aztec FMB80, Golden Eagle HD  
Audioarts AE-Net, IOC, audio router, D75N consoles  
Audion Labs Vox Pro  
Audioscience 5044  
Brady ID Expert labeler  
Broadcast Electronics FMI 301, ID 20  
Broadcast Tools 8.4 Plus, HR-1, SS 8.2  
Comrex Access, Matrix  
Day Sequerra M4.2R  
DBX 1066  
Dell servers, clients, LCD monitors  
Denon DN 635  
Digigram VX222v2  
Electro Voice RE-20  
ELO Touchscreens  
ETA PDB power conditioners  
Gepco digital audio cable  
Imediatouch  
JBL Control 5  
Krone punch blocks  
Lightner Electronics integration services  
Mackie 32.8  
Middle Atlantic racks  
Moseley Lanlink HD, SL9003Q  
Neutrik connectors  
OC White microphone booms  
Orban 6300, 8200, 8500  
Powerware UPS system  
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Rane HC-6  
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Sandman telephone surge suppressors  
Spirit ES  
Stellar Communications ground system  
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Symetrix 528, 581E  
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## AudioScience ASI5044



The ASI5000 series are professional PCI audio adapters that comes in three models. The 5044 features four stereo inputs and four stereo outputs, both balanced analog and AES/EBU digital. The adapter can playback up to 12 stereo

streams of PCM audio (using WAVE or HPI driver) and record up to eight stereo streams of PCM audio (using WAVE or HPI driver). The SSX multi-channel mode allows the adapter to record and playback PCM streams of up to eight channels. The adapter is built around 24-bit analog-to-digital and digital-to-analog converters and provides 100dB SNR and 0.002% THD+N at 32kHz to 192kHz sampling rates. Up to four cards can be used within one system. Drivers for Windows 2000/XP WAVE/WDM and Linux ALSA software are available.

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## TFT EAS 911



TFT congratulates Delmarva on its new installation. Delmarva, like thousands of other TFT customers, uses the EAS911 Encoder/Decoder to originate and decode EAS protocol messages. A built-in impact printer and digital voice recorder make an operator's task simple by maintaining a written record and saving time when broadcasting an emergency message is vital. Not only can the TFT EAS911 relay messages automatically, but it can also be interfaced to many graphics platforms, character generators and even the switched telephone network. An ordinary telephone, even a cell phone, can be used to generate and manually forward emergency messages. Lighted pushbuttons on the front panel complement the LCD and LED indicators to guide the operator through routine procedures and setup. Models are available for all radio and television applications.

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## Electro-Voice RE-20

The broadcast industry-standard microphone, the dynamic, cardioid RE-20 features the Electro-Voice Variable-D design to reduce the boominess that can result from proximity effect. A favorite among broadcasters and sound engineers worldwide, the heavy-duty, internal p-pop filter reduces unwanted pops, while the

internal element shock-mount reduces vibration-induced noise.

The large diaphragm provides flat frequency response and handles high SPL levels with ease. The pickup uses a humbucking coil. The RE-20 also includes a pass roll-off switch. An optional suspension shock mount is available.



[www.electrovoice.com](http://www.electrovoice.com)  
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## Sangean HDT-1

By Scott Trask

**W**ith many of the stations in the market broadcasting an HD Radio signal I was looking for an affordable off-air monitor. I wanted a device that I could place in the station to demonstrate HD Radio for my fellow employees. I found an inexpensive device in the Sangean HDT-1 radio component tuner.

Out of the box the tuner looks like any standard component stereo piece of equipment. Its black finish fits nicely in any component stereo setup and is suitable for placement in a standard 19" rack by itself. The unit comes with the following accessories: a remote control, detachable power cord, RCA audio output cable, an FM dipole and AM loop antenna. It also comes with an instruction manual, which is good but not too intuitive.

On the front of the tuner from left to right you will find a standby/on button, number keys, an LCD (white and blue) display, and buttons for preset, frequency, info and band, along with a tuning, seek and HD seek rockers. Located on the back, from left to right, is the type F FM antenna input connector, an AM loop antenna socket, RCA audio output connection and ac power input. Inside the box you will mostly find empty space with the power supply, amplifier, I/O, front panel, and the display controller along with the LG-Innotek DSP HD Radio module.

Installation is straightforward. Connect both

AM 2), press the preset button and the number of the desired station. Frequencies can also be entered directly by pressing the frequency button and entering the desired frequency.

### Bountiful display

Once a station is selected, the receiver will display the program-associated data for HD Radio or the FM RBDS data with PS, PTY, RT and CT on the LCD display. The radio will toggle between HD Radio and analog on its own. Manually toggling between the digital and analog mode

**Device operation is simple, and it displays lots of information.**

## Performance at a glance

- PLL synthesized digital tuning
- Backlit LCD display
- Displays PAD and RBDS
- External antenna input
- Line-out (stereo RCA)

antennas and the power cord, connect the audio output and turn it on. The tuner can receive AM and FM HD Radio signals to include the multicasts, along with AM and FM analog to include C-QUAM AM stereo.

Device operation is simple, and it displays lots of information. All the functions are available from the remote control or the front panel. If the unit is in the stand-by mode a red LED lights and the time is displayed in the LCD window. This time may need to be reset if the unit ever loses power, but the good news is that it does retain its presets. There are a total of 20 for each AM and FM. To set them, select the band (FM 1, FM 2, AM 1 or

is not possible. It is also not possible to split the analog and digital between the left and right outputs to verify the audio sync.

The info button cycles through the following information: radio text, time, signal quality, frequency and spectrum. By holding the info button for two seconds it cycles through another menu that displays contrast (LCD display), bit-error rate, carrier-to-noise ratio, fuse bit check, transmission mode, station ID and unit version.

The features that I found most useful were the contrast and the carrier-to-noise ratio. The LCD display can be bright, especially in a room with total darkness. The carrier-to-noise ratio was useful when I aimed the antenna.

The tuning rocker moves up or down the dial one channel at a time. The seek rocker finds the next usable signal and the HD Radio seek rocker only stops on stations broadcasting in HD Radio. To find an HD Radio multicast channel use the tuning rocker. The HD rocker will not do this. There will be an indicator if the unit is locked on

to a HD Radio signal. There is no FM stereo light for analog reception.

In my opinion the radio sounds great. This was never more evident as when I turned it on in my house and both of my sons asked me why the radio sounded so much clearer. Depending on how the stations are processing their signals the blend from analog to digital can be subtle. But some stations are using the same processing for both signals and the difference is noticeable when listened to in HD Radio. Even the HD-2 streams sound good. Again, the quality is chiefly dependent on the station processing.

For a first-generation HD Radio component tuner, Sangean has done a good job. There are a few bugs as I noted, but these can always be updated in future models. The clock in my unit seems to lose about two to three minutes per month.

While the unit cannot be used to verify time sync between the analog and digital streams, it is very capable as an off-air monitor.

*Trask is director of engineering, Lincoln Financial Media of Georgia in Atlanta.*

## Sangean

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**E** [info@sangean.com](mailto:info@sangean.com)



**A closer view of the HDT-1 controls and display.**

Editor's note: Field Reports are an exclusive Radio magazine feature for radio broadcasters. Each report is prepared by well-qualified staff at a radio station, production facility or consulting company.

These reports are performed by the industry, for the industry. Manufacturer support is limited to providing loan equipment and to aiding the author if requested.

It is the responsibility of Radio magazine to publish the results of any device tested, positive or negative. No report should be considered an endorsement or disapproval by Radio magazine.

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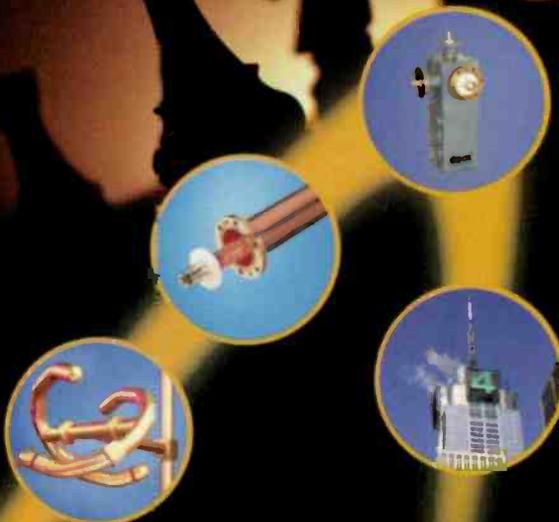
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## Wheatstone Bridge

By Kirk Chestnut,  
CPBE

**A**s part of the facility installation at Entercom Kansas City (profiled in the April issue of *Radio* magazine), we installed a Wheatstone Bridge router with G-series control surfaces. We knew that we wanted to build the facility around a router for maximum flexibility with our nine stations. These needs were met with the Bridge.

The system is built around card-configurable frames that can sample any combination of analog or digital audio sources and interface with logic control sources. Two frames can be connected to share as many as 64 sources and destinations using Wheatnet Audio Network cards and CAT-5e cable. As many as 48 frames can be connected using the Wheatnet Hub for a flexible and scalable building-wide system.

It wouldn't surprise me if the North Carolina-

processing 512 analog or digital audio sources, and its scaled-down cousin the Satellite. The Bridge frame is suited for centralized operations where a high volume of signal processing is concentrated in one or more rooms. The Satellite frame is a cost-effective interface for smaller studio settings with fewer audio sources. Both devices have essentially the same function, but have different audio signal-handling capacities.

### Hardware

Each frame is configured with a CPU card and can be populated with a combination of mic pre-amp, line level analog, digital AES, logic and DSP mixing cards. Physical connections are made with 25-pin D-style, RJ-45 or BNC-type connectors.

The Microphone Card accepts eight mono microphone level (-50dBm) sources and provides eight mono direct outputs. The pre-amplified microphone signal is electronically balanced and introduced to a 24-bit A/D sampler set to the master clock rate. All eight digitized audio signals are inserted into a single Time Domain Multiplexing (TDM) channel on the router bus. The card also supplies 32V phantom power.

The Analog Eight Channel Stereo (16 mono) Input Card is a direct coupled, balanced input with a nominal level of +4dBu. Signals are buffered and digitized using 24-bit A/D converters. The Analog Eight Channel Stereo (16 Mono) Output Card can be configured in mono, stereo or 5.1 output modes. Outputs are direct coupled, balanced at 50Ω with a nominal level of +4dBu.

The Digital Eight or 16 Channel Input Card conforms to the AES-3 standard interface of +5V peak-to-peak balanced signal at 110Ω. Inputs are transformer balanced. The Digital Eight or 16 Channel Output Card also conforms to the AES-3 standard. Sample rates of 44.1kHz and 48kHz are set according to settings on the DSP card. There is an option for selecting an external clock source as well. Embedded channel status

## Performance at a glance

Eight-channel  
microphone  
pre-amp boards

Eight stereo channel  
analog input and  
output boards

Eight and 16 channel  
digital AES input and  
output boards

Generation Series  
consoles in a variety  
of fader and output  
bus sizes

TCP/IP-based remote  
control panels

Extensive configuration,  
monitoring and control  
with XPoint GUI software

Direct TCP/IP  
communication with  
many popular audio  
automation systems

Wheatnet Hub 48-port  
centralized network  
controller

based company took inspiration from the hundreds of spans, viaducts and turntable drawbridges that surround the factory. The Bridge interconnects a family of audio interfaces and control devices into a cohesive and flexible system. Like islands, studios are no longer isolated or limited by cabling or router size.

Creating connections, processing audio and making future changes is easy when every audio source, destination or logic control resides in the same digital system. In our installation, Generation-series mixing surfaces take the place of the traditional console, and fader and switch commands are transmitted to their respective Bridge frame. Because no audio passes through the surface, all audio conditioning and mixing takes place within the digital confines of the frame.

Control logic such as remote microphone on, off, cough and talk back functions are digitized and routed just like its audio counterpart. Recently, Wheatstone developed a TCP/IP-based logic control so stand-alone, multi-button panels and computer automation systems can easily communicate to the Bridge over Ethernet.

At the heart of this system are two classes of interface processors: the Bridge, capable of

information is also transmitted with the audio such as channel mode, word length, sample, time of day and block CRC.

The Logic input/output card is a general-purpose interface (GPI) that hosts 12 independent, opto-isolated, solid-state relay inputs and outputs. Customer supplied +5 to +15Vdc is applied to a logic input. The state of that input can be cross connected to a logic output port or can be programmed as an inverted state of the input. Output logic can be programmed in a normally on, off or current state when disconnected from an input port.

The DSP card (digital signal processor) is used by the Bridge to condition and mix audio. In systems configured for radio, two processor cards are installed, one to pre-condition the incoming audio and the second one to perform the mixing bus function. Larger systems use a dedicated card for the master mix.

The number of cards used is dependent on the number of input sources and total mix buses. Frames may be equipped with redundant DSP cards to self heal should a DSP card fail. Mapping DSP cards with their respective mixing surface and frame is accomplished using XP Configuration GUI software.

The CPU card is a full-blown computer in a small package that provides control for the router frame. It is a PC/104 computer with RAM, Flash disk (in place of a hard drive) and an Ethernet port. This device communicates with all the control surfaces, Ethernet controllers and PC XPoint GUI software via TCP/IP. It is backward compatible with legacy Wheatstone products that use RS-485 serial communications.

The Wheatnet Audio Network Card, as alluded to earlier, connects a master chassis to a local chassis via CAT-5e or fiber optic cable. This card also comes in a four-port variety for connecting multiple frames, control surfaces or hubs together. An audio network card transports as many as 64 bi-directional channels of audio. Physical connections include two DB-9 connectors for RS-485, RJ-45 and fiber optic ports for Wheatnet audio connections.

## Wheatstone

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controls the entire router system. Audio source and destination connections are viewable at a glance while sub-menus guide the user to configure hardware, channel definitions and create connection salvos, cross-point locking and system diagnostics.

While the XP Configuration GUI provides extensive configuration and control options on a central PC, the Bridge Digital Audio Network is also controlled by hardware and software interfaces. Rack- and console-mounted XY controllers as well as TCP/IP-based button panels provide tactile input selection.

Three levels of system access to XPoint protect the operation from tampering or accidental changes. The software setup guides the system administrator through Ethernet/IP address changes and various system configuration menus. Each frame or tier must be configured defining what type of card is installed in each slot position.

Most of the sub-menus will be rarely used once the system has been configured. The Cross-point Grid screen will be the most frequently used, perhaps on a daily basis. This 512 x 512 point grid separates the sources vertically from the destination signals horizontally. From here, signal definitions

are created denoting the channel name (in eight characters), mode (mono, stereo, 5.1 surround, etc.) and the frame (tier), card and channel where the audio or logic function originates.

Routable logic works similar to its audio counterpart where logic inputs (contact closures or button presses) are cross connected to logic outputs. The duration of the output closure lasts as long as the input state remains in a closed position. These logic signals may be piggy-backed onto audio signals: i.e. when a microphone channel is opened, a logic closure for tally is also active. As many as six logic signals can be ganged together. Triggered port logic is a means by which salvos are activated, such as a talk-back function for temporary audio changes made by contact closures.

Despite the rapid pace to which our world is being reduced to a keyboard, mouse and monitor, there is still a need for push-button panels. Wheatstone has developed a line of TCP/IP-based button panels for this purpose. Once assigned a static IP address, the GP series panel can be programmed to perform specific audio routing and logic changes.

Where more extensive control is needed, short

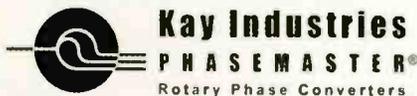
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of installing a full-blown control surface, outboard XY Controller modules are used. Each XY controller can access any source or destination signal within the system, or be limited to a specific group of signals. Limiting signal visibility prevents certain users from making unauthorized changes. Signal visibility can be defined on the XY Controller GUI software as well as on stand-alone XY controllers.

Wheatstone has a long-standing reputation in the broadcast industry for durable, reliable and sensibly designed consoles. The Bridge digital audio network system and the companion Generation series consoles are no exception. During my recent installation, I was able to witness first hand the commitment to customer service Wheatstone provided from design all the way through to installation and final configuration. We experienced a couple of software glitches in the beginning that were troublesome, but they were resolved in a timely fashion.

As Wheatstone looks to the future, certain improvements such as expanding the limited eight-character label size might be useful. I found it



The Wheatnet Switch is an X-Y router controller for the Bridge.

tedious to locate a specific input or output signal on the XP GUI, especially when you have to browse through 512 entries. It would have been helpful to sort sources alphanumerically as opposed to just a sequence of router channels.

All in all, the Wheatstone Bridge digital audio router system is a well-designed and flexible system, keeping pace with the ever-evolving nature of broadcasting.

*Chestnut is assistant chief engineer of the Entercom Kansas City stations.*

Editor's note: Field Reports are an exclusive *Radio* magazine feature for radio broadcasters. Each report is prepared by well-qualified staff at a radio station, production facility or consulting company.

These reports are performed by the industry, for the industry. Manufacturer support is limited to providing loan equipment and to aiding the author if requested.

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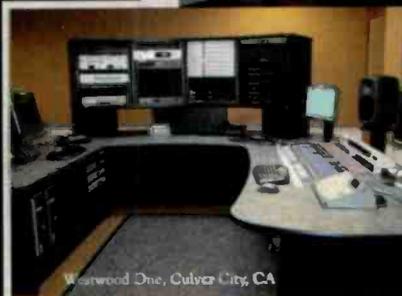
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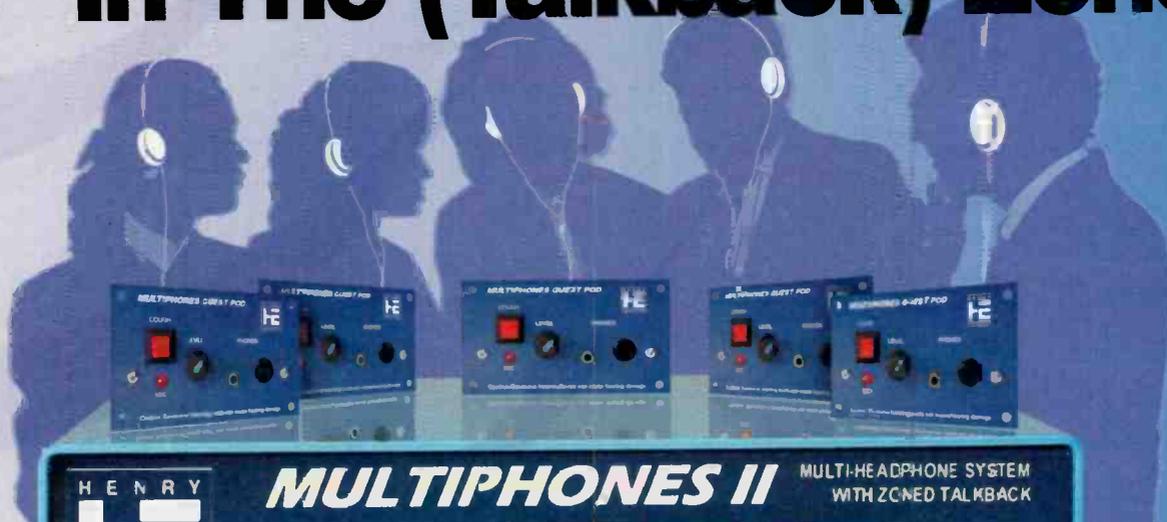
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## Selling history

**O**ne of the largest—and rarest—radio sets ever made, the WLW Model Super Power Radio Receiver, was sold at auction on April 28 for \$55,000.

The WLW Model Super Power Radio Receiver (profiled in the April issue of *Radio* magazine) was built in 1935 by the Crosley Radio Corporation in response to what had previously been hailed the world's largest radio, the Zenith 1000Z Stratosphere receiver. Crosley built at least three and perhaps as many as 10 of the 35-tube sets, which originally retailed for \$1,500 (roughly \$20,000 in 2007 dollars).

Except for missing two of its four amplifiers and two speakers, the set auctioned was in excellent condition. Complete, it might have brought \$75,000 to \$100,000. Only one other example of the Crosley WLW Model is known to exist today.

The sale was conducted by Estes Auctions in Burbank, OH ([www.estesauctions.com](http://www.estesauctions.com)). Auctioneer Richard Estes also sold a Zenith Stratosphere for \$55,000.

*Michael A. Banks*  
*Author, Crosley: Two Brothers*  
*and a Business Empire that*  
*Transformed the Nation*

What a coincidence to read last month's article about the Crosley WLW Super-Power Radio immediately prior to my being able to experience one first hand. People from all over the country gathered in northeast Ohio to attend a recent antique radio auction. A Crosley WLW Super-Power Radio sold for \$55,000 as did a rare Zenith Stratosphere console radio. A beautiful yet almost as rare Sparton Nocturne

deco mirror radio in great condition sold for \$37,500. Many vintage radios in uncommonly colorful Catalin cases sold for over \$1,000 each. To be in the presence of so many high quality antique radios was a day that I will never forget. As I sat in the auction gallery I could only think of the historic moments those radios must have informed their owners of over the years. Moreover, I never thought I would see the day when an AM radio would cost more than many brand new broadcast transmitters! My sincere gratitude goes

out to everyone who collects and restores antique radios and keeps the memories of the glory days of broadcasting alive for all of us.

*Ron Bartlebaugh*  
*director of engineering*  
*The WKSU Stations, Kent State University*  
*Kent, OH*

### More than a cheap radio

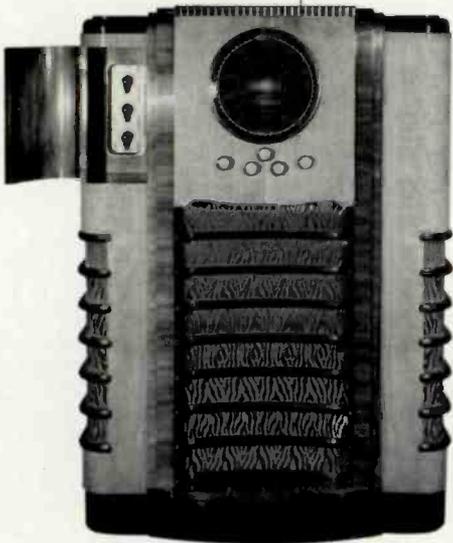
As an engineer and consumer of what I engineer, I find it very funny that the May 9, 2007, issue of *Digital Radio Update* that I received had an article heralding the \$60 price tag for Radisosophy's new HD 100 tabletop clock radio. Yes it has multicast capability and interesting enough an auxiliary input for an Ipod. But where is the aux output to plug into an existing audio system? Or am I allowed to ask—a recording device?

Just another reason why HD Radio will never fly as predicted. Nice technology for AM as long as your blend circuit does not kick in too much. Little improvement for FM. Oh yes, more channels but at bit-rates that even with modern compression algorithms just are not the same as analog. It's a good thing for HD Radio that the oldies format has been announced as the format with least growth potential but it provides source material that really identifies the artifacts of digital compression. These algorithms cannot provide enough bass (for any format) and for oldies the combination of master tape hiss and inability to track higher frequencies makes this format sound wishy washy, to put it in layman's terms. I always thought a Phil Spector recording or a Buddy Holly recording sounded pretty good for the technology of the times until I heard it over HD Radio or even my satellite radio.

I predict the following before HD Radio goes away; I am waiting for the stations around the country to not only make you a member of their listening club by logging in online to their website but to be a "special listener" by getting out the credit card and your HD Radio receiver's serial number so they will advise their conditional access system to allow you to hear their secondary channels. Oh I can hardly wait to hear the public say "sign me up!" Or will it be; "I have to pay for this now?"

Stations should concentrate on localism, public service and good entertainment. Gee, we knew how to do that once.

*Name withheld by request*



**The WLW Model Super Power Radio**

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**A dear Harry letter**

Chriss:

I took your advice and wrote a letter to Senator Harry Reid about the Radio Goldfield matter. I wonder how many other broadcasters took the time to do so?

By the way, I drove through Goldfield last week on the way to Reno. The radio station sounded like it was playing somebody's eclectic collection of music from an Ipod. Other than a station ID, there was nothing that would constitute "local" programming - no news, no weather, no PSAs. So much for the compelling "community service" aspect.

Larry Fuss  
president  
Contemporary Communications  
Las Vegas



April 12, 2007  
Senator Harry Reid  
528 Hart Senate  
Office Building  
Washington DC 20510

Dear Senator Reid:  
As a life-long broadcaster, I am appalled at your actions in the Radio Goldfield matter, in which you, on behalf of the operator of an illegal radio station in Goldfield, NV, circumvented the established rules and regulations of the Federal Communications Commission in order to permit the illegal radio station to

continue operating without a license. Over the years, I have built and operated many small-town radio stations. In every instance, I followed the established procedures for obtaining licensing authority for these stations. It wasn't always easy, but I went about it the way it was

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supposed to be done. Your decision to circumvent the FCC's authority sets a very dangerous precedent. As a result, we can expect to see many more radio stations built without FCC authority, and all justifying it by using Radio Goldfield as an example.

I know from experience that the FCC is incredibly inefficient and sometimes downright incompetent. However, if they're not doing things the way you or any other lawmaker would like to see them done, then change the rules—don't dilute their regulatory authority by circumventing established policy that myself and all other legitimate broadcasters have been subject to for years.

I would welcome the opportunity to discuss this or any other broadcast industry matters with you at any time.

Sincerely,  
 Larry G. Fuss  
 President - Delta Radio LLC - WROX-AM,  
 WKXY-FM Clarksdale, Mississippi  
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REMODELING



Just got my copy of the April issue and noticed the WSTB article while doing a quick perusal. Many nice photos and a good story. All in all, a great article!

Ty Judd  
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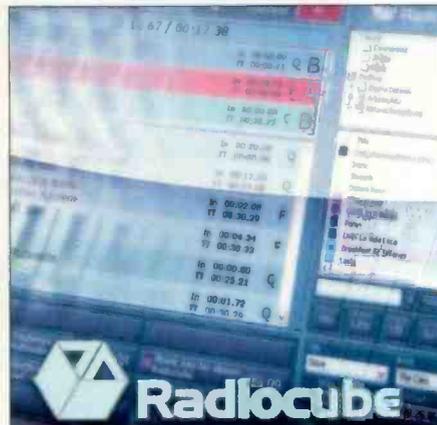
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	P1	P2	
BITS TESTED:	24549408	24475680	
BITS ERRORS:	19497	298731	
BBER:	0.00079419	0.01220521	
	P3	P1D5	
BITS TESTED:	72590424	10660	
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# Contributor Profile

Meet the professionals who write  
for **Radio** magazine.  
This month:  
**Facility Showcase, page 46.**



**Jeff Twilley**  
Director of  
Engineering  
Delmarva  
Broadcasting  
Wilmington, DE

Twilley's radio career began during his senior year of high school on weekends at

WJDY-AM. While apprenticing under the engineer he gained an interest in the technical side of radio, at the same time finishing his degree in electronics. At 19 he became the chief engineer at WWTRWETT in Ocean City, MD, and at 22 he was promoted to director of engineering for WQHQ/WLWV.



Written by radio professionals  
Written for radio professionals

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by Kari Taylor, senior associate editor

## Do you remember?



The first Continental Electronics 317C 50kW AM transmitter was installed in 1965. The transmitter was mostly solid-state and featured few tubes, and it could deliver up to 125 percent positive modulation. The 317C offered motor-driven tuning and power adjustments, and was designed for unattended operation by remote control. A 12-phase plate power supply eliminated the need for a filter reactor and provided extra power for the high positive peak demands of low frequency programming. Continental Electronics manufactured the 317C until 1989, and there are still some in operation today.

## That was then

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**ASK YOUR ENGINEER!**

639B Mics showing the six different pick-up patterns in the form of a switch. The 639A - 639B, 639C and 639D show others.

**Western Electric**

52, EXHIBIT 107 - October 1940

The Altec 639A and 639B cardioid directional microphones were also sold under the Western Electric name, as shown in this ad from the October 1940 issue of *Electronics* magazine. The 639-type microphone combined a dynamic moving coil pressure element and a ribbon velocity actuated element enclosed in a housing that served as a protective guard and as a windscreen. The output of these two elements were used independently, or were combined in various proportions by means of a selector switch attached to the microphone to yield several directional patterns.

The 639A consisted of a ribbon velocity element and a dynamic pressure element, whose outputs are combined so that they yield a cardioid pattern. The 639B had a six-position switch that yielded omni, cardioid, several types of hypercardioid and figure-eight patterns.

## Sample and Hold

### HD Radio Growth Projections (number of users)



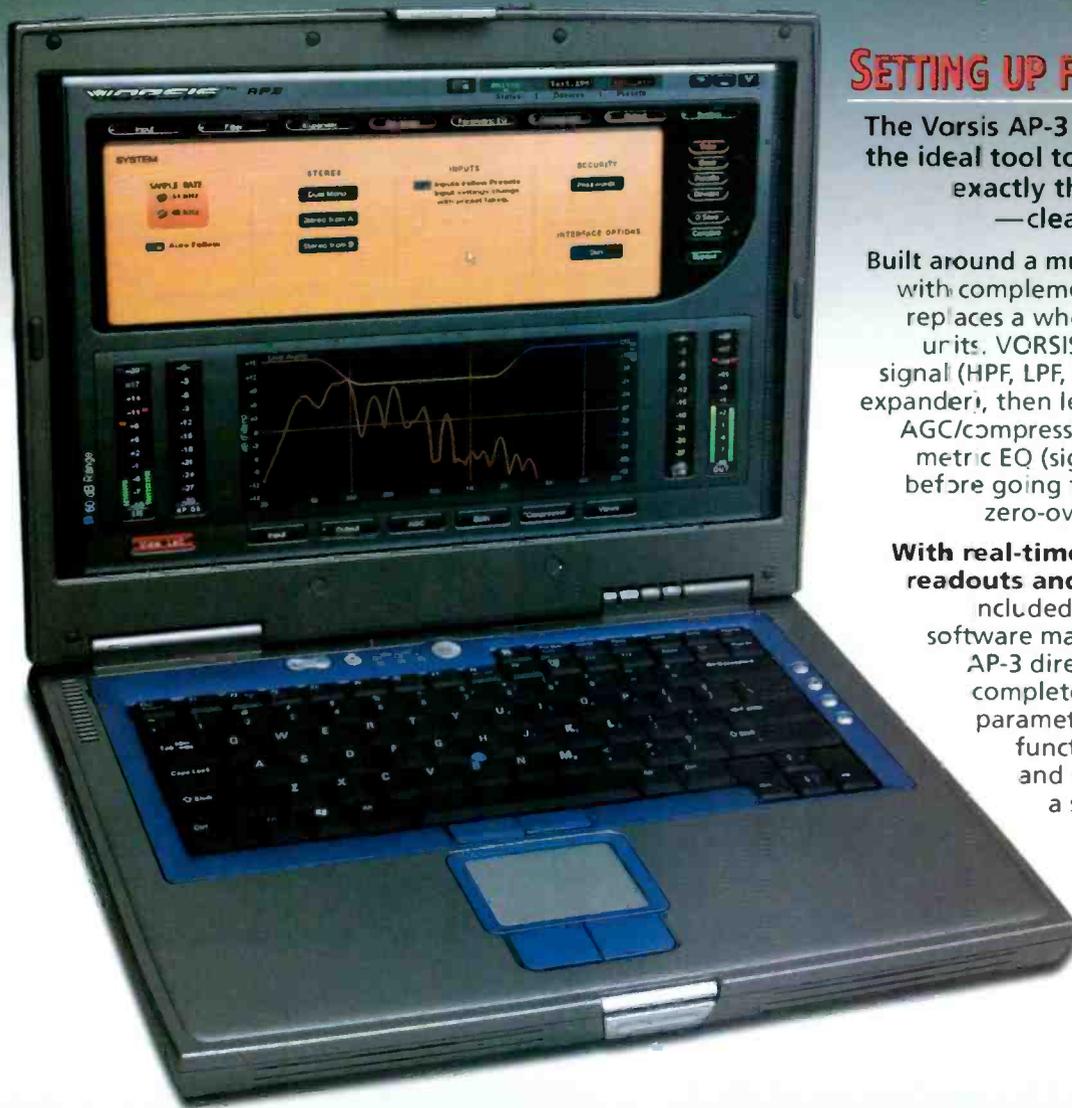
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This Little Unit



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## BUT THE *MISSION* REMAINS THE SAME

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