

# Radio

THE RADIO TECHNOLOGY LEADER

April 2011  
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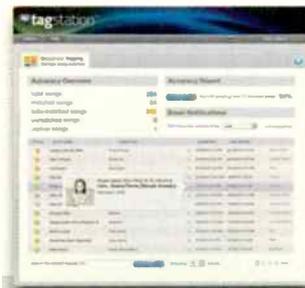
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### ON THE COVER

Clear Channel Chicago operates seven stations in the nation's third largest market. The facility is nearing the conclusion of a studio integration project that radically upgrades the networked audio system.



# Report-IT 'Codec Moments' Score a Hole in One

“ The advantages of Report-IT Enterprise are obvious. This development is huge for field reporters like me...

- Kevin Allen, Producer/Host, "Views from the Rough" ”

We've all heard of those Kodak moments and in my career as a professional photographer and now as producer and host of the weekly golf talk show "Views from the Rough", I've had many of these. I'd also like to share a more recent experience, what I call my "codec moments".

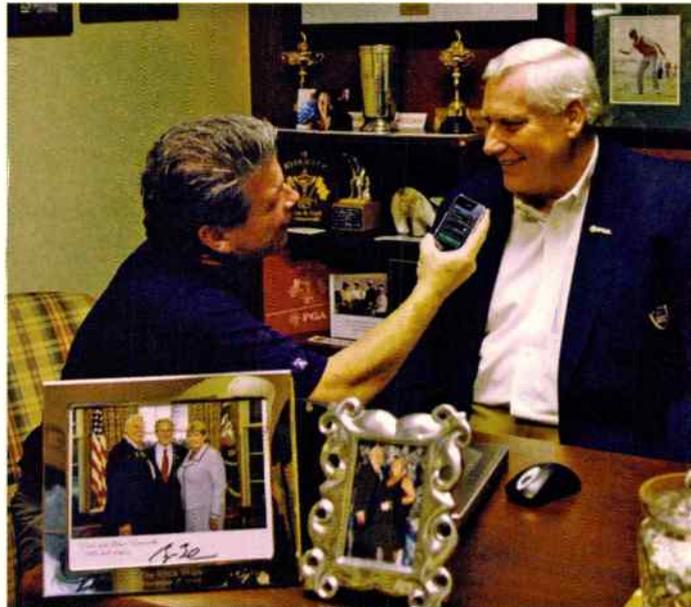
When interviewing hundreds of professional athletes in the past I had to make sure that I had my cassette recorder, mike, fresh cassettes, batteries and headphones with me at all times. More than once, something would be missing. I'd eventually get the interview, but all the equipment was a burden and foul-ups were embarrassing. I kept thinking there had to be a better way - something simple, something compact, yet reliable.

This is where my "codec moments" come in. Tieline has developed the Report-IT Enterprise iPhone application which turns the iPhone into an audio codec and professional portable recorder. This development is huge for field reporters like me - now all I have to carry is my iPhone.

The iPhone mic has a studio quality response and I press just one button on Report-IT to connect to my studio and feed broadcast quality audio. Report-IT also lets me record and edit interviews and then play back these selections as a live insert within my live reports. I can also feed raw audio back to my FTP site for editing when I'm back in the studio.

For anyone who has tried to interview a celebrity at a moment's notice, the advantages of this new technology are obvious. I can capture comments and intriguing conversations that would be missed while setting up a traditional recorder. Plus I'm not lugging ten pounds of equipment around 18 holes!

Back at the club house or the media room, I don't have to keep an eye on equipment, and my iPhone or my iPad is ready to record those personal nuggets that make Views from the Rough so unique. I invite you to listen and judge for yourself at [www.viewsfromtherough.com](http://www.viewsfromtherough.com).



Kevin Allen "Views from the Rough" Interviewing Allen Wronowski, President of The PGA of America with Tieline's Report-IT



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# Currents Online

Selected headlines from the past month.

## Radio Magazine Honored in Missouri Association of Publications 5th Annual Ranly Awards

Facility Showcase in the December 2010 issue wins the Best Written Single Article award.

## Art Constantine Dies in Traffic Accident

He and wife Lisa Schub were killed after their motorcycle collided with a New Jersey State Police cruiser.

## Senate Bill Reintroduces FCC Tech Expertise Requirement

Senate Bill 611 is, in effect, a replacement bill for S.2881 introduced last year.

## SBE 2011 Membership Drive Begins

The grand prize is a trip to the SBE National Meeting in Columbus, OH, in September.

## Bye-Bye so Zune? (HD, That is)

Microsoft may orphan its Zune HD media player.

## NAB Announces 2011 Crystal Radio Awards Finalists

Since 1987, the NAB Crystal Radio Awards have recognized radio stations for their outstanding year-round commitment to community service.

## Michigan Broadcasters Recognize Engineering Achievements for 2011

The Michigan Association of Broadcasters has awarded the 2011 Carl E. Lee Broadcast Engineering Excellence Awards to Ralph Haines III and Michael Laemers.



## 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 prize courtesy of Hosa.

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## 131st AES Calls for Broadcast/Media Streaming Papers

The convention will be held Oct. 20-23, 2011, at the Jacob Javits Convention Center in New York.

## Site Features

### NAB Session Guide

We featured an overview of the Broadcast Engineering Conference sessions in the March issue. Add those events to your calendar by accessing the session table at [RadioMagOnline.com](http://RadioMagOnline.com)

### EAS Info

There are plenty of questions about EAS. We are trying to find the answers. Check out the EAS section online for information about equipment status and rulings.

### E-newsletters Keep You Informed

The Radio Currents comes to you each week, Digital Radio Update and the New Products Extra come to you twice a month, and the NAB Insider provides all the convention info you need leading to the NAB Show. Sign up today.

### Industry Events

The Radio magazine Industry Events section lists upcoming conventions and conferences.



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## NPR defunding

**W**hen the House of Representatives voted to cut funding from National Public Radio, a flurry of debate began. One of the roots of the issue lies in Congress trying to find ways to cut federal spending. But the debate cannot stand only on the financial issues. Immediately, politics were invoked, and issues about conservative vs. liberal news reporting became a prime rallying point.

Funding to NPR does not go directly through Congress. Federal NPR funds are disbursed by the Corporation for Public Broadcasting to both NPR and NPR member stations. NPR itself receives an estimated 2 percent of its money directly from the CPB. It receives about 40 percent of its federal money from NPR member stations.

The debate has revealed (to me at least) that many people do not understand the relationship between NPR as a program creator and distributor and NPR member stations. Cutting the federal funds will affect the network operator, but it will also affect many local radio stations who use federal funding to operate.

My radio career has always been on the commercial side. I admit there were times I would hear a public radio station engineer lament that he was not going to get his million dollar federal grant to install a new transmission system, which would certainly rub me the wrong way. Meanwhile, I was scraping all I could out of an engineering budget that was significantly less. I'm not saying public radio stations operate with fiscal irresponsibility. They manage their budgets within their means. But so do the commercial stations. But I was never able to file for a grant to cover any shortcoming.

I have toured many public radio facilities. Most of them are top-notch. The engineering is solid. The equipment is good. Could some of these stations have completed their projects with products from the next-leading and less expensive brand? Certainly. But they are all working within their means to get the job done.

Cutting unnecessary spending is a practical measure in balancing the budget. But this bill – even without the political debate – does not appear to be well reasoned. Cutting NPR funding will

not only affect the network side, but many local radio stations. Can these stations make up the lost funds through local support? Probably not all of the money.

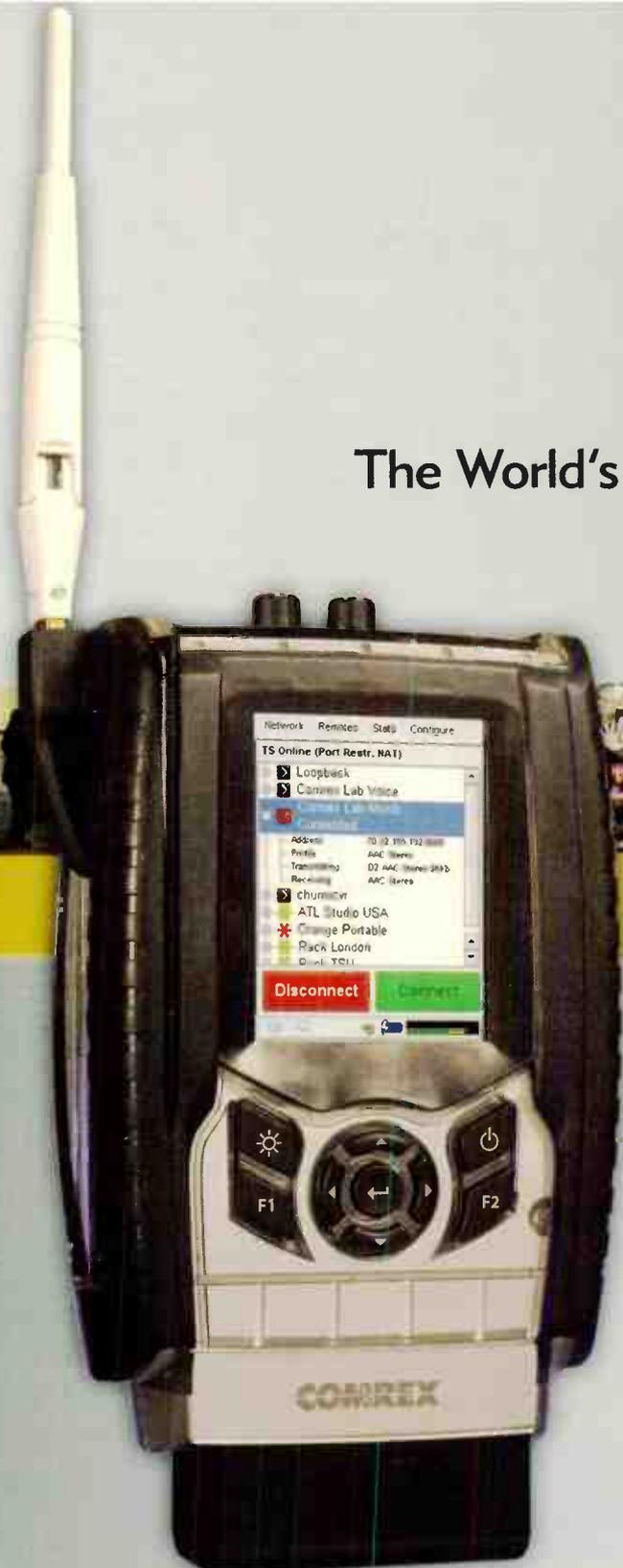
If this bill were to pass, the local public radio stations would be placed on something of a more-level playing field with the commercial stations. But most public stations carry programming that is not a mass-appeal form either. (And again, I'm not talking about any politically oriented programming.) Many stations carry jazz (real jazz mind you) and classical music. These great art forms could lose their voice if a bill like this is passed.

Cutting NPR funding has been raised many times in the past, but this is the farthest the idea has gotten to date. Presidents Nixon, Reagan and GW Bush tried to cut NPR funding. So did Newt Gingrich in the mid-1990s. Since the Corporation for Public Broadcasting was launched in 1967 it has faced threats of losing federal support.

It's unlikely the NPR defunding bill will pass the Senate, and the president has already voiced his opposition to the bill. But this should at least raise the awareness of public radio stations to develop their own plans in case the idea ever does become reality. 

*Chris Scherer*

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## Broadband to the car

By Kevin McNamara

If you haven't noticed, car makers, wireless carriers and wireless equipment manufacturers have slowly been working on making the automobile a mobile media room. OK this may not be the only reason, but there is a great deal of forward movement to make the automobile "connect" with the outside world, in real-time, for a variety of reasons, particularly the idea that this ability will enhance driver safety. You will hear the term "connected car" more and more as auto makers offer options that essentially keep an automobile connected, wirelessly, to the outside world. In reality the term has a lot less to do with delivering multimedia content and a lot more to do with providing a safe driving experience. The connected car concept is not merely a computer tied to some form of wireless backbone, rather it could consist of several wireless connections utilizing satellite and terrestrial networks as well as wireless networks intended to communicate with other nearby vehicle and roadside systems.

The technology under the hood has expanded at a massive rate with each new model year. Modern cars may have 60 or more separate microprocessors and more than 200 individual on-board sensors. For these microprocessors to communicate with each other, manufacturers developed and implemented the Controller Area

networking is expected to be replaced by wired and wireless Ethernet networks in the future.

### Enter IPv6

Internet Protocol version 4 (IPv4) has been (and still is) the most widely used IP addressing protocol in the world, however it is limited in the total amount of individual addresses (4,294,967,296) it can assign as it is based on a 32-bit address. Some experts have the available addresses exhausted sometime in 2011. In contrast the IPv6 uses 128-bit addresses and will provide a virtually unlimited pool of IP addresses. The availability of new addresses is essential to support the myriad of equipment and devices that will be able to communicate over a network. These devices include mobile phones, wireless broadband, cable modems, appliances, automobiles and virtually anything that can be connected to a network. The connected car alone could use 100s of individual IP addresses as the CAN-Bus is replaced by an IP-based network. The connected car will also utilize multiple IP addresses to communicate to the various external wireless connections required for things like on-board navigation, system diagnostic, broadband data and voice systems.

Intelligent Transportation Systems (ITS) permit vehicles to communicate with other vehicles and roadside systems in order to share safety warnings, traffic and other information with other vehicles. Seems simple enough, but when implemented, ITS can actually act as a form of traffic control between vehicles operating in the same area interacting not only with the driver, but also having the ability to control the vehicle to avoid collisions or simply make traffic move more efficiently. The technology that will be used to allow vehicles to communicate with each other is known as Vehicle to Vehicle (V2V). V2V utilizes a portion of the unlicensed 5.9GHz band set aside for Dedicated Short Range Communication (DSRC). In the United States, the DSRC channel plan consists of seven 10MHz channels. The system could also support other non-ITS related services such as providing access to e-mail or other Web-based services. Currently services like OnStar are providing certain services such as crash notification, emergency communication, the ability to read operation parameters, remote door unlocking and engine shutdown (in the event of a theft). These systems utilize national cellular networks to connect with the vehicle.



### LTE Connected Car from the ng Connect Program

Network (CAN or CAN-Bus). The CAN permits host-less communications on a common bus, not unlike the old RS-485-type serial communications protocol used to interconnect test equipment and other devices before Ethernet became the most practical method. The CAN is also the reason you or your service technician can plug into that receptacle under the dashboard and read all the various parameters in your car. This method of

## The car as a media room

It has been several years since terrestrial radio has enjoyed being the only form of entertainment in the car. Americans spend an average of 45 hours each week in the car, and most of that is spent in the coveted morning and afternoon drive-time hours. The options for getting your fix of entertainment in the car have multiplied – Terrestrial radio, CDs, streaming audio and video, Internet, email, MP3 players, DVD, satellite radio and fixed broadband video delivery. While most of the Internet-based services have yet to realize full integration into an automobile, they are currently available on a typical smartphone. Some auto makers and after-market manufacturers are offering docking options for certain brands of smartphones that allow drivers to access the features of the phone through the built-in radio system.

There have been several approaches to implementing full broadband connectivity to automobiles; one of the more interesting concepts has been created by a consortium called ng Connect. The group was formed by Alcatel-Lucent and now has more than 50 members. The group developed a concept vehicle that utilizes next generation 4G/LTE networks to provide an always-on broadband connection called the LTE Connected Car. LTE represents the latest

generation of wireless data standards. It is currently in the beginning stages of deployment by the U.S. wireless carriers. What sets LTE apart from earlier standards is drastically improved data throughput (up to 1Gb/s) and it is natively optimized for carrying multimedia content. These connected car concepts are also being tested using other current generation data standards such as WiMax and Wi-Fi, although these do not appear likely to be adopted widely by national carriers at this time.

It appears the lines are becoming increasingly blurry between the connected car and the smartphone, in terms of delivering multimedia content. Will there still be a place for the AM and FM buttons in these vehicles? While it is sad to witness local terrestrial radio getting lost in the noise of technology, it is exciting to see how broadcast owners are adapting to streaming delivery platforms, which give those of us who moved away from our home markets the opportunity to once again listen to our favorite station while we are driving ... anywhere in the world. 🎧

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



Read more about the ng Connect concept vehicle's features at [RadioMagOnline.com](http://RadioMagOnline.com).

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# FCC modifies radio move-in policies

By Lee G. Petro

**T**he FCC recently modified its procedures to evaluate requests for new and community of license modifications for AM and FM stations in an attempt to slow the perceived flood of radio services moving from rural into urbanized areas. Over the years, the FCC developed a set of priorities to allocate FM allotments and AM radio assignments to satisfy the requirement in Section 307(b) of the Communications Act that such services are distributed in a "fair, efficient and equitable" manner.

The first and second priorities are meant to ensure that a particular community or area receives either its first or second full-time radio service. Next, the Commission's third priority is the provision of a first radio service assigned to a particular community. The final priority is a catch-all provision that gives a preference to the proposal that promises the greatest service.

Since all but the most remote areas in the country already receive at least two radio services, the FCC's review of proposals has focused on the provision of the first radio station to a particular community. This becomes an issue where the community is

outside an urbanized area, but would provide coverage to 50 percent or more of the urbanized area also would not be granted the Priority 3 preference. Finally, a proposal specifying a community outside an urbanized area, but could be modified through the subsequent submission of a minor change application (and thus avoiding a more-thorough review) would not be granted a Priority 3 preference.

However, the FCC did provide that the presumption could be rebutted, and gave guidance as to how a proponent could still qualify for a Priority 3 preference. Specifically, the proponent must demonstrate that the community was truly independent of the urbanized area, that the community has a specific need for an outlet for local expression, and that the proposed facility would be used to satisfy that specific need.

## Tucked in

To make these showings, the FCC will continue to permit proponents to use the well-established *Tuck* factors. The FCC has been applying the *Tuck* factors since 1988 to determine if a community has a need for a radio station independent of the larger community. The three-part *Tuck* analysis looks at specific indicia to substantiate the claim that the community in question was separate and distinct from the surrounding urban area.

While authorizing the continued use of the *Tuck* factors, the FCC did mandate the tighter scrutiny in reviewing the laundry list of information submitted by the proponent. The FCC will now require actual evidence in support of the local need, including statements from residents attesting to the separate and distinct nature of the community from that of the surrounding urban area, information relating to the growth the community, and any geographic or cultural separations between the community in question and the urban area. However, the FCC will not approve any change that would create a loss of the only over-the-air service to an area, or that would leave just one over-the-air service.

As noted above, these modifications to the FCC's rules and policies are intended to limit the migration of radio services into urban areas. Only time will tell whether these changes lead to the intended result, or whether such migration efforts merely will be delayed. 

*Petro is a member of Fletcher, Heald & Hildreth, PLC, Arlington, VA. E-mail: petro@fhhlaw.com.*

## Dateline

May 1, May 15: Radio stations located in the District of Columbia, Maryland, Virginia, and West Virginia continuing to run License Renewal Pre-Filing Announcements.

June 1: All Radio stations located in the District of Columbia, Maryland, Virginia, and West Virginia file License Renewal application and EEO Program Report. Non-commercial radio stations also file Biennial Ownership Report (FCC 323-E).

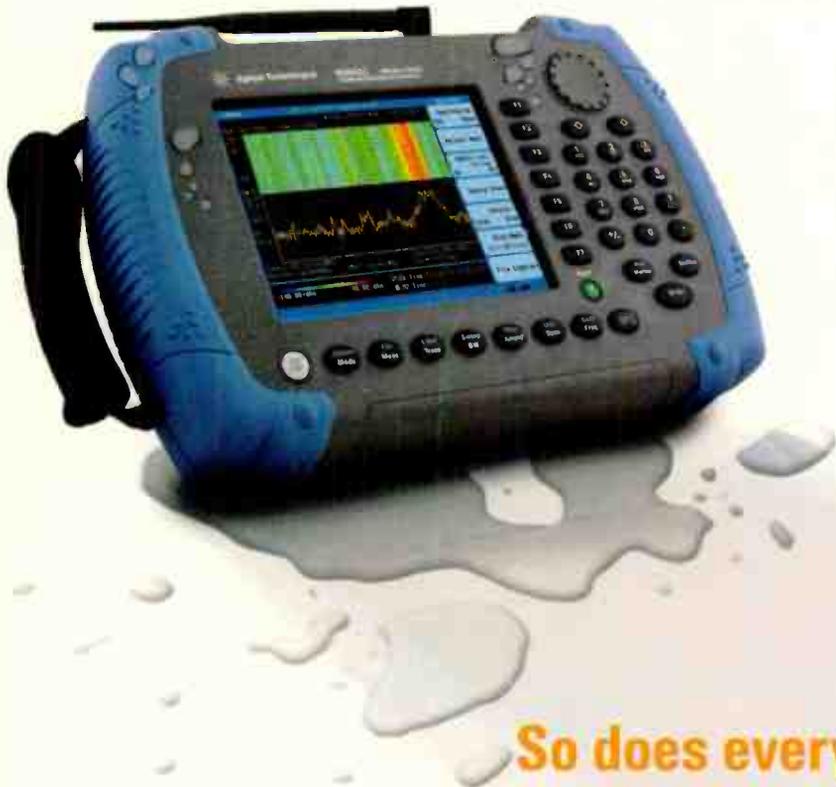
June 1: Radio stations located in the District of Columbia, Maryland, Virginia, and West Virginia run License Renewal Post-Filing Announcements on June 1, June 15, July 1, July 15, Aug. 1, and Aug. 15, 2011.

June 1: Radio stations located in North Carolina and South Carolina run License Renewal Pre-Filing Announcements on June 1, June 16, July 1, and July 15, 2011.

located immediately adjacent to an urban area, and the proposed service area would cover most of the urban community, raising a concern that the proposal is intended to serve the urban area, rather than the proposed community.

In response to this concern, and the perceived impact on rural radio services, the FCC modified its policies, and created a rebuttable preference against granting such proposals. First, a proposal that specifies a community located within an urbanized area would not be granted Priority 3 preference. In addition, a proposal that specified a community

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TRENDS IN TECHNOLOGY



# Monitoring HD Radio

It's now far easier to build an IBOC monitoring system than it was five years ago.

By Doug Irwin, CPBE AMD

**W**hen I first put an IBOC radio transmitter on the air (almost six years ago) there weren't many good choices in monitor receivers. There were plenty of radios that would pick up the IBOC signals, but none could really be relied upon in the way that we were accustomed to with analog modulation monitors. Fortunately since then, both known and not so well known manufacturers have developed new monitors. These IBOC monitors make great analog FM monitors too, so that's an additional benefit. Here's a look at what's out there.

# Simplicity Made Smarter



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The Pilot is easy on the eye and the budget and like the JetStream Mini, Logitek has built it with ease of use and durability in mind. The Pilot is a tabletop control surface that includes all of the basic engineering features your staff will need- and more- including 4 Program busses, 3 monitor sections and 24 mix minus busses. It is available in frame sizes for 6 to 24 faders.



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# Monitoring HD Radio

The company with the longest history in making modulation monitors for broadcast has to be Belar Electronics. Its IBOC monitor is the FMHD-1. Some of its most important features are:

- Frequency agility
- Off-air reception or high-level inputs available
- Metering of IBOC L, R, L+R and L-R
- Metering of analog L, R, L+R, L-R, pilot, and total mod
- Time and level alignment (analog vs. IBOC audio)
- Spectrum analysis
- SIS and PSD data
- IBOC status and control information
- Bit error rate measurement
- Four user-assignable alarm outputs (via relays)

The FMHD-1 actually has two high-level RF inputs available, so if it is installed at the transmitter site using separate transmitters for analog and IBOC, the RF signals can be combined within the meter itself. It also has two modes of communication available: Ethernet and RS-232. In either case, Belar's GUI - WizWin - must be installed to access the unit. The monitor also contains two IBOC decoders; so two streams can be decoded simultaneously.

The FMHD-1 is 2RU and has a 640X240 LCD color display on the front panel along with a rotary encoder wheel used to control and configure the unit.

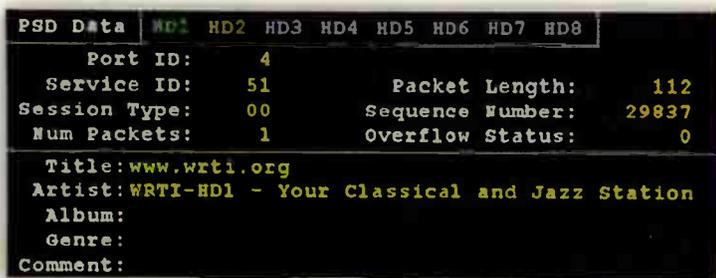
I want to point out two of the displays that I think are most useful to those that transmit IBOC signals. The first (Figure 1) is the time and level alignment.



**Figure 1. Time and level alignment screen on the Belar FMHD-1**

To this screen, you would need to rough-in the time delay to something much less. Based on my experience, time delay needs to be checked fairly frequently.

PSD also needs to be checked regularly. The FMHD-1 has a display to help with that (Figure 2).



**Figure 2. The FMHD-1 PSD parameter display**

And I mentioned that the newer IBOC monitors have useful features for the analog transmission as well. Figure 3 shows the display for analog levels.

Of course on the legacy analog meters, you can select the desired parameter to monitor and show the results



**Figure 3. Analog readings can also be made with the FMHD-1.**

one at a time via pushbutton. Having a visual display such as this is quite useful.

## Multiple monitoring

Now if you have a cluster of stations in your market (and thus many IBOC streams) you may want to consider a different tack with respect to monitoring the digital transmissions such as Audemat's GoldenEagle HD. The company makes one for AM and one for FM, but we'll consider just the FM one in this case. Their operation is similar.

The GoldenEagle is definitely meant to go at a studio location. The primary means of communication with the unit is via IP. Here are some of its salient features:

- Can be configured to scan and monitor up to 10 different stations
- Can be configured to generate alarms based on attributes such as low RF level, low modulation level, excessive time differential (analog vs. IBOC)
- Alarms can be sent via SMTP
- Spectrum analysis (optional)
- Supports SNMP, thus the unit can be queried by any SNMP manager
- Will stream analog and digital streams
- Real-time measurements of PSD, SIS, time delay

Again, the GoldenEagle HD is really designed to monitor multiple stations and would be ideal for an operation needing to monitor a geographically large area. From one central location, any number of GoldenEagle HD units receiving stations in a statewide network (for example) could be monitored via IP on a real-time, proactive basis. (In other words, you log in to a unit and listen to any station via the unit's audio streaming capability.) Alternatively, they could be monitored 24/7/365, in the background, via SNMP. (Want to know more about SNMP? See the March 2011 Trends in Technology article.)



**Figure 4. Selecting parameters with the Goldeneagle**

To configure the Goldeneagle, use Audemat's GUI. Following are some of the more common pages used to monitor IBOC stations. Figure 4 shows one particular view

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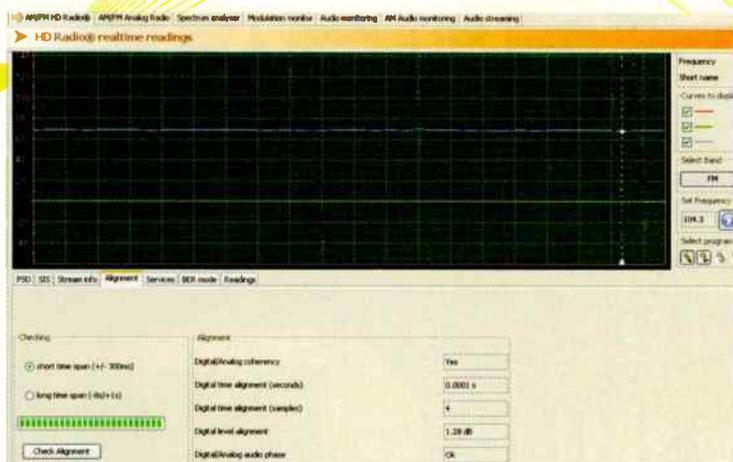


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# Monitoring HD Radio



**Figure 5. Checking the time alignment on the Goldeneagle**

where you can see among the tabs along the top that I've picked AM/FM HD Radio and the tabs near the lower left that I've selected PSD. Note the title and artist are shown. (When transmitting PSD data with digital streams this is something you will need to look at occasionally.) In Figure 5, I've moved one tab over to alignment, which will also need to be viewed periodically. There are two speeds at which you can measure the time delay. If you can rough the time delay in to what you think is less than 300ms, then you use short. If not, then you use long.

The GoldenEagle also offers streaming audio capability. From Figure 6 you can see (again going across the top of the display) that I've selected the audio streaming tab. You can compare analog vs. digital (handy for roughing in the time delay) or you can listen to analog only, or the digital streams (up to eight).

## Seize the day

DaySequerra offers the M2.2R IBOC receiver/monitor. This 2RU device has both a high-level RF input and an antenna input. Some of its key features are:

- Frequency-agile, covers both AM and FM bands
- Monitoring of analog components including pilot level, SCA level
- Composite outputs, full-time digital output
- RDS and multipath display
- Digital-to-analog time, level, phase alignment
- PSD for up to eight digital streams
- Performance loss module with six alarm relay outputs
- Ethernet interface, remote dashboard software with



**Figure 6. Selecting the streamed audio feed**

fault indications via visual display and email

- Scans up to 100 preset channels
- Figure 7 shows the remote dashboard. I've mentioned several times that it's (unfortunately)



**Figure 7. The remote dashboard of the M2.2R**

necessary to check the time alignment between the analog and digital streams for the MPS quite frequently. DaySequerra offers the M2DDM to solve this problem. This unit corrects time delay aberrations automatically in the background. There are several versions.

The single-station version includes internal digital delay. It is designed to be installed at a transmitter site. The multiple-station version sends real-time correction information via IP to embedded exporters. It is designed to be installed at a common receive location. The full remote-control version with the M2DDM dashboard can be accessed via IP. It also includes user-programmable, optically isolated alarm outputs that can correspond to loss of analog carrier, OFDM carriers and program silence, audio streaming available via IP, and it can send alarms outbound via email or text message.

Figure 8 (page 20) is a block-diagram of the intended installation method at a transmitter site (single-station version).

## More basic needs

The Inovonics INOmini 632 is an FM analog and HD Radio receiver for off-air broadcast monitoring capable of decoding up to HD8 multicasts. Analog and HD Radio digital programs are both accompanied by digitized text and housekeeping data including FM RDS, RT+ tagging data and IBOC PSD, which are shown on the front-panel LCD display.

When the 632 is set to receive IBOC it does not automatically revert to analog reception if the digital signal



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The Pivot Room is an auxiliary studio, but it's outfitted the same as the main seven studios.



By Bob Fukuda

# Clear Channel Chicago

## Multiple studios receive an audio network upgrade

**C**lear Channel Chicago operates seven stations in the nation's third largest market, consolidating five FMAs and two AMs into a single facility. The facility is nearing the conclusion of a studio integration project that radically upgrades the networked audio system, minimizing infrastructure and simplifying the workflow.

The consolidated operation comprises two floors of a large building at 233 N. Michigan Ave. in the Loop neighborhood of downtown Chicago. On-air and production resides on the 27th floor, with the sales and business operation located one floor above. Each floor encompasses 37,500 square feet.

The root of the upgrade involves a transition from a serviceable but outdated networked audio system to a Harris VistaMax platform. At press time, 21 of the 28

studios have migrated to the new system, with the final rooms on schedule for an early spring transition.

The original layout of the facility was designed in the tradition of pods, with localized studio clusters representing each station. Depending on the operation, each station has three or four studios per cluster – one on-air control room and a mix of production and voice track studios to suit the operation. The facility also has two independent on-air studios and one multi-purpose studio on the 27th floor, and a performance space/studio on the 28th floor. Every studio ties to the VistaMax network.

On the main floor, urban stations WGCI-FM, WVAZ-FM and WGRB-AM are located in the north hall, with the remaining four stations (WKSC-FM, WLIT-FM, WNUA-FM and LMA station WWON-AM) situated in the south hall.

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**WKSC main production has a layout similar to the other production studios.**

A large technical operations center (TOC) separates the two halls, housing all of the racks and infrastructure equipment that powers the studio operation.

## Technical core

The motivating influence behind the rebuild was based on problems with the existing networked audio system. Issues with spare parts and technical support aside, the architecture made little sense in the modern studio environment. An audio frame was required in each studio, and every component pertinent to the local operation was wired to that frame.

A dedicated server was required for each control surface, further expanding the footprint. Ultimately, the central electronics absorbed five full equipment racks in the TOC – an enormous amount of real estate by today's standards. The VistaMax system, even with additional headroom, reduces the footprint to a single rack, clearing four racks for other purposes. One has since been repopulated with new equipment, but the total infrastructure has been reduced from 77 to 74 racks.

A newly constructed wall in the TOC centralizes the wiring blocks for VistaMax. Audio systems are wired to Krone blocks, with optos and relays wired to standard Telco 66 punch blocks. Harnesses built into the VistaMax frame support direct wiring from the blocks, eliminating the X21 connectors required for the previous system.

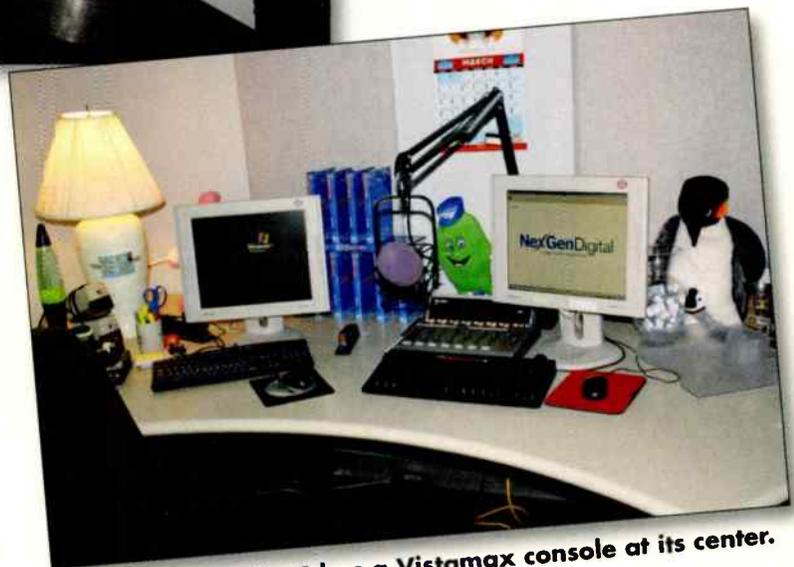
Existing multimode fiber to each studio was replaced with 25-pair CAT-5 wiring. The re-use of existing analog trunks for redundant signal transport ensures there is no single point of failure from TOC to the studios.

The general on-air signal flow begins with the RCS Nex-Gen system; the system's audio server sends the program audio to the Krone blocks and into VistaMax. From there, the signals move on to the processing racks, filled with

Omnia-6eXi (FM) and Omnia-5eXi (AM) units for analog and HD Radio signal processing. Harris Intraplex STL HD provide audio transport over T1 links to multiple transmission points around the city, including the John Hancock Center and the Willis Tower among other sites.

Post-delay audio for online streams breaks off prior to hitting the Intraplex units. Online streams for all HD Radio and FM/AM signals are supported and delivered by Akamai Networks.

A bulk of the remaining TOC equipment is dedicated to signal monitoring. On-staff engineering in Chicago developed an Intelligent Silence Sensor to monitor each station. The system also monitors



**Voice Track Studio 4 has a Vistamax console at its center.**

Arbitron Portable People Meters (PPM) for all program streams, including HD2 channels and online properties.

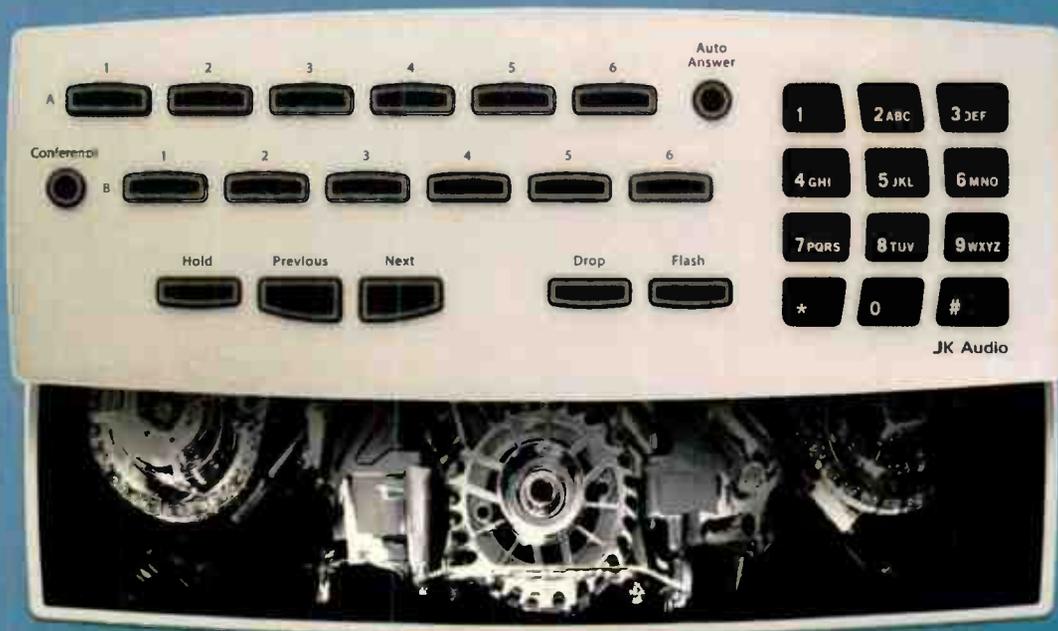
Elsewhere in TOC, XDS satellite receivers for Citadel Broadcasting and Premiere Radio Networks bring in syndicated programming from Doug Banks and The Steve Harvey Show, respectively. Sage Endec units are also located in the TOC to automatically trigger EAS signals for each station.

The HVAC system is designed to keep all the equipment in top operating conditioning, with three-ton and three five-ton condenser units providing forced air over powered cooling water. Three APC 40kVA UPS units provide backup to the entire system, able to support the entire operation for approximately 50 minutes. The units are only required to support the studios for a little more than 90 seconds, as Clear Channel Chicago shares a large generator with the building system.

## On-air and production

The on-air operation consists of nine 12x18 studios – one for each station and two specialty studios. All are built to similar specifications, with Harris PR&E custom furniture

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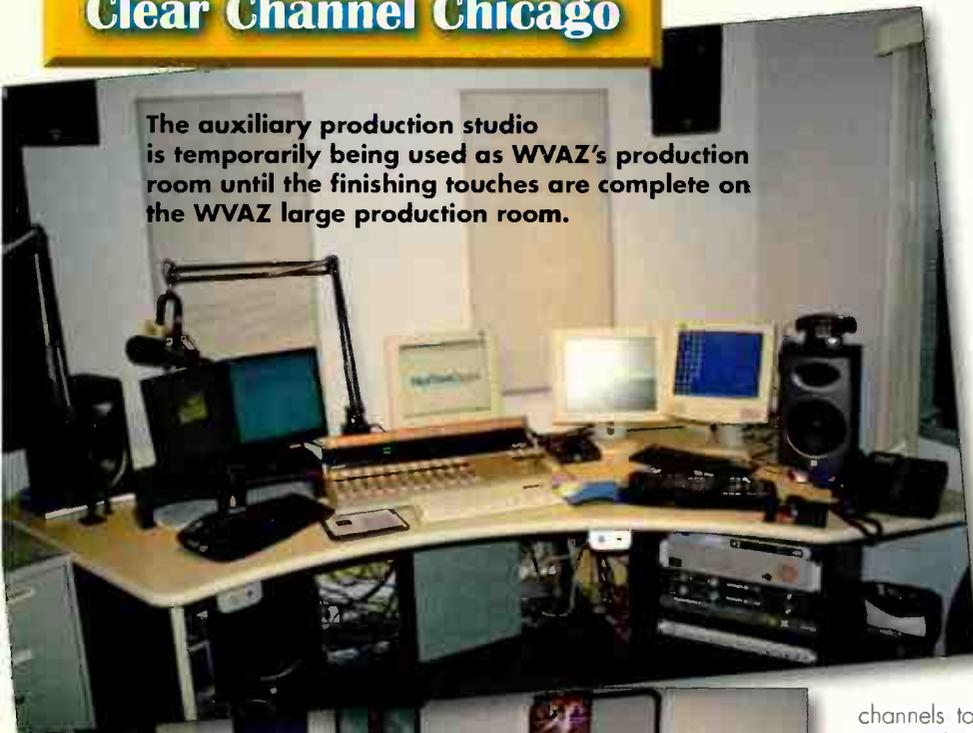
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World Radio History

The auxiliary production studio is temporarily being used as WVAZ's production room until the finishing touches are complete on the WVAZ large production room.



**Voice track studio 2 is also used by WLIT for AM drive.**

and turret assemblies housing all the required equipment. Harris PR&E RMXdigital consoles connect to the central VistaMax system, with jocks able to pull up sources from any of the console channels.

Other sources wired to each on-air console include five microphone processors (Symetrix 528A or AirTools 6200 units, wired mono to the five left channels), Telos 2101 phone hybrid signals, NexGen automation, Audion Labs VoxPro record/edit systems, Tascam CD players and Harris World Feed Panels. The World Feed Panel is a multi-user interface panel that provides a host of inputs and outputs for guests (musicians, TV production crews). This provides a direct-to-air interface for external source equipment.

RMXdigital is a clear upgrade from the previous on-air console. One notable improvement is mix-minus. The older consoles offered one mix-minus channel, which made live channel mixing a

cumbersome process. The RMXdigital provides six distinct mix-minus channels for our jocks, providing far more on-air flexibility.

The furniture is mostly designed for stand-up shows, with one host and four guest positions. Five Electro-Voice RE-27 or RE-20 microphones hang over the guest/host positions in most of the studios, with Harris 3x6 headphone distribution amplifiers built into the furniture. CDAir W2000 CD burners are also installed in the turrets atop the furniture surfaces for talent air checks.

Production studios are similarly outfitted, though vary in size and console choice. Four 12x18 large production rooms feature RMXdigital consoles, while six smaller 12x10 production rooms feature Harris PR&E NetWave digital consoles. The NetWave delivers audio networking to the smaller production rooms via custom dual-fader modules on three

channels to support routable sources. All production studios also add Adobe Audition and ProTools editing.

Music playlists for NexGen automation are built mostly on computers in the production studios. On the 28<sup>th</sup> floor, the traffic and billing operation ingests commercials, promos and other interstitials into the system. The NexGen server in the TOC automatically makes sense of the various elements coming from two different operations.

## Specialty studios

Voice track studios add an important element to the station programming. These smaller studios have a limited amount of equipment, with Harris PR&E StereoMixer digital consoles providing seven linear faders, four analog inputs, three digital inputs and mix-minus capabilities.

Adobe Audition provides editing capability. Computers were added to the rack room and converted to Audition machines, with the program wired to the second channel on each StereoMixer. Three channels of NexGen automation and a microphone processor serve as

additional StereoMixer sources. In all, these consoles offer three more channels than the previous voice tracking consoles.

The two additional on-air studios provide homes for certain shows. "Brotha Fred's Morning Mayhem", heard locally on WKSC, broadcasts from one of these studios. The layout is slightly different from the other on-air control rooms, with an additional microphone and guest seat added to the sit-down furniture design.



### Equipment list

Adobe Audition  
AirTools 6200  
APC 40kVA UPS  
Audion Labs VoxPro  
Avid ProTools  
Electro-Voice RE-20, PE-27  
Harris Intraplex STL HD, PR&E  
NetWave, PR&E RMXdigital,  
PR&E StereoMixer, VistaMax,  
World Feed Panel  
Odyssey FZBM10W Universal Fit  
Battle Mix DJ Coffin  
Omnia-5eXi, 6eXi  
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World Radio History



The rack room houses the Vistamax routing frames.

The final on-air control room, dubbed "The Pivot Room," serves as an auxiliary/backup studio, outfitted the same as the main seven. The Reverend Jesse Jackson exclusively uses this studio for his Sunday morning "Keep Hope Alive" program heard locally on WVON. Similarly, any of the fully equipped productions studios can quickly be converted to on-air studios if necessary.

The most unique studio is the "Beat Mix Studio," essentially an unused talk studio where jocks can add live mixes to the on-air programs. This studio features VistaMax network sources, six microphones and an Odyssey Battle Coffin for live mixes. The Battle Coffin includes two turntables in battle position, one mixer and a laptop. This studio also occasionally hosts live musical guests and other specialty programs, including a recent political candidate debate.

Upstairs, the 20x15 Coca-Cola Lounge features a 6x9 stage for scaled-down musical performances and artist meet-and-greets. The converted storage area is a carpeted studio outfitted with VistaMax sources and a Battle Coffin. The Battle Coffin units are popular here, as the urban stations all do

live on-air mixing to some extent. WGCI broadcasts three live mixes per day: morning drive, Mix at 5 and Mix at 8.

## Communication is key

The north hall wing, home of the urban format stations, features three pods of four studios each, while the south wing features four pods of four. Soundsoak acoustical wall panels and IEC-specified doors and windows provide acoustical treatments and noise-proofing as necessary.

Rather than rely solely on visual cueing through the glass windows, Harris added intercom functionality to the VistaMax systems. Personalities can now speak to each other via a simple pushbutton system – an important feature that the previous networking system lacked.

Harris also sent representatives to the facility to make the audio and logic wiring connections as part of its studio design services. This included the layout, harnessing and integration of wiring into the furniture design. We watched as Paul Barzizza, business development manager for Harris, crawled around the floor making all the necessary connections. Once arranged, we simply plugged everything in.

Simple connectivity is the central theme to this project. From the main VistaMax frame wiring in the TOC to the simple I/O connections at the networked consoles, onto the sensible studio furniture harnesses, the entire project showcased a clean migration from an antiquated methodology to a modernized networked audio system. 

Fukuda is market director of engineering, Clear Channel Chicago. Photos by John Boehm.

Web Images

**clear crisp bright sound**  Results 1 of 1



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# NAB NEW PRODUCTS



## Desktop intercom stations

### Axia Audio Booth C3113

**IC.20D, IC.1D:** The IC.20D desktop station has 20 station presets with high-visibility 10-character OLED displays for quick contact with frequently called stations. Like its rackmount cousin, it includes a keypad and display screen to provide fast access to any station system-wide, plus group talk, mic and speaker mute, and auto-answer functions. IC.20D also has a built-in speaker, front-panel mic connection and a 4-pin locking headset jack. The keypad

can also be used to dial outside phone lines (using an optional telephone hybrid). Presets can be assigned on the fly, or programmed with the built-in Web interface. The IC.1D desktop station adds intercom capabilities to any desktop. There are 20 LED-backlit film-cap buttons that can easily be labeled with station names, and an OLED callback window that assists the operator in identifying and answering calls from intercom stations not programmed onto a speed key. IC.1D also has a built-in speaker and front-panel 4-pin locking headset jack and front-panel mic input. Presets are easily programmed via built-in Web interface.

216-241-7225; [www.axiaaudio.com](http://www.axiaaudio.com); [inquiry@axiaaudio.com](mailto:inquiry@axiaaudio.com)

## Digital dynamics processor

### Jünger Audio Studiotechnik Booth C6742

**B46 Level Magic:** The stand-alone B46 processor is a professional non-destructive normalizer that performs automated leveling of digital audio signals. The unit integrates Level Magic the adaptive loudness algorithm based on a multi-loop dynamic range control principle where slow changes (AGC), fast changes (transient processing) and look ahead peak limiting are handled simultaneously, thus offering level management with exceptionally high audio quality and without coloration, pumping, breathing, distortion or modulation effects. A Web interface has been added that allows users to operate the unit remotely from a host computer. It also has a new front panel design and is now compliant with all current loudness recommendations including ATSC, ITU and EBU R128.

+49 30 677 7210; [www.junger-audio.com](http://www.junger-audio.com)  
[sales@junger-audio.com](mailto:sales@junger-audio.com)

## Music production system

### Samson Technologies Booth C1439



**Zoom R8:** In addition to eight-track playback and two-track simultaneous recording using SD memory cards, the R8 is a digital multi-track recorder, an audio interface, a control surface and pad sampler. The built-in drum sounds can be triggered using eight pads and three bank keys

to assign sounds to each track and create loops. The R8 comes with a 2GB SD card and supports up to 32GB SDHC cards for a maximum of 100 track hours. Using SD media for recording not only makes the R8 lighter and more portable, it also ensures increased reliability with no concern for a crashing hard drive.

631-784-2200; [www.somsontech.com](http://www.somsontech.com)  
[info@somsontech.com](mailto:info@somsontech.com)

## A/V software

### Sony Creative Software Booth C11001

**Vegas Pro 10:** New features in the native 32- and 64-bit versions of Vegas Pro 10 include stereoscopic 3D editing tools, enhanced closed captioning features, broadened video effect support based on the Open Effects Association standard, and new event level audio effects including audio event FX, input busses, VU meters and track meters. The software also features expanded multicam functionality, improved DSLR video, track grouping, advanced transport controls, and image stabilization.



800-577-6642

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

## 2x6 switch core

### JK Audio Booth C153



**Concierge:** Allowing connection of two hybrids across six phone lines, this switch matrix routes six incoming analog phone lines to JK Audio innkeeper 1rx or innkeeper 2 digital hybrids. A firmware upgrade makes most older model hybrids compatible. Concierge adds music on hold input, auxiliary phone integration and intuitive call control. Two Concierge switch cores can be bridged together, providing six additional phone lines for a 2x12 system.

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

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World Radio History

# NAB NEW PRODUCTS



## Portable codec Musicam Booths C1156, SU9206

**Ikusnet.** A portable IP codec for both radio and television stations, Ikusnet (short for "I can see your network") transmits audio and video in real-time back to a flagship station. With Ikusnet, reporters can edit and transmit packages instantly, or broadcast an event in its entirety with just one portable codec. Additionally, the codec, which features 3G and 4G connectivity, offers the flexibility to broadcast live video whenever, wherever and however. Its encoder/decoder process monitors the link quality for best data rate and adjusts accordingly automatically. Other features include: IP and DVB-ASI interface, H.264 video compression protocol with adaptive bit rate, 32GB removable storage, foldable 2"x4" monitor, touchpad menu, and design for outside use.

732-739-5600; [www.musicamusa.com](http://www.musicamusa.com)  
sales@musicamusa.com

## Exciter RVR Booth C3332

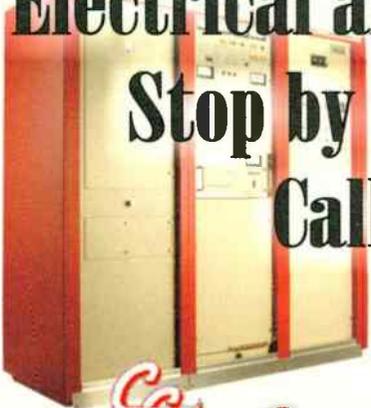


**PTX100-DDS:** PTX100-DDS uses DSP technology complying with all EC, FCC and CCIR standards. It features a built-in digital stereo coder, ITU professional limiter and on-board RDS, and AES/EBU, L/R, mono and MPX inputs, auxiliary inputs for SCA/RDS signals. It is completely microprocessor controlled, easy to program via menu or RS-232, and all main parameters are displayed on the LCD screen. It interfaces with all RVR telemetry systems to guarantee simple remote control of operating parameters.

305-471-9091; [www.rvrusa.com](http://www.rvrusa.com)  
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**Telephone line coupler,  
balancing unit**  
**GlenSound Electronics**  
**Booth C1148**



**GS-CUT101, GS-PASTE201:** A line-powered telephone line coupler, GS-CUT101 provides a balanced audio output from a normal telephone line. The front panel features a heavy duty on hook/off hook switch and an external handset can be connected for dialing. With a parallel handset connection, both sides of the phone call will be output. There is an audible ring when receiving an incoming call, which can be turned off. An LED also indicates an incoming call. The GS-PASTE201 is a line-powered telephone-balancing unit, providing balanced audio input as well as output from a normal POTS line. Specification is otherwise similar to the GS-CUT101 with the mic/line input switchable, level controls and an input compressor.

+44 1622 753662  
[www.glenSound.co.uk](http://www.glenSound.co.uk)  
[sales@glenSound.co.uk](mailto:sales@glenSound.co.uk)

**FM transmitters**  
**BW Broadcast**  
**Booth C1311**

**Aptus:** The Aptus high-performance FM transmitter range will be a fully equipped multi-purpose solution. Featuring a touch front panel, these transmitters have built-in audio-over-IP decoding, RDS encoder and comprehensive metering/analysis functionality. The models also have advanced multi-band DSP audio processing as standard and onboard memory for local backup audio, Ethernet and serial remote control, silence detection and source switching, built-in stereo generator, SCA inputs, and all-new sophisticated alarms and notifications.

866-376-1612  
[www.bwbroadcast.com](http://www.bwbroadcast.com)  
[info@bwbroadcast.com](mailto:info@bwbroadcast.com)

**Digital radio console**  
**Audioarts Engineering**  
**Booth C2623**

**IP-12:** The IP-12 starts with a 12-fader control surface. Each of the 12 input modules is equipped with an LED source name display and an A/B source selector whose sources can be set via a rotary encoder in the master section. Each input module has access to four program buses and has cue and talkback switches. A 100mm long-throw fader and lighted channel on/off switches round out the module. The master section offers control room, studio, and headphone controls with source selection, and an onboard headphone jack and amplifier. Timer controls, a master talkback button, and a built-in cue speaker with volume control are provided. There are four event switches and six programmable buttons available for user functions. The meter bridge has three stereo pairs of bright 30-segment horizontal LED bar graph meters, as well as an on-board timer with controls located in the master section. The control surface connects via Ethernet to its audio engine, the IP-88cb.

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**MudGuard:** The MudGuard isolates a mic by eliminating external noise bleed and filtering out external overtones. This design is engineered for maximum effectiveness using Studiofoam to reduce excessive room ambience and off-axis sound. It mounts easily to most microphone stands and clips and is 18.5"W x 14.75"H x 7.5"D.

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Congratulations to

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EAA Radio, Fishers, IN

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# NAB NEW PRODUCTS

## RDS Encoder WorldCast Systems Booth C750



**Audemat FMB50:** Based on the same hardware as the FMB80 with its reliability, quality and functionality, the new FMB50 is available at an affordable price point and can be easily upgraded should you require more extensive functionality in the future. In addition to the scrolling PS which scrolls dynamic messages such as song titles and artist information, the interactive functionality offered by the FMB50 enables listeners to access Web-related data or a music store, use an EPG to schedule program recording, contact the station directly by SMS, e-mail or phone or gain easy access to information on commercials. Also supplied as standard is Audemat's new RDS Viewer monitoring application. This displays the RDS data broadcast by the encoder and allows the broadcaster to verify integration with automation software.

305-249-3110; [www.audemat.com](http://www.audemat.com)  
[contact@audemat.com](mailto:contact@audemat.com)

## Computer shortcut keys P.I. Engineering Booth SL5622

**XK-24:** The XK-24 features 24 keys with green or red backlighting with a black and gray co-injected case suitable for hand-held operation and equally comfortable on a desk. It comes with MacroWorks 3 (MW3) for Windows 7, Vista, XP or 2000. MW3 allows any computer user to build and customize a workflow keypad. Also included, ControllerMate for X-keys offers Mac OS-X users a new interface with full support for all X-keys USB devices. These new X-keys devices may be flashed with firmware upgrades and offer a new reflector mode to communicate with even the most reluctant software applications.



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## New at NAB

Booth #C1411



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# NAB NEW PRODUCTS

## Digital radio processor DaySequerra Booth N3830

**Eclipse LBR4:** This four-stream AES stereo audio processor is specifically designed to improve the audio performance of low-bit-rate HD Radio multicasts, DAB and DRM channels with particular focus on stereo at 24kb/s. The Eclipse features DTS Neural Loudness Measurement technology to provide accurate loudness measurements and newly developed psychoacoustic processing with look-ahead gain correction to make audio level adjustments that are transparent to listeners. DaySequerra's proprietary Eclipse codec pre-processing engine has been specially tuned for operation at 24kb/s, 32kb/s, 48kb/s and 64kb/s bit rates to significantly reduce artifacts from lossy codecs and low-bit rate transmission.

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



## iPhone/iPad/ iPod Touch app Lawo Booth C2628

**Remote App:** This app for the iPhone, iPad and iPod Touch can remote control faders, load snapshots and trigger many custom functions such as "Routing Connects" or GPLs. Furthermore, the iPhone can become an additional user panel for Nova73 HD routing systems and mc2 consoles.

+49 7222 1002 0; [www.lawo.de](http://www.lawo.de)  
[info@lawo.de](mailto:info@lawo.de)

## Data connectors Neutrik Booth C8137

**Multimedia Connector Series:** The new line of connectors includes several variations of data connectors for USB, FireWire and HDMI ports. For USB connection, Neutrik offers a new 2.0 cable and two gender changers. The NKUSB cable delivers a data rate of up to 480MB/s and is available in 1-, 3- or 5-meter lengths. The NAUSB-W is a reversible USB gender changer that comes in the universally accepted D-size housing. It is nickel-plated and accompanied by a version in black (NAUSB-W-B). All three units are dust and water-resistant and comply with the IP65 safety standard in combination with each other.

704-972-3050; [www.neutrik.com](http://www.neutrik.com)  
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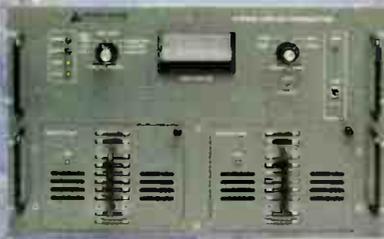
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## Emergency radio transmission

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**Booth C2217**

**Portable Radio Systems:** These portable radio systems include everything needed for remote, temporary or emergency operation, including BE's AudioVAULT studio control system and 1kW STX LP transmitter along with mixer, audio processor and audio-over-IP connectivity in one rugged case. The STX LP is a lightweight, solid-state transmitter with built-in FM exciter, backup controller and more; it includes IP connectivity for monitoring RF operation remotely from any laptop or PC. AudioVAULT is an all-inclusive automation system with studio tools for creating, managing and delivering audio programming. It offers fully automated or live-assist operation with local or remote control via an IP connection. It can receive and play IP audio sent over the IP data network and can also accept outside audio sources for recording or playout. Easily transportable, these systems are for backup or temporary operation during extreme weather conditions or other emergency situations when a portable, "mission critical" system is needed.

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## UPGRADES and UPDATES

RCS has released NexGen Digital version 2.11.1, which adds enhanced IP audio support to communicate with Wheatstone and Axia systems. ([www.rcscommunity.com](http://www.rcscommunity.com)) ... Logitek's JetStream Mini console engine/IP networking platform offers an increased I/O density with the ability to handle up to 128 channels within a single AoIP node. ([www.logitekaudio.com](http://www.logitekaudio.com)) ... Barix has updated its Reflector Service for STL, syndication and remote contribution to improve performance and provide added user tools. ([www.barix.com](http://www.barix.com)) ... Audio-Technica is now shipping the AT2022 X/Y stereo condenser microphone, which features two adjustable condenser capsules. ([www.audio-technica.com](http://www.audio-technica.com)). ■

## Air-cooled FM transmitter

**Harris**  
**Booth N2502**

**Flexiva:** This VHF FM solid-state transmitter provides radio broadcasters with a single platform to support analog and global digital standards. Quad-mode operation supports FM, FM+HD Radio, HD Radio-only or DRM+ digital broadcasting, while the transmitter incorporates Harris Real-Time Adaptive Correction (RTAC) technology to optimize power and minimize adjacent-channel interference. Flexiva transmitters are built on the legacy of Harris radio broadcast transmitters, including the ZX Series and its efficient power supply, cooling and control designs. Available in power levels up to 20kW, Flexiva transmitters also leverage Harris PowerSmart technology to create a compact, cost-efficient transmission solution with high power density and low operating costs.



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[broadcast@harris.com](mailto:broadcast@harris.com)

## Virtual studio

**Merging Technologies**  
**Booth C3239**



**Pyramix 7:** Pyramix features a re-worked user interface and a ground-up rebuild of the Media Management system. Multi-channel tracks and new clear, intuitive track headers with direct access to effects controls enhance the timeline. Automation curves are now colored for easy identification and automation sub-tracks enable multiple parameters to be displayed simultaneously. A sample rate conversion module, HeptaCon, offers: state-of-the-art processing in 64-bit float with the latest filters and dithering algorithms. Media management and library databases have been completely rebuilt.

207-773 2424; [www.merging.com](http://www.merging.com)  
[plaporte@merging.com](mailto:plaporte@merging.com)

## Audio processing Blade

**Wheatstone**  
**Booth C2623**



**IP-88VE:** Part of the WheatNet-IP Intelligent Network, the IP-88VE occupies a single rack space, but packs an impressive complement of eight fully independent Vorsis Embedded three-band stereo audio processors. Each processing chain consists of a four-band parametric equalizer followed by a crossover and three bands of compression. The compressors each feed their own limiters, whose outputs are then fed to a broadband lookahead limiter for tight peak control. The Blade has its own local I/O, with eight stereo pairs of AES digital audio in and out, and can function as a standalone processing engine. Because it's a Blade, it can also instantly configure itself as part of a new or existing WheatNet-IP Intelligent Network, making its processing power available throughout that network. The IP-88VE is configured and controlled over Ethernet using a computer.

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# NAB NEW PRODUCTS

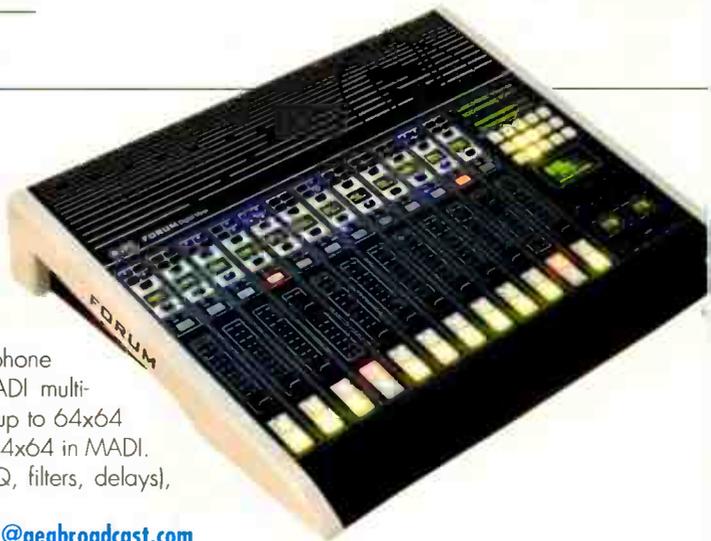
## Compact digital audio console

**AEQ**

### Booth C1628

**Forum:** Forum's control surface is available with 4, 8 or 12 faders, and comes standard with a 12-fader configuration. Its audio engine is an integral part of the control surface, including analog audio I/O, digital (AES-SPDIF) audio I/O, microphone inputs (MIC/LINE + phantom selection) and MADI multi-channel connectivity. Forum is capable of routing up to 64x64 audio I/O channels (analog, digital or mic), plus 64x64 in MADI. It uses advanced DSP technologies (integrated EQ, filters, delays), while maintaining straight-forward operation.

800-728-0536; [www.aeqbroadcast.com](http://www.aeqbroadcast.com); [sales@aeqbroadcast.com](mailto:sales@aeqbroadcast.com)



## Portable loudspeaker

**Sennheiser Electronic**

### Booth C2055

**K-Array KR400S:** Crafted in Italy, the KR400S is an ultra-slim, two-way loudspeaker designed for small-to-medium wavefront systems in both mobile and installed applications. It includes two KR400 satellites and two KL21ma powered subwoofers. The KL21ma subwoofers feature a 2,500W, 21" drive unit with neodymium magnet structure and suspension, which is engineered for maximum line excursions. Its ultra-light reflex cabinet is fitted with four pocket handles and one 35mm pole mounting point for easy installation of satellite speakers. The KR400S also features a line array of 24 by 3" high efficiency neodymium magnet drivers enclosed in an ultra-strong chassis.

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## Wireless intercom system

Anchor Audio Communications/Portaco

### Booth C856

**ProLink:** ProLink is a digital wireless intercom system that transmits in a range of 250' through walls and glass and can operate up to 15 hours using three AA rechargeable or alkaline batteries. Each belt pack can communicate in push-to-talk mode, which is always receiving but only transmits when the PTT button is pushed, or "always on" mode, which provides completely hands-free communication. A four-user system consists of one master belt pack and three remote belt packs. When the team needs to work in two separate groups, the ProLink can be expanded to a seven-user system that includes two master belt packs and five remote belt packs.



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## Emergency messaging platform

Digital Alert Systems

### Booth C2952

**DASLC, DASLCR:** Providing core Emergency Alert Systems (EAS) and Common Alerting Protocol (CAP) functionality, DASLC and DASLCR offer dual monitoring inputs and analog-only switching. Economically designed, these 2RU models are specifically designed for radio facilities needing minimal EAS/CAP requirements. The DASLC offers critical functionality, and the DASLCR adds two integrated high-performance AM/FM/VWX radio receivers. Both units meet all FCC Part 11 rules and conform to FEMA CAP V1.2 and IPAWS 1.0 standards, allowing broadcasters to reduce headaches and substantially improve operational efficiency for just a little more than adding a CAP-converter to their legacy EAS equipment.

585-765-2254; [www.digitalalertsystems.com](http://www.digitalalertsystems.com); [info@digitalalertsystems.com](mailto:info@digitalalertsystems.com)



## Microphone on/off switch

Whirlwind

### Booth C4342

**Micmute:** Micmute boxes offer passive switching for controlling the on and off conditions of a microphone or balanced line signal via footswitch. There are three models that cover all the essential mic control functions. Each box has a female XLR input and a male XLR output jack with a heavy-duty footswitch actuator. Micmute PM is push-to-mute, Micmute PT is push-to-talk and Micmute PP is push-on, push-off.

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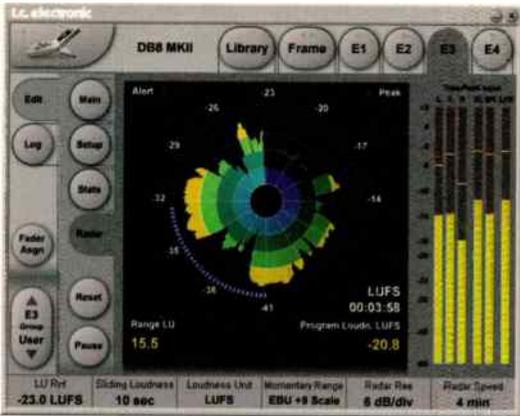
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### DB4 MKII and DB8

**MKII:** The DB4 MKII and DB8 MKII conform to new EBU, ATSC and ITU Loudness and True-peak level standards across all platforms and all formats. The MKII versions feature EBU R128

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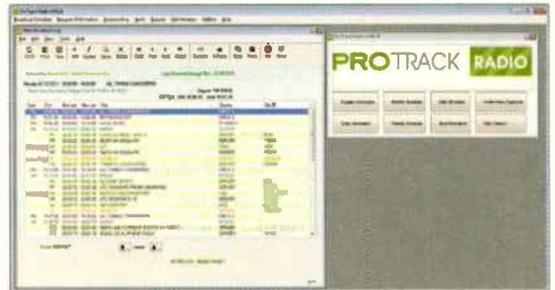
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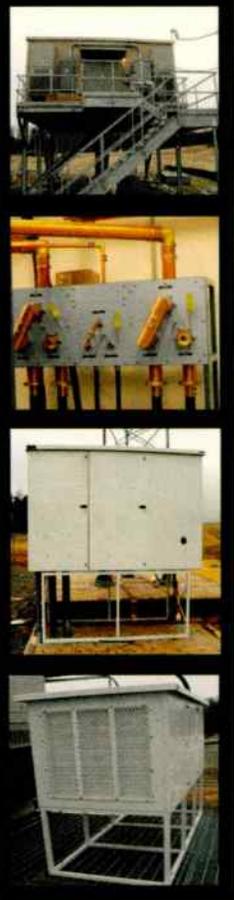
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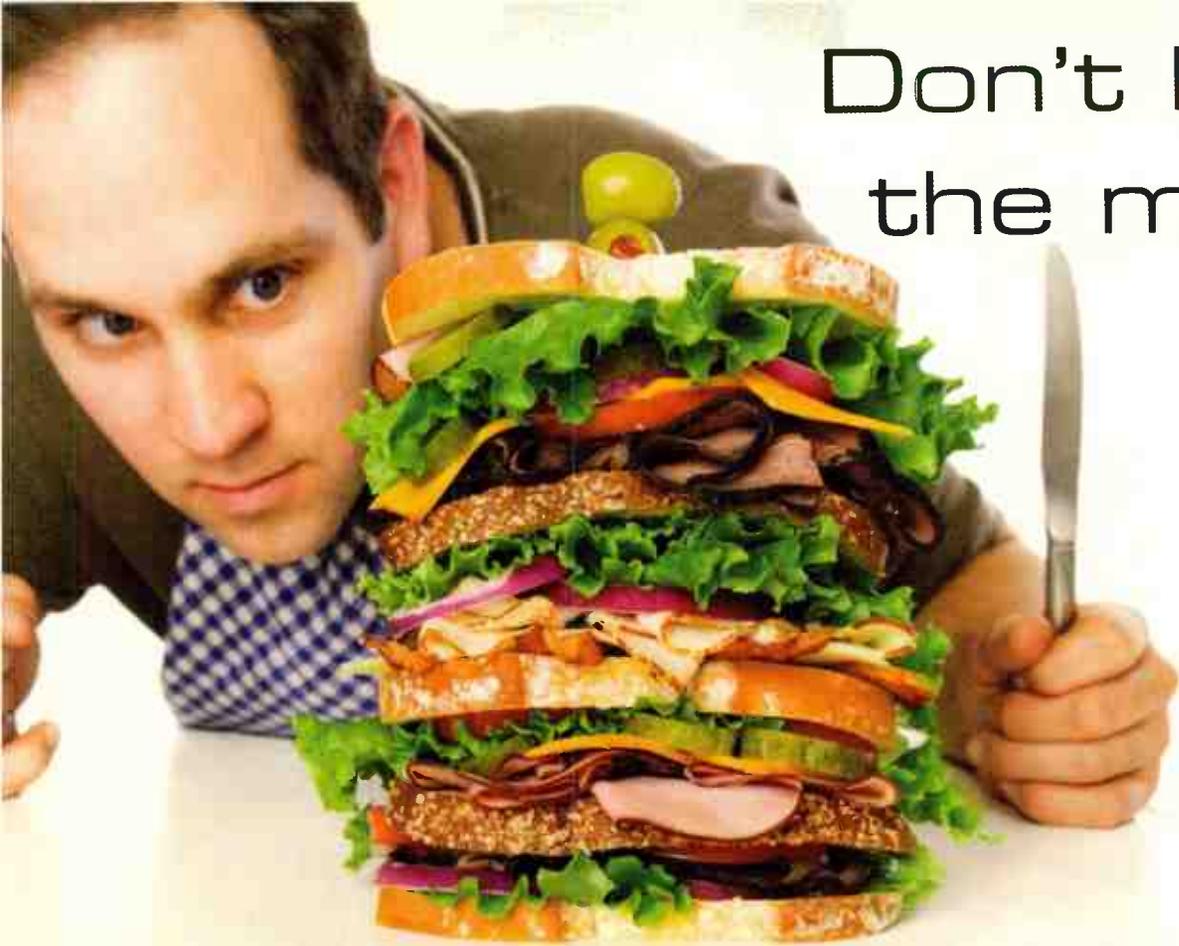


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# NAB NEW PRODUCTS

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**Zaxcom**  
**Booth C2549**

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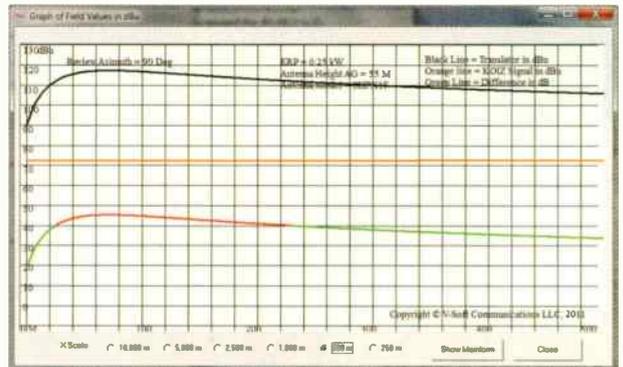
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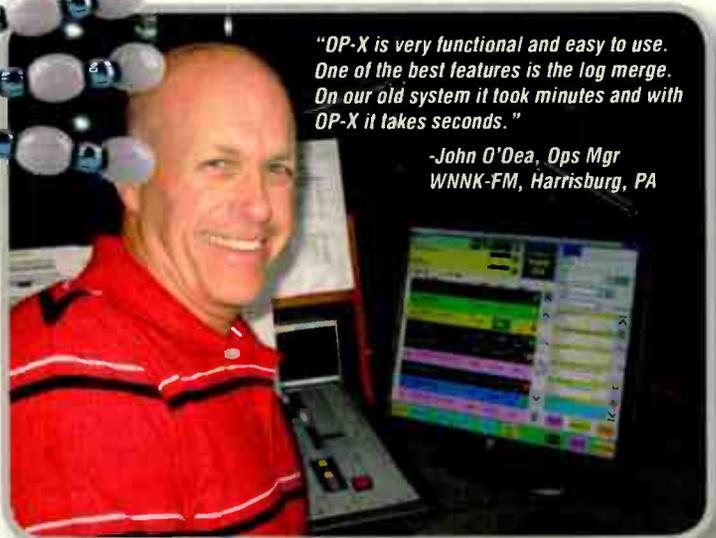
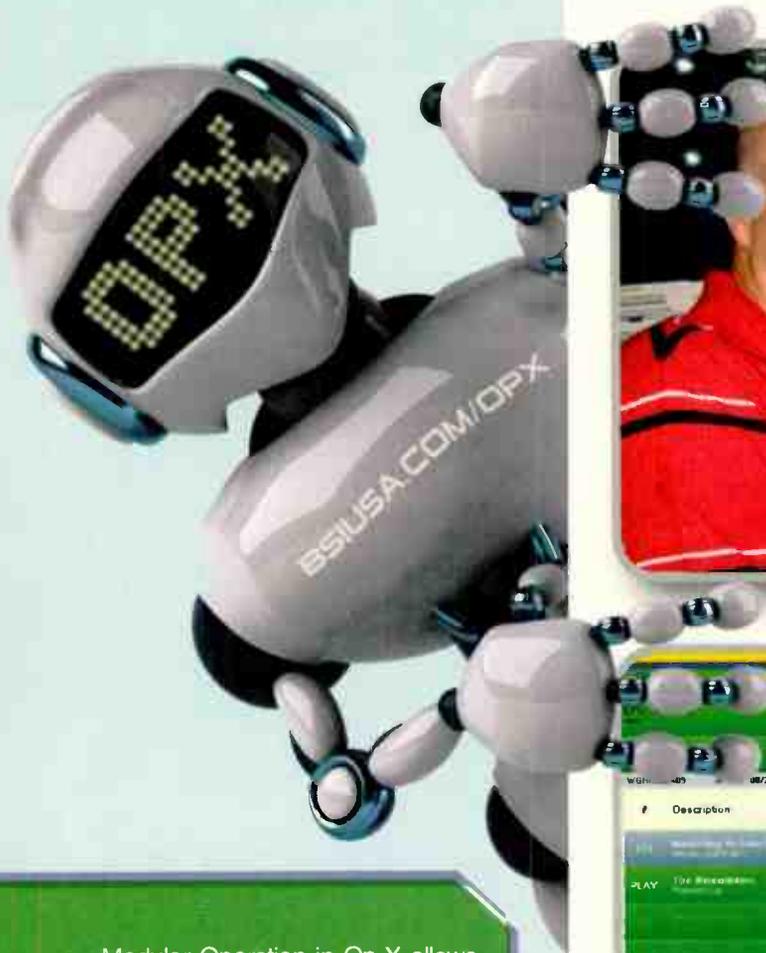


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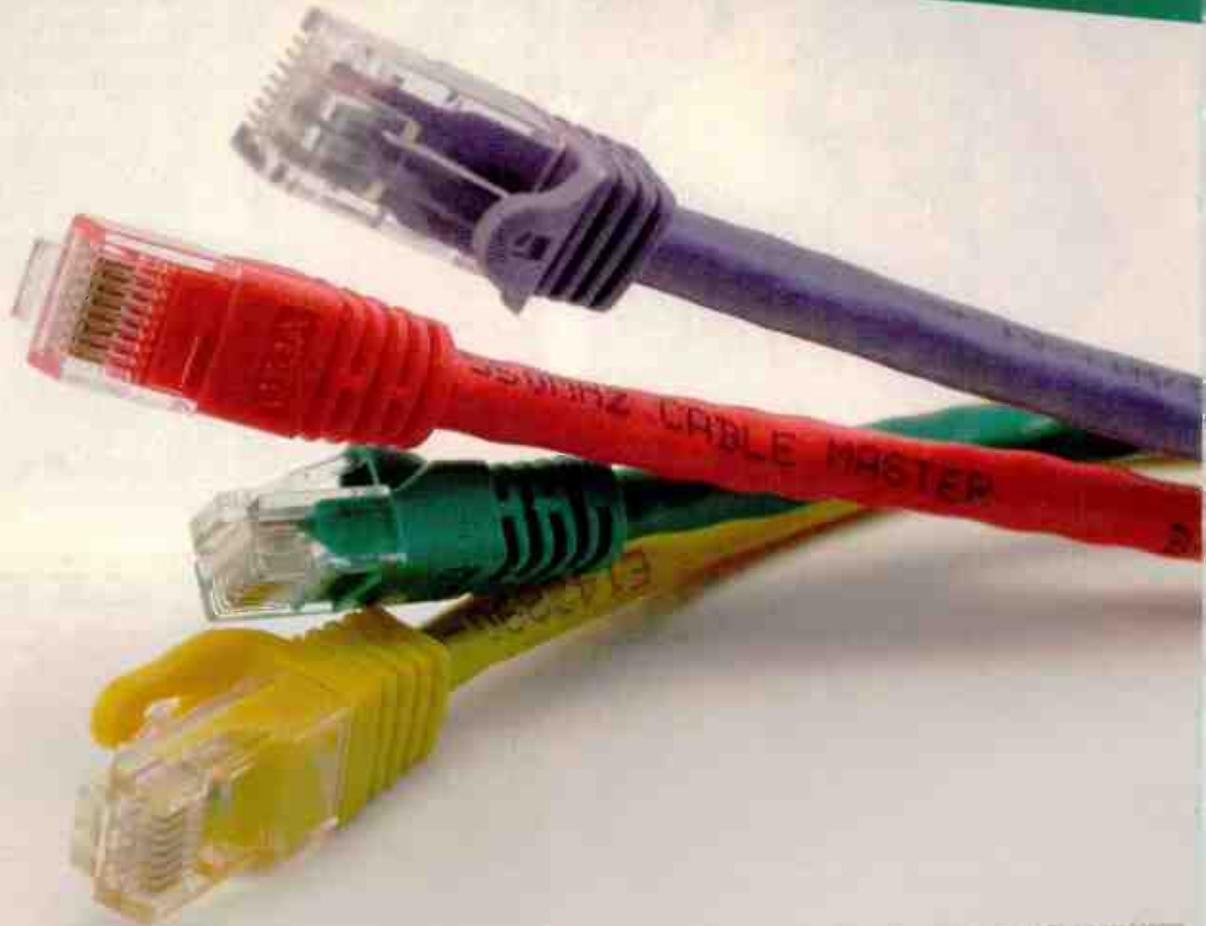


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## Choosing a Network Switch for Audio-over-IP

**A**ll network switches are not created equal. While all carry Ethernet packets, there are limits to how many packets a switch can handle. Even an expensive business-class gigabit Ethernet switch may not be up to snuff.

Audio-over-IP systems use multicast streaming technology to send audio around the facility. Multicast streaming was designed for applications like videoconferencing. In a typical office where one or two conferences may happen for an hour or two at any given time, the excess load is minimal. However, in a radio station where many streams run non-stop, it does not take long to overload the network.

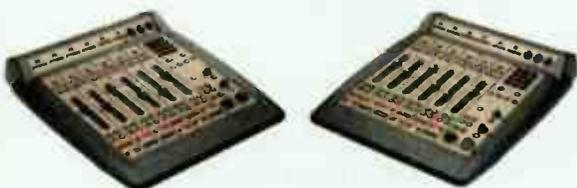
### **AoIP unmanaged network**

Each audio device has its own private IP address, and each device is sending and receiving multiple streams of audio. Those streams are assigned Class D multicast addresses. This address range is between 224.0.0.0

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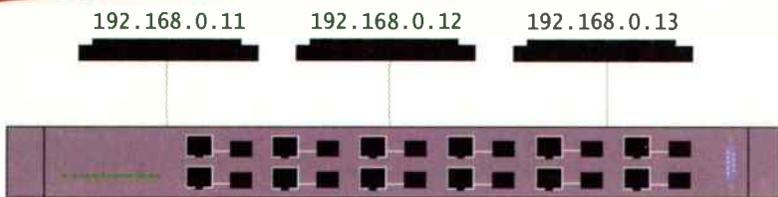


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# Choosing a Network Switch



**An AoIP network with an unmanaged switch**

to 239.255.255.255. Most of that range is reserved for WAN and Internet specific uses by the Internet Assigned Numbers Authority. However, there is a block between 239.192.0.0 - 239.251.255.255 reserved for organizations to use locally; this block is used by AoIP devices. Every audio stream gets its own multicast address assigned automatically by its sender, and all network switches will pass that data.

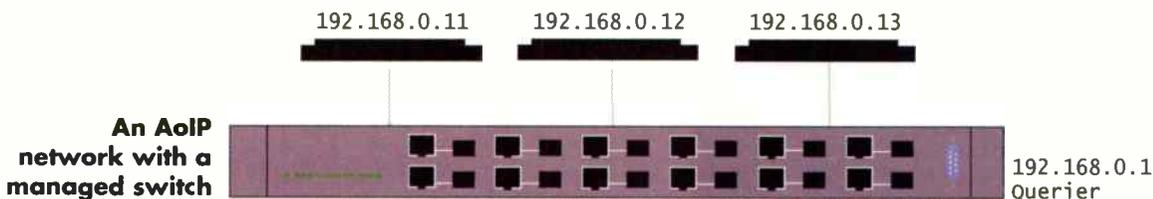
The problem is that once all of the audio devices

are powered up and sending anywhere from 8 to 64 different streams out to the network the switch will dutifully pass that traffic to every port - along with the rest of the data flowing across the network - whether the other ports need all of that data or not. This is called flooding. Like in a denial of service attack, once you fill the pipe with enough unwanted traffic, needed packets won't get through, and the end result is clicks, pops and holes in the audio.

Unless you are building a very small AoIP system, an unmanaged switch will simply not work because the streams that are transmitting but not being used at the moment will flood out the on-air streams.

## AoIP managed network

The solution is a managed switch that keeps track of the multicast traffic and forwards only the streams being used. However, with the hundreds of management protocols available, it's entirely possible to pick managed



**An AoIP network with a managed switch**

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switches that aren't capable of managing multicast traffic. There's one set of letters to pick out from the acronym soup: IGMP.

Internet Group Management Protocol (IGMP) snooping restrains multicast traffic on a switched network, and was developed to manage multiple videoconferences. AoIP systems are derived from the same standards used in videoconferencing; therefore, the same management system accomplishes the same thing for audio.

There are two flavors of snooping. Passive snooping listens in on the traffic and does not filter or interfere with it in any way. Active or proxy snooping will filter traffic to lessen the load. The switch keeps track of what streams appear. When a user requests that stream, it then forwards that traffic only to the ports that are listening. When that user no longer needs the stream and stops listening, the switch stops sending that data to the port.

There must be one switch on the network that serves an IGMP querier. The querier creates the tables that keep track of the streams. Without this, snooping will not work.

Some switches are capable of snooping but not serving as a querier. These are intended to communicate with a switch that has the feature. If multiple switches with queriers are installed in a facility, only one will serve as the querier, as there can be only one master list.

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# Choosing a Network Switch

## The switch is the heart of the AoIP system

Pretty much any AoIP system can be hooked up as a snake back to back and pass every channel without a problem. When the system increases in scale, it's the network switch that manages the bandwidth. In many respects, the maximum number of network channels is not a function of the AoIP appliance but the network switch that ties the appliances together.

When shopping for a switch, the two most important things to find amid all of the acronyms on the spec sheet are "IGMP Snooping" and "IGMP Querier." If after reading the data sheet you're still not sure that the features are supported, find the manual for that model online and look up how to set up both features. If it's in the manual, the feature had better be there.

A capable switch for an AoIP system can range in cost anywhere from \$600 to over \$1,000. Not every switch will be recommended by every AoIP

manufacturer and not every switch will be the right tool for the job.

## Start with a plan

Map out the network infrastructure before you make a purchase. The first thing to take into account is whether or not you already have suitable Ethernet cable in the walls and/or where you have available conduit or cable trays in place to get to the studios. The second thing to take into account is that unlike a network switch that you can buy at the office supply store, a switch capable of handling AoIP will have to crunch a lot of numbers, generate a lot of heat, and have a small noisy fan inside to keep itself happy. Therefore, while the AoIP appliances are fanless and suitable to mount inside a studio, the network switch is not and should be mounted in a rack somewhere else.

Most radio stations have set up their IT infrastructure with all cable runs terminating in an equipment rack locked away in engineering. This is ideal for AoIP: It's



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# When shopping for a switch, the two most important things to find amid all of the acronyms on the spec sheet are "IGMP Snooping" and "IGMP Querier."

simply a matter of making room in the rack for your AoIP network switch and connecting the studio runs to the switch.

Some facilities may elect to use multiple switches due to the layout of the building or available conduit. In this event, set up the querier switch as the core of the network and have snooping capable switches on the edges talk to the querier at the core.

## Which model do I buy?

Like most computer equipment, the moment that this

goes to press, any model numbers listed would be already out of date.

Generally speaking, the top end of Netgear's professional series represents the entry level in IGMP capable switches. HP's ProCurve series is the midrange tier, and Cisco represents the high end.

The support department will be able to recommend a current switch that fits a station's needs and budget.

*Davis works in tech support for Logitek Electronic Systems, Houston.*



**FSM726**

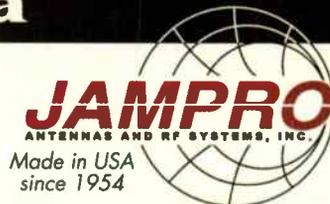


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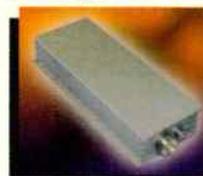
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## Tips, tricks, hints and more

By Doug Irwin, CPBE AMD

### Under pressure

**A**ntenna, transmission line, transmitter – three key mission critical elements of any radio station. Without any one of those, the station is off the air. The transmission line, being totally passive, can sometimes be forgotten with so much other stuff going on. If it fails, though, suddenly it becomes the #1 priority. So, maintaining it – since it will last years and years of properly maintained – is vitally important.

A big part of maintaining your transmission line is keeping moisture out. That's done in one of two ways – either by way of a dehydrator, or by way of nitrogen. Both are used to keep positive pressure inside the line itself.

If you happen to have a dehydrator installed at your transmitter facility, dutifully maintaining dry air and positive pressure inside your transmission line, you need to keep a few things in mind. (These all come from the Andrew user manual, by the way.) First, if the dehydrator is running more than 20 percent



of the time, check the system for leaks. Second, the dehydrator itself needs an overhaul for every 6,000 hours of run time. There are two choices in getting the work done: Buy an overhaul kit from the manufacturer and do it yourself, or send the unit to the manufacturer. Most companies offer a loaner program if needed. ERI, SPX Communication Technology and others also provide dehydrators.

Because the dehydrator requires power and has moving parts there is certainly a possibility that it will fail at some point. Maintaining pressure inside the transmission line is so important it's wise to have some sort of backup pressure system available.

That's where the nitrogen bottle comes in.

Nitrogen has advantages and disadvantages. The obvious advantage is that it can be stored on-site for long periods of time and have it available. It's inexpensive. There are no moving parts or power required to use it. The disadvantages are that it can be hard to get a bottle delivered (you know this if you've moved one yourself) and

if some sort of substantial leak in the line develops, the bottle can empty quickly.

Whether you use nitrogen all the time or just as a back up for your dehydrator, there are a couple of things you want to know once you leave the site: What is the line pressure, or alternatively, is the line pressure too low, or too high?

To determine the line pressure, use a pressure transducer, such as the Broadcast Devices PSW-100, which provides an output voltage corresponding to the measured pressure (0 to 6 psi). The facility remote control can be configured to trigger an alarm should the pressure read too high or too low. Another company that makes pressure transducers is Omega Engineering.

Then again, maybe you don't really care what the exact pressure is; you just want to know if it is too high or too low. (If you already have a dehydrator likely you're using its low-pressure switch; however, if the unit is out of the rack, you may need an alternative.)

In this case McMaster-Carr has something to help. Page 569 of the online catalog has several choices in adjustable pressure switches. Using two of these devices, you could detect the too low as well as the too high conditions. You will need a manifold to connect all the sensors to line. Dehydrator suppliers sell these as well. You can also try the nitrogen gas supplier or a welding supply shop for the gas fittings.

*Irwin is transmission systems supervisor for Clear Channel NYC and chief engineer of WKTU, New York. Contact him at [doug@dougirwin.net](mailto:doug@dougirwin.net).*

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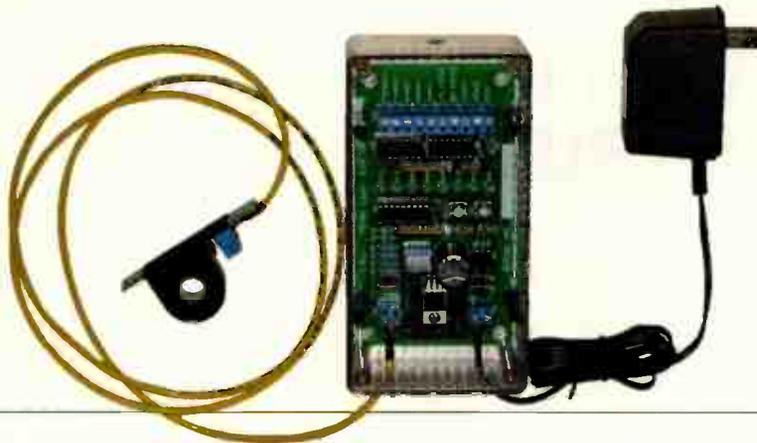
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## FM Services TLM-1

By Michael Bradford,  
CPBE

I can't tell you how many stations I have noted in past years with incandescent tower lighting systems which have no method to fulfill all monitoring requirements of the FAA and FCC. Too many times to remember, I found photo controls that failed with no alarm, flasher modules that failed in the "constant on" mode with no alarm, or flashers that went squirrely and were flashing 55 times a minute or only four times a minute ... all with no alarm from the simple current transformer "monitor" that was installed.

Given that the FCC has issued fines in excess of \$7,000 for "wanton and continued" failures in tower lighting, it only makes good sense to have a lighting monitor that will fulfill all pertinent requirements.

After completing a due diligence inspection for Holy Family Radio at a three-tower directional array east of Grand Rapids, MI, I discovered the simple current transformer-based "monitors" simply did not meet all the requirements of the FAA/FCC as detailed in the Rules. I spent a lot of time pouring over various catalogs trying to locate a single system or a module to comply with all the Rules when I remembered a Field Report in *Radio*

qualities and thoughtfulness; it comes in a clear plastic case for easy mounting and access to the calibrate and reset buttons. All connections are via euro-style barrier strips. DIP switches allow you to customize the system for specific remote control interfacing. The current transformer with the TLM-1 is a separate device and can be easily mounted inside the service panel with the tower lighting breaker. This allows the monitor module to be mounted separately from the service panel location for easy viewing of the status and alarm LEDs and connection to a remote control system.

When all the lights are on and operating as normal, pushing the calibrate button causes the TLM-1 to store this data and compare future operation with these normal values. Individual beacons, obstruction lamps, flasher operation or photo control operation can be monitored with an individual opto-isolated status output. There is also a common alarm status output on each module that alerts any failure.

The TLM-1 comes with its own wall-wart power supply, but it can be powered with 9-12Vdc/ac at 100mA locally if desired.

### Performance at a glance

- Individual alarm outputs
- Status outputs for lights on/off and beacon on/off
- LED indicators for each alarm and status output
- Opto-isolated outputs
- Insures FAA lighting compliance

magazine from 2009. I dug into my back-issues and found the information I needed on the TLM-1 system module. According to the description, the TLM-1 seemed to respond to all failures that required a call to the FAA and issuance of a NOTAM.

I contacted the manufacturer, Stoney Owen, at FM Services in Wilkesboro, NC, to discuss the TLM-1 in detail. Two days later, I had a TLM-1 module in my hand.

Here's a microprocessor based system designed to monitor a tower's beacons, obstruction lamps, flash rate, photo control operation – even the presence of an ATU heater bulb for winter months. This neat little device shows superb design

### My installation

My specific need was for a two-tower monitoring system for the three-tower array. As only two of the three towers are required to be illuminated, I needed two of the TLM-1 modules. I designed the basic layout to fit a Stahlin JW1210HPL enclosure with a solid aluminum type BP1210AL back-panel. This model comes with a weather-tight clear cover so the TLM-1 status and alarm LEDs can easily be viewed with the door closed. I also chose to use a universal input power supply module to power the two TLM-1 boards that I obtained from Digi-Key (part number 285-1747-ND). I installed a 1/4 x 20 brass bolt for

# FIELD REPORT

a solid ground connection on the Stahlin solid aluminum back-panel, and a jumper to each TIM-1 circuit board's ground lug for protection.

I connected the two TIM-1 commons together and use the individual alarm outputs to monitor each tower separately with the station's Sine Systems RFC-1B.

I chose to program the alarm outputs for normally on so the remote control channel assigned to each tower will reply with status on for a normal, no alarm situation. Should there be a failure in a beacon, flasher or photo-control, the remote will send a message to the Holy Family Radio control center so that the required call to the FAA reporting center can be made and the NOTAM number logged. Once the repairs are made, the TIM-1 can be re-calibrated and returned to normal operation.

The TIM-1 comes in a plastic enclosure when delivered, but the circuit boards have drilled and plated holes in the corners for custom installation. The TIM-1 will monitor up to eight 620W or six 700W beacon bulbs and eight 116V obstruction bulbs in



**A solid ground is attached in the final installation.**

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a 120Vac lighting system.

I am writing a letter to the Commission and the FAA to request relief from the requirement of a visual quarterly tower light inspection as required in the Rules given the extent of the status monitoring provided by the TIM-1 system.

*Bradford is the owner of Broadcast/Audio Services, Jackson, MI.*

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

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

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## Audio-Technica AT4040

By Gil Wilson

**L**ately I've been looking at microphones I could use as multi-purpose mics and not just for voice or instruments. I had several suggestions for condenser mics, although my preference in a radio production room has always been a dynamic mic. My main problems with condenser mics come down to just two issues: One, they tend to pick up too much sound and I end up cleaning the recorded material before I can do my production; and two, they require phantom power. Most of the stations I've worked for don't have on-air consoles that provide phantom power.

This time around I think I may have overcome my ill-feelings toward condenser mics, and I owe that to the Audio-Technica AT4040.

The AT4040 is a beautiful mic that performs as well as it looks. Its housing is symmetrical, which provides an open acoustical environment that minimizes unwanted internal reflections. It also includes a switchable 80Hz high-pass filter and features a cardioid pattern. This came in handy when I was recording a group of people for a commercial. They were not broadcast professionals and they all wanted to voice the spot together rather than me mixing down in the audio software. I placed

two separate tracks (one mic for two instruments, and the two instruments recorded separately). The ability to change the rolloff allowed me to experiment with different sound and frequency changes to find the one that best fit the instruments I was miking. The elimination of low-frequency distortion provided an expanded sound without any clipping from the recording. When I was recording the bass guitar, the sound was full and the ability to cut out some low end with just a switch on the mic made for some clean recordings.

My next test was to see how this mic would do as an on-air studio mic. At first I was thinking it might be overkill for this mic, but after the trial I was sold. Our on-air console did not provide phantom power, but soon after borrowing (and later purchasing) an inexpensive phantom power adapter/supply I overcame my phantom power phobia. Monitoring the direct feed and the on-air feed, the sound was incredible: crunchy, crisp, clear and detailed. In

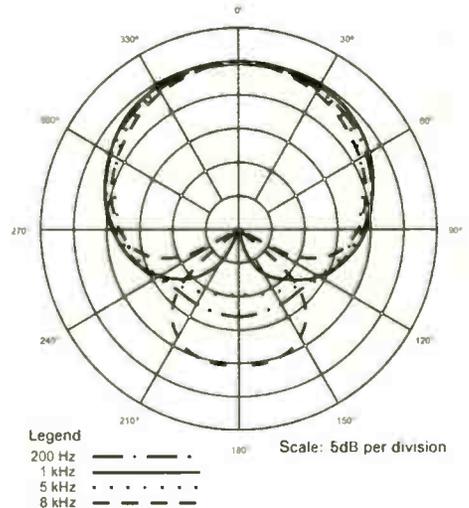
### Performance at a glance

- Cardioid condenser mic
- 20Hz – 20kHz frequency response
- 80Hz, 12dB/octave low-frequency roll-off
- 10dB pad
- 100Ω impedance
- Includes shock mount, dust cover and carrying case

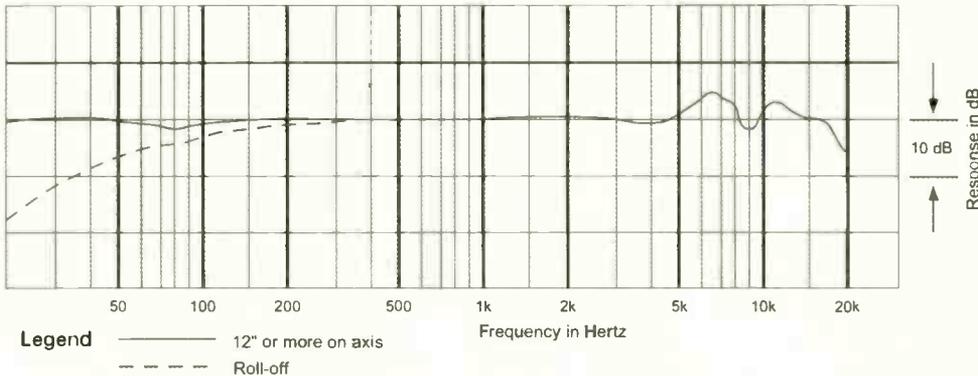
the mic centrally among the three of them and the cardioid pattern eliminated the unwanted room noise and picked them all up with pretty equal strength.

#### Various uses

Another test I ran on the mic was recording a band so I could experiment with the sound and functionality. I used it first to just mic the instruments individually, and since it was on my dime, I recorded two instrument amps at the same time. With easy mic placement I found that again this mic saved me time by not requiring the mixing of the two sources. When I compared the two finished audio tracks, there was no difference between the mixing of the



# FIELD REPORT



fact, when switching the mic back to our regular studio dynamic mic, the sound was muddy.

Our signal processor cleans a lot of the sound before sending out on the airwaves, but with the AT4040, I'm guessing the processor didn't have to work as much as it did with our dynamic mics. It all comes down to the mic capturing pure natural sound.

I respect the sound the AT4040 provided for the on-air studio, but found this mic to be perfect for the production studio. I used this mic with a variety of mic preamps and every time it provided the clean, wide sound for recording of the non-professionals and the highly desired clarity by the production professional. I never thought of a mic as being a

time-saver but this one definitely saved time. 🎤

*Wilson is an announcer, producer, webmaster and promotions guy at WAKO-AM/FM, Lawrenceville, IL.*

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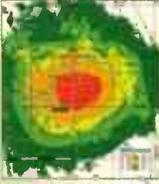
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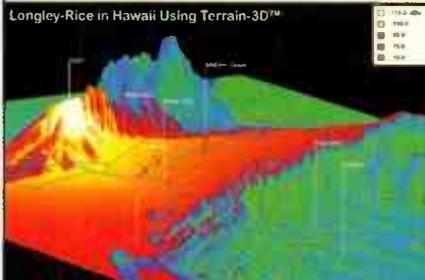
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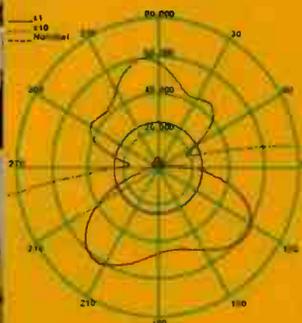
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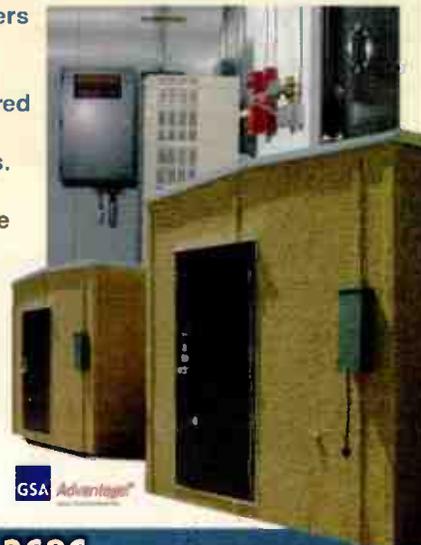
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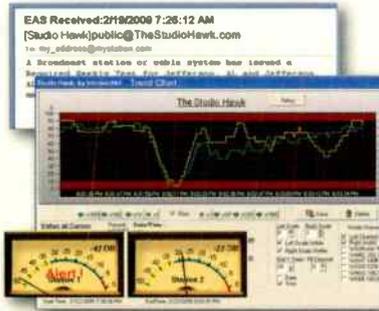
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## Recognitions



### Radio magazine honored by Missouri Association of Publications

The 5th Annual Ranly Publications Awards recognized two articles from and one issue of Radio magazine.

The March 2010 issue of Radio magazine was a finalist in the Best Entire Issue category, and the February 2010 Trends in Technology (Portable Recorder Lineup) was a finalist in the Best Single Written Article.

The Best Single Written Article winner was the December 2010 Facility Showcase called KMXL-FM/KDMO-AM: Small Town, Big Ideas. This article profiled the studio upgrades at an AM/FM family-owned combo in Carthage, MO. The stations replaced their aging analog equipment with digital consoles and routers and completely remodeled the studio infrastructure in the process.



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by Erin Shipps, senior associate editor

## Sample and Hold Radio in times of crisis

As I write this column, Japan is still reeling from a deadly earthquake/tsunami combo that so far has claimed the lives of thousands of people. This tragic event triggers memories of the not-too-far-gone 2010 earthquake in Haiti, which killed hundreds of thousands. In these times of disaster and crisis, we are reminded of the importance of the media and communication.

A report on Haiti from the Knight Foundation explores the parts media play in times of emergency. Specifically regarding radio, the report stated:

"Radio is Haiti's dominant medium. Access to radio can be shared easily and relatively cheaply among many people, and serves both literate and illiterate populations. According to the CIA World Factbook, Haiti has more than 250 commercial and community radio stations; a 2009 Voice of America survey describes radio receiver ownership as virtually universal. These factors made radio the undisputed lifeline for the Haitian public after the earthquake. Most Haitian radio stations were knocked off the air by the

quake. Only one, Signal FM, managed to continue broadcasting to an audience of nearly three million throughout the crisis. Station owner Mario Viau was later honored by the National Association of Broadcasters Educational Foundation, which lauded Signal FM as a vital source of information for the millions of Haitians who had no access to fuel, electricity or telephone service immediately following the earthquake. 'Its round-the-clock coverage helped locate missing people, spread news to families searching for lost loved ones and delivered messages to Haitians across Port-au-Prince regarding available water resources and hospital information. It also helped save the lives of numerous Haitians by providing reports to rescue teams describing where immediate aid was needed.'

"Radio's importance as an information source was amplified because it complemented other critical information sources. Community networks and local churches were able to distribute messages more effectively by working with radio. Other forms of media such as text messaging and

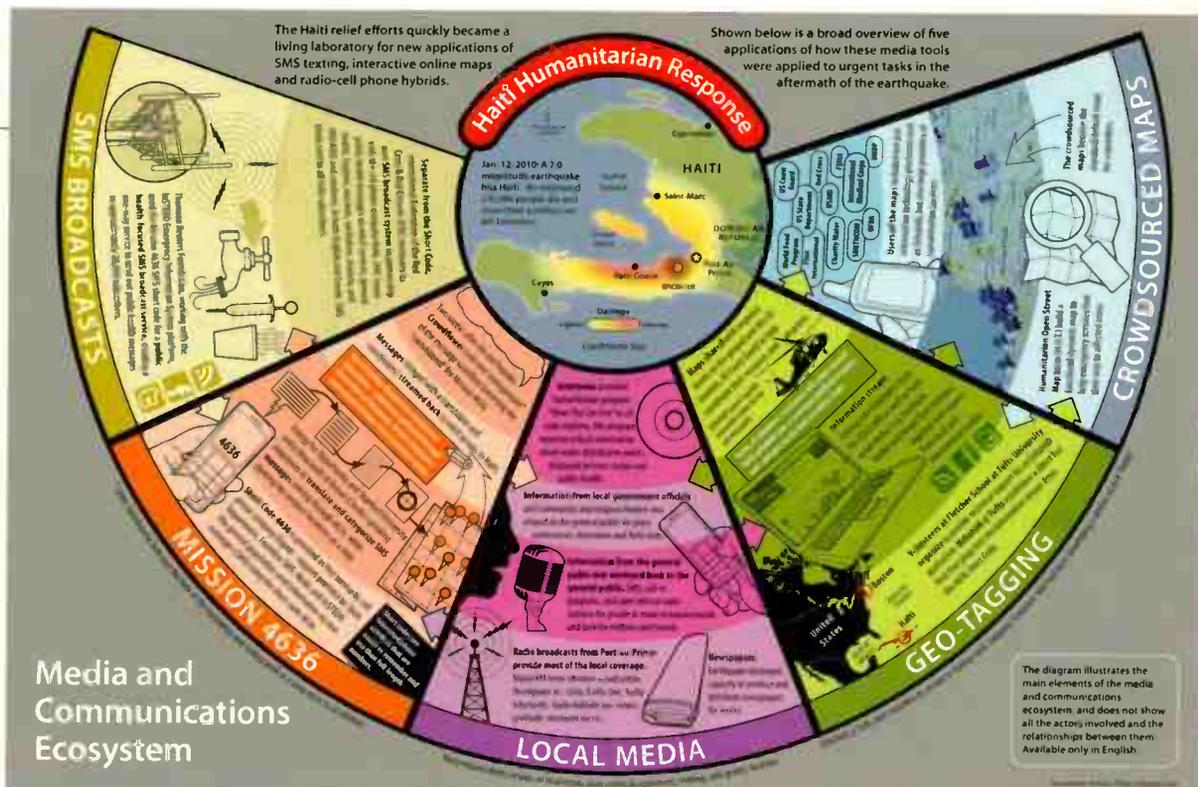
social networking combined with radio to improve delivery of key information with a consistent message to the widest possible audience. Other media organizations also mobilized to help, including the Haitian Journalists Association, the local community organization Katye pa Katye (also known as Quartier par Quartier) and Haitian telecommunications providers such as Digicel and Voilà. Digicel was particularly influential in the relief effort and donated extensive time and resources.

"Even before they resumed service, Haiti's local mass media helped international relief efforts by offering vital local knowledge. Local Haitian organizations and diaspora networks also joined the communications process through social media. These groups drew on telephone (and less frequently, Internet) contact with friends and family in Haiti to post updates on Twitter, Facebook and Flickr to communicate to a broader public."

To read the entire report, visit [http://www.knightfoundation.org/news/press\\_room/knight\\_press\\_releases/detail.do?id=377001](http://www.knightfoundation.org/news/press_room/knight_press_releases/detail.do?id=377001).

This chart from the Knight Foundation's Haiti Report shows how many forms of media were used after the 2010 earthquake in Haiti. Illustration by William Pitzer, Infoartz.com.

Source: John S. and James L. Knight Foundation



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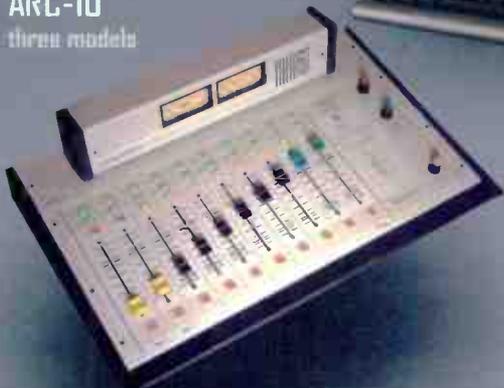
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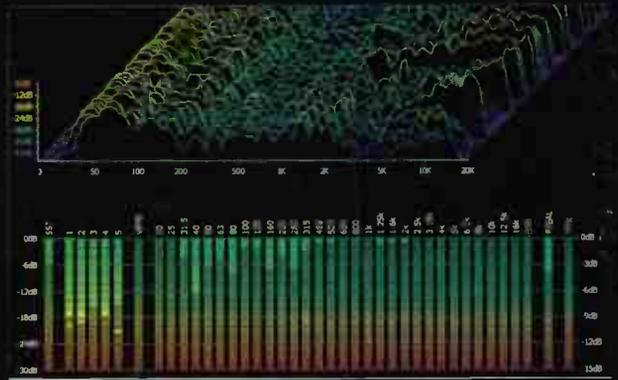
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"What an amazing difference in sound quality!!! This is a brand new FM station and comparing it to the other new station in town using the Other brand of processor our client is louder, cleaner, and even legal. Wheatstone definitely has a winner here with Vorsis."

"This is a great sound and we are so, so pleased with our new Vorsis on-air processor. You just threw down the gauntlet to the processing industry with this new unit! Nobody can match a sound this loud, this clean, and this unique! Now everybody gets to chase after us for a while. Thanks Vorsis!!"

"Our signal used to virtually disappear in downtown New York when we went on night pattern because of the extremely high level of man-made noise. Now when we're on night pattern our coverage in downtown is actually better than when we are on day pattern, the other brand of audio processor and a 10X higher powered transmitter! We're buying a second one to put on our day-time transmitter!"

"You have to be kidding! I have NEVER heard FM audio sound this good, this detailed, this smooth, this clean, and this loud (how did you do it??). Very nice work!"

"Love the box!!! Overall the sound of the station is vastly improved. It's loud, wide and clear."

"I guess the only word for Vorsis is 'WOW.' It's got some great bottom end, and it's more transparent than any processor I've heard."

"The AGC/Compressor/SST combination is simply amazing. We play classical CDs. Older classical CDs were mastered at a much lower level than current ones. Announcers don't compensate and never will. Your processor is able deal with what amounts to probably 40-45dB (or more) \*average\* level variations and hold them perfectly in the sweet spot with virtually no squashing, pumping, sucking, or other usually audible artifacts of such wide range level control. In short it does its job perfectly every time."

"This box sounds much better than any other processor I have ever tried. Ever!"

"I love classic rock and it's the program format on the station that I own. No other processor that I've tried (and I think I've tried them all!) sounds as good on this format. We're nice and loud and still cleaner than the other stations in the market. We were surprised to hear the intentional dynamics of songs actually get on the air - other processors just flatten them out or turn them into a sea of mush. For the first time ever we're also hearing subtle nuances in songs that we used to think we knew every single note of. What an amazing air sound! No.... What an amazing processor!!"

"Your equalizers are actually useful and unlike other processors do not grunge-up the sound merely by enabling them."

"The SST algorithm is the least audible of ANY processor I have ever had experience with. I'm not sure how you did it or exactly how it works but its automatic "leveling" is excellent - no pre-processing whatsoever is necessary with SST."

"The high end of this processor is very open sounding - there is no fake "sparkle" with the HF EQ either. Perfectly clean and natural sound. And did I mention LOUD?"

"Finally! A processor that deals effectively and transparently with over-sibilant announcers and audio levels that usually go all over the place! (I especially love the tweak-able multiband thresholds!)"

"Why haven't the other audio processor companies been able to make an AM box that sounds this good? I can't think of a positive superlative that is big enough to describe how pleased I am with our AM sound now. Our coverage seems to have increased by quite a bit too!"

"Our multipath is Gone! GONE! As an engineer I have difficulty believing a processor can make this much difference in apparent coverage area but the listening is the proof. We've had several listeners call and comment that their reception has greatly improved and even I've noticed vast improvements when driving through what were previously horribly multi-path prone areas. I'm not sure why, but it sure does work!!"

"This box has great metering and excellent analytical tools - you get good visual indication of everything that is happening inside."

"The unit's stability has been flawless, not even a tiny glitch. We have it set up to time-sync and it works great. The scheduler-based (and SILENT!!) preset switching is perfect! Unit sounds very accurate sonically and is very easy to set-up."

"We are now VERY unique in our audio. Compared to other stations in the market, we are as loud yet maintain legal modulation (at least 4 stations in our market run with 130%+ modulation). We're not "squashed" sounding at all and if you compare us with the other stations (all formats) we're clearly a dynamic and clean stand-out signal on the dial now."

NOTE: We aren't naming names because everyone who is reaping the rewards of sounding better appreciates their anonymity (with respect to the competition). We won't blow your cover, either.