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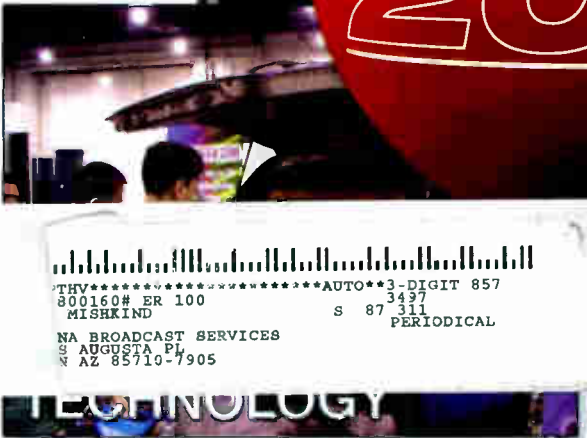
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World Radio History

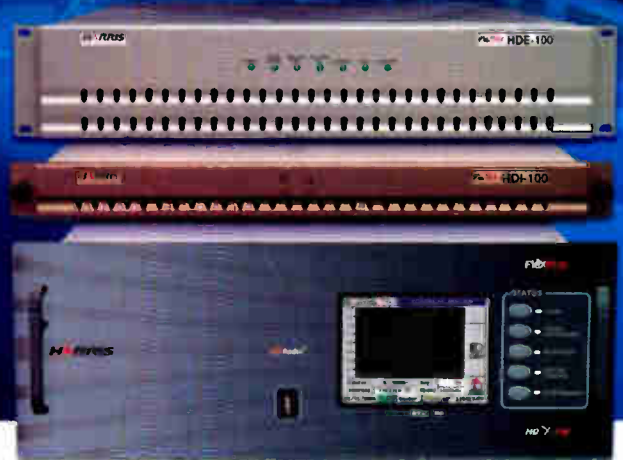
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Vice President of Engineering  
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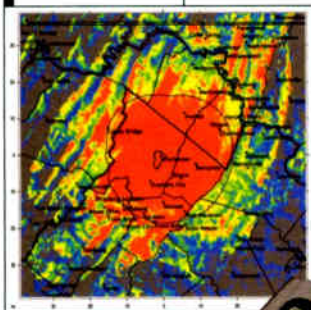
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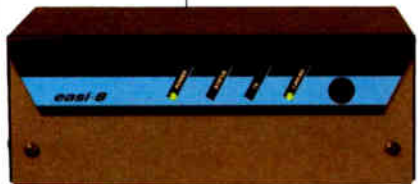
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### ON THE COVER:

Make navigating the NAB convention easy with the NAB Preview, which gives you instant access to everything you need. Cover design by Michael J. Knust.







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**-Mike Rabey Chief Engineer  
Entercom Indianapolis**



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## Currents Online

Selected headlines from the past month.

### Congressman Intros Bill on Audio Broadcast Flag

New Jersey Congressman Mike Ferguson says that the Audio Broadcast Flag Licensing Act of 2006 will protect the property rights owners, but it will not interfere with the HD Radio rollout.

### Nielsen Exits PPM Research Program

The TV ratings company will not participate in the deployment of the Arbitron Portable People Meter, but Arbitron sees the split as a chance to focus on its own goals and timetable.

### Nautel Hires Conlon as CEO

Peter Conlon joins Nautel after many years of working in the telecommunications industry. He is the former CFO of Positron Fiber Systems.

### HD Digital Radio Alliance Launches Promotional Campaign

The 12 owners that comprise the HD Digital Radio Alliance have kicked off the first phase of a promised \$200 million advertising campaign to educate and motivate consumers toward adoption of HD Radio technology.

### Kahn Files Suit Against Ibiquity, Others

Kahn claims that Ibiquity, Lucent Technologies, Clear Channel and others have suppressed competition and monopolized AM and FM radio. This sounds like the AM stereo battle of 20 years ago.

### FCC Issues NAL Against Behringer for \$1 Million

The FCC claims that its equipment authorization rules were violated when Behringer marketed at least 50 different digital audio devices.

### AWRT Awards Trembly as Engineer of the Year

The award was created in a partnership with the SBE. Crisly Trembly has worked in TV for 30 years and currently works as studio manager/engineer-in-charge for CBS Television City in Los Angeles.

## Site Features

### Find that article

Each issue of *Radio* magazine is available online, and each article can be found in several different ways. Search by issue, topic, department or use the convenient search window on every page.

### Do you remember?

After 13 years and more than 120 issues, *Radio* magazine has quite a collection of magazine covers. You can view them all online in the Cover Gallery. How many do you remember? The Gallery also recaps all the Pick Hit Award winners since 1994.

### Industry Events Calendar

A list of all the conferences, conventions, seminars and other industry events is updated regularly on the *Radio* magazine website. Look on the lower left side of each page.



**Find the mic and win!**

Tell us where you think the mic icon is placed on this issue's cover and you could win a Heil mic courtesy of Transaudio Group.

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Eventide Broadcast Delays are designed to keep profanity off your air, and angry listeners, embarrassed advertisers, and the FCC off your back. We invented the obscenity delay and have a solution for stations large and small that provides up to 80 seconds of the highest quality revenue and license-protecting delay.

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The BD600 offers two different methods of delay buildup and

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For HD, the BD600 offers MicroPrecision Delay™ mode which allows up to 10 seconds of delay to be adjusted in real time in 100 nanosecond increments. This is useful for synchronizing analog and digital signals while on-air, without audible artifacts, to maintain a seamless user experience.

Whatever your size, whatever your format, you can't expect to protect the integrity of your air and the foundation of your business without an Eventide Broadcast Delay in your rack.

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World Radio History

## Much ado

**S**o the HD Radio rollout has begun. In the February Viewpoint I discussed the obvious absence of HD Radio on the convention floor of the CES convention. In January, I noted that the creation of the HD Digital Radio Alliance was a nice try, but that the effort may be too little and too late.

Then, at the beginning of February, I started seeing some consumer attention to HD Radio. I began seeing articles in newspapers and magazines around the country. The first batch touted that stations in a particular market were getting a second digital channel. The next round detailed the \$200M marketing campaign that radio stations were launching (which is still funny money, but at least it's getting attention). Now, it's a mix of these topics with a little touch of terrestrial fights back satellite.

I admit that I was impressed with the new attention. Maybe this alliance effort can pull it off after all.

Unfortunately, the high feeling that HD Radio was getting some attention was lost rather quickly. On Feb. 28, I received the latest Crutchfield catalog. Crutchfield has been one of the few havens to find something about HD Radio, so I jumped right in.

The 148-page catalog is full of consumer products, and when I happened to flip it open to page 23 (the first page I saw when I opened the catalog) I saw a JVC car stereo with an LED readout that says HD RADIO. Could it be that this was the moment that so many people have dreamed about? I quickly went back to page one to see how the new-found interest in HD Radio was going to be presented.

I should have stayed on page 23.

I went through the entire catalog and the only other HD Radio product I found was the Boston Acoustics Receiver Radio HD on page 142.

(The BA also had the old list price of nearly of \$500.)

I will give Crutchfield some credit; both receivers have a box that encourages reader to visit the company's website for more info about HD Radio.

After my initial thrill of seeing the JVC and its display, I then noticed the ironic touch that has taunted HD Radio for so long. Next to the JVC radio is a box that says "Sat Radio Ready." So much for making an impact.

In fact, nearly every car stereo in the catalog says that it is Sat Radio Ready. Going a step further, there is an eight-page section all about satellite radio that is subtitled "It's a Radio Revolution."

Satellite radio is all over the place. HD Radio got two mentions.

I realize that the alliance is just getting started on its work, so maybe the next catalog will have something more prominent on HD Radio. Maybe I'll start seeing more HD Radio mentions in the Sunday newspaper ad flyers. Maybe I'll even see portable HD Radio products that will appeal to the younger listeners. But to do this, the alliance needs to promote HD Radio outside the familiar (and no-cost) confines of unsold radio inventory.

Meanwhile, DRE and Kahn have been quiet. Maybe they're planning something big for NAB2006. We'll see soon enough.



Chriss Scherer, editor  
cscherer@prismb2b.com



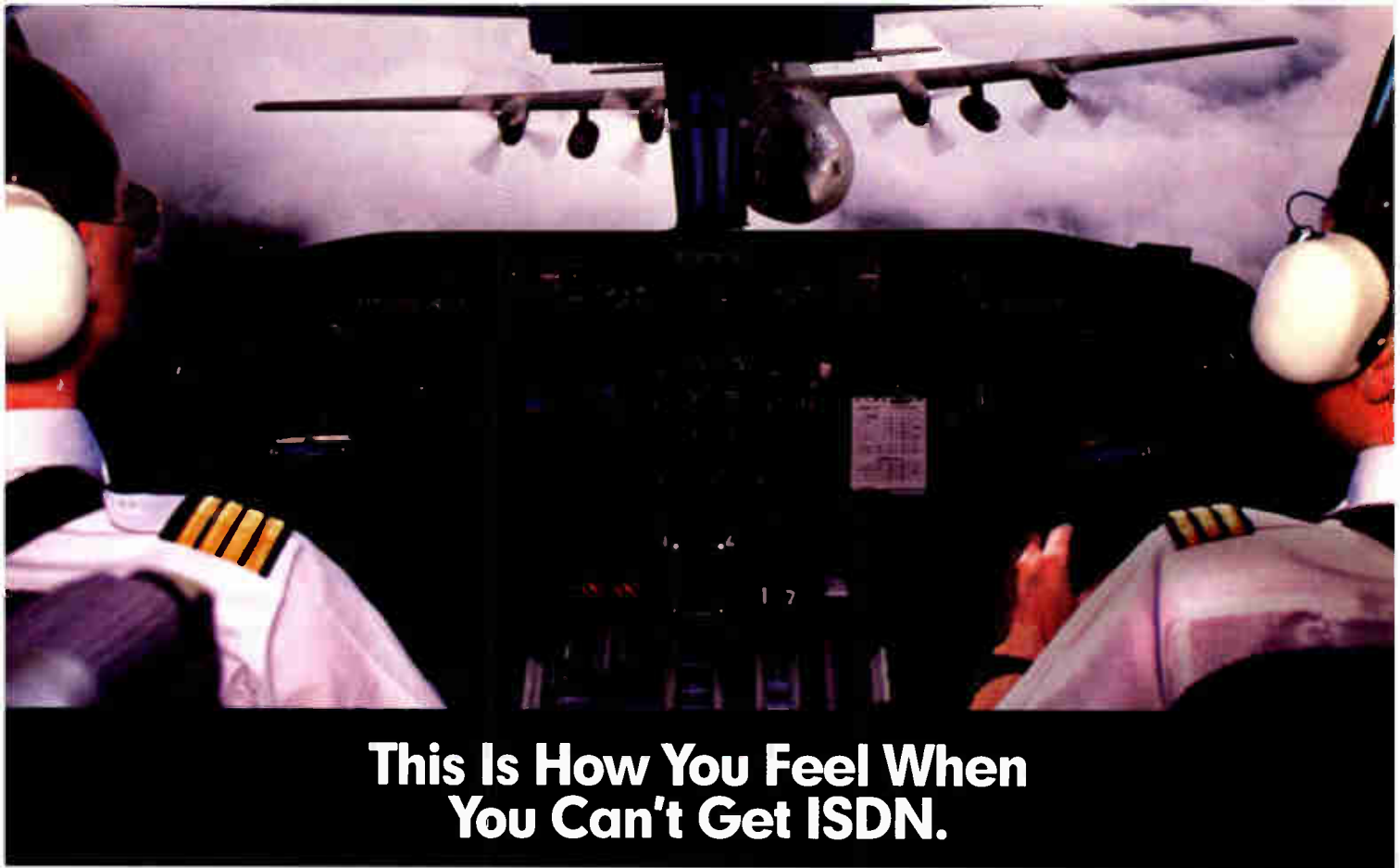
**The mark of excellence**  
*The Radio magazine Pick Hits of 2006*

The Pick Hit Awards are the original technology awards presented at the NAB convention. Established in 1985, this award recognizes the top 15 new product introductions at the convention. The original award is still the best. Look for the winners on the last day of the convention.

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# COMREX



## Engineering assistance

By John Battison, P.E., technical editor, RF

When general computer usage was still in its infancy, handling data was far less easy and accurate. As time progressed, consulting engineers began to develop their own engineering programs. Some engineers would sell their computer programs, but computer-assisted engineering was not widely available in the form of companies specializing in computerized engineering programming. Most of the work was performed manually on a calculator, sometimes even on a slide rule.

### CMBE

Specializing in radio broadcasting, CMBE audio and RF services with an emphasis on audio processing and signal coverage. Typical work involves digital and analog audio, audio production quality assurance, signal measurements and tuning, antenna systems design/troubleshooting, remote monitoring/control and signal coverage mapping.

A division of CMBE, RealCoverage.com is a Web-based mapping service that provides rapid e-mail delivery of letter-sized coverage maps and RF planning studies for any frequency from 540kHz to 100GHz including AM, FM and TV stations.

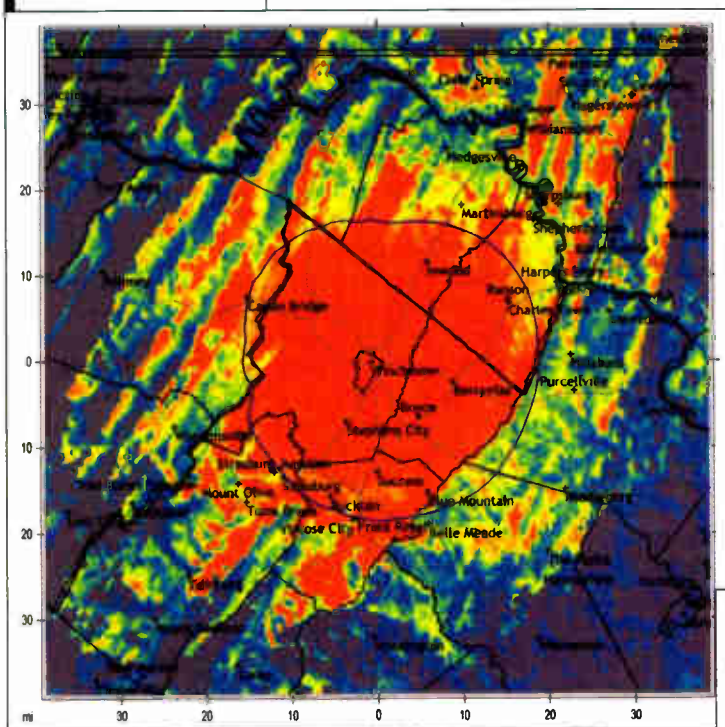
### Dataworld

Dataworld's engineering services are Web-based. Customized mapping of coverage patterns for commercial, non-commercial radio and TV stations is available. Maps are based on FCC-predicted contours or Longley-Rice calculations, and provide several data layers such as boundaries, ethnic population densities and multiple demographic breakouts.

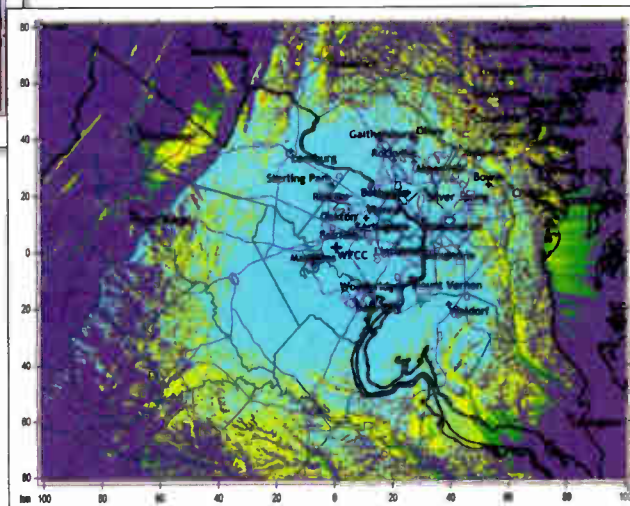
FM Explorer is a what-if planning tool for FM allocation analysis. A current allocation can be viewed, and then criteria can be changed and the results can be seen in the study and on the map. FM/TV/LPTV technical engineering studies are offered on a subscription basis.

### Radiosoft

Radiosoft offers several software programs and services such as Radio Compass, a browser-based mapping system. Radio Compass Online Maps create maps with FCC station data and choose map characteristics, including layers for



One of the problems of that period was assurance that the database used was accurate. The FCC's database frequently proved to be incorrect. Unfortunately, today the same problem with the Commission's database still occurs sometimes, and the resulting accuracy of any programming always depends on accurate data. For this reason, many of the engineering programming services prefer to use their own databases.



Map images courtesy of CMBE.

A variety of maps and charts can be generated with current software packages.





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1.5 kW Digital, 4 kW Hybrid, 5.5 kW Analog Transmitter

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# Making Digital Radio Work.

detailed map features. This is suited for those who require the sophistication and complexity of a radio propagation and geospatial information system.

Comstudy 2.2, offers a contour calculator, integrated 3D viewer and propagation engine, terrain-based interference analysis, shadow matrix, frequency finder online coordination tool and an optimized database engine for serving transmitter data.

## RF Software

RF Software develops and markets tools for broadcast consulting engineers, and its related company, RF Engineers, offers engineering services. Services include maximum possible exposure, radio frequency radiation and field measurement services; what-if situations and similar white/gray studies; collocation and interference studies and multiple transmitter facilities studies; and propagation analyses using Longley-Rice and point-to-point methods. The company also provides one-on-one training and seminars on RF area exposure modeling and the use of

advanced engineering software.

## Softwright

Softwright developed the Terrain Analysis Package (TAP) for Windows. It evaluates existing or proposed transmitter sites, coverage predictions, intermodulation studies and transmitter site administration. The TAP software is written by engineers for engineers and technicians. All the equations, calculations and methodology are traceable to published documentation including IEEE published papers, technical manuals and textbooks.

## V-soft Communications

V-soft Communications offers programs for AM, FM and TV. FM Commander uses the FCC database for all FM frequency searches and allocation work, and it integrates the U.S. Census, terrain elevation databases, a polygon-based USGS mapping engine, the FCC's tower registration database, the AM database, airport and TV databases. AM-Pro performs daytime ground-wave and nighttime skywave allocation studies, AM contour mapping provides a antenna pattern editor that allows drag-and-drop editing of a directional pattern using a mouse. The company also offers a free, online AM and FM ZIP Code/signal program that will produce a table of all ZIP Codes and signal strengths within a station's 50dBu contour.

E-mail Battison at [batcom@bright.net](mailto:batcom@bright.net).



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*Ed Schwartz, VP, Broadcast Engineering  
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*Thomas Ray, VP, Director of Engineering  
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*Rick Adams, Director  
Interactive Children's Entertainment, AOL Kids*

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## FCC begins review of Katrina impact

By Harry Martin

The FCC has established an independent panel to review the impact of Hurricane Katrina on communications networks. Twenty-four members from various sectors of the telecommunications and media industries have been appointed to serve on the panel. The vice presidents of engineering from Clear Channel and Entercom have been designated to represent broadcasters on the panel. Other sectors represented are public safety organizations, wireline telecommunications providers, wireless telecommunications providers, cable providers, satellite providers, equipment providers, utilities and unlicensed telecommunications providers.

The panel has been given the tasks of 1) reviewing the impact of Hurricane Katrina on telecommunications and media infrastructure in the affected area and 2) submitting recommendations to the FCC for improving disaster preparedness, network reliability and communications among first responders. A report from the panel is due June 15, 2006.

Despite the botched governmental response before and after Katrina struck, there is a perception in many circles that the FCC's performance was praiseworthy. Press reports described Commission staffers working long hours—seven days a week, making themselves available to resolve problems, responding to requests and generally providing relief where needed. The positive PR for the agency and its staff was considerable, particularly in contrast to the unrelenting criticism to which other agencies (FEMA) were subject.

While in retrospect the FCC might be second-guessed on some aspects of its post-Katrina approach, (for example, why did the FCC insist on having licensees seek individual STAs for emergency facilities when the agency could presumably have simply granted a blanket STA to all licensees in the storm-affected areas) the overall take-home message has been that the FCC went beyond the call of duty in facilitating emergency communications to Katrina-ravaged areas.

Presumably with that positive image in mind, the Commission is seeking to reconfirm its role as an effective force for good. The panel is seeking input from all interested members of the public. Written statements may be submitted at any time. In addition, short oral presentations from the public were solicited for the panel's next meeting.

The panel convened its inaugural meeting in Washington in January, but it plans to hold its next meeting in Jackson, MS, on March 6. Requests to make oral presentations were invited by public notice that was issued in February. It is not clear whether there will be additional opportunities to make direct, oral presentations to the panel at the March 6 meeting, but presumably such opportunities will arise in connection with future meetings.

Written and oral presentations to the panel during the March 6 meeting are to focus on 1) the impact of Hurricane Katrina on telecommunications and media infrastructure and public safety communications, 2) the sufficiency and effectiveness of the recovery effort with respect to this infrastructure and 3) ways to improve disaster preparedness, network reliability and communications among first responders.

Panel meetings are open to the public and may also be viewed on the FCC's website.

### Renewal cycle ends

The renewal cycle for radio stations, LPFMs and FM translators which began on June 1, 2003, with the filing of renewals for stations in DC, Maryland, Virginia and West Virginia, ended on April 1 with the filing of renewals for stations in Delaware and Pennsylvania. Radio station license renewals are now issued for eight years. Thus, radio stations whose renewals were filed on April 1 will, in most cases, be granted for a term ending Aug. 1, 2014. The next radio renewal cycle will begin June 1, 2011, for stations in DC, Maryland, Virginia and West Virginia.

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

### Dateline:

Radio stations in Michigan and Ohio must file biennial ownership reports on or before June 1, 2006.

June 1 also is the deadline for radio stations in Arizona, DC, Idaho, Maryland, Michigan, New Mexico, Nevada, Ohio, Utah, Virginia, West Virginia and Wyoming to place their annual EEO reports in their public files and post them on their websites.



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# ACCESS GRANTED

**W**elcome to the *Radio* magazine NAB2006 preview. The NAB convention is the largest broadcasting event of the year, and this year's convention is expected to be another record-attendance event. Digital technologies are maturing, radio ad sales continue to show increases and consumer interest in media is as high as it has ever been. The discussions on the convention floor will likely cover the various forms of digital terrestrial radio and its associated technology.

Our convention preview provides many elements to help you prepare for the show. This issue of *Radio* magazine is packed with useful information to help you navigate the floor. The exhibit hall is the center of activity and overflows with new product introductions. Look for many of the new products in the NAB Extra!

The FASTtrack—a *Radio* magazine exclusive—organizes the exhibitors into product categories, and then sorts them according to booth number. This is done so that you can plot the shortest course—the

fastest track—between exhibitors showing the products you seek.

The convention floor covers a lot of space, and most of the radio-specific exhibits are in the North Hall. Our pull-out map will help you find your way.


When you need a break from the exhibit halls, take in a session. The session timetable outlines all the events of the Broadcast Engineering Conference and more.

And be sure to take the FASTtrack with you on your PDA. Download the *Radio* magazine FASTtrack, Exhibitor Directory and BEC Session Guide to your Palm or Pocket PC today. The files are on the *Radio* magazine website. Look for the FASTtrack for PDA link.

See you in Las Vegas.

*Chris Scherer, editor*





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**G**et a preview of some of the most innovative products debuting at NAB2006 with the NAB Extra! This section provides access to products long before you get to the show, so you can plan which booths to visit. With booth numbers included, the NAB Extra! will help you find exactly what you are looking for.

PUSH BUTTON FOR  
**IMMEDIATE  
ACCESS**  
to

**NAB  
Extra!**



**Solid state media recorder**  
**Nagra**  
*Booth N3100*



**Ares-M:** This solid-state record offers an operating range of -20° to 60°C with 24-bit, 48kHz A/D conversion. It measures 5" x 2" x 0.8" and it weighs less than 250g. The recorder offers a 1.1 USB connector for file transfer and battery charging. The unit's sampling frequency can be set from 32kHz to 48kHz. It features an internal omni-directional mic and stereo mic and line inputs, and an internal speaker. Its S/N ratio is greater than 90dB A-weighted. The device also offers built-in audio editing, automatic record start, an adjustable audio record buffer, menu setting templates, markers and software updates from the Internet.

615-726-5191; fax 615-726-5189  
[www.nagraaudio.com](http://www.nagraaudio.com); [mail@nagra.com](mailto:mail@nagra.com)

**Newsroom mixer**  
**Wheatstone**  
*Booth N1815*



**5200-D:** A networkable news mixer, the unit provides front- and rear-panel

mic input connectors along with a front-panel headphone jack. The mixer also provides a single-segment LEDVU meter and two output buses with program and mix-minus options. The five total inputs consist of one mic, one analog input and three digital outputs (two with router selectors). A built-in Ethernet Bridge X-Y controller is standard, as well as cue speaker and headphone, cue level control, monitor selector and headphone volume control.

252-638-7000; fax 252-637-1285  
[www.wheatstone.com](http://www.wheatstone.com); [sales@wheatstone.com](mailto:sales@wheatstone.com)

**Booth numbers from the NAB  
are current as of March 15.**

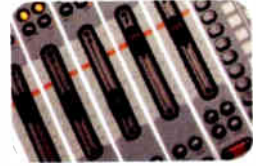
# Can a broadcast console have a fan club?

"The more I learned about Axia, the more impressed I became with their routing system and consoles, and how well their network topology was designed. We ordered nine studios, and we love it. Our operators keep raving about how easy things are to operate. Even our listeners tell us how good WOR sounds!"



— Thamas R. Ray III, CPBE, Vice President /  
Corporate Director of Engineering, Buckley Radia

"Axia's Ethernet links are switched connections – no hubs. With guaranteed bandwidth, and some clever clocking mechanisms, latency simply isn't an issue. With regard to cost, we found a significant difference between Axia and the other options we examined. Going with Axia cut our costs by roughly 33%..."



— Ethan Tarrey, Chief of Research & Development,  
Minnesota Public Radia

"We liked Axia consoles so much we installed them in a second studio. Then a third. Then a whole second cluster. And Axia cost about half what some companies wanted us to spend. My colleagues are so impressed, they want Axia consoles in their stations, too!"



— Jarge Garza, Chief Engineer  
Univision Radio, McAllen, Texas

"I've worked with lots of equipment in the past 30 years, and Axia is by far the easiest system to install and get up to speed with. There are just a few cables instead of hundreds; the entire installation – with testing – took just one week."



— Rudy Agus, Chief Engineer, Hi-Favar Broadcasting  
Los Angeles, California

"The announcers tell us how much they love working with the Axia consoles... It's great to be able to setup and save multiple configurations that can be recalled at a moment's notice. I don't know why we hadn't gone this route earlier. Where we're installing new equipment, we're onboard with Axia."



— Owen Martin, Director of Engineering,  
Newcap Radio, Alberta, Canada

"The jocks took to the new Axia consoles like fish to water. Show Profiles are their favorite part, because they can all have custom board setups. Since the first studio was installed, we've added a new production and interview studio, and we plan on building three more studios. It'll be all Axia, all the way to the transmitter."



— Marc Jahnsan, Chief Engineer, WEGL-FM  
Auburn University, Auburn, Alabama



[www.AxiaAudio.com](http://www.AxiaAudio.com)



# NAB Extra!

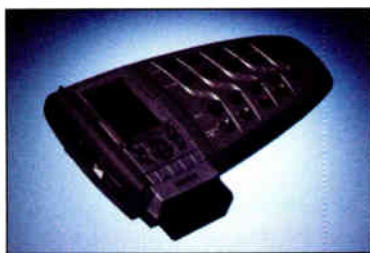
## Analog/digital audio test system Prism Sound



**Booths N2524, N1327**  
**Dscope Update:** Key new features to Dscope include the Acoustics 1 package, which offers transducer/room test support, including dB SPL units, measurement mic sensitivity and frequency response calibration, impulse response by MLS and swept-sine method, LS impedance measurement by use of an

external ballast resistor in series with EUT and analog I/O, which will run optionally at 48kHz as well as 96kHz and 192kHz.

973-983-9577; fax 973-983-9588  
[www.prismsound.com](http://www.prismsound.com); [sales@prismsound.com](mailto:sales@prismsound.com)



## Audio codec Comrex Booth N2722

**Access Portable:** About the size of a camcorder, this hand-held unit may be powered for more than seven hours by its rechargeable battery. For broad-

casts that require larger mixing and headphone capabilities, the system may be docked into the stereo mixer/headphone management section to provide a full-featured, table-top, five-channel mixer/codec. The codec uses BRIC technology to deliver wideband mono or stereo audio on a single POTS line or IP network including the Internet. Other features include a built-in Ethernet port, and connection to a range of other networks via integral Cardbus slot including, modem, 3G cellular, Wi-fi and Wi-max.

800-237-1776; fax 978-784-1717; [www.comrex.com](http://www.comrex.com); [info@comrex.com](mailto:info@comrex.com)

## Headphones Audio-Technica Booth N3218

**Import series:** Audio-Technica is manufacturing three professional monitor headphones featuring a low-profile, closed-back dynamic design for isolation in loud listening environments. The headphones handle high SPL levels, and use large-aperture drivers, copper-clad aluminum wire voice coils, rotating earpieces for one-ear monitoring, and oxygen-free copper cable with gold-plated stereo 1/8" connector and 1/4" adapter. The range includes the ATH-PRO700 SV, ATH-PRO5 V and ATH-PRO5 MS. For portable and active applications, there are seven styles that include three adjustable clip-on models featuring two lightweight ear buds; a lightweight ear-bud/clip-on hybrid headphone with a three-position design; and a folding headphone designed for comfort, quality and portability. Models include the ATH-EW9, ATH-EM9r and ATH-EM7 GM adjustable clip-on headphones; ATH-CM7 SV and ATH-CM7Ti ear-bud headphones; ATH-EC7 GM ear-bud/clip-on hybrid headphones; and ATH-ES5 SV portable folding headphones.

330-686-2600; fax 330-686-0719  
[www.audio-technica.com](http://www.audio-technica.com); [pro@atus.com](mailto:pro@atus.com)



## Virtual studio Merging Technologies Booth SL3755

**Pyramix 5.0:** In Pyramix version 5.0, the system's firmware has been expanded from 64 to 128 I/O. The company has improved the media management and libraries, transport and machine control, timeline and editing, CD editing and SACD authoring as well as general settings. The main unit features a master fader section and 24 additional user-definable keys across two layers that can be used as 48 direct access solo/mute/track arming keys, locators, cue triggers or any other chosen function. There is a separate and optional eight-fader expansion unit with eight rotary encoders and both units use 100mm touch sensitive moving faders with dedicated solo, mute, read and write automation keys.

858-675-9703; fax 847-272-0597  
[www.merging.com](http://www.merging.com); [info.america@merging.com](mailto:info.america@merging.com)

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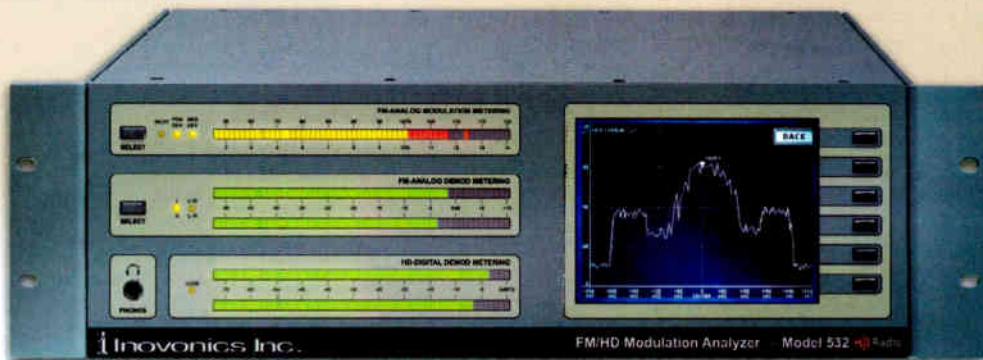
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## Visit Inovonics - Booth N3206

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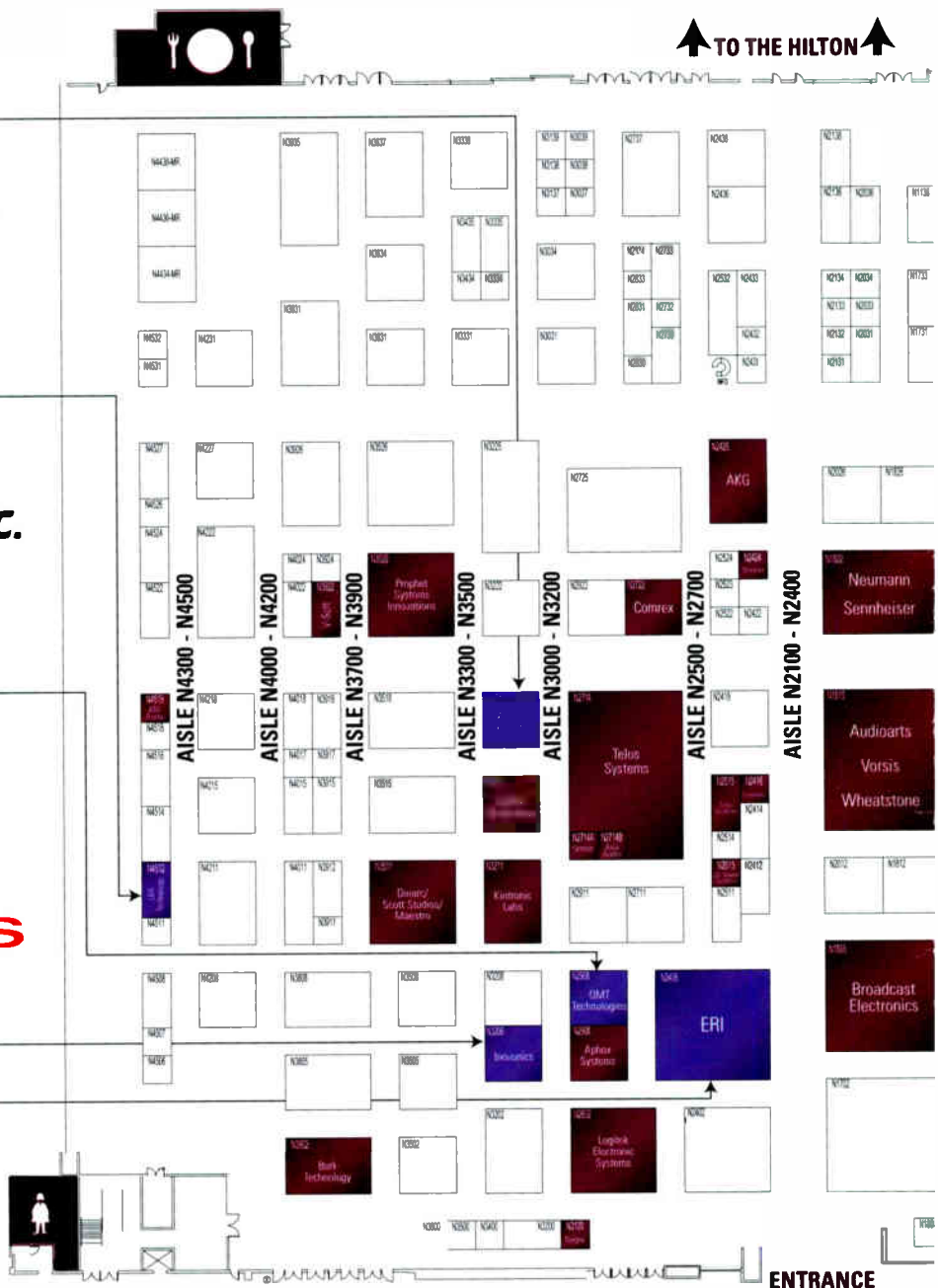
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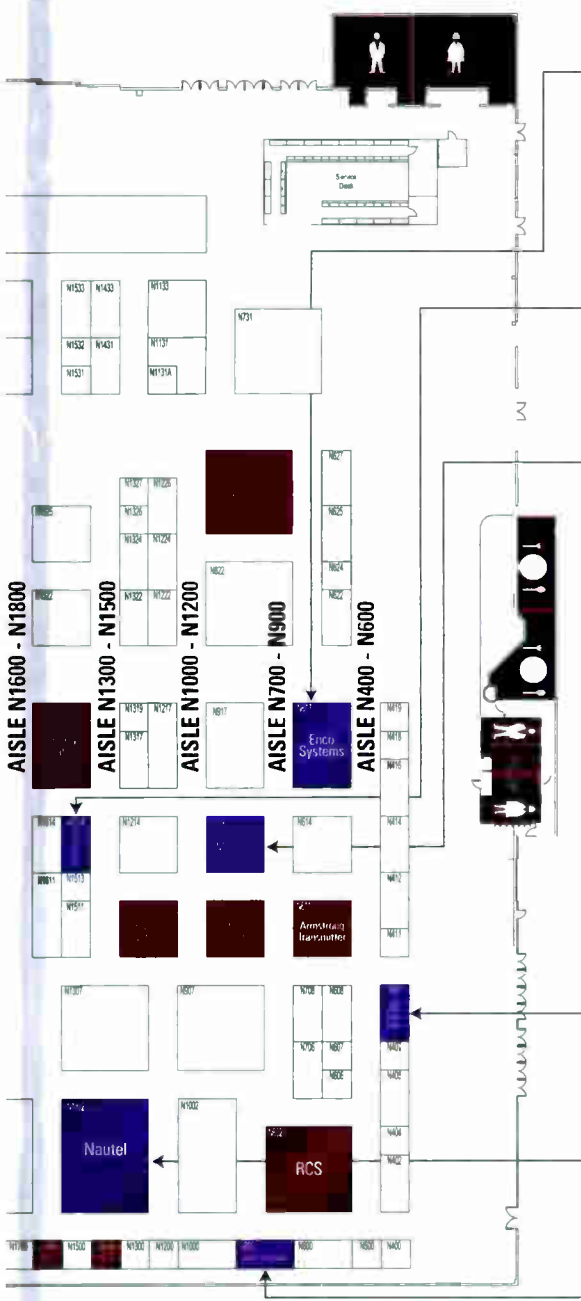
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**Broadcast Electronics**  
**Booth N1808**

**4MX 25:** Based on patent-pending 4MX medium-wave digital transmission technology, which is a method of modulating the duty cycle of the radio frequency directly to produce a more linear output waveform, the 25kW transmitter is DRM-compatible and capable of linear audio

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**Marantz**  
**Booth N600**

**PMD560:** Offering more than 35 hours of recording time on a 1GB CF memory card, this compact rack-mount digital recorder is a solid-state recorder with recording to Compact Flash media cards or Microdrives. Uncompressed WAV files can be recorded at 44.1kHz or 48kHz, and MP3 files can be recorded in mono (at 64kb/s) or in stereo (at



128kb/s). Using a standard 1GB Compact Flash card, the unit can record more than 1.5 hours of stereo and more than three hours of mono uncompressed audio, more than 17 hours of stereo MP3 and more than 35 hours of mono MP3 audio. The recorder features RCA input and output jacks, two remote jacks as well as an RS-232C connection port. The front panel offers a headphone jack with volume level and a built-in USB interface.

630-741-0330; fax 630-741-0652  
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Booth N4519**

**Prontonet:** The Prontonet is a multiformat audio codec with capabilities such as dual codec (two independent encoders and decoders) supporting G711, G722, MPEG1/2 Layer II, MPEG1/2



Layer III, MPEG2/4 AAC LC and MPEG4 LD as well as Apt-x among its standard coding algorithms and bi-directional uncompressed linear audio transmission over IP through its Ethernet 10/100 port. The Prontonet can also establish a back-up link using ISDN at 64kb/s or 128kb/s under communication loss of X21 or IP links.

973-659-0555; fax 973-659-9555  
www.ataaudio.com; sales@ataaudio.com

**Audio logger  
Energy-Onix  
Booth N3335**

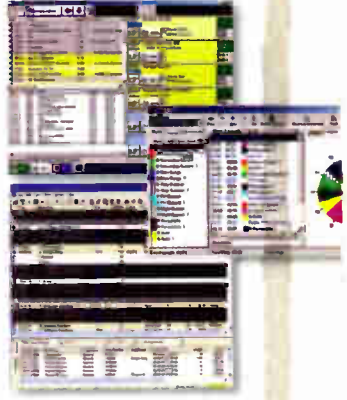
**Documentor:** This audio logger permits a station to select previous programs by the minute, hour, day and month. The unit can drive 10 terminals simultaneously via LAN or Internet connections.

888-324-6649; fax 518-758-1476  
www.energy-onix.com; energy-onix@energy-onix.com

**Automation, scheduling,  
management system  
Enco Systems  
Booths N617, C2507F**

**Streamline:** Enco partnered with Wicks Broadcast Solutions and Powergold to create Streamline, an integrated automation, music scheduling and traffic system. Streamline integrates DAD's library/playlist functions with Visual Traffic spot entry/log management and Powergold music scheduling/analysis, simplifying a workflow. The system runs on standard PCs with Windows 2000 or Windows XP Pro operating systems.

800-362-6797; fax 248-827-4441; www.enco.com; sales@enco.com



**Audio converter  
Symetrix  
Booth N2414**

**Lucid 88192:** This audio converter supports eight channels of A/D-D/A conversion at sampling frequencies up to 192kHz. The multi-format unit offers simultaneous connectivity for analog, AES/EBU digital audio and SMUX2 ADAT optical digital audio. An option port is included for future adoption of additional formats.

425-787-3222; fax 425-787-3211  
www.symetrixaudio.com; symetrix@symetrixaudio.com



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**Tony Masiello**  
Senior VP, Operations  
XM Satellite Radio

**Ed Schwartz**  
VP, Broadcast Engineering  
XM Satellite Radio

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*Ed Schwartz*  
VP, Broadcast Engineering  
XM Satellite Radio

*"One of the early and important choices I made in designing the XM facility was the selection of StudioHub for our audio and data wiring infrastructure. Now, six years later, I've never regretted that decision."*

*Tony Masiello*  
Senior VP, Operations  
XM Satellite Radio

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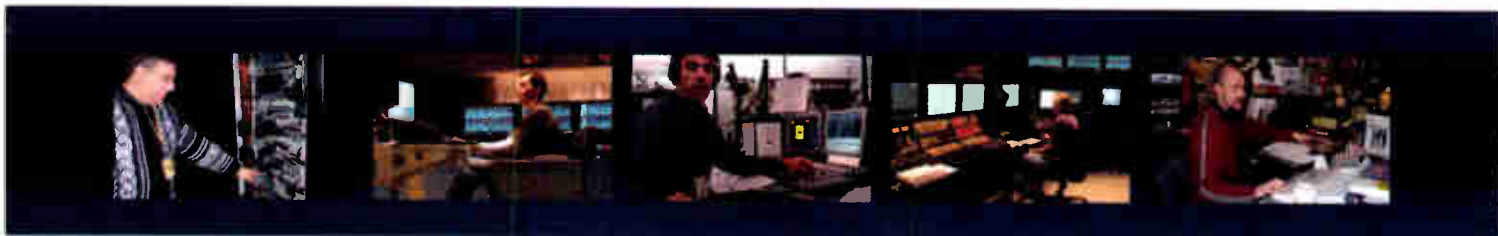
StudioHub+ is the universal analog and digital approach to wiring all your broadcast gear.



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Radio Systems, Inc. • 601 Heron Drive • Logan Township, NJ 08085  
Phone: 856-467-8000 • Fax: 856-467-3044 • [www.studiohub.com](http://www.studiohub.com)





**Digital telephone hybrid**  
**Sonifex**  
**Booth N4507**

**DHY-03:** This DSP-based digital telephone hybrid is a redesign of the DHY-02 and offers 75dB typical line balance rejection. The hybrid's feature-set includes universal line compatibility, input and output gain adjustment, input and output metering, conferencing, RS-232 serial control,



local and remote line hold switching, integrated auto-answer, automatic call disconnection, auto-ducking, DTMF tone recognition, a balanced mic/line input and balanced line output.

207-773-2424; fax 207-773-2422

[www.independentaudio.com](http://www.independentaudio.com); [info@independentaudio.com](mailto:info@independentaudio.com)

**Translator remote control**  
**Crown Broadcast**  
**Booth N3912**



**Airsis TM2000:**

This system offers full command and control of the translator and transmitter fleet via the Internet. No phone lines or satellite dishes are required—just a whip antenna. The system comes standard with a two-way RS-232 data port for connection to a satellite receiver, tower light controller or other on-site equipment. Data retrieved can be e-mailed or displayed on the AirsisVision website. Log on to the AirsisVision secure website to calibrate, monitor and control the translator. The online database stores translator readings and other site information providing logs.

800-262-8919

[www.crownbroadcast.com](http://www.crownbroadcast.com); [fmsales@irecl.com](mailto:fmsales@irecl.com)

**Enclosure**  
**APW Mayville**  
**Booth SL2132**



**Stantron Broadcast Rack:** Available in a variety of heights and depths, this rack offers a low profile with a powder coat finish. Horizontal lacing brackets simplify the management of cables by spreading them from front to back. The integrator can tie cables in strategic areas to accommodate a narrower space. Thin profile power strips provide space savings in high-density wiring applications. Top and rear mountable fan panels assist airflow through the rack system and keep terminal gear within its proper operating temperature range.

800-558-7297; fax 920-387-7196

[www.stantronracks.com](http://www.stantronracks.com)



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Broadcast Electronics, Inc. • 4100 North 24th Street, Quincy, Illinois 62305-3606  
 Telephone: (217) 224-9600 • Fax: (217) 224-9607 • E-Mail: [bdcast@bdcast.com](mailto:bdcast@bdcast.com)

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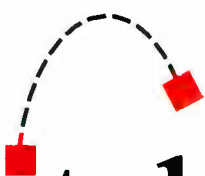
WFCJ's John Graham does a little studio maintenance.

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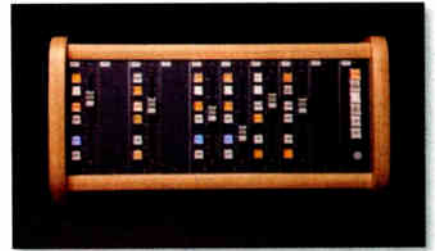


**Audio processor, controller  
Junger Audio Studioteknik  
Booth N3200**

**Level Magic, Level Magic Surround:** Level Magic uses an adaptive level control algorithm to equalize audio levels from any source at any time. The range incorporates automated gain control, plus transient processing and peak limiting for continuous unattended control of any program material. Level Magic Surround is designed to support eight-channel audio processing.

+49 30 677 7210; fax +49 30 677 72146  
www.junger-audio.com; sales@junger-audio.com

**Mini console  
Sierra  
Automated Systems  
Booth N907**



**Rubi-T:** This mini Rubicon broadcast console is 6" high and features any number of input modules, monitor modules and talkback modules. This console is useful for news booths, edit booths, voice booths, voice tracking and mini secondary effects mixer in on-air studios. Features include full-length 100mm P&G fader and four programmable source select or bus assignment buttons.

818-840-6749; fax 818-840-6751  
www.sasaudio.com; sales@sasaudio.com

**DT12 connectors  
Gepco International  
Booth C5733**



**G37:** These 12-channel DT12 connectors feature an anodized aluminum backshell that locks in place with two set-screws into a series of castellations. The set screws and castellation prevent accidental loosening of the connector shell thereby extending the operating life. The male connector shell is constructed from stainless steel to prevent damage and wear. The crack-proof neoprene insulator features a bonded and scalloped design that prevents rotation. The pins and sockets feature a three-micron, mil-spec gold plating for improved solder and tarnish resistance. For strain relief, the connectors feature an oversized nut and rubber gland seal with an optional kellem cord grip and heat shrink.

800-966-0069; fax 847-795-8770  
www.gepco.com; gepco@gepco.com

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Additionally Belden is the market leader in Unshielded Twisted Pair (UTP) data cable design, supplying extremely high quality cables for 10 Gigabit Ethernet performance, as well

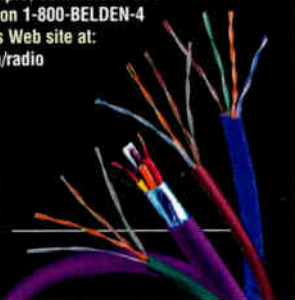
as Category 6 and 5e. And, only Belden offers UTP cables with Bonded-Pairs. Belden Bonded-Pair cables ensure good attenuation characteristics over longer distance since the pair conductors are bonded together to maintain a consistent conductor-to-conductor spacing. Bonded-Pairs also mean Installable Performance® — that is, unlike other UTP designs, Bonded-Pair cables maintain their superior electrical performance even after the rigors of installation.

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- The parametric EQ takes care of any frequency anomalies with surgical precision.
- Post-processing insert point, -10dBV and +4dBu analog outputs, 24/ 96 digital outputs on AES3, S/PDIF and Optical, word clock I/O, and a cough switch with soft mute allow the Model 230 to be easily interfaced into any system.

So if you are looking to touch your listeners, you should be looking at the ApheX Model 230.

[www.aphex.com](http://www.aphex.com)

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**DJ headphones**  
**Denon Electronics**  
**Booth N600**

**DN-HP1000:** Using a closed-back design for isolation, these headphones employ a large speaker driver (53mm) and feature rich bass with a frequency response from 5kHz to 33kHz. The headphones' soft padded ear cups swivel 180°. They use a folding design, dual nickel-plated adapter (1/4" and 1/8") and semi-coiled soft insulated cord with reinforced cable strain.

973-396-0810; fax 973-396-7459; www.d-mpro.com; info@d-mpro.com



**STL**  
**Broadcast Electronics**

**Big Pipe LT:** This series offers a data capacity starting at 10Mb/s for transporting AES and



analog audio as well as multiple channels of HD Radio audio and data. This version has been optimized for point-to-point connectivity between a studio and a transmitter site. It is capable of transporting main channel audio at 32kHz, 44.1kHz or 48kHz sampling rate, plus several channels of HD Radio coded audio for HD2 Multicasting, as well as channels of advanced data services while still providing Ethernet connectivity and RS232 serial data to the studio or remote site.

217-224-9600; fax 217-224-9607

www.bdcast.com; bdcast@bdcast.com

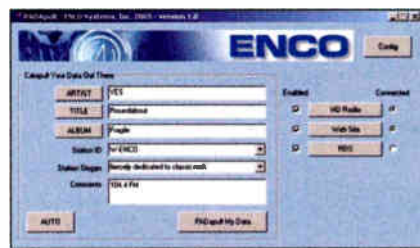
**Low-power FM transmitter**  
**Harris**

**ZX:** Based on Harris' Z-Series of transmitters, the ZX low-power transmitter is available in 500W, 1,000W and 2,000W power levels for analog broadcasting. Upgrades to HD Radio are achieved when driven by the Flexstar HDX-FM exciter, as a hybrid analog/digital system or in digital-only mode.

800-622-0022; fax 513-459-3890

www.broadcast.harris.com; broadcast@harris.com

**PAD management system**  
**Enco Systems**



**Booth N617, C2507F**

**Padapult:** This system enables real-time manual sending of data to HD Radio, RDS, websites (up to six locations) from a control room, while also integrating data output from the automation system or satellite provider. A stand-alone application, it can be used with any radio automation system. There's also a text stream embedded in the carrier wave. Text scrolls across the front of the receiver's LCD panel.

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The Electronics Research LYNX™ Dual Input Side Mount FM Antenna is designed specifically for FM IBOC applications. This new antenna is capable of transmitting both the analog and digital FM signals without requiring a high loss hybrid combiner and maintains high isolation between the digital and analog transmitters. The design meets the current Federal Communications Commission requirement for informal notification of IBOC implementation.

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ERI has developed a compact arrangement of our famous FM 970 band pass filter cavities to address the specific needs of FM IBOC broadcasting. ERI's mask filter configuration can provide the right response for any requirement.



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The quality and reliability of ERI's standard quarter wave hybrids have been adapted for use as an IBOC Hybrid Combiner. The iBOX™ 10 dB Hybrid Combiner is available in two versions:

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Booth N3208**

**Radio Assist 7.5 Modules:** The short message service module for the Radio-Assist 7.5 range of digital audio software programs uses mobile phone platforms as a new way to communicate interactively, allowing on-air talent to play interactive SMS and voting games with listeners. The Air-DDO module is spread over two monitor screens. The GUI simultaneously displays four broadcast channels and offers access to help and preparation tools, including a cue, on-air monitoring, playlist modification, recording and production. The statistics tool allows users to measure and monitor the effectiveness of various elements of their daily broadcasts, including the number of times an audio clip has been played. This new tool automatically displays results per day, month or the user's period of choice. Multitrack XT is an editing tool for multitrack digital audio recording and editing. It offers time stretching, pitch shifting, noise reduction, noise gating, synchronization, stereo and multitrack broadcasting support for CD audio engraving programs and import/export MP3 files.

866-638-4222; fax 973-575-7812

www.netia.net; j.martin@netia.net

**Manifold combiner**

**Dielectric  
Booth C2020**

**DFM series:** The unit is similar in appearance to a traditional branch-style combiner, but the output manifold, which is comprised of one coaxial line, has a separate tee junction for each input frequency and a short circuit stub on the end farthest from the output. As with all combiners, each input to the manifold combiner requires a band-pass filter tuned for the input frequency. This filter rejects all other frequencies in the manifold.



800-341-9678; fax 207-655-7120; www.dielectric.com; dcsales@dielectric.com

**Mixing console**

**Audioarts Engineering  
Booth N1815**

**D-75N:** This digital audio mixing console can be modified with the Net-75 panel to provide a fully integrated network system with the option of autonomous console operation when needed. Four output buses along with eight digital inputs and outputs are provided within each panel. Six faders within the D-75N provide access to thousands of analog and digital system resources. Input modules are equipped with eight character LED displays, rotary source selectors and take buttons.

252-638-7000; fax 252-635-48547; www.wheatstone.com; sales@wheatstone.com

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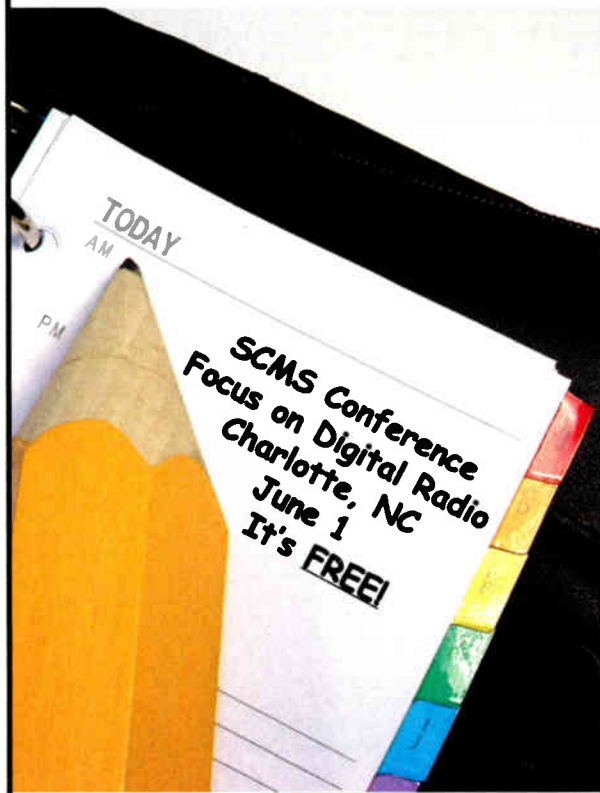
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**Automation system  
OMT Technologies  
Booth N2908**



**Imediatouch 2.6:** This automation software has added new features. The Non-Stop Broadcasting Auto-Failover hardware safeguard covers the station when there is a server problem. The update also includes improved satellite show recording for delayed playback, auto trim to fine-tune recordings quickly, auto resume to start the backup machine where the main server left off, a project editor to create shows quickly from multiple cuts, expanded Cart Chunk tag support to improve content ingest and new production features. In addition, the on-screen display has been updated with a new look.

888-665-0501; fax 204-783-5805  
www.omt.net; omt@omt.net

**All-hazards digital alert system  
Global Security Systems  
Booth N4208**

**GSSNet:** This alert and notification system uses the existing nationwide FM broadcast infrastructure to provide messaging coverage and a proprietary messaging system that allows secured and encrypted data with layered and targeted messaging to personnel. Command and control centers are installed with full redundancy. Messages are transmitted from an FM radio tower to multiple receivers in the coverage area. Fixed-wireless substation receivers and wireless receivers are made available to be distributed to all counties and other jurisdictions throughout the state as defined by the authorities.

www.gssnet.us; info@gssnet.us

**AES/EBU surround format  
D.A.V.I.D.**

**Booth N3034**

**RF-64:** D.A.V.I.D. has implemented the newly standardized RF-64 surround sound format. In cooperation with broadcasters, the IRT and EBU staff, D.A.V.I.D. engineers developed this new specification. It is available as an upgrade to all customers. The file format is designed to meet the requirements for multichannel sound in broadcasting and audio archiving. It is based on the Microsoft RIFF/WAV format and WAV Format Extensible for multichannel parameters. Additions are made to the basic specification to allow for more than 4GB file sizes when needed. The format is transparent to the BWF and all its chunks.

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# AUDIO OVER IP



## Applications

- STL links over IP networks
- Distribution of live or shared programming
- Multicasting
- Remote broadcasting over IP networks
- Automatic fallback to ISDN

## Communication Interface

- 10/100 Base-T interface
- ISDN U or S/T
- X21

## Coding algorithms

- Standard and Enhanced apt-X™, G711, G722
- MPEG1/2 LAYER II, MPEG1/2 LAYER III
- MPEG 2/4 AAC LC, MPEG4 AAC LD (Low Delay)
- PCM Linear Uncompressed Audio Over IP

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AUDIO

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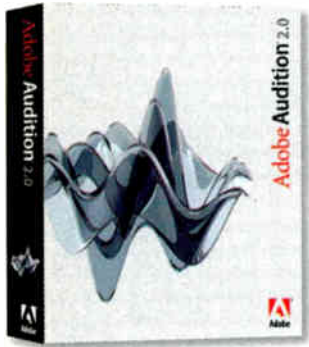




**Audio editing software**  
**Adobe Systems**  
**Booths SL3732, SL186-MR**

**Audition 2.0:** In Adobe Audition 2.0, a new low-latency mixing engine with ASIO hardware support allows greater creative flexibility, with real-time effects and input monitoring. Automatic delay compensation keeps everything in sync while you mix an unlimited number of tracks, including as many as 80 simultaneous input and output devices. The revamped mixer panel lets users set up the routing, using inputs, outputs, sends and buses. Parameter automation can be recorded and adjusted in the mixer itself, or in the new automation lanes in the timeline. Users can also add 16 sends per channel, providing techniques for mixing and monitoring sessions. Use CPU power more efficiently by creating sends on several tracks that go to a bus with a reverb or other effects applied. Or use sends and buses to create mixes for specific purposes, such as a mix-minus feed for a remote session.

800-833-6687; fax 408-537-6000; www.adobe.com



**Signal processor**  
**Vorsis**  
**Booth N1815**

**AP-1000:** This multiband, dual path FM plus HD processor features an interactive user interface that provides remote monitoring and control. The unit simultaneously provides outputs to FM or AM transmitter and HD Radio signal chain. Other features include multi-band processing, embedded graphic control, Ethernet interface, front panel USB ports and remote monitoring using interactive GUI software.

252-638-7000; fax 252-635-4857; www.vorsis.com; sales@vorsis.com

**Telephone hybrid remote interface**  
**JK Audio**  
**Booth N4215**

**RIU-IP:** This remote control interface for the company's Innkeeper 2 and Innkeeper 4 digital hybrids contains a Web server that allows the user to send and receive control data through his Web browser. The unit features a RJ-45 Ethernet port along with several remote control capabilities such as indication of incoming rings per line; the phone line can be taken off-hook or on-hook; users can set it for auto-answer and ring count; start and stop conference (Innkeeper 2); and adjustment of transmission and receive level per line. The unit always provides test tone start and stop per line and address book upload and download. RS-232 remote control port uses ASCII protocol and no external power is required.

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F7	F8	F9	F10	F11	F12		
PauseAfter	Prevent Edits	Menu	Stop All	Fade Prev	Play Next		
File	Name	Length	Killdate/Artist	Intro	EOM	Type	Mar
✓ 17:05:27	14235	3:16.4	Smith	12	05.3	Music	6:00.0
✓ 17:11:22	14236	00.0			00.0	Rotation	6:00.0
✓ 17:15:00	14237	06.0			00.6	General Ann	08.0
✓ 17:11:44	14205	2:53.8	Miracles	9	04.1	Music	6:30.0
✓ 17:11:44	0660	00.0			00.0	Rotation	1:00.0
✓ 17:15:00	12611	00.0			00.0	Rotation	1:00.0
✓ 17:15:00	12611	11.1			11.1	General Ann	6:00.0
Next: 16:44	14450						
17:20:05	0831	3:20.1	Sonny & Ch	8	01.3	Music	6:30.0
17:20:05	0831	00.0			00.6	Rotation	6:00.0
17:23:47	14444	3:44.6	Simon & Ga	10	02.6	Music	6:30.0
17:24:02	10472	15.6			00.6	Rotation	1:00.0
17:24:17	20100	15.4	01/23/2006		00.2	Auth Control	6:00.0
17:24:17	0835	00.0			00.6	Rotation	6:30.0
17:24:17	0141	00.0			00.6	Rotation	31.0

**"...I'm very impressed with the entire process by which the Waitt team worked with us."**

Michael Hulvey, General Manager, WRHK-FM, Danville, IL

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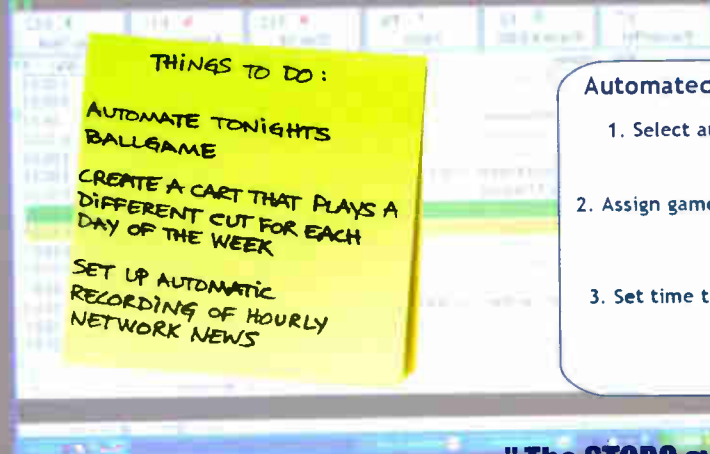


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1. Select audio source

NAME FOR THIS NETWORK:  Only  
 Audio Input Channel: 2

2. Assign game closures

Select Trigger: 04 - End of Game  
 01 - [Empty]  
 02 - Ballgame Local Break  
 03 - Ballgame Legal ID  
 04 - End of Game

3. Set time to switch to game

Days of the week:  All  
 Wed  Thu  Fri  
 Hour of the day:  All  
 03  04  05  06

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Larry Fuss, President, WROX-AM/WKXY-FM, Clarksdale MS

## Rotating Multiple Audio Cuts:

1. Set a file number to type "Rotator"

Select File Type:  Audio  
 Play-Only  Rotation  
 Direct  Merge

2. Choose type of file rotation

Rotation Type: 2 = by Day of Week

3. Enter file numbers and save

File	Name
Wed 7488	Sale Ad for Wed
Thu 7489	Sale Ad for Thu
Fri 749	

## Creating Automatic Background Recording:

1. Select audio source

NAME: DEVICE 1  
 Channel: 2 Mode: Stereo

2. Specify file number

Type: 91: AutoRecord  
 File/Command List: 5001

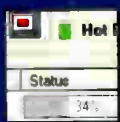
3. Select times and days to record

Hours of the day when this command is active:  All  
 Mid  01  02  03  04  05  06  
 Noon  13  14  15  16  17  18

Your time is valuable...

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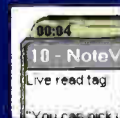
### Audio Import Manager (AIM)

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## Low power bandpass filters

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Booth N1517

Model 2914-2, 2914-3, 2914-4: Specs of the 2914-2 filter are as follows: power handling is 1,000W; VSR at  $\pm 100\text{kHz}$  is 13:1; typical insertion loss is  $-0.65\text{dB}$ ; typical frequency response at  $\pm 100\text{kHz}$  is  $-0.01\text{dB}$ ; and inputs and outputs are type N female. Specs of the 2914-3 filter are: VSR at  $\pm 100\text{kHz}$  is 1.06:1; typical insertion loss is  $-1.15\text{dB}$ ; and typical frequency response at  $\pm 100\text{kHz}$  is  $-0.05\text{dB}$ ; Specs of the 2914-4 include VSR at  $\pm 100\text{kHz}$  is 1.06:1; typical insertion loss is  $-1.65\text{dB}$ ; and typical frequency response at  $\pm 100\text{kHz}$  is  $-0.08\text{dB}$ .

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www.shively.com; sales@shively.com



## Extender Gefen

Booth SL541

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www.gefen.com; gsinfo@gefen.com



## M/HD Radio mod monitor

### Inovonics

Booth N3206

Model 532: The company's first product manufactured under license for Iniquity's HD Radio digital transmission system, the 532 measures parameters of the analog FM and the digital HD program channels, and includes a display of the occupied spectrum.

800-733-0552; fax 831-458-0554  
www.inovon.com; info@inovon.com

## VD/CD duplicators Disc Makers

Booth SL4385



**Reflex 2, Reflex 10:** The two-drive Reflex 2 and the 10-drive Reflex 10 are 16x VD/48x CD writers, each with a new controller that offers 128MB buffer. The two systems feature the ability to rename files stored within the hard disk and separate user accounts with password protection. The Reflex duplicator line now features duplicators with one, two, four, seven and 10 drives, and duplicate as many as 80 VD or 150 CDs per hour.

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**Portable recorder  
AEQ**

**Booth N3518**

**PAW 120:** Built on the success of the DR 100, which received a Pick Hit Award from *Radio* magazine at NAB2005, the PAW 120 will replace the DR 100 next year.

The recorder features a built-in speaker, aluminum case and a dual-color LED display. The unit operates on two AA batteries. The recorder appears as a USB removable external device for Windows and Mac. It records and edits linear PCM and MPEG compressed audio, supports the BWF file format, and stores audio to an internal 512MB flash memory. It features a built-in microphone and accepts a mono or stereo external microphone while providing phantom power. An AGC and voice-activated recording can be switched on or off.

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



**15kHz stereo codecs**

**Tieline America**

**Booth N3215**

**I-mix G3:** Tieline Technology now offers IP-based connections with its G3 Commander and I-mix G3 platforms. The audio over IP capability allows stations to connect reliably over the Internet and deliver FM-quality mono and stereo audio for remote broadcasts. The new IP software has been integrated into the Tieline Commander G3 file codec and the I-mix G3 codec. Broadcasters can even go wireless over 802.11 Wi-fi.

888-211-6989; fax 317-913-9615; [www.tieline.com](http://www.tieline.com); [sales@tieline.com](mailto:sales@tieline.com)



**Color analyzer**

**DK Technologies**

**Booth C2044, C2507A**

**PM5639/06:** Designed to provide accurate alignment, this analyzer checks color temperature and luminance levels of LCD monitors. The system measures the x and y values in the CIE diagram, luminance in candela per sq.m. or footlamberts, and correlated color temperature of the monitor. A RGB bar graph display with zoom function makes white balance alignment easy and intuitive. The PM5639 family of color alignment products has its roots in the design of the original Philips color analyzer.

+45 4485 0255; fax +45 4485 0250

[www.dk-technologies.com](http://www.dk-technologies.com); [info@dk-technologies.com](mailto:info@dk-technologies.com)

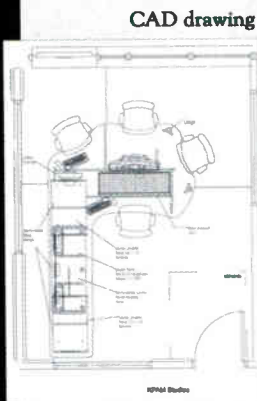
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 Societies & Agencies**

- American Radio Relay League .....Lobby 9
- Radio Advertising Bureau .....Lobby 11
- Society of Broadcast Engineers ....Lobby 28
- SMPTÉ.....Lobby 29
- Federal Communications Comm..... N3526
- Radio Music Licensing Cmte ..... N3924

**Audio Accessories,  
 Headphones & Speakers**

- Ward-Beck Systems ..... C 326
- Richardson Electronics ..... C 526
- Dorrough Electronics.....C 1233
- DK Technologies.....C 2044
- TC Electronic.....C 2507E
- Enco Systems.....C 2507F
- Panasonic .....C 2518
- Prophet Systems Innovations..... C 4431**
- Telex Communications ..... C 4535
- Acoustical Solutions .....C 4817
- Wohler .....C 5132
- Prime Image .....C 5136
- Neutrik.....C 6033
- Whirlwind.....C 6541
- Riedel Communications ..... C 8507
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- Heil Sound ..... N 407
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- Eventide ..... N2416**
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## Notes on booth numbers

There are several prefixes on the booth numbers. Here's what they mean:

**N** - North Hall

**C** - Central Hall

**SU** - South Hall upper level

**SL** - South Hall lower level

**OE** - Outdoor exhibits between the Central and South Halls

**R** - RTNDA exhibits in the Hilton

**Lobby** - Booths in the lobby areas. The lower booth numbers are in front of Banners restaurant outside the North Hall. The higher booth numbers, such as the SBE in Lobby 28, are near the Broadcast Engineering Conference session rooms S220 through S227.

Once you have identified the hall where a booth is located, you then have to navigate the floor to find it. In general, the booth number follows a grid. The first digits represent an aisle (or column), the last two digits represent a row. In the North Hall, this is easy to follow. When you stand at the hall entrance near Banners Restaurant, N400 is in the front to the right and N4538 is in the back and to the left.

The Central Hall is also simple. The aisles start from the front. When standing at the entrance with the bus loading area behind you, C101 is in the front on the left, C11547 is in the back on the right.

The South Halls can be confusing because the grid system is divided into the front and rear portions of the halls. Standing at the entrance with the Monorail behind you, the lower aisle numbers are on the left and they increase as you move right. The confusing part is that the odd-number aisles are toward the front and even-numbered aisles are in the back. Both levels are split at about the midway point.

While it seems that SU107 should be across the aisle from SU207, it is not. SU107 would be across the aisle from SU307. SU207 is halfway back and on the left across the aisle from SU407.

Note: the booth numbers provided are for illustrative use only and may not be actual booth numbers.

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7:30 Breakfast

8:30 HD Radio Transmission

10:30 Multicasting

12:00 Lunch- Keynote TBA

2:30 Planning Digital Audio  
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4:00 Reception



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**Plug-in daughter cards** allow channel-by-channel selectable analog or digital input support. Cards can be added easily or swapped in the future as the studios' complement of digital inputs grow or change.



**Upper control cards** feature a microprocessor for each channel providing complete user-selectable remote control, muting and channel mixing programmable by individual channel input.

**Optional I/O connectors** are available for all input and output circuit boards are available with easy-to-wire 5-pin balanced removable screw terminal connectors or with StudioHub+ standard RJ-45 connectors.



**Available option cards** are easily installed on the console rear panel and include:

- Distribution Amplifier card
- 4 & 8 position audio switcher card
- Squawk-box card
- Enhanced remote interface card

**A 15 pin remote control** connector for each channel provides input selectable remote start and channel feedback signals.

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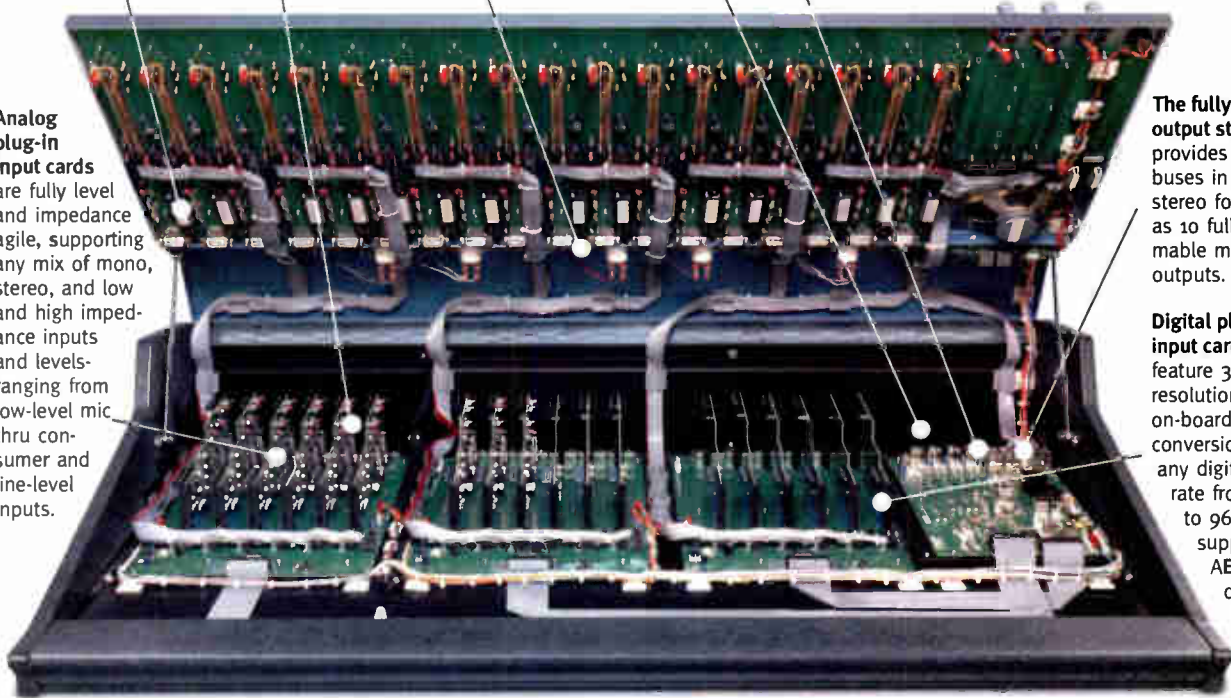
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**Analog plug-in input cards** are fully level and impedance agile, supporting any mix of mono, stereo, and low and high impedance inputs and levels ranging from low-level mic thru consumer and line-level inputs.

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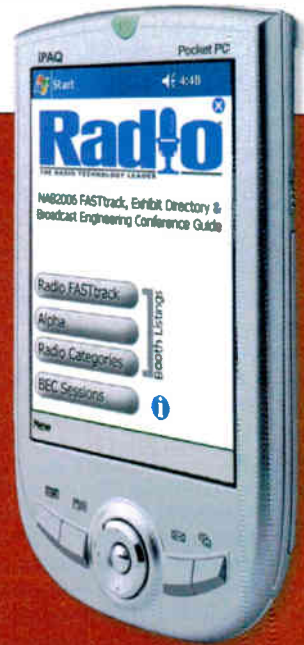
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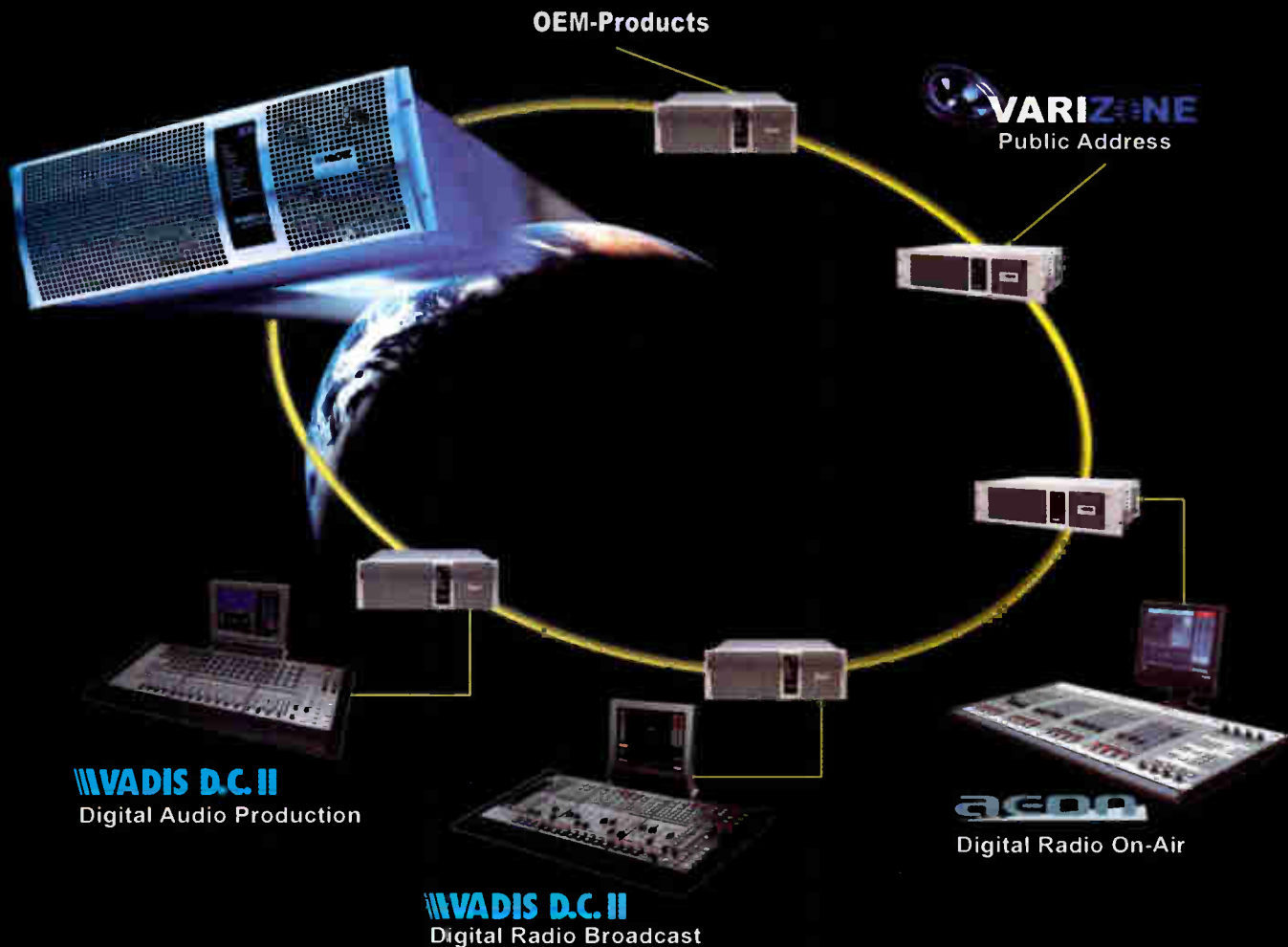
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<b>ERI-Electronics Research</b>	..... <b>N2406</b>
Middle Atlantic Products	.....SL1181

**Recording & Labeling Media & Accessories**

Wireworks	.....C 3043
JVC	.....C 3217
Maxell	.....C 6932
TDK Electronics	.....C10741
American Recordable Media	.....C10748
Professional Label	.....C10844
Denon Electronics	.....N 600
Dymo	.....N2133
Apogee Electronics	.....SL1941
Brother	.....SU 431
Ampex Data Systems	.....SU1030

**RF Feedline, Components, Towers & Services**

Micro Communications (MCI)	.....C 307
Ryma	.....C 307A
Richland Towers	.....C 746
Myat	.....C 817
RFS Broadcast	.....C 1217
Jampro Antennas	.....C 1517
Econco	.....C 1526
CPI Eimac	.....C 1526
Burle Industries	.....C 2016

Dielectric	.....C 2020
Tower Elevator Systems	.....C 2116
Coast to Coast Tower Service	.....C 2117
Stainless, division of SpectraSite	.....C 2447
Radian	.....C 3814
Andrew	.....C 8147
VF Gadgets	.....C10735
RFS Broadcast	.....C11600-MR
Flash Technology	.....N 412
Micro Communications (MCI)	.....N 418
Phasetek	.....N 706
<b>Altronic Research</b>	..... <b>N 911</b>
Com-Tech Srl RF Filters	.....N1131
EMR	.....N1300
Coaxial Dynamics	.....N1319
TWR Lighting	.....N1511
<b>Shively Labs</b>	..... <b>N1517</b>
Econco	.....N1611
CPI Eimac	.....N1611
Tower Consultants	.....N2034
Allied Tower	.....N2132
Unimar	.....N2134
<b>ERI-Electronics Research</b>	..... <b>N2406</b>
Comet North America	.....N2511
Bird Electronic	.....N2911
Honeywell Obstruction Lighting	.....N2922
KPFF Consulting Engineers	.....N3037
<b>Kintronic Labs</b>	..... <b>N3211</b>
American Tower	.....N3637
Magnum Towers	.....N3918
<b>LBA Technology</b>	..... <b>N4512</b>

**Satellite Equipment & Services**

Norsat International	.....C 3848
DH Satellite	.....C 5641
International Datacasting	.....C 5841
NPR Satellite Services	.....C 6841

Dawnco	.....C 7141
Andrew	.....C 8147
<b>Broadcast Tools</b>	..... <b>N1400</b>
Patriot Antenna Systems	.....OE107
Inmarsat	.....OE336
Wegener Communications	.....SU1376

**SCA & RBDS, Tuners and Monitors**

Modulation Sciences	.....C 118
<b>Harris</b>	..... <b>C 807</b>
RFS Broadcast	.....C 1217
Dielectric	.....C 2020
Wohler	.....C 5132
RFS Broadcast	.....C11600-MR
Denon Electronics	.....N 600
<b>RCS</b>	..... <b>N 602</b>
<b>Broadcast Tools</b>	..... <b>N1400</b>
Viarradio	.....N1431
<b>Audio Science</b>	..... <b>N1514</b>
Day Sequerra	.....N1800
<b>Broadcast Electronics</b>	..... <b>N1808</b>
Belar	.....N2418
Potomac Instruments	.....N2422
Audemat-Aztec	.....N2532
<b>Circuitwerkes</b>	..... <b>N2711</b>
Nokia Visual Radio	.....N2725
<b>Inovonics</b>	..... <b>N3206</b>
<b>Burk Technology</b>	..... <b>N3802</b>
Nokia Visual Radio	.....SL2414A

**Software - Business, Traffic, Scheduling, Inventory**

Wideorbit	.....C 361
Xytech Systems	.....C 860
<b>Prophet Systems Innovations</b>	..... <b>C 4431</b>
Traffic.com	.....C 9615
Xytech Systems	.....C11610-MR
RadioTraffic.com	.....N 414
Wireready	.....N 500
<b>RCS</b>	..... <b>N 602</b>
Bid4spots.com	.....N1326
<b>Prophet Systems Innovations</b>	..... <b>N3522</b>
Scheduall	.....SL1955

**Sound/music/image libraries**

Network Music	.....C 855
5 Alarm Music	.....C 1246
Killer Tracks	.....C 1255
Megatrax Production Music	.....C 1259
Blue Fuse Music	.....C 1263
Omnimusic	.....C 1346
Firstcom Music	.....C 1535
Associated Production Music	.....C 1551
Manhattan Production Music	.....C 1955
615 Music Library	.....C 1959
Sound Ideas	.....C 2151
Sony	.....CW10300
Megatrax Production Music	.....N1500
Stephen Arnold Music	.....R331
615 Music Library	.....R436
Groove Addicts	.....R440
Smartsound Software	.....SL2955
Sony	.....SU 107

**Studio & Facility Support Products & Accessories**

Nemal Electronics	.....C 744
<b>Harris</b>	..... <b>C 807</b>
Xytech Systems	.....C 860
<b>Zero Cases</b>	..... <b>C 1463</b>
ESE	.....C 1639
Allen Avionics	.....C 2139
Hilomast	.....C 3341
Mole-Richardson	.....C 4210
Masterclock	.....C 5716
Pomona Electronics	.....C 6636
Maxell	.....C 6932
Will-Burt	.....C 7543
Techni-Tool	.....C 7826

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MilesTek .....	C10523
Philips .....	C10811
Xytech Systems .....	C11610-MR
Society of Broadcast Engineers .....	Lobby 28
<b>Efron Computerized Studios .....</b>	<b>N 408</b>
Jennings Technology .....	N 411
Denon Electronics .....	N 600
Prime LED .....	N 606
Towerline Software .....	N 607
Superior Electric .....	N 708
Circuit Research Labs .....	N1136
<b>Studio Technology .....</b>	<b>N1211</b>
<b>Radio Systems .....</b>	<b>N1211</b>
<b>Broadcast Tools .....</b>	<b>N1400</b>
<b>Wheatstone .....</b>	<b>N1815</b>
Arrakis .....	N2026
<b>ERI-Electronics Research .....</b>	<b>N2406</b>
Symetrix .....	N2414
<b>Omnirax .....</b>	<b>N2424</b>
Comet North America .....	N2511
E-Z Up International .....	N3031
<b>Inovonics .....</b>	<b>N3206</b>
Yamaha .....	N3222
<b>V-Soft Communications .....</b>	<b>N3922</b>
Innovative Office Products .....	N4017
NOAA .....	N4018
<b>LBA Technology .....</b>	<b>N4512</b>
KD Kanopy .....	N4516
Anthro .....	SL 640
Noren Products .....	SL1141
Middle Atlantic Products .....	SL1181
APW Mayville .....	SL2132
Hardigg .....	SL3785
WhisperRoom .....	SL4387
NKK Switches .....	SL4400
Forecast Consoles .....	SU 146
Torpey Time .....	SU 946
TBC Consoles .....	SU1390
Canare .....	SU4164

**System Integrators,  
Installers, Consultants  
& Services**

Richardson Electronics .....	C 526
<b>Harris .....</b>	<b>C 807</b>
Non-Stop Music Library .....	C 851
Stainless, division of SpectraSite .....	C 2447
Enco Systems .....	C 2507F
Wolf Coach .....	C 3835
International Datacasting .....	C 5841
Calumet Coach Company .....	C10441
Digidesign .....	CW11005
<b>RCS .....</b>	<b>N 602</b>
Enco Systems .....	N 617
<b>Klotz Digital .....</b>	<b>N 826</b>
<b>Muscam USA .....</b>	<b>N 914</b>
Circuit Research Labs .....	N1136

Orban .....	N1136
<b>Broadcast Electronics .....</b>	<b>N1808</b>
Arrakis .....	N2026
Tower Consultants .....	N2034
Sadie .....	N2138
<b>CBT Systems .....</b>	<b>N2711</b>
KPFF Consulting Engineers .....	N3037
Netia Digital Audio .....	N3208
Medical Coaches .....	OE108
Non-Stop Music Library .....	R337
Microsoft .....	SL 125-MR
Avid .....	SL 701
Dalet Digital Media .....	SL1132
Microsoft .....	SL1161
Mayah Communications .....	SL1206
APW Mayville .....	SL2132
Backbone Networks .....	SL2921
Siemens Business Services .....	SU 23-MR
Leitch .....	SU2929

**Test & Measurement  
Equipment**

Modulation Sciences .....	C 118
Ward-Beck Systems .....	C 326
Dorrough Electronics .....	C 1233
Dielectric .....	C 2020
<b>Sencore Electronics .....</b>	<b>C 3810</b>
Neutrik .....	C 6033
Whirlwind .....	C 6541
Pomona Electronics .....	C 6636
Leader Instruments .....	C 7332
Andrew .....	C 8147
<b>Altronic Research .....</b>	<b>N 911</b>
Calrec Audio .....	N 917
Audio Precision .....	N1317
Coaxial Dynamics .....	N1319
Prism Media Products .....	N1327
<b>Broadcast Tools .....</b>	<b>N1400</b>
ATI .....	N1800
<b>ERI-Electronics Research .....</b>	<b>N2406</b>
Symetrix .....	N2414
Belar .....	N2418
Potomac Instruments .....	N2422
Prism Media Products .....	N2524
Audemat-Aztec .....	N2532
<b>Logitek .....</b>	<b>N2802</b>
Bird Electronic .....	N2911
<b>Inovonics .....</b>	<b>N3206</b>
RDL (Radio Design Labs) .....	N3331
Bext .....	N3508
Trompeter Electronics .....	SU3006
<b>Sencore Electronics .....</b>	<b>SU3009</b>
Tektronix .....	SU4141

**Transmitters, Antennas**

Superior Broadcast .....	C 131
DMT USA .....	C 316
Propagation Systems Inc .....	C 330
<b>Harris .....</b>	<b>C 807</b>
RFS Broadcast .....	C 1217

Jampro Antennas .....	C 1517
Dielectric .....	C 2020
Kathrein, Scala Division .....	C 3907
Larcan .....	C 4119
RFS Broadcast .....	C11600-MR
Valcom .....	N 419
<b>Armstrong Transmitter .....</b>	<b>N 611</b>
RVR .....	N1133
EMR .....	N1300
<b>Nautel .....</b>	<b>N1302</b>
<b>Shively Labs .....</b>	<b>N1517</b>
CTE International .....	N1525
AEV .....	N1533
Continental Electronics .....	N1702
Seratel Technology .....	N1733
<b>Broadcast Electronics .....</b>	<b>N1808</b>
Marti Electronics .....	N1808
OMB America .....	N1812
TFT .....	N2012
<b>ERI-Electronics Research .....</b>	<b>N2406</b>
Audemat-Aztec .....	N2532
<b>Kintronic Labs .....</b>	<b>N3211</b>
Energy-Onix .....	N3335
Nicom .....	N3435
DB Elettronica .....	N3505
Bext .....	N3508
SBS/Eddystone Broadcast .....	N3805
Crown Broadcast .....	N3912
RVR .....	N4434-MR
<b>LBA Technology .....</b>	<b>N4512</b>

**Wire, Cable & Connectors**

Nemal Electronics .....	C 744
RFS Broadcast .....	C 1217
<b>Belden .....</b>	<b>C 1655</b>
Wireworks .....	C 3043
Audio Accessories .....	C 3047
Kings Electronics .....	C 4711
Gepco International .....	C 5733
Neutrik .....	C 6033
Clark Wire & Cable .....	C 6330
Whirlwind .....	C 6541
Pomona Electronics .....	C 6636
Amphenol .....	C 7216
Andrew .....	C 8147
Switchcraft .....	C 9316
Rip-Tie .....	C 9848
RFS Broadcast .....	C11600-MR
Heil Sound .....	N 407
<b>Altronic Research .....</b>	<b>N 911</b>
Henry Engineering .....	N1200
Bird Electronic .....	N2911
AEQ .....	N3518
<b>ATA Audio .....</b>	<b>N4519</b>
Hosa Technology .....	SL 542
Tascam .....	SL2913
Tascam .....	SU1053
Multidyne .....	SU1729
Canare .....	SU4164
Mohawk .....	SU5155

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**NAB2006  
Sessions**

## Top technology highlights technical sessions

The Broadcast Engineering Conference is packed with presentations about radio technology. Now in its 60<sup>th</sup> year, the technical sessions cover all aspects of radio broadcasting, but this year's topics lean toward issues covering RF and HD Radio.

The sessions begin on Sunday, April 22, with the SBE Ennes Workshop. This year's topic of "Everything RF" jumps right into the RF theme of the conference. The workshop divides the time between radio and TV topics, so unless your interest covers both, you'll be able to take a break from the day-long session.

The Broadcast Engineering Conference opening keynote address will be delivered on Sunday, April 23, in room S219/220. This year's keynote will be delivered by Tomlinson Holman, a professor of cinema-television and electrical engineering at the University of Southern California, and an innovator in audio technology. His address will discuss consumer expectations of high-quality audio and video and how broadcasters can best compete with this demand.

The Radio Luncheon will be held on Tuesday, April 25, in the Hilton Barron room. A ticket is required to attend. During the lunch, Dick Purtan of the WOMC Detroit morning show will be inducted into the NAB Broadcasting Hall of Fame, and Walt

Mossberg, technology columnist for *The Wall Street Journal*, will deliver the keynote address. The NAB Crystal Radio Awards will also be presented during the luncheon.

On Wednesday, April 26, the Technology Luncheon will feature a keynote address from Chris Anderson, the editor-in-chief of *Wired* magazine. During the luncheon, the NAB's Television Engineering Achievement Award winner, S. Merrill Weiss, and the Radio Engineering Achievement Award winners, Benjamin Dawson and Ronald Rackley, will be honored. A ticket is required to attend the luncheon.

The annual Amateur Radio Reception will be held on Wednesday, April 26, at 6 p.m. This popular event draws a large crowd every year, and the event sponsors provide many door prizes.

The schedule grid on the next page shows the session timetable.

The breakdown of all the papers is available in the *Radio* magazine FASTtrack, Exhibit Directory and Broadcast Engineering Conference Guide for the PDA, which can be downloaded from the *Radio* magazine website at [beradio.com](http://beradio.com). In addition, some key elements of interest to *Radio* magazine readers from other conferences have been included in the session timetable.





Jay Goldman  
Technical Director  
WXPN Radio  
University of Pennsylvania

photo by Wally Corbin / Eastern Photo.com

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# Session Timetable

	8:00	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30 >	
<b>April 22</b>																						
S219/220	SBE/Ennes Workshop: Everything RF										SBE/Ennes Workshop: Everything RF											
S226/227	Connecting with the Consumers																					
<b>April 23</b>																						
S219/220	BEC Keynote	What Is Broadcast Quality?						Final Steps in the DTV Transition: The Death of Analog										Living the Digital Media Lifestyle in the Home and Beyond				
S226/227	Making Radio Work - Part I						The Evolution of IT in Radio Broadcasting															
<b>April 24</b>																						
S219/220	Disaster Preparedness for Broadcasters																					
S227	Digital Radio Worldwide						IEEE/BTS Delivering Television to Handheld Devices: A Technology Tutorial															
N240	FCC Compliance																					
N236											FCC Roundtable											
Hilton Barron	Opening Keynote																					
<b>April 25</b>																						
S221	Towers and RF Safety		Viewers on the Move				File-based Workflow for Television															
S227	Managing Your Digital Radio Bandwidth						Emerging Technologies for Radio															
S228											SBE Membership Mtg											
N231											SBE EAS Meeting											
Hilton Ballroom A											Urban/NAB Party											
N237	Improving Disaster																					
Hilton Barron							Radio Luncheon															
<b>April 26</b>																						
S221	Managing Your Multicast						Emerging Technologies for Television															
S227	Test and Measurements for HD Radio						Making Radio Work - Part II															
N232	ASCAP and BMI Performance Licenses																					
Hilton Barron							Technology Luncheon															
Hilton Ballroom B											Amateur Radio Operator's Reception											
<b>April 27</b>																						
S219/220	Digital ENG/SNG																					
S221	Interoperability in the DTV Facility																					
S227	The NRSC - A Report on its Activities																					

Radio  
TV  
SBE  
Radio/TV  
Other

# The NAB Engineering Achievement Awards



## Dawson and Rackley are co-recipients for radio

Two leaders in AM radio technology will be honored during the Engineering Luncheon at NAB2006. The 2006 Radio Engineering Achievement Award winners, Benjamin Dawson and Ronald Rackley, are known for their work in AM transmission systems around the world.

The NAB Engineering Achievement Awards were first established in 1959. They recognize individuals for their significant contributions that have advanced broadcast engineering.

Benjamin Dawson, the managing partner of Seattle-based Hatfield and Dawson Consulting Engineers, has practiced as a telecommunications consulting engineer for the last 30 years. He has designed, implemented and refurbished medium-wave antenna systems with as many as 10 towers at power levels as high as 2MW. Dawson began his career while still in junior high school. He is a Registered Professional Engineer (Electrical) in



Benjamin Dawson



Ronald Rackley

Washington and California. He is a member of the Association of Federal Communications Consulting Engineers, the Institute of Electrical and Electronic Engineers and the Society of American Military Engineers.

Ronald Rackley is partner in the engineering firm of du Treil, Lundin and Rackley of Sarasota, FL. Rackley worked as a radio station chief engineer and was a consultant to other nearby stations during college. Following his formal education, he worked for two engineering firms and a major manufacturer of antenna system equipment before co-founding a predecessor to his present firm, du Treil,

Lundin and Rackley, in 1983. Rackley is a member of the Association of Federal Communications Consulting Engineers, where he has served as president. He also served as vice president of the Broadcast Technology Society of the Institute of Electrical and Electronic Engineers. He was a consultant to USA Digital Radio during its early years of digital radio development, and has recently been called on to assist numerous client stations in evaluating and improving their AM antenna systems for HD Radio. Rackley is a registered professional engineer.

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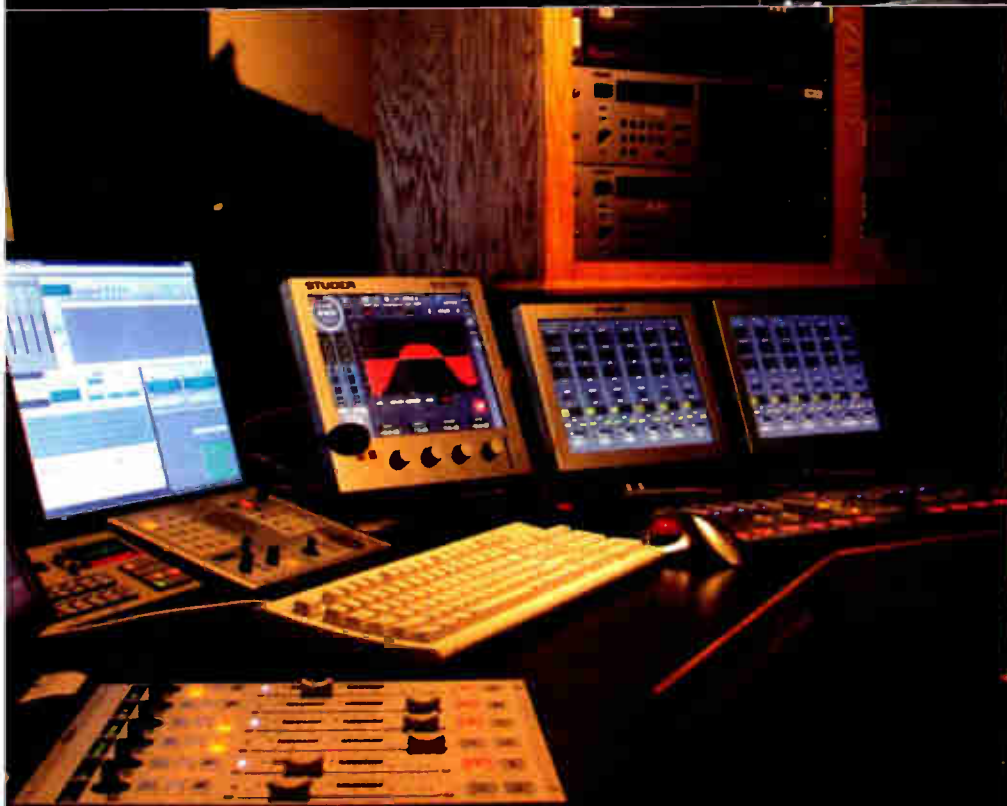
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# A new level

The heart of the audio system has some new tricks

**W**e live in an era of rapidly progressing technology. I was reminded of this when I began preparing this article. Three years ago I wrote a similar article, so I decided to look back and see how much has changed. I was surprised how much progress has been made in such a short period of time.

While analog audio consoles are still alive and well, many major audio console manufacturers no longer feature analog consoles at the top of their product lines. The analog boards that are available still range from the simple to the complex, but they are no longer the stars of the show. Stations with one control room or modest means can still use the analog consoles, but the possibilities offered by digital make it attractive to stations that want to build an integrated audio system.

## Going digital

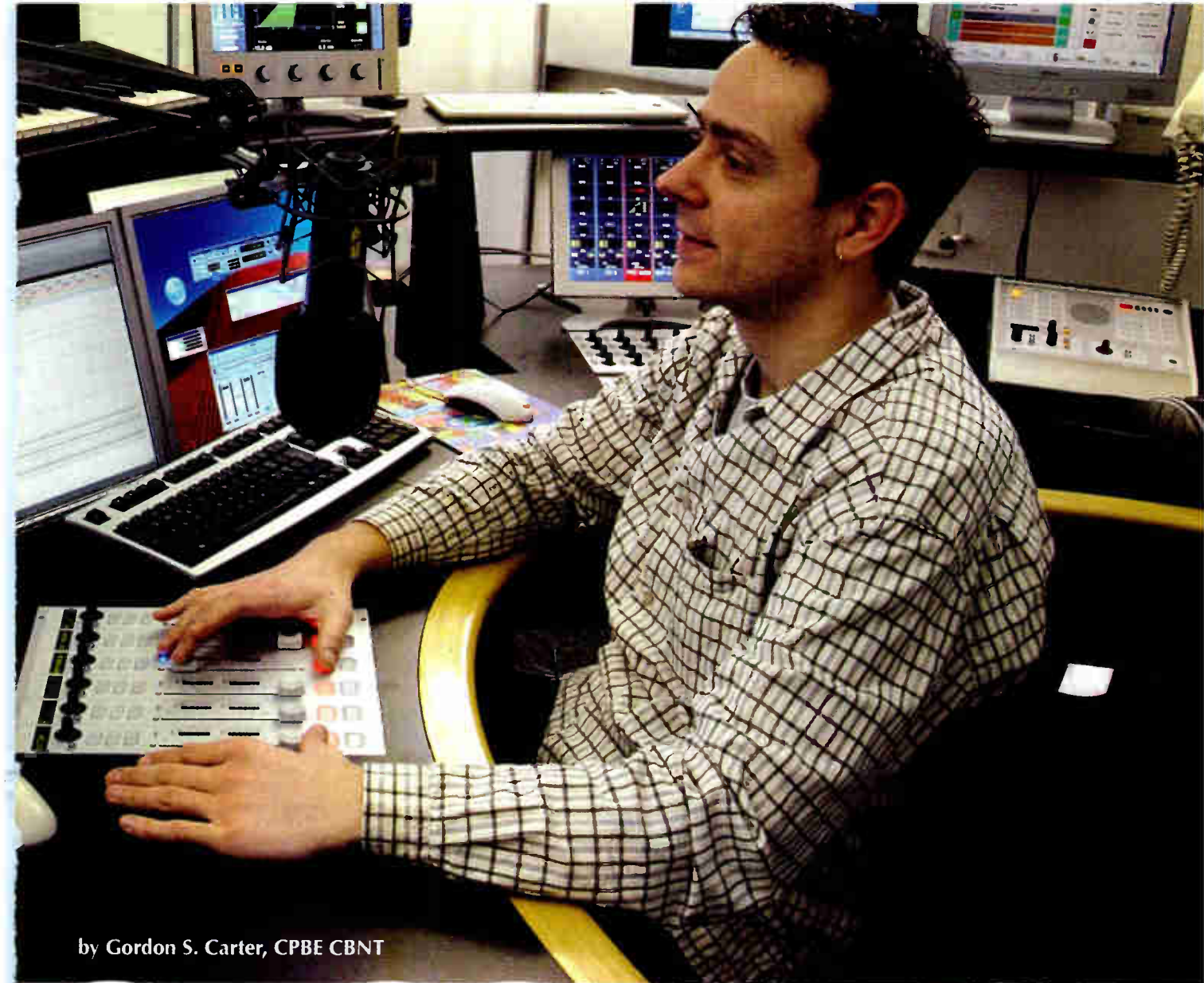
Digital consoles now cover the full range from economical to complete audio control systems. Several manufacturers now offer digital consoles in a small package. Some of these consoles are digital realizations of simple analog consoles, but others are

feature-laden consoles in stand-alone packages, designed for the small station that wants an all-digital air chain. In many cases the digital consoles are comparably priced to similar analog consoles. Some of the stand-alone consoles can be added to larger systems in the future with little modification.

Many digital consoles have a great deal more flexibility than their analog cousins. Depending on the design of the console, you may have a lot more inputs and outputs than you may think necessary. The beauty of the digital console is that virtually any output can be used for any function. Depending on the console, you may be able to have multiple outputs follow a given front panel control, thus creating mix-minus or other special functions. Some even provide a group of user-assignable buttons with macro programmability, so you can perform a series of functions with the press of one button.

As the digital consoles become larger and more complex, they typically become part of a total system that includes a digital router and multiple consoles or control surfaces. Again, manufacturers have chosen slightly different paths to achieve the same ends. Some





by Gordon S. Carter, CPBE CBNT

# OF CONTROL

have chosen to create a router and include all the console functions in the router under software control. They then have one or more control surfaces that connect to the router to create a complete audio system. Others have chosen to include the typical functions of the console in the console, and then connect the console (one or more) to a router with fully integrated control in the console. To the end user, the results are the same: a fully integrated audio system. However, installation and maintenance are a bit different.

Some digital consoles, like analog consoles, only provide the basics of console operation: audio level control, on-off switching, bus assignment. Others provide additional functions commonly found only in high-end analog consoles, like equalization, dynamics processing (compression/limiting), and the ability to have multiple setups of the console. Almost all have some measure of automation interface. The ability to easily interface the consoles with automation systems makes them attractive to stations that are modernizing from older analog consoles.

The routers used with these systems are not your father's routers. Previous generations of routers (mostly analog) simply routed the

audio from one input to one or more outputs. Most were contained in a single chassis or modular chassis system, but needed to be in close proximity to unity the operation. The current digital routers may or may not include A/D converters on the inputs, but all provide some means of reclocking or synchronizing the digital signals coming in to them. This is necessary to prevent glitches when switching or mixing the signals. They are distributed systems, with a central unit (usually placed in a rack room or other location where audio signals enter and leave the facility. Smaller units can be placed in control rooms as needed to deal with local sources within that room, such as a CD player). The various units are connected by optical fiber or other means of data networking. The control surfaces connect to the nearest router chassis, but can control any source or destination in the system (depending on software rules set up by the system administrator). This type of system minimizes the amount of room-to-room wiring and greatly simplifies the total system. Again, depending on the design of the system, the router may contain all the control functions for the audio (level, routing and more) or some of these functions may



# A new level of control

be located within the console itself.

In addition to the basic function of routing audio, the current digital routers can also route control signals. A couple of the control signals that can be routed are muting and machine control, such as start and stop. The flexibility of the router/control surface combination adds even more utility. You can set up multiple mix-minuses, route IFB signals for remotes

and studios, and even provide full intercom functionality. The uses are limited only by your imagination.

With all this flexibility there are some advantages that may not be readily apparent. For instance, you may be able to reduce the number of control channels on the control surface from what you would have in a simpler system. Any given control channel on the console can be connected to any source, and all functions will follow with that assignment. For instance, a channel that is used for a local announce mic during a morning drive (live operation) can be the voice track channel later in the day when the station is automated. Most of the control surfaces provide dynamic labeling so operators can tell at a glance what source the channel is connected to. By the way, most systems will not allow a channel that is switched on to be reassigned until it is turned off.

Most of the systems allow you to set up scenes or presets for the control surface. They may have different names, but the idea is the same. You can save one or more setups of the console (sources, gain, mix-minuses, IFB, control, even equalization and dynamics control) for the entire control surface and then recall this setup with a simple action. For instance, if you have a busy morning program with lots of call-ins,

## Resource Guide

Manufacturers and suppliers of mixers for radio studio applications

### **AEQ**

954-581-7999  
www.aeqbroadcast.com

### **AEV SRL**

+39 051 950 350  
www.aev.net

### **Arrakis Systems**

970-461-0730  
www.arrakis-systems.com

### **Audioarts Engineering**

252-638-7000  
www.wheatstone.com

### **Auditronics**

252-638-7000  
www.wheatstone.com

### **Autogram**

800-327-6901  
www.autogramcorp.com

### **Axia Audio**

216-241-7225  
www.axiaaudio.com

### **Clyde Broadcast Products**

+44 141 952 7950  
www.clydebroadcast.com

### **Dixon Systems**

416-261-3773  
www.dixonssystem.com

### **Harris**

800-622-0022  
www.broadcast.harris.com

### **Henry Engineering**

626-355-3656  
www.henryeng.com

### **Klotz Digital America**

678-966-9900  
www.klotzdigital.com

### **Lawo**

+49 7222 1002 0  
www.lawo.de



Stand-alone consoles, whether they are analog or digital, still have a practical place in many operations.

you can set up several faders as phone interface inputs, complete with mix-minuses. Then, later in the day, when you have a slower pace with lots of music and no call-ins you can replace the phone interface inputs with music sources, such as CD players or a hard drive playback system. The shift change can be as simple as a push of a button. While the closing theme of the morning program is playing, change the setup and as soon as the theme is finished, that channel will also switch to the new setup.

### **Built-in backup**

Another advantage is the ability to back up the primary control room. Because the control surface can control any signal in the system, any control surface can become your on-air control room. This can be a big plus for times when work needs to be done in the normal air control room or even if the control surface (or its connection to the rest of the system) fails. Again, depending on the system, this function can be password protected or possibly even remotely activated via a computer. While you probably don't want this to be a function that anyone can access without thinking (a single button press), you can build it in and control who can access it. When you change control surfaces to another room, any control or auxiliary audio signals (IFB for instance) normally associated with a given source will stay with the channel.

Most manufacturers offer more than one series of control surfaces.

# Multicasting.

It's like trying to fit —  
well, you know.



Management has decided to multicast. Which seems like a terrific idea — until you consider just how little bandwidth each channel will get. How will the sound of your station(s) survive these shrinking bitrates? Omnia can help.

New Omnia Multicast with SENSUS™ restores the fullness and depth that bit-reduction steals. Our DSP gurus teamed up with the codec experts at Telos (the folks who introduced broadcasters to MP3 and MPEG AAC). Together, they developed a unique suite of tools to pre-condition audio for HD Radio™ multicasting.

SENSUS technology enhances punch, preserves presence, and reduces artifacts. Even heavily bit-reduced channels (like multicast) can be significantly improved by Omnia running SENSUS. And like all Omnia processors, Omnia Multicast delivers the smooth, clean, pure signature sound that grabs your listeners and holds them hour after hour. No wonder the top stations around the world choose Omnia over all other processor brands.

Multicast like you mean it... with Omnia Multicast.



*Omnia Multicast with SENSUS codec conditioning, Omnia Bass Management system and distributed look-ahead limiter significantly improves the sound of HD multicast and other bit-reduced streams.*



OmniaAudio.com



# A new level of control

Some offer meters on the control surface, conventional analog meters or, more commonly, digital bar graph meters. Others offer metering as part of a full range of display options to connect any VGA monitor. As with analog consoles, the features and options on different



Most networked audio consoles are control surfaces that send commands to an audio engine.

control surfaces will appeal to different people. This is not a reflection of the quality of the control surface, just how well it meets a particular need.

Once the decision to install a digital router/console system is made, do your homework. Start by determining the specific needs. How many inputs and outputs are needed for the system? Be sure to include intercom, monitor (including headphones) and control functions. Identify which sources are mono and which are stereo. Break the needs down by location. A spreadsheet may be helpful to collect and organize all of this information.

As you look at systems, ask lots of questions. Does the system have the flexibility you need? How about redundancy or fallback in case of equipment failure? What about redundant power supplies? How easy is the initial setup of the system? How much setup does the manufacturer provide on purchase?

Get a user list from the manufacturer. Call people on the list and ask their experience. Find out their opinion of the system and the service after the sale. Find out if they know anyone else with this manufacturer's systems and contact them, especially if they are not on the user list. Remember that no one is perfect. No matter how good the manufacturer is, if you dig deep enough you will find bad things about it. Take the comments with a grain of salt, and weigh them carefully.

Once you have limited your choices, present the

## Resource Guide

### Logitek

800-231-5870  
www.logitekaudio.com

### LPB

877-LPB-COMM  
www.lpbinc.com

### Otari

800-877-0577  
www.otari.com

### Radio Systems

856-467-8000  
www.radiosystems.com

### Sierra Automated Systems Eng

818-840-6749  
www.sasaudio.com

### Soundcraft

818-920-3212  
www.soundcraft.com

### Studer

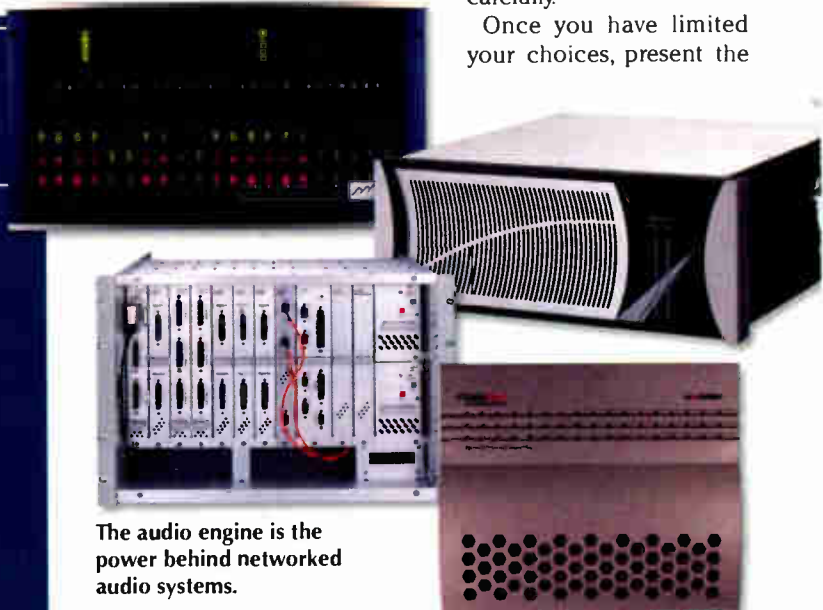
818-920-3212  
www.studer.ch

### Ward-Beck Systems

800-771-2556  
www.ward-beck.com


### Wheatstone

252-638-7000  
www.wheatstone.com



The audio engine is the power behind networked audio systems.

manufacturer with your needs. The company will work with you to configure a system. Once you have a system configured you can begin to work on a price. If you find that you can't manage the budget for the entire system at one time, consider a staged installation where you start with one room, and add as money is available. This not only helps distribute the cost, but can help you budget your time for installation. It would also allow you to get a room operational for training before your operators have to deal with the system on air.

While these systems are right at home in a cluster of stations, don't overlook the possibility of using them in smaller situations. A simple station with a control room, production room and newsroom may find the advantages of a digital system to be well worth the cost. 

*Carter is chief engineer of WFMT Chicago.*

Type A  
Obsessive  
Compulsive  
Micromanager

We've been called a lot of things

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*innovative solutions*

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Intelligent Rack Accessory

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- printer port
- battery backup



Model RFC-1/B  
Remote Facilities Controller

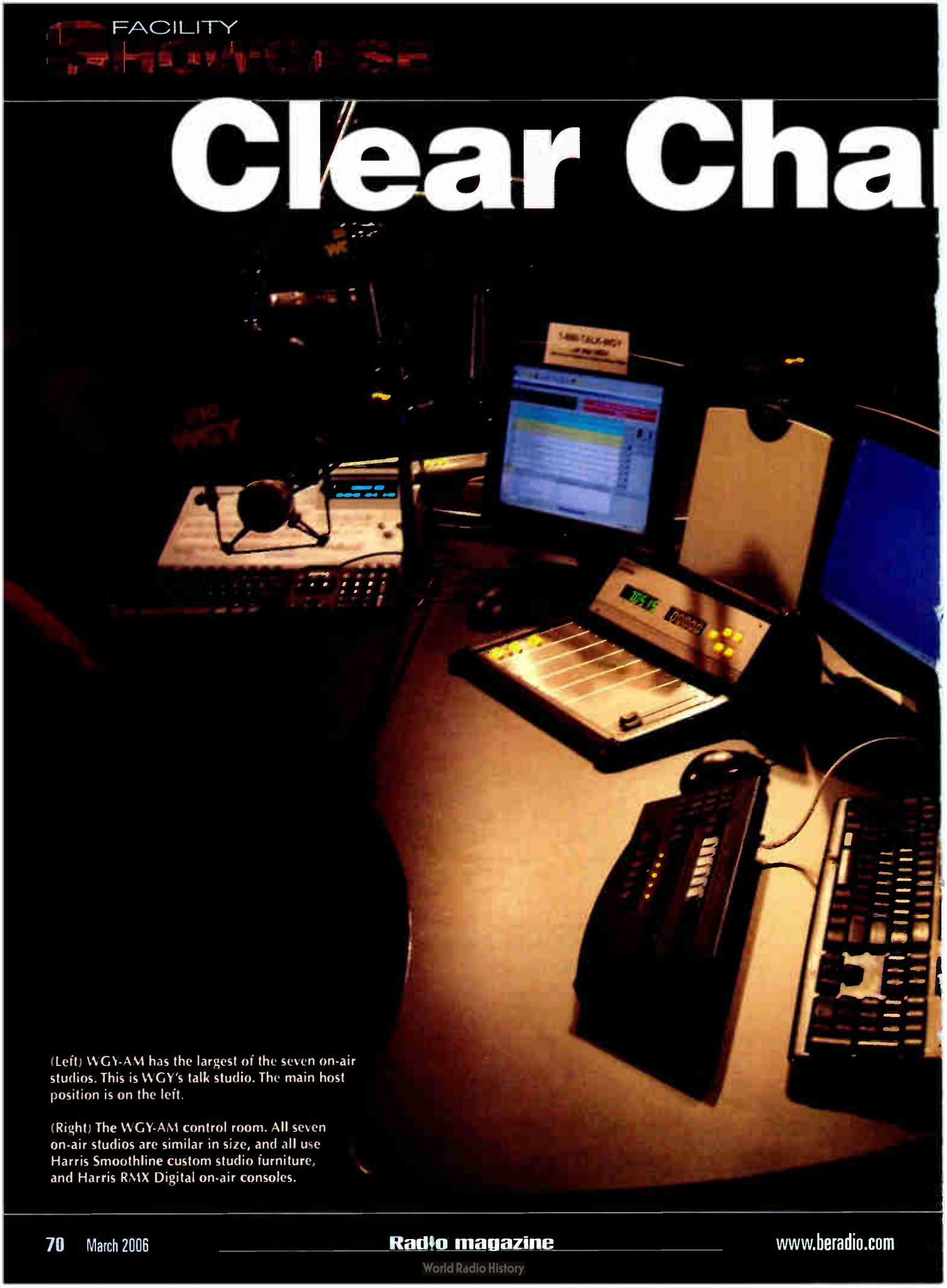
- dial-up remote control
- transmitter monitoring
- automated control

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nashville, tennessee • 615-228-3500 • [www.sinesystems.com](http://www.sinesystems.com)



# Clear Cha



(Left) WGY-AM has the largest of the seven on-air studios. This is WGY's talk studio. The main host position is on the left.

(Right) The WGY-AM control room. All seven on-air studios are similar in size, and all use Harris Smoothline custom studio furniture, and Harris RMX Digital on-air consoles.

# nnel

By David Abdo

# Albany consolidates seven stations



**C**onsolidation continues to happen on many levels throughout the broadcasting industry. The big trend in consolidation going back five to 10 years had to do with ownership of stations. While this continues to a degree, the trends over the last five years have shifted toward facility consolidation.

Clear Channel Albany owns seven regional radio stations: five FMs (WPYX-FM, WHRI-FM, WKKF-FM, WRVE-FM and WTRY-FM) and two AMs (WGY-AM and WOFX-AM). The station group recently relocated to a new facility in Latham, NY, bringing all seven stations under the same roof with the idea that merging all technical and business elements results in a smoother, more efficient operation for the entire group.

Clear Channel Albany previously operated two studio facilities about nine miles apart: our main office in Albany and a second, satellite operation in Niskayuna, NY. Our engineering staff, comprised of two full-time engineers, a part-time contractor and me, often found itself spread thin. When simultaneous technical issues occurred at both sites, we would have to decide which was more serious and leave one station's technical issue hanging until the other could be resolved.

The radio industry's multi-station acquisition phase meant that station groups were frequently acquiring operational facilities. In many cases, this meant dealing with different engineering standards. Wiring and infrastructure differences were especially notable in our case, because one facility used 66 blocks and a massive amount of bridging, while the other facility was designed around AMP Taper technology and distribution amplifiers.



# Clear Channel Albany

The consolidation to the Latham site gave our group the ability to start fresh from an engineering standpoint. The property had previously housed an HMO firm. Clear Channel cut a deal with the new landlord for about 27,000 square feet, signing a 10-year lease. Design firm Lockett and Farley, often used by Clear Channel, immediately went to work by gutting the entire infrastructure. Although technically a refit of an old building, everything inside is new construction. All that remained were floors, outside walls and the roof. In some instances the floors were disposed of and taken right to the dirt. The facility was rebuilt from the shell that remained.

## Plans in motion

The main goal of the consolidated facility was to group the operations. The larger of the two older facilities had an undesirable layout, with studios spread throughout. The main terminal equipment room was designed around a two-station operation. Clear Channel Albany started with an AM and FM and subsequently added many more signals. Everything became crowded as a result. The new facility was planned to ensure we didn't run out of space before the 10-year lease expired.

The facility is soundly built and designed. Protection was a central theme of the initial design. We opted for facility-wide UPS protection because a large portion of our operation is computer-based. All mission-critical technical facilities, including the on-air and production studios, are powered by a UPS. In the event of a power failure, the UPS batteries seamlessly carry the load until our generator starts, keeping us on the air.

An APC Infrastruxure system was purchased on Lockett and Farley's recommendation. This is a rack-mountable UPS design as opposed to the typical large lunchbox-style case traditionally placed on the floor. The downside with this system is that I had to give up two full racks to make room for the UPS system. In return, this puts the UPS directly in our climate-controlled terminal equipment room where we maintain the 69° or 70° temperature at all times. With four separate HVAC systems we have redundancy in case one system fails. Additionally, the remaining racks are powered by smart ac strips that report back to the UPS on the current draw and the load in each rack. This information is networked, and available off site via the Web. The positive aspects outweigh the negatives.

## A better layout

The facility layout, as previously mentioned, is far more appealing than our previous facilities. Visitors entering the front door immediately walk into a spacious lobby. A conference room behind the lobby overlooks the Mohawk River and doubles as a performance studio. This space is usually reserved for large meetings, but is also wired for microphones and monitors. A small, attached control room with a Soundcraft LX7II mixer is used to produce live performances for in-house or on-air broadcasts. Many of these performances will be advertised as listener-appreciation events, where a listener audience can attend and watch the performance.

The remainder of the facility is divided into two wings, both secured by electronic locks that require a key pass for entry. The right half of the building is largely sales, traffic and administration. The consolidation of our sales and management team was essential for a smoother business operation.

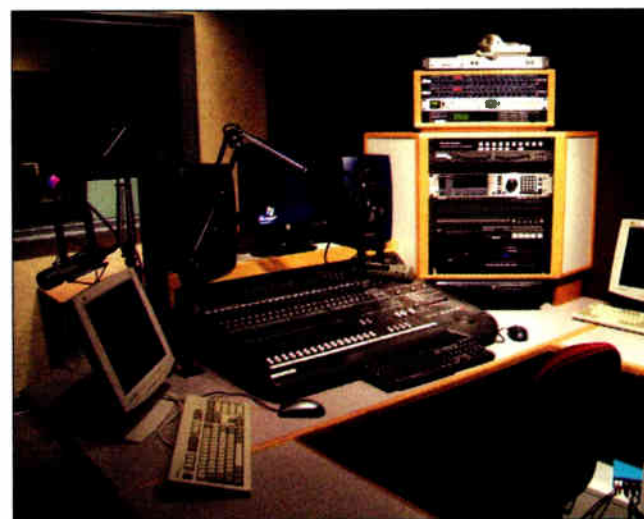
The left half of the building is devoted to technical operations: engineering, production, on-air studios and air staff office space. At the center of the technical corridor is our terminal equipment area. The approximately 1,100-square-foot space features three distinct



WRVE-FM's on-air studio. The co-host sits at the right circular portion, with Production 1 visible through the window.



Station visitors can view the outer terminal equipment rack room through a window. The entire rack room is 1,100 square feet and is compartmentalized into three distinct areas.



All seven production studios feature three microphones for one operator and two guests. Production 5 is centered around a Mackie D88 mixer.

rows of equipment racks (standard Middle Atlantic 32" and 36" deep racks with front and rear rails, and Chatsworth open relay racks). The two outside rows, which house typical broadcast equipment, each feature 12 racks of equipment in a back-to-back positioning. A central row of the Chatsworth communication racks divides the space and is the wiring backbone for the facility.

The first rack row is positioned four feet from the hallway and situated behind a glass wall, with the second rack row about eight feet behind it. Operators have access to these front racks adjustment on-air processing and related equipment. The racks are compartmentalized and feature predominantly Moseley and Harris digital and analog STL equipment, Starguide satellite receivers, specialty receivers, ISDN and POTS codecs and telco equipment. Several of the racks are devoted to the individual stations, and are home to various Omnia and Orban on-air and off air "confidence" processors and a variety of analog, HD Radio and multi-function modulation monitors. Several other racks are home to the facility's Prophet Systems Nexgen system, associated servers and archival systems, as well as our business servers.

The technical heart of the facility is a Harris Vistamax networked audio and routing system. Built to 384x256 and centralized in the terminal equipment area, Vistamax is integrated into its own rack and is wired to the central facility communication racks. Inputs and outputs for all the radio stations go through Vistamax, providing the ability to share sources between all on-air and production studios and other technical and non-technical areas. Vistamax distributes audio throughout the facility, including programs fed from the satellite receivers and other on-site and off-site sources. The Vistamax also eliminates numerous distribution amplifiers and patch bays, as well as the traditional toggle, rotary and push button switches often found mounted in panels. This reduces the complexity of signal routing and systems integration for a multi-signal facility.

The center row of racks, off limits to operations, contains the bulk of the house wiring, including communication blocks, cross-connect wiring, studio wiring, telephones and networking, as well as the Vistamax fan-out, for the entire facility. We use Krone blocks, which are far more flexible than the AMP Taper pins or 66 blocks used in the past. The Krone blocks feature a connection that is considerably more positive than the older 66 blocks, though the downside is that there are fewer connections available per block. The Vistamax system eliminates most of the issues related to having fewer connections. Another positive factor is the Krone's built-in test port. Signals can be interrupted or bridged into and out of the blocks as necessary. Signals can be monitored, measured and inserted, and the Krone cross-connect blocks can be used as a miniature patch system if desired.

The seven on-air studios are similar in size, all featuring Harris Smoothline custom studio furniture, and nearly identical Harris RMX Digital on-air consoles. Talk station WGY-AM is the largest, with a control room, talk studio and news booth comprising the station's on-air headquarters. A Harris Impulse digital console in the news booth ties to the Vistamax with external hardware connections. The signals are routed to the Vistamax mainframe in the rack room and back to the Harris RMX Digital on-air console in WGY's main control room.

The WGY talk studio features basic furniture, microphones and a small turret for the host to control the monitors and headphones. Live talk programming for the station originates from this studio, with room for the host and several guests, and is routed directly to the on-air studio.

Source equipment is generally the same for each on-air studio. A

complement of Sony Mini Disc players and recorders, various CD players and recorders, and even a few cassette machines are integrated into studio cabinetry. On-air hosts and guests use the recorders for personal archiving; Clear Channel also uses the recorders for occasional archival purposes. Other sources arriving through the Vistamax and assigned to the on-air console include TV audio, telephone/ISDN equipment, satellite equipment and all other production and on-air studios.

WOFX-AM, our sports talk station, is a slightly scaled down version of WGY, with a separate control room and talk studio but no news booth. This station was largely automated in the old facility because there was no room for a separate talk studio. With the additional room, WOFX continues to add live programming, making the talk studio an important piece of the station's on-air operation.

The five FM stations are all similar, with predominantly single control arrangements for music. WPYX-FM, a classic rock station with a lively morning show, is the only noticeably larger studio. This studio offers enough room for six guests, with additional standing room when necessary.

Prophet Systems Nexgen hard disk system is central to the entire on-air operation. The Nexgen is used for the majority of on-air programming, with CD players and cassette machines serving as backup, or used for the occasional piece that isn't ingested into the Nexgen. The daily log dictates much of the Nexgen's ingest and playout schedule

## Equipment List

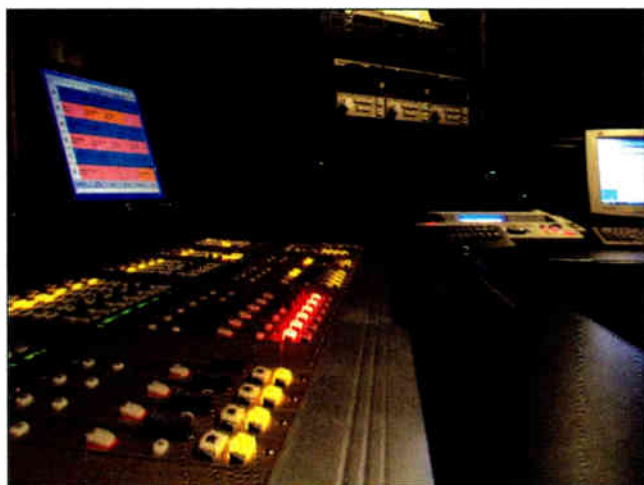
Alesis RA-150  
APC Infracore UPS  
Behringer UB2222FX, UB1204PRO, MX2004A  
Belden wire and cable  
Chatsworth racks  
Comrex Hotline, Matrix  
Crown D-75  
DBX-186  
Electro-Voice RE-20  
Gepco wire and cable  
Harris Smoothline  
Harris Vistamax, RMX Digital, Airwave Digital, Impulse  
Krone blocks  
Mackie VLZ-Pro, D8B  
Middle Atlantic racks  
Moseley Lanlink  
Omnia 6EX, FM, JR  
Orban Optimod 8500, 6200, 9200  
Prophet Systems Nextgen  
Shure SM-7  
Sony MDS-E12, MDS-JE410, MDS-JE 510  
Soundcraft LX7II  
Symetrix 528E  
Tannoy Reveal  
Telos Zephyr, Xport, Xstream  
Tieline Commander, I-Mix



# Clear Channel Albany



A conference room behind the lobby doubles as a performance studio. This space is wired for microphones and monitors, and features a small control room with a Soundcraft LX7II mixer for production of live, on-air performances.



The WHRL-FM air studio.

and the system works from there, interrupted only for live programming. As a result, our AM stations rely on the Nexgen less. However, all on-air studios have functioning Nexgen-enabled workstations. The Nexgen naturally ties into an archival Dell server with about 600GB of storage that typically stores cuts, spots and promos for as long as 30 days. Pre-recorded long-form programming, including programs received via satellite, are also stored in this server.

The seven production studios are also similar in design and layout. We used some of Harris' Smoothline furniture here also. It's always been my preference to duplicate the equipment and layout of studios within a facility to reduce the learning curve for operators who move from studio to studio. Having a similar complement of equipment in each studio also reduces the engineering complexity, as

familiarity sets in.

Five production rooms (Production rooms one, two, three, four and seven) feature Harris Airwave Digital consoles with Vistamax outputs to contribute to and take sources from the system. Production rooms five and six feature Mackie mixers. All seven of these consoles are repurposed from the old facilities as they continue to serve us well. The basic production room also features three microphones for one operator and two guests, and sport Electro-Voice RE-20 or Shure SM-7 mics. CD players, DVD Players and Mini Disc players are also included, with recorders to come in the near future. All production rooms are Nexgen-capable, featuring three playback channels. Various editing systems are also used for production purposes.


Two additional facility features round out the technical area. A six-workstation newsroom is central to the operation of the stations. Each workstation features a Mackie 14-channel VLZ-Pro mixer and Vistamax connection to deliver audio to various studios for live news updates. The option to go live from any or all of the newsroom workstations is also available through the Vistamax system.

## All in the family

Our division of CCTN, the Clear Channel Traffic Network, also operates out of our facility. Local traffic conditions are gathered and broadcast over our seven stations, as well as one of our local TV stations, with expansions slated to cover other markets in the Northeast from our facility. Here, three CCTN studios feature eight-input Behringer mixers, the Prophet system and a wide variety of communication equipment. The mixers are primarily designed for voice, with ISDN and Vistamax capability for connection to each on-air studio.

Clear Channel Albany operates seven transmitter sites, one for each station, ranging from distances of one mile to 17 miles (most are in the eight mile to 10 mile range). Our STLs are evolving as a result of our HD Radio initiative. WGY and three FM stations (WPYX-FM, WHRL-FM and WTRY-FM) are currently broadcasting in HD Radio. Analog/composite STLs are being phased out and replaced with digital STL systems that offer higher fidelity audio. Moseley Lanlink systems, while not yet operating, are in place so we can further improve communication with our transmission facilities.

We currently use T1 lines and fixed 950MHz STL systems to transport audio. We are also combining T1s and 950MHz STLs on a single path in some situations where audio for HD Radio and analog stations are sent to the transmitter sites. Clear Channel Albany is awaiting final local approval for an STL tower. Our current location in the Mohawk River Valley means we are working over challenging STL paths and difficult terrain. The T1 circuits have come in handy for now, because we can transport program audio to our current towers and use those sites as relays.

Clear Channel Albany is currently in fine working operation at the Latham location, with close to 10 years on the lease and room for expansion. Future challenges include the advent of multicasting, which will double the amount of program signals on our FM stations. This could mean converting some production rooms to on-air studios for supplementary HD Radio program services. The Harris Vistamax system can easily accommodate these signals with the addition of more accessories. In the meantime, the launch of this facility affords us an enormous amount of flexibility for on-air operations, as well as engineering and business-oriented actions that were simply not available when we were spread across two facilities. 

*Abdo is director of engineering, Clear Channel Albany.*

# Facility Focus

## the technology behind Clear Channel Albany

### Prophet Systems Nexgen



Prophet Systems is a complete digital technology company specializing in broadcast automation management and control. NexGen Digital provides hardware and software configurations scalable to any size station. Clear Channel, Albany has integrated this technology to suit its facility. NexGen complements the high-energy site with reliability and efficiency. System management is worry free with minimal

time spent configuring and maintaining the network. Features in NexGen include WANcasting, which allows stations to share resources, Digital Reel-to-Reel, which allows time shift recording of up to four programs simultaneously on one computer, and CDX/AFC, which is the most powerful and full-featured CD Ripper and Automatic Format Converter available.

[www.prophetsys.com](http://www.prophetsys.com)  
877-774-1047

### Comrex Matrix



The Comrex Matrix offers the ultimate in flexibility for remote broadcasts. Whether on regular telephone (POTS) service, ISDN lines or GSM wireless networks, the Matrix can send high-quality remote audio to the studio from virtually anywhere. As a 15kHz POTS codec, the Matrix can connect with all Comrex POTS codecs, and with the optional ISDN module, the Matrix is compatible with most ISDN standards. When the remote site has no phone line, the optional GSM module allows the Matrix to transmit 7kHz audio with an internal GSM wireless phone. Along with the full line of Comrex codecs and telephone hybrids, the Matrix will help your station broadcast great-sounding audio from anywhere.

[www.comrex.com](http://www.comrex.com)  
800-237-1776

### Telos Zephyr Xstream



The Zephyr Xstream family includes the rackmount-style unit, the portable MXP and the rackmount MX. The rack-mount version features analog and AES/EBU inputs and outputs

with independent sample-rate converters. All the units feature multiple coding algorithms, including G.722, G.711 and MPEG Layer-3 and Layer-2, MPEG-2 AAC, and MPEG-4 AAC-LD, a built-in ISDN terminal adapter, a 10Base-T Ethernet port for remote control and streaming of MP3-coded audio, and an auto-configuring 90 to 240V power supply. An optional V.35/X.21 interface is available. The portable MXP adds a digital four-channel stereo mixer. The MX is a rackmount version of the MXP. The MXP and MX also adds selectable AGC/limiter processing presets by Omnia, built-in 48V phantom power for two mic inputs, and two separate local headphone mixes to monitor send or receive audio, or both.

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

### Harris PR&E RMXdigital



The latest generation of the Vistamax network-enabled radio broadcast consoles, the RMXdigital is a cost-effective, compact design built upon the philosophy and value of its big brother, the BMXdigital.

While the RMXdigital is an excellent choice for stand-alone console applications, the built-in Vistamax audio/logic router allows users to take advantage of networked power on their own time frame. The Vistamax network shares audio resources across the facility without the need for time-consuming and costly wiring. The RMXdigital provides flexible operation and a quick, simple and cost-effective installation.

The all-digital design offers four program buses with digital and analog outputs; one send bus with digital and analog outputs; up to four simultaneous telco/codec inputs with automatic on-line/off-line switching; 44.1kHz or 48kHz sampling rate; and console session set-up with preset recall.

[www.broadcast.harris.com](http://www.broadcast.harris.com)  
800-622-0022





## AEQ DR-100

By Steve Fluker

**T**echnology advances in the studio can be great. They help make our lives easier and improve the quality of the programming product that we broadcast. New products are becoming smaller, more powerful and easier to use. Unfortunately, these same advances tend to spoil us, as we always want more. This was the case recently in the news department of WDBO in Orlando. These reporters are not only some of the best journalists in the

the flash card recorders that they were using. The kicker was that they also wanted something that would allow them to do some basic cut-and-paste editing on the recorder like they can do on their laptop computers.

### In your pocket

In my search I came across the AEQ DR-100 digital field recorder, a *Radio* magazine 2005 Pick Hit Award winner. The first thing that impressed me was the size of the device. It's about the size and weight of a small cell phone, yet it is packed with features. The recorder is menu-driven using the navigation buttons and a 1.5" built-in LCD display. It comes with built-in flash memory capable of recording 4.5 hours of stereo audio, but it accepts external flash memory cards for even more recording time and flexibility.

The DR-100 comes complete with everything you need to get started including the rechargeable battery and power adapter, an internal and an external microphone, audio cable, headphones, belt case, USB cable and software for the PC. It even features a built-in FM tuner to monitor the station.

I was a bit concerned at first when I saw that the recorder was menu-operated, but after only a few minutes with it in my hands I was recording, editing and transferring files with no trouble. The menus are clear and easy to navigate, yet for those more technically challenged, the basics like record and play are easily found. I was also impressed by all the information shown on the screen in record mode. The LCD display clearly shows the record format mode (MP2, MP3 or G.723), sample and bit rates, input level meters and input source. It displays timers showing the



### Performance at a glance

- Built-in FM tuner
- Small and lightweight
- Easy to navigate menus
- Built-in waveform editing
- Internal memory with external expansion

business, but are also adventurous enough to want to try the latest tools of the trade. Fortunately, they also have the ability pick up something new and learn to use it fast. It's this talent level that helped WDBO take home the station of the year award for 2005. It's also this talent level that demands the best.

Recently, the news department needed some new field recorders. They have been using Minidisc for some time, and also have a couple of flash card recorders. They also typically carry a laptop with them to edit their stories and send the files back to the newsroom. What they asked for this time was a recorder that's more reliable than their mini-disc recorders, and smaller than

length of the recording, plus how much time is remaining on the memory card so you don't get caught short. There's even a small frequency spectrum meter shown. All of these are on the display at the same time so there's no fumbling through menus to find the needed status information.

Recording is easy and flexible. The digital recorder comes with a built-in microphone, which I found to provide good quality. It also comes with a small external plug-in mic, or you can use your own microphone for the best quality interviews. There is also a line input and output to record from media distribution boxes or other audio devices. The system can also record directly from its built-in FM tuner, or can input MP3 files from a PC. There are three recording modes, MP2, MP3 and G.723. The MP2 mode is the primary suggested mode of operation because it opens other features. Two sample rates can be chosen in this mode (32kHz and 48kHz) as well as several bit rates ranging from 112 to 384kb/s in the stereo mode, or 32 to 192kb/s in the mono recording mode. The built-in waveform editor is

only available for MP2 files. The unit also offers the option to set recording levels or take advantage of the built-in AGC. Record options include instant start, start on first audio or delayed recording via the built-in timer. While recording, the user can push a button to place a mark making it easy to find desired material later.

### Outstanding editing

While the recording features are nice, it's what you can do afterward that really makes the recorder shine. Once audio files have been recorded, you can open them in the Sound Editor mode and view the waveform on the display. Again, I was impressed with how easy it was to begin cut-and-paste editing. Within minutes of playing with the machine, I was already making edits and cleaning a file. This display may be small (1.5"), but the waveform fills the screen with a resolution that makes editing clear and easy. As with most editors, simply mark the start and stop points on the waveform. You can create rough edit points then go back and adjust if needed. You can even zoom in on the waveform display for precise editing. After the audio section is highlighted, you can listen to what's inside or outside of the selected area to hear how edits will sound. Next, you can choose to delete the section or save it as a new file. All editing is non-destructive, so you can go back and recover the original recording at a later time. To provide even more flexibility, you can merge other audio files into your edit decision list (EDL). This allows field reporters to record a news report and edit in their actualities on the spot. Finished audio files can then be downloaded to a PC to be e-mailed back to the newsroom. The system even has the ability to connect to a modem if you want to transfer the file via a telephone line.

### In the field

Our reporters have been using the recorder in the field now for several weeks successfully. The one issue that I have heard some negative feedback on is with the battery. What makes this unit so small and lightweight is its cell

phone-like design. It even uses a battery typically found in a cell phone. A full charge can provide about three hours of recording, editing and playback time, but when it goes dead, that's it. Find an electrical outlet to recharge it. Some of our other recorders use standard AA or AAA batteries, which the reporter can carry in the car or even purchase at any store. I suggest purchasing a spare battery with the unit and keeping it charged. I also suggest alternating the batteries to keep them fresh and active. One other feature that I personally would have liked to see is a built-in speaker. Nothing fancy, but just something that you could use to verify the recording. The DR-100 comes with headphones, but a speaker would be a nice addition.

The editing features go well beyond other recorders in this class, allowing our reporters to edit stories in the field without the use of their laptop. AEQ definitely deserves its Pick Hit Award for the DR-100 professional digital recorder, and from my understanding, the company has yet another model about to be released that will allow editing in some of the other recording formats as well.

*Fluker is director of engineering for Cox Radio, Orlando, FL.*

### AEQ

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**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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## Wit Easi-8

by Jeffrey Zimmer

# W

hen putting together a remote control system, we are inevitably confronted by the differing control and monitoring needs of each piece of equipment within a station. The main transmitter may require a momentary closure to ground, whereas the auxiliary requires latching a voltage. The Common Point sample exceeds the input level of the remote control during the day but not at night. When all is said and done, many of us find ourselves with a combination of relay interfaces, voltage dividers,

mounted side-by-side in a 19" rack. The package contains a panel for mounting the system in a rack, and a dual panel is available. Mounting brackets are also included for wall mounting the unit. The front panel contains a series of LEDs and looks like a large network router. The rear panel offers 18 Phoenix plug receptacles and an RJ-45 jack. The unit is a network-based remote control system with flexibility in the metering inputs, control outputs, limit monitoring and logging.

### Metering and control

Each input channel uses a fully balanced difference amplifier requiring no reference to ground. Input voltages can be ac or dc of either polarity, with a range from zero to 160V.

Relay contacts on the control outputs are rated for 2A at 24Vdc, 50W max switched load, or 1A at 120Vac, 120VA max switched resistive load. Each relay output can be configured with isolated set and clear closures, or configured as a full Form C with the typical NO-C-NC connections.

Now it gets really good. Plug it into a computer network, point a browser to it and now you have a wide range of programming and configuration options.

Each metering input can be calibrated by entering offset and multiplier values. Or, it can be calibrated by connecting the sample, entering what the meter should display and the values are calculated for you. Setting alarm conditions is one of the real shining points of this unit. Four limit values can be established for each input. Separate actions can be taken for each limit, as well as separate actions

taken as the value goes above or below the limit. The actions taken consist of logging, e-mailing, executing a relay closure or nothing. A time delay can be applied to that limit so that an alarm condition exists only if the limit is exceeded for a specified period of time.

Tower light monitoring provides a good example. By feeding the output of my ac tower light current sample into the unit, I can set a low limit to log the time when the lights turn on and off. I set another limit to send a notification if one sidelight is out, a third limit to send a notification if the beacon is not blinking, and a fourth limit to send a notification if the beacon is stuck in the on position. All these limits can have time conditions applied to them so it won't trigger an alarm in the daytime. A similar approach could be used for different day and night common point values and tower parameters.

The default display provides all the channels for a single unit on one browser page. When using multiple units, the screens for each unit can be displayed by clicking

### Performance at a glance

- Simple setup
- Small and lightweight
- Flexible monitoring inputs and control outputs
- Versatile logging options
- Network accessible

operational amplifiers and a variety of other extras required to properly interface the remote control system, filling up rack space and adding additional problems and maintenance concerns. The need to issue alarms for time dependent systems, such as tower light monitoring and day/night common point readings, and the desire to avoid persistent alarms for momentary excursions from the norm, such as silence sensing, just add to the problems.

Rick Prime, technical director for Family Stations, recently sent me the Easi-8 remote control unit developed by Wit. At first glance, I noticed the size and simplicity of the unit. At 3" x 8" x 6" the unit is small—small enough that two can be



through the Windows task bar. Alternately, specific pages may be defined by pulling readings from any input of any unit within the network. I have three pages setup: one displays transmitter, tower lights and general info, a second displays the day antenna values and day common point, and the third displays night antenna values and night common point. The metering display provides numerical and graphical representations of the metering input. On a 17" LCD monitor, I could easily watch all of the tower values at once, from across the room, while making phasor adjustments.

Network-based communications provide a variety of configuration options. A unit can be plugged into a cable or DSL network with a static IP, and monitoring can be done from anywhere with Internet access. Prior to obtaining a high-speed connection, I connected mine to a network with a Windows XP machine acting as a host for Windows Remote Desktop. I could then dial in and view the system. This is slow but sufficient.

### All the extras

Included with each unit are a rack panel, wall brackets, a prewired temperature sensor ready for use, power supply, Phoenix plugs for the input and output connections, a direct and a crossover Ethernet cable, a little greenie screwdriver, installation manual and a current version of Java on CD. The installation manual provides the basic features of the Easi-8 to help you get started. Actually, a quick read-through was all it took. Much of the setup was done intuitively. However, if needed, a more detailed manual is provided on the included CD.

I've always felt that consistent logging of readings, particularly at a directional AM, was one of the best diagnostic tools I have to intercept problems in the antenna system.

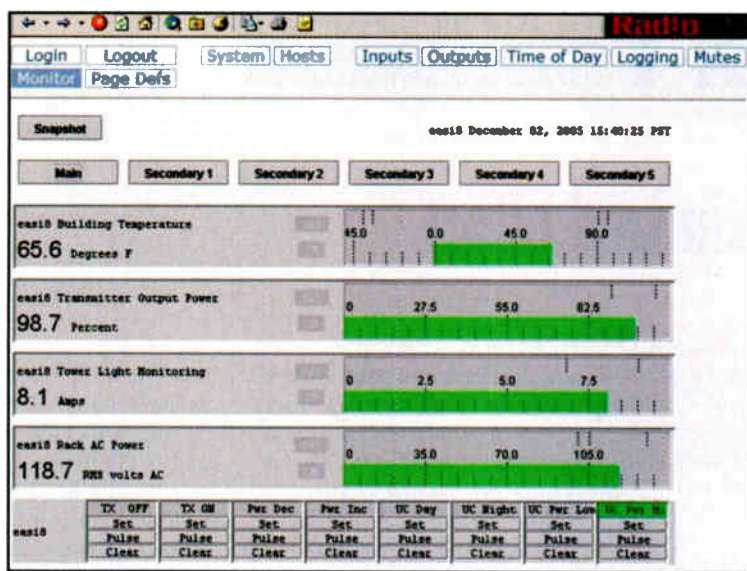
### Wit

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**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.

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User screens can be customized to display readings from all the Easi-8 units in use.

A slow drift over time or rapid changes in the first few minutes of energizing an ATU can aid in diagnosing a failing capacitor or other problems. The logging functions of the Easi-8 are versatile. The unit can be programmed to e-mail a log that consists of a snapshot of readings. The frequency of e-mails can range from once every second to once a day or less. It could also be programmed to e-mail only on an alarm. As an aside, during testing, it takes about 1.5 seconds to send the e-mail so you only get about 40 messages in a minute if it's set to log every second.

While on the subject of diagnostic tools, I believe this unit would be a useful addition to the toolbox. The small, lightweight box can easily be deployed at any location to log power line fluctuations, control timing or anything else that can be monitored via a voltage or contact closure.

Technical support and development are intertwined with Wit. Minor bugs in the system were identified and solved. Suggestions made were considered and in some cases implemented. In fact, if I do have a complaint, it is that the documentation lags behind the constant improvements and features being added. However, this is a minor complaint because I am pleased with the initial features and any questions are only a phone call away.

Versatility, size and simplicity are the most desirable factors in this device. Wit has determined what the real-world concerns are for the station engineer and have produced a product that addresses those concerns aggressively and effectively.

Zimmer is assistant technical director of KECR, Lakeside, CA.



# Reader Feedback

www.beradio.com

## Maximized effort

As I speak with listeners and read posts at online forums, one recurring theme I see is "it's the content, stupid" or something similar. People say that radio is stale, not innovative or the formats are too narrow or limited. Satellite radio, which unlike free radio is controlled 100 percent by only two companies is, on the other hand, lauded as a remedy for these maladies.

So why can't the hundreds of free, over-the-air broadcasters provide a challenge to the two national satellite companies? One of the primary reasons has always been the competitive nature of our business and pursuit of maximum audience and profits.

## HD Radio Pure Digital. Clear Radio.

Because each terrestrial radio broadcaster only has a few "channels" (independent radiostations) available in any given market (the FCC maximum is eight in even the largest markets), no single broadcaster can provide a variety of programming similar to what the two satellite providers, with their 100+ channels each, can provide. And because there are so many competing terrestrial broadcasters in each market, out of financial necessity we tend to compete over the most popular or lucrative formats. The result of this is that we don't have a variety of programming choices in each market equal to the number of stations in that market. Listeners may have a number of country stations, a number of top-40, hip-hop and rock stations, etc., but more eclectic, adventurous, innovative or niche formats are few and far between.

The objective of the HD Digital Radio Alliance is to learn from history and work cooperatively to address programming diversity and meet the listeners' needs before everyone is on the air with the new digital signals and this becomes a big business, as traditional analog radio has become over time. The alliance isn't just for or about the

large broadcast groups: a number of smaller broadcasters have joined up, and the alliance encourages all radio broadcasters, large and small, to come together and be a part of this effort to establish a new radio service for the listening public. This plan really can't provide maximum variety to the consumers unless all the broadcasters in a market, large and small, participate.

Our studies of the number of radio signals providing reliable coverage of each market have demonstrated that it will take all of the broadcasters in each market cooperating to provide the variety of program content that satellite can provide. The innovative concept of the alliance is simply about deciding on programming in a market first, and working together, to guarantee that no two secondary digital channels in a market duplicate the same programming, and that maximum programming innovation, diversity and choice is available to the listeners. So we'll have a free radio service that is equivalent or superior in depth, variety and diversity to satellite. If stations each go their own way, do research, and then select the most popular formats to compete over for these new secondary channels as we've traditionally done with the analog stations, we simply won't achieve the worthy and important goal of programming diversity.

As many have already correctly pointed out, if there isn't something unique, better and different provided by digital radio it's going to be difficult to persuade any significant number of consumers to invest in the hardware. The HD Alliance is all about creating something unique, better, different—and free!

What this is all about is saving free radio. Listeners will be able to get digital clarity, with variety on a par with what the satellite services can provide, for free. We can do this with the new digital channels since they don't already have an entrenched listener base and established revenue stream that we're depending on to keep the lights burning. As with FM radio back when AM was king and FM was a novelty, we can afford to do something new and different on these new channels. So why even consider programming each of those channels via the same competitive paradigm as we've done with our existing analog stations?

To me that doesn't make a lot of sense. It's a little like the classic definition of insanity: doing the same thing over and over again, but expecting a different result.

Is this concept guaranteed to work? No. But I believe it's the right thing to do at this critical time.

It's been said of the alliance that large broadcasters such as Clear Channel aren't, or can't be, in touch with their listeners, and thus can't know what to program to meet the needs of the local markets they serve. This simply represents a misunderstanding about how Clear Channel programs our radio stations. Clear Channel as a company doesn't

comments?

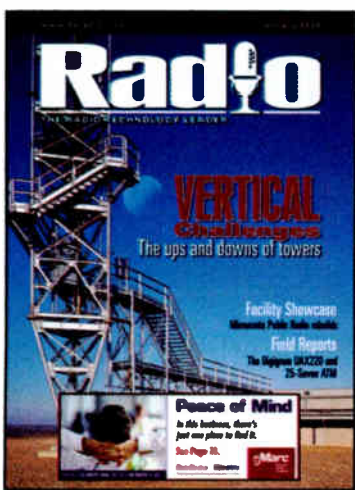
radio@primediabusiness.com

program the local stations: our local program directors do. Clear Channel Radio owns or programs roughly 1,200 radio stations in the United States. This amounts to about nine percent of all U.S. radio stations (which contrary to what some of our detractors may say, is far from any sort of monopoly by any definition). Those 1,200 stations are programmed by 900 local program directors. Those local program directors live and work in their local markets and know their listeners personally. Just because their paychecks say Clear Channel and they happen to work for a company that owns a large number of stations doesn't make them any less locally connected or committed.

I love the radio business and am passionate about it, and I am optimistic that these second audio channels will give us all a chance to provide a new, relevant, meaningful service to the listening public, for free, without disrupting a service and business model that still attracts millions of listeners (and dollars) daily and provides many of us with our income. Until we had the second digital channels we were trapped in a Catch-22: we couldn't afford to change (too much revenue riding on the status-quo) but we couldn't afford not to (lest we get left behind as people adopt satellite radio, cell-phone entertainment, Internet radio and Ipods).

We stand today at a pivotal crossroads in the evolution of our industry. My hope is that you and the leaders at your stations and companies will join us in reinventing our business to maintain our vibrancy and relevance into the 21<sup>st</sup> century.

*Steve Davis  
senior vice president, engineering  
Clear Channel Radio  
Tulsa, OK*



Chris,  
You were right on target once again in the January edition of *Radio* magazine. Someone has really dropped the ball in the HD Radio receiver manufacturing segment. No one I know in the specialty radio vendor business can recall the last ad or informational article pertaining to HD Radio receivers, let alone as to why

their customers ought to begin to think about buying one (a digital HD receiver). I see very few ads for HD Radio and even less explanations as to what it is and why I should look into one.

I read a lot of articles as to broadcasters change over to

HD Radio, but little as to how it will affect me, the listener! The consumer market has a long way to go to even begin to understand this new technology, and how it will benefit them. The average person on the street has no idea about HD Radio and that is going to really hurt initial sales. The new HD Radio receivers are just going to appear to be just a plain old expensive radio to the consumer and the consequences of that are really going to be felt. Start-up sales will be so slow and hard that some manufactures are going to take fatal hits.

Keep up the drum roll. Someone may wake up. I hope it's not too late.

*John Wagner  
Ohio*

### But it is the content

Chris,

You, as an editor, should be more knowledgeable of radio than you appear to be.... i.e., your editorial on HD Radio at the CES

## Find the mic winner January issue

Congratulations to

### Duane Pavlicek

of DP Engineering, Colorado Springs, CO.

His name was drawn from the correct entries for the January issue. He won the Heil Sound PR-20 from Transaudio Group.



The mic icon was next on the right leg of the tower even with the center of the moon.

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in the February issue. It is content, not fidelity, that makes a station successful. Please, learn that mantra and say it 10 times a day...please.

These fools in the driver seats of radio have all missed the point. See the mantra above. Technology is not going to make a station succeed—content does. That's why creaky, ancient modulation, known as AM, is still a top vote-getter in our cities. It's the "content of modulation" or quality of program presented that gets the listeners, not the latest transmission gimmick.

OK, hoping I've made my point, extend that to "HD Radio will be a wasteful experiment of desperation." Satellite is growing by leaps and bounds and the only salvation for terrestrial is to "identify with your local population." That's it.

Larry Tighe  
WRNJ-AM  
Owner  
Hackettstown, NJ

## Customer dissatisfaction

Chriss:

As a broadcaster I appreciate great audio but just as important, I appreciate great audio at home as well. In this case it's from the position of a consumer that I'm writing to you because you seem to share my zeal for the rollout of HD Radio.

For a few years now my wife and I have wanted to redecorate our living room but haven't been able to afford this project until now. Included in that plan has been the addition of a new audio system. The one that has caught our ears and eyes is the Bose 3-2-1 virtual surround system.

Even though I tend to be a traditionalist as it relates to audiophile equipment, Bose impresses me on numerous fronts. In short, I love the 3-2-1 system and would buy one ASAP except for one thing. It doesn't have AM/FM HD Radio compatibility. I e-mailed Bose and asked them about this, noting a segment from the *Sound & Vision Magazine* 2006 buyers guide, where on page 72 it says: "As of April 2005, 2,000 stations, reaching 60 percent of the U.S. population, had signed on for it."

Here's the reply I received from Bose:

*With more than 40 years invested in research, Bose Corporation is a proponent of technological advancement in the consumer electronics industry.*

*We will only ask our customers to invest in new audio and video formats when those formats have been established as industry standards and are widely supported by the electronics industry. Our engineers are continually researching and evaluating new audio/video technologies and, when they are proven to provide good value and continued benefits, we incorporate them into our products.*

*For example, we may choose to adopt a new disc format only if discs are widely available; we may adopt a new radio reception technology only when broadcasts are not limited to a small area or small audience.*

*Thank you for contacting Bose Corporation.*

*Aric MacDonald Ext. 61068*

*Customer Support Team*

Chriss, this is a disappointing reply considering the fact that the Bose slogan says, "Better sound through research." With 2,000 stations committed to it and allegedly over 600 actually broadcasting in HD, how could any company's marketing department not see the advantages of jumping on this now?

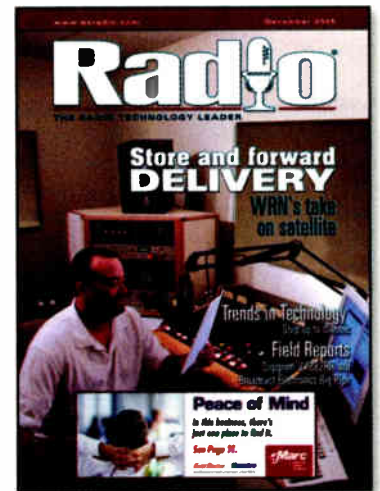
The bottom line for me is this. I don't even want to spend \$50 much less \$1,500 or more for a piece of entertainment equipment that will eventually have an outdated tuner. With the news I just recently heard that HD TV sales are just beginning to outpace analog TV sales, it's high time for radio receiver manufacturers to get on the HD Radio bandwagon, and not just on top-of-the-line units either.

*name withheld by request*

## Accuracy counts

I read the comments presented by Scott Boehme of The Society for Accurate Information and Distribution Foundation in the December 2005 issue. The following comment caught my eye: "A station has to rent IBOC for a lot of money." Wrong! A station makes an outright licensing purchase and does not have to "rent" IBOC for a lot of money. Mr. Boehme should look again at the name of his organization and consider the information presented in his statements.

Thomas R. Ray, III, CPBE  
vice president, corporate director of engineering  
Buckley Broadcasting/WOR Radio  
New York City





**Rick Adams**  
 Director, Interactive  
 Children's Entertainment  
 AOL Kids

# STUDIOHUB+ CASTING CALL

*"Hi, I'm Rick Adams. I am executive producer, host, also producer, technical director, technical person, I make tea. This is my show. This is my studio. I do everything. This is an online radio show from AOL and basically we broadcast live here everyday using this fabulous board from our friends at Radio Systems. And of course, those are the people who brought you the extremely good and marvelous StudioHub which I will be talking more about later. This is my studio. We broadcast to over a million kids a week and we are very happy about it. That's a million kids a week Awesome. Did I tell you, by the way, that we broadcast to a million kids a week."*

*"Look, sure we use XLR's. They're very important. Look how nice they are. They are good, a very great thing and I'm glad we have them. I love XLR's. The problem is, you're like - I got this, but I can't make it work with the other thing. If only you had Radio Systems StudioHub, right? Because then, you'd be able to get, like, use a CAT-5 or an RJ45, or whatever you call it."*

*"See this? Genius! Genius! So, the StudioHub, is really a good thing. And it means if you've got this, you can just plug into anything. It's really incredible. So, thank you Radio Systems. Thank you StudioHub!"*

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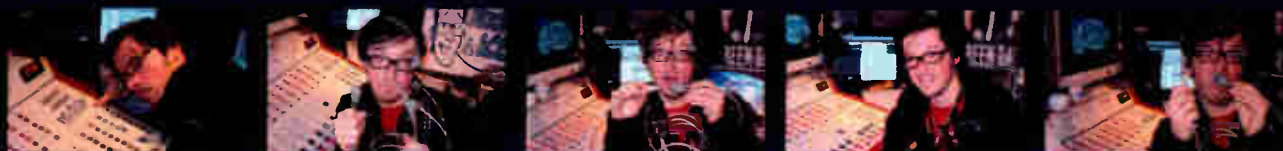
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## Differences of opinion

We all know that the PD and GM judge sound quality from a different reality. This is not a slam, rather a simple observation. The reality is that we engineers as screwdriver heads are not always in possession of a right-brained perspective when it comes to sound quality and proper implementation. That said, it has been mused about my office that HD Radio should be markedly different in its audio quality than its analog counterpart. I view that to be totally off the mark because the transition blend from analog to digital would be so obvious (to my left brain)—they view it as showing off the increase in sound quality and thus a motive for buying such technology.

All this is to say that the purveyors of HD Radio technology should keep this in mind: A complete phase-aligned signal pathway with a full complement of processing DSP would be just what the right-brainers ordered.

*Michael Kernen  
chief engineer  
Greater Media Detroit,  
WCSX/WMGJ/WRIF*

*Good observation, Michael. The Trends in Technology feature in the April issue will look at some of the aspects of processing bit-reduced audio such as HD Radio.*

*Also, because of the traditional heavy-handed approach to audio processing analog signals, there is a growing interest in a more subtle approach on digital signals.*

*—Chriss Scherer*

## Reception with the Receptor

I have been listening to stations with the Boston Acoustics Receptor HD radio, and I have to tell you that I am impressed with this receiver's selectivity.

I use rabbit ears for FM reception and receive every New York-area HD Radio station. Currently, WPLJ is running HD 1, 2 and 3 streams. What I have noticed with the BA's HD Radio reception is that stereo separation in digital is much more pronounced, and the HD 2 channels run what appears to be about 80 percent as loud as the HD 1 channel.

As with any new technology, there is a learning curve, although with this radio there's more learning what the radio is capable of as opposed to how to use it.



**Boston Acoustics Receptor HD**

The weakness is in the antenna provided with the radio. Is it a lack of sensitivity or the fact that an external antenna is needed to make the radio shine? Again, who purchases a component-quality receiver and doesn't connect an external antenna to it? I have never operated a receiver with such spectacular selectivity characteristics. The absolutely clean second-adjacent audio demos I've provided speak volumes to that selectivity and I am in a region served by many city-grade signals on both bands.

The fact that an HD Radio-encoded FM station can provide three separate channels of high quality digital stereo audio on one frequency should more than satisfy the few who claim that they cannot listen to an out-of-market station because of HD Radio's effect on analog receivers. With the additional channels come additional formats to choose from. Most people tune to the strongest signal and do not DX the commercial broadcast bands anyway.

As for IBOC on the AM broadcast band, it's a work in progress. Some very well-engineered stations such as WOR sound terrific, as if one were listening from an off-air monitor at the station. But because the bit-rate is near minimum for quality reception (remember we're dealing with a much noisier segment of spectrum) sometimes due to error correction techniques in the radio some small artifacts can be heard. The codec currently used is, in my opinion, far superior to that used by Ibiquity a few years ago. One other issue will have to be addressed: the use of multiple compression schemes from origination to end user.

Still, HD Radio is a major improvement in how we receive our broadcast signals and for a first generation receiver the Boston Acoustics Receptor is quite impressive and takes advantage of everything HD Radio has to offer.

I made an audio demo of some of the signals that I have received with the radio. [Go to [beradio.com](http://beradio.com) to hear the file. Click on Reader Feedback in the March 2006 issue and follow the link to the audio file.]

The demo features different stations that I received on a single afternoon. I was able to receive several different adjacent-channel stations running IBOC.

The first station on the demo (WOR, New York) demonstrates the kind of signal I received. It acts as the control in this experiment. The next signal on the demo was recorded during the start of afternoon critical hours. The station is WLW, Cincinnati on 700kHz. WOR was still running its IBOC encoder on 710kHz.

Likewise, the recordings of WPIT (730kHz 5kW, non-D) were made while WOR was running IBOC. The lack of any digital QRM is immediately noticeable.

So much for the complaints of IBOC causing interference to second- and third-adjacent stations.

*Dave Saviere  
New York City*

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# Control Freaks



## SRC-8 III

The SRC-8 III is a computer interface to the real-world. Connecto through an RS-232 or RS-422 serial port the SRC-8 III can notify your PC software program that any of 8 opto-isolated inputs have been opened or closed and allows your software to control eight SPDT, 1-amp relays. Communication with the SRC-8 III can be accomplished via short "burst" type ASCII or binary commands from your PC (computer mode). Also, two units can be operated in a standalone mode (master/slave mode) to form a "Relay extension cord," with 8-channels of control in each direction. The unit can communicate at data rates up to 38400. The SRC-8 III may be expanded to 32 inputs x 32 outputs.



## SRC-32

The SRC-32 is a computer interface to the real world. Connection through an RS-232 or RS-422 serial port, the SRC-32 can notify your PC software program that any of 32 optically isolated inputs have been opened or closed and allows your software to control sixteen SPDT, 1-amp relays and an additional 16 open collector outputs. Communication with the SRC-32 can be accomplished via short burst type ASCII or binary commands from your PC (computer mode). Also, two units can be operated in a standalone mode (master/slave mode) to form a "Relay extension cord," with 32-channels of control in each direction. The unit can communicate at data rates up to 38400. The SRC-32 may be expanded to 128 inputs x 128 outputs.



## ESS-1

The ESS-1 provides a cost-effective, small profile solution for standard serial-to-Ethernet connectivity. Designed with the broadcaster in mind, the ESS-1 is equipped with extensive RF1 protection. It is ideal for applications requiring data support for both RS-232 and RS-422 communications. The ESS-1 allows any device with a serial port, Ethernet connectivity and is ideal as a serial bridge/tunneling or applications where a COM port, TCP Socket, UDP Socket, or UDP Multicast functionality is needed. The small profile of the ESS-1 makes installation hassle-free.



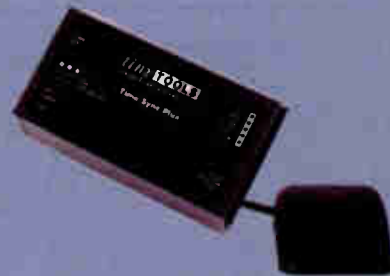
## AVR-8

The AVR-8 is a voice remote control system that automatically reports changes detected on any of its eight status inputs to a remote telephone and/or pager. After speaking a greeting message that may identify the source of the call, the AVR-8 then speaks a unique message for each status input. The user may customize each factory-recorded message. After reporting, the AVR-8 is ready to receive commands through your telephone keypad. Functions include telling the AVR-8 to report on the input state of any of the eight status inputs, commanding the AVR-8 to pulse any one of its four SPDT relays for 750 ms and/or luring any one of the relays on or off. When a relay command is given, the AVR-8 speaks the relay "name" followed by the "on" or "off" message.



## WRC-4

The tiny TOOLS WRC-4 is a fresh approach to remote site monitoring and control, or providing an inexpensive solution to internet enabling your present remote control system. The WRC-4 combined with web access and your favorite web browser brings you the following features. A powerful built-in web-server with non-volatile memory, 10/100base-T Ethernet port, four each channels of 10-bit analog inputs with a large monitoring range, optically-isolated status (contact closures or external voltages) inputs, normally open dry contact relays, open collector outputs, front panel status indicators, a single front panel temperature sensor and 4-email alarm notification addresses. The WRC-4 is also SNMP enabled. The WRC-4 has carefully been RF1 proofed, while including the accessories other manufacturers consider optional. The WRC-4 is supplied with removable screw terminals and loaded with a generic web page that may be easily edited by the end user.



## Time Sync Plus

The tiny TOOLS Time Sync Plus provides four separate GPS time referenced outputs. The first is a SPST relay, which pulses at 12:00, 22:00, 42:00, 54:30 each hour and is user programmable in each of four locations for any minute and second each hour. The second output is an active high driver with a 100 ms pulse each second, while the third output is a 4800-baud, RS-232 serial port providing a time zone adjustable hours, minute and seconds time code. The fourth output provides an active high driver in the ESE TC-90 serial time code format. Indicator LED's are provided to display power/valid GPS data, programming mode and time sync relay operation. A Garmin 12 Channel GPS receiver with embedded antenna is supplied.



## VAD-2

The tiny TOOLS VAD-2 is a user programmable two-input multi-number voice/pager auto dialer with integrated stereo silence sensor, designed for dial out paging and/or voice message notification. The VAD-2 is equipped with two dry contact inputs and stereo silence sensor, which, when tripped, will sequentially dial a pager and/or up to four different phone numbers and play back a user recorded message corresponding to the tripped input. The VAD-2 also provides two SPST one amp relays for the control of external equipment.

## SRC-2/SRC-2x

The tiny TOOLS SRC-2 interfaces two optically-isolated inputs and two SPST relays to a RS-232 or USB port, while the SRC-2x does this via a 10/100base-T Ethernet port. Both the SRC-2 and SRC-2x can notify a user's PC software program that any or two optically isolated inputs have been opened or closed and allows your software to control two SPST, 1-amp relays. The SRC-2x is also able to send an email when either of the two inputs change state. The user may also add up to 48 ASCII strings per input and 16 user defined strings per relay. Communication with the SRC-2(x) is accomplished via short "burst" type ASCII commands from the user's PC. Also, two units may be operated in a standalone mode (master/slave mode) to form a "Relay extension cord," with two channels of control in each direction. The SRC-2 communicates using RS-232 at baud rates up to 9600 and the SRC-2x via 10/100base-T Ethernet. The SRC 2(x) is powered by a surge protected internal power supply. Either unit may be rack mounted on the optional RA-1 mounting shell.

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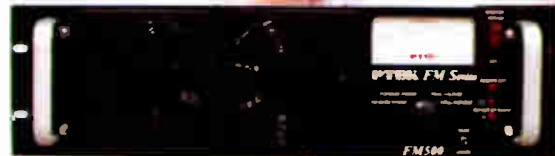
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# Contributor Pro-file

Meet the professionals who write  
for Radio magazine.

This month: Field Report, page 78.



**Jeffrey Zimmer**  
Assistant Technical  
Director  
**KECR**  
Lakeside, CA

Zimmer started his career as a station engineer with Family Radio at KECR AM and FM in 1992, after spending 18 years in civil engineering. Currently, he oversees implementation of remote control systems and is involved with RF safety compliance.

He has been active for many years in amateur radio education and testing. In his spare time, he enjoys photography and music such as playing the trombone, flute, percussion and keyboards.



Written by radio professionals  
Written for radio professionals

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SCMS, Inc	36,49	800-438-6040	www.scmsinc.com
Sencore	38	800-736-2673	www.sencore.com
Sennheiser Electronics	17,43	860-434-9190	www.sennheiserusa.com
Shively Labs	40	888-SHIVELY	www.shively.com
Sine Systems	69	615-228-3500	www.sinesystems.com
Studio Technologies	59	847-676-9177	www.studio-tech.com
Studio Technology	25	610-925-2785	www.studiotechology.com
Telos Systems	19,67,75	216-241-7225	www.telos-systems.com
TieLine Technology	5	888-211-6989	www.tieline.com
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V-Soft Communications	88	800-743-3684	www.v-soft.com
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Wheatstone	2, 93, 94	252-638-7000	www.wheatstone.com
Zero Manufacturing	37	800-547-3960	www.zerocases.com

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# Sign Off

By Kari Taylor, senior associate editor



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## Do you remember?



Twenty years ago, the Fluke 9000 series Micro-system Troubleshooter line offered an asynchronous signature probe option. With this option, engineers could pinpoint every digital hardware fault on a board, including faults in circuits that operated independently of the microprocessor bus cycle. Engineers could test boards with this system's built-in, preprogrammed test routines. Users could automatically check the entire microprocessor kernel—bus, ROM, RAM and I/O. The probe option also eliminated the need for a logic analyzer or scope to test asynchronous circuits.

The system installed into a new or existing 9000 series unit, and offered signature analysis, waveform capture and event counting. The 9000 could diagnose DMA controllers, disk controllers, communication circuits, peripheral controllers and dynamic RAM timing relationships.

## Sample and Hold

### Broadband-enabled hotels expected to increase



Source: In-Stat, [www.in-stat.com](http://www.in-stat.com), "Battling for Broadband: Broadband in the Hospitality Industry."

## That was then



In its May 1969 issue, *Broadcast Engineering* ran an article called "FM Proof of Performance." This article sought to answer the question of why FM is better and how to prove that it's better so engineers will actually use it. At the time, all FM stations were required to make a standard monaural proof. If a station also broadcast part of the time in stereo it had to run an additional stereo proof. The "system approach" emerged—measurement from mic terminals input to transmitter output.

This picture, from the cover of the May 1969 issue of *Broadcast Engineering*, shows Patrick Finnegan as he performs a proof-of-performance test. *Broadcast Engineering* began a three-part series on radio station proof of performance measurements in response to the increasing number of violations cited by the FCC.

**This Little Unit**



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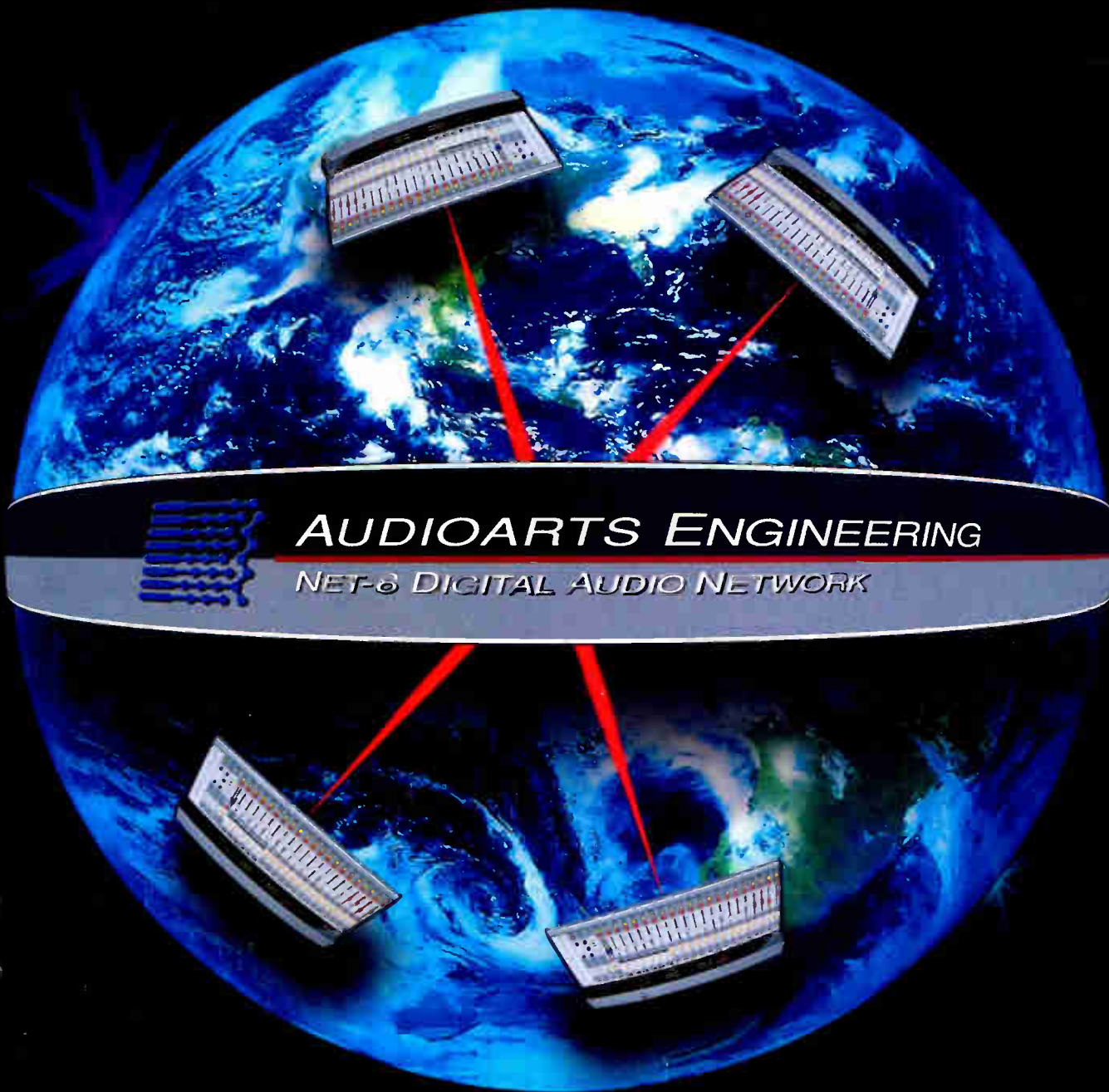
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