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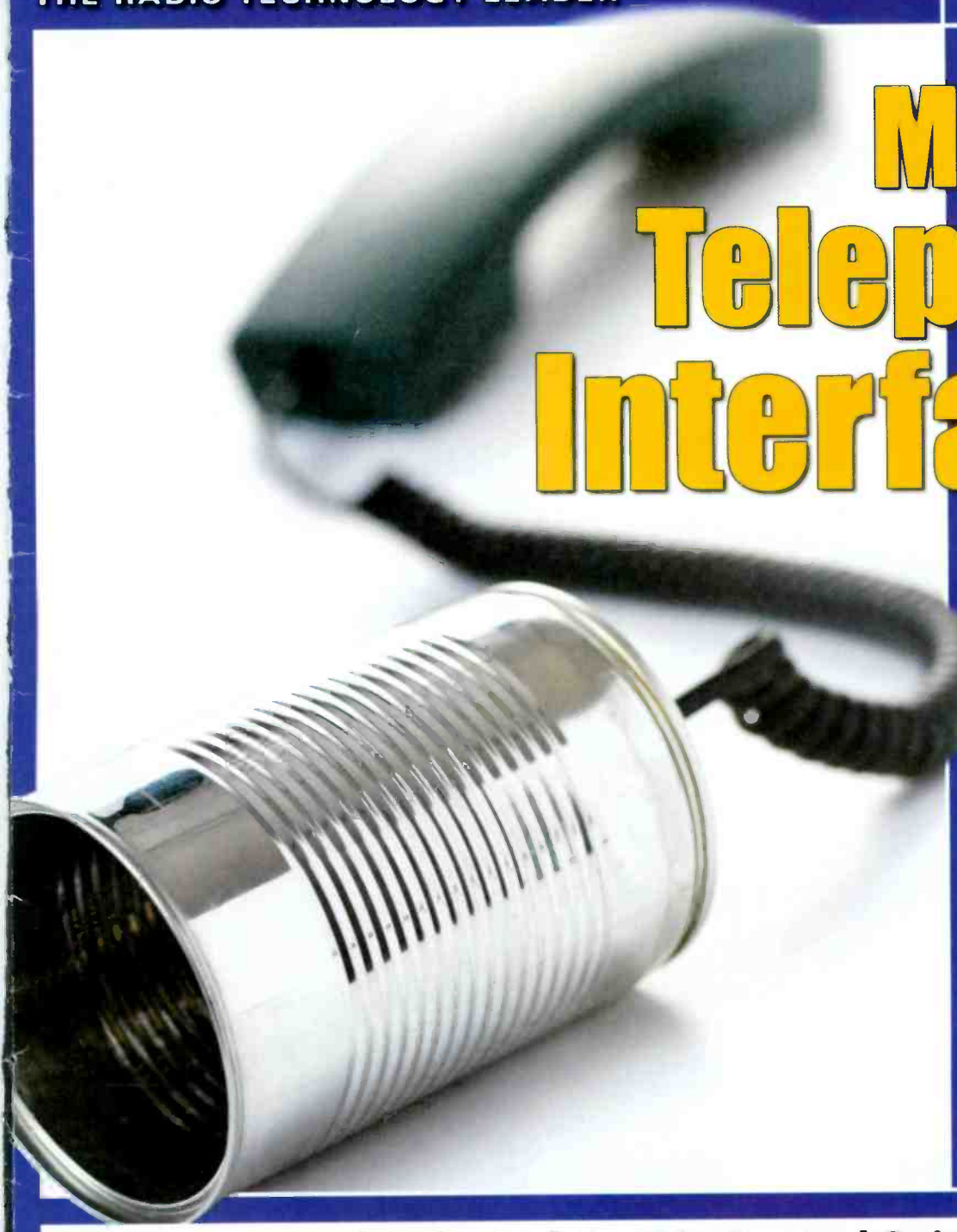

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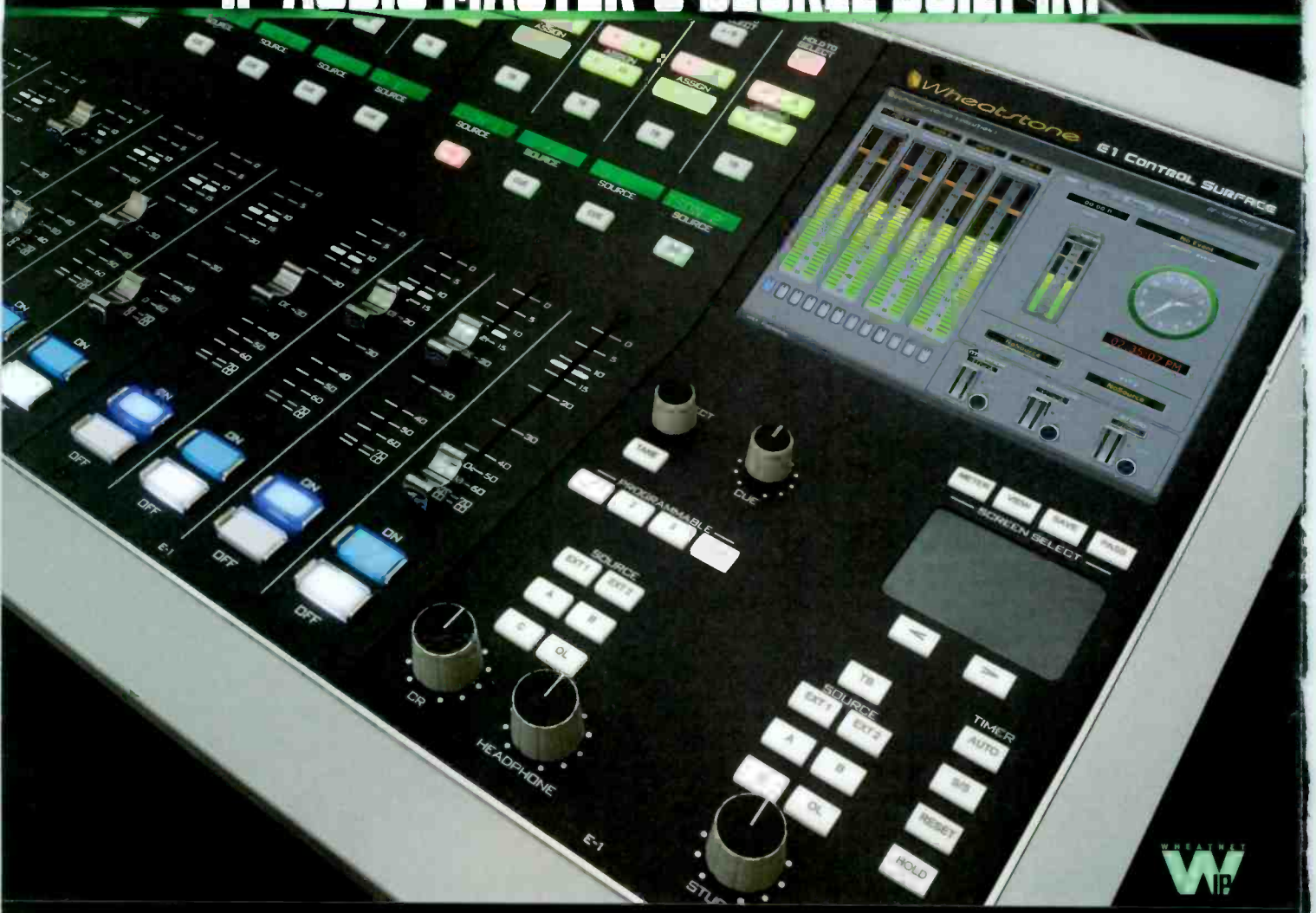

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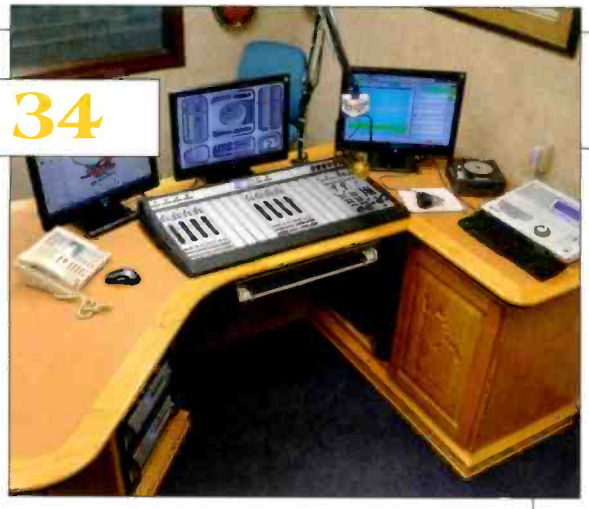

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ON THE COVER

Modern on-air telephony has evolved far beyond the tin-can sound of POTS. Even ISDN is considered old school. Read more on page 16.

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Currents Online

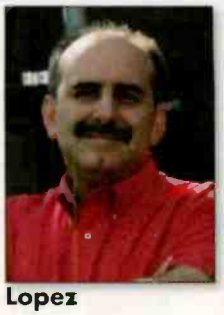
Selected headlines from the past month.

Dielectric Hosts Annual Engineering Conference

The event provides broadcasting executives an opportunity to study new technologies and broadcasting concepts presented by a number of industry experts.

SBE Finalizes 2010 Candidate Slate

Vinny Lopez seeks a second term as president. Ballots will be mailed to SBE members and tallied on Aug. 26, 2010.



Lopez

DAS Offers CAP-Compliant Firmware Upgrade for Dasdec

The upgrade will be available to Dasdec-I and Dasdec-II customers when the final FEMA/FCC CAP requirements are announced.

NAB Announces 2010 Marconi Radio Award Finalists

The winners will be announced on Sept. 30 at the NAB Marconi Radio Awards Dinner and Show.

Court Rules FCC's Indecency Policy Unconstitutional

The ruling came in the case of Fox Television vs. FCC, and is considered a win for broadcasters.

Graham Jones Retires from NAB

He worked for the NAB for eight years, but his broadcast career spans more than 40 years.

129th AES Convention Committee Plans Convention

The theme for the convention is Your Bridge to the Future. The convention will be held in San Francisco, Nov. 4-7, 2010.

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Realities of media ownership

The debate over media ownership rules rises to hot-button status every decade or so. Once again, it's on the minds of the FCC, media owners and many community activist groups.

At the end of 2008, the FCC mildly relaxed its ownership rules to permit radio or TV stations to be co-owned with a newspaper in the top 20 markets. Its ruling took into account the need for a diversity of voices by stipulating that other major news outlets must exist in the market for the cross-ownership allowance to be granted.

One issue that seems to be overlooked by the opposition is that the Commission also adopted measures to increase broadcast industry participation by small businesses, including minorities and women.

Cross-ownership and consolidation are not new issues. Little by little, media owners have been allowed to add more media outlets to their ranks. When the first market duopolies were allowed, I remember hearing cries that the media sky was falling. Those opposed to the consolidation feared a single media owner would become too power-

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ful. I won't deny that some media owners have amassed a robust portfolio of media offerings, but the claims that a single voice will control all local news and information has not come to pass.

Now the FCC is in court to defend its action in relaxing its rules. There is concern that there will be insufficient diversity of voices in the top 20 markets now that the long-standing cross-ownership prohibition has been relaxed. The new rules stipulate (in their basic wording) that there must be other voices present in the market for the allowance to be made.

Chairman Genachowski stood by the FCC's authority and noted that proper procedure was followed at the time. The new rules were adopted under Chairman Kevin Martin. The FCC's filing in the Court of Appeal says its "policy judgments and its line-drawing must be upheld so long as they are reasonable and supported by substantial evidence in the record before the agency." The filing takes a jab at the opposition by saying "disagreement with reasonable policy judgment and line-drawing is not invalidating; nor is the fact that the record might support a different conclusion, so long as the result the Commission reached is within the range of permissible choices before it at the time." Genachowski issued a statement reiterating this stance.

FCC Commissioner Michael Copps, who likes to brandish the public interest argument with a broad stroke, says the FCC by its recent filing is "encouraging the evisceration of our media ownership limits and abandoning our most basic public interest responsibilities regarding radio and television."

In a simple view, putting control of all the media under one or two voices will have obvious detrimental effect, but the rules do not make it open season for a single media outlet. There are reasonable restrictions in the rules to ensure diversity of ownership.

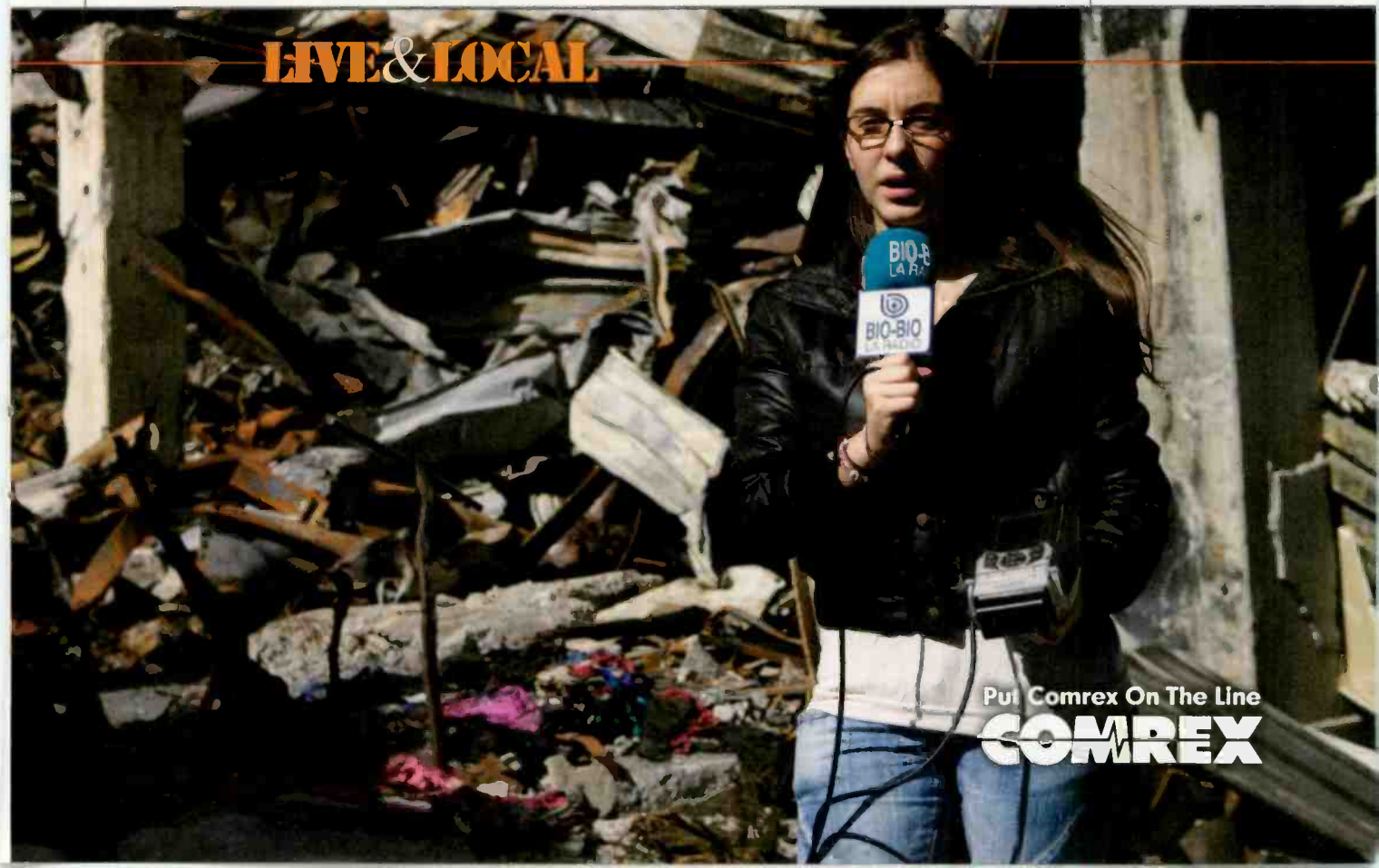
And while it's important to serve the public interest, it's also important for media outlets to responsibly run their businesses. This is another point that seems to elude Copps.

While the masses do not have instant access to the radio and TV airwaves, they have easy access to other forms of media. We have all seen the effects of some media going viral. Modern communications can easily influence the dominant media outlets in providing diverse views on an issue.

I applaud Commissioner Copps on his desire to uphold the public interest, but it seems he is doing so with an outdated view of modern technology and social practice.

Chris Schaeu

What's your opinion? Send it to radio@RadioMagOnline.com



Tower siting and the environment

By Kevin McNamara

The process of developing a new or collocated tower site has changed radically over the past 30 years. Like all things that attract government involvement, the deployment of a tower site is rich in federal, state and local regulations. Much of this is a result of the massive need for mobile telephone carrier towers.

History

When we think of environmental protection issues, the first things that come to mind relate to the quality of our air, water, ecosystems and wildlife. But consider these issues also include historical buildings or neighborhoods, landmarks (structures, roads and burial grounds), protected lands and national parks.

In 1966, Congress passed the National Historic Preservation Act (NHPA) and in 1969 the National Environmental Policy Act (NEPA) was enacted. These laws form the basis of our current broad environmental regulations. The FCC created its own rules and regulations in 1974 as part of the mandate for federal agencies to enforce the NEPA, and amended the rules in 1986, essentially handing most of the approval tasks to state and local governments.

The 1980s was the time when the need for new cell towers began to explode. With much of the regulatory processes handed to the state and local governments combined with the pressure from its citizens, intentional barriers were put up to deter the construction of new towers. The telephone carriers and their representative trade organizations mounted several lawsuits and challenges to these barriers, primarily citing that inability for a particular carrier to provide coverage to a particular area would create an unfair advantage to competing carriers.

Congress later passed the Telecommunications Act of 1996. One small part of the new act permitted the FCC to override decisions of state and local governments in matters of tower siting. The environmentalists were not happy with this and wanted to see specific rules that considered the environmental effect of erecting new structures and adding antennas to existing structures – towers, buildings and other structures.

The NPA

The answer to this was the Nationwide Programmatic Agreement. The actual title is much longer, but this document defines the review policy, with regard to environmental issues, of all new towers built after 1986 and collocated antennas added to existing structures (towers, buildings, smokestacks, etc.). It requires all new structures and collocations to review their impact within these eight categories:

1. Officially designated wilderness areas
2. Officially designated wildlife preserves
3. Situations that may affect listed threatened or endangered species or critical habitats
4. Situations that may affect historical sites listed or eligible for listing in the National Register of Historic Places
5. Indian religious sites
6. 100-year floodplains (as determined by the Federal Emergency Management Agency's (FEMA) flood insurance rate maps)
7. Situations that may cause significant change in surface features, such as wetland fills, deforestation or water diversion
8. Proposed use of high-intensity white lights in residential neighborhoods

Although not specifically listed in the NPA, Section 1.1307(b) requires tower owners to assess RF emissions for compliance. There are some exclusions that can be applied, such as a tower enhancement (rather than a new installation), replacement for an existing tower, construction of a temporary tower or construction of a facility less than 200 feet in overall height above ground level in an existing business area. A tower siting consultant can provide advice in specific situations.

The environmental assessment

The bottom line is that every licensee is required to perform and submit an environmental assessment (EA) when making application for a new structure, an existing structure when adding new antennas or making a major change to an existing installation against the NPA categories. How you perform the evaluation is not specified and could be performed without a professional consultant, however it is recommended you engage an environmental

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consultant who is familiar with the requirements of the NPA and has the proper experience to perform the study. Section 1.1312 requires a licensee filing an EA to await commission approval of its proposed project before commencing any construction, even if commission approval is not otherwise required for such construction.

Historic preservation offices

As part of the EA, a submission packet must be submitted to both the applicable State Historic Preservation Office (SHPO) and Tribal Historic Preservation Office (THPO) for your state. According to Section 106, you are required to get concurrence from these organizations prior to submitting the EA. My experience is that each state is different in terms of how it operates the SHPO. Some are fully staffed, and some are volunteer staffed. The Indian organizations are even more random. These tribal groups sometimes operate over several states, so it can be difficult to find the appropriate organization to deal with.

According to Section 106, the SHPO/THPO offices are required to provide a decision within 30 days or it can be assumed that concurrence has been provided. You (or your consultant) should keep good communications records of the contacts (or attempted contacts) to these offices as well as documentation that the packages or any requested information were delivered. The FCC has the right to arbitrate any disputes that may arise from a determination of adverse effect.

The FCC's Tower Construction Notification System (TCNS) can be used to upload the EA and supporting information, where it will be delivered to the proper offices. The system facilitates the Section 106 requirements but not intended to replace normal communications between the offices and the applicant. TCNS can be accessed through the FCC website.

I can't stress the importance of taking the proper steps to ensure compliance with section 106 before an application is filed. There have been cases where the FCC has ordered structures removed and issued fines due to noncompliance. In addition, the siting portal on the FCC website has a wealth of information that will help in the process.

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

Online Resources

NPA
wireless.fcc.gov/siting/npa/intro.html

Environmental checklist for Section 106
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Public file refresher

By Harry Martin

How much FCC immunity do radio stations buy when they participate in the Alternative Broadcast Inspection Program (ABIP) operated by state broadcast associations? Here's an example of a situation where a station did not receive any immunity at all.

An FM station in Connecticut was asked by a visitor to see the licensee's articles of incorporation and bylaws, but they were not in the public file. The requester later wrote the station asking again for copies of the documents, but got nothing. He complained to the FCC, which asked the station for its side of the story. The station responded that it had not kept its corporate documents in the public file until shortly after the requester asked for them, at which time the corporate documents were being reviewed by the licensee's lawyer. The station pointed to its clean record in several ABIP inspections. These defenses were unsuccessful, and the station was fined $1,250.

ABIP is a voluntary inspection program that merely protects the licensee from random FCC inspections for a period of time. The results of ABIP inspections, which are provided to the local FCC field office, do fend off official inspections, but the program does not protect licensees from liability for violations that are brought to the FCC's attention in different contexts (e.g. through a citizen complaint or a complaint by a competitor) even if the violations should have been uncovered during an ABIP inspection.

Dateline

For noncommercial radio stations in Iowa and Missouri, the biennial ownership report deadline is October 1.

October 1 is the deadline for radio stations licensed in the following locations to place their Annual EEO Reports in their public files: Alaska, Florida, Hawaii, Oregon, Puerto Rico, Virgin Islands, Washington and the Pacific Islands.

The radio station license renewal cycle begins again in 2011, with the first batch of renewals being due on June 1, 2011, for stations in Washington, DC, Maryland, Virginia and West Virginia.

Inspection time

While it is true there is little if any demand to see broadcast public files, the public file rule is still on the books and is one of the favorite items, in addition to EAS logs, that an FCC inspector will ask for. To comply with the rule, commercial radio stations should make sure they have the following in their local public inspection files:

- The station's current license with the signature of the issuing FCC staff member and the most recent renewal of license certificate.
- Any outstanding construction permits for facility changes (until licensed).
- The most recent ownership report, usually the most recent biennial report.
- Contracts and instruments listed in the ownership report, including organizational documents, LMAs, JSAs, equity pledge agreements and other agreements affecting ownership (e.g., options, buy-sells or rights of first refusal).
- Pending applications for modified facilities (until a construction permit is issued).
- The current contour map.
- Pending assignment or transfer-of-control applications until such transactions are consummated – then the assignment authorization, consummation notice and ultimately a new ownership report.
- Renewal applications and related public announcements (until renewal is granted).
- Requests for special temporary authorizations to be replaced by responsive approval letters from the FCC.
- Political file (records showing disposition of requests for time by political candidates).
- Annual EEO public file reports and, if applicable, midterm EEO reports.
- *The Public and Broadcasting* FCC manual (available on the Audio Division's website).
- Letters and e-mails from the public regarding station operations.
- Issues/programs lists for each quarter of the current license term.
- Material relating to an FCC investigation, including official correspondence, notices of violation and responses to such inquiries.

The public file should be readily accessible at the main studio during regular business hours. It is best to limit your file to what is required, and it is best not to make your public file available online. Public file requirements for noncommercial stations are generally the same although they are note required to have a political file (unless they provide time to candidates) and they must maintain lists of donors who sponsor particular programs.

Martin is a member of Fletcher, Heald & Hildreth, PLC, Arlington, Virginia. E-mail: martin@fhhlaw.com

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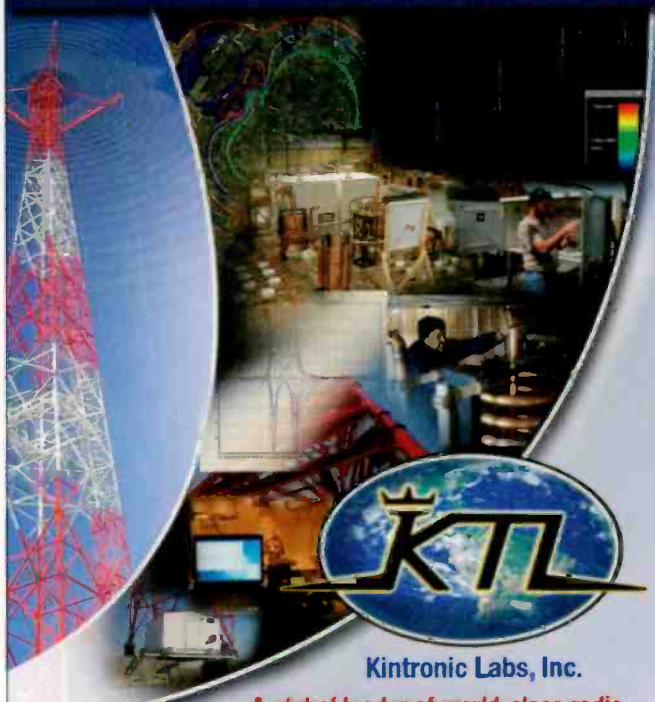

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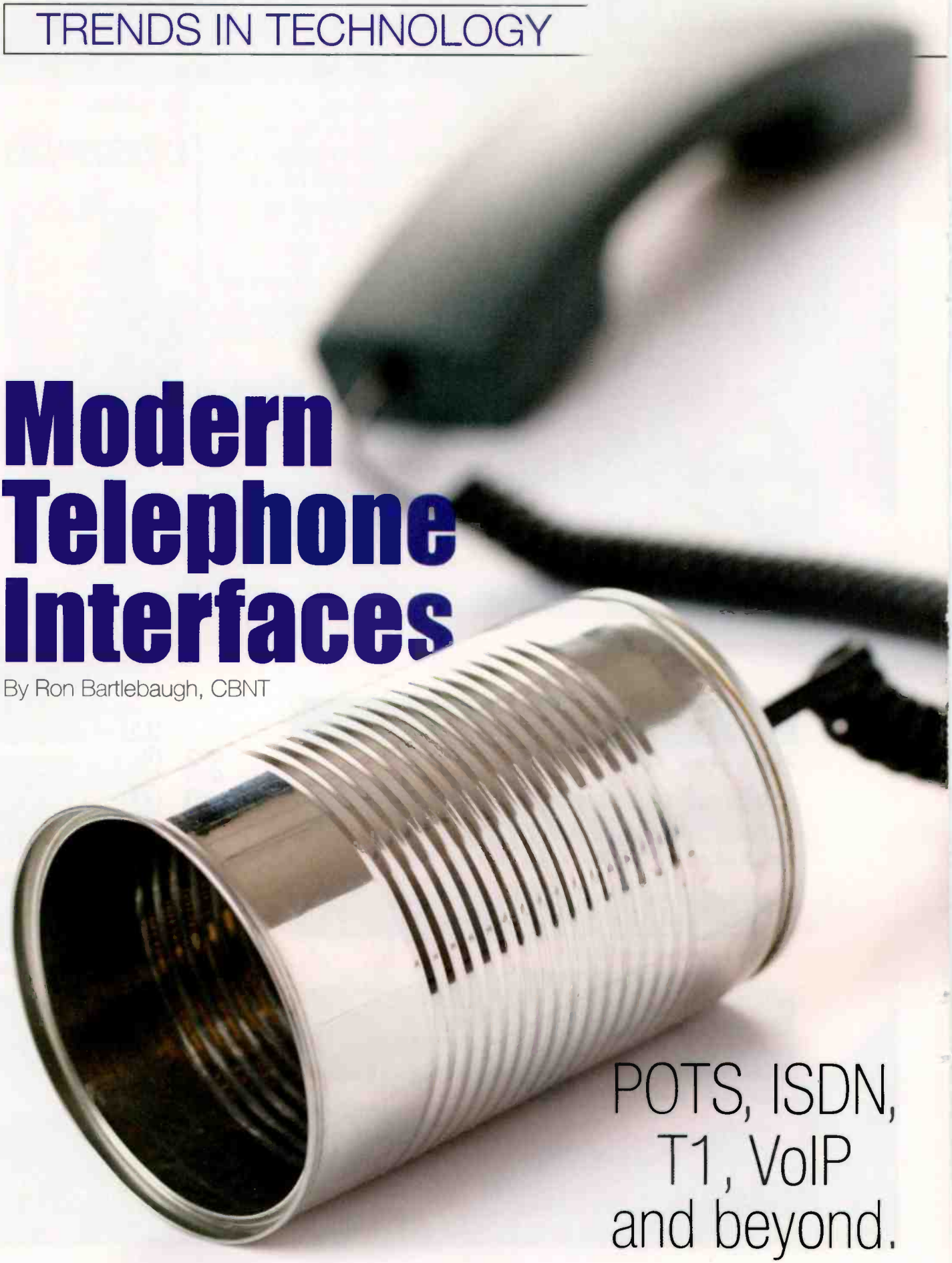
Modern Telephone Interfaces

By Ron Bartlebaugh, CBNT



POTS, ISDN, T1, VoIP and beyond.

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Telephone communications have advanced at star-light speed from the early experimentation days of Alexander Graham Bell, Thomas Edison and Jimmy Smith. Who was Jimmy Smith, you ask? He and his buddy Pete were two of the many who discovered they could talk to each other at a distance by tying a piece of string to two cans and then communicating with each other over the taut string.

Long gone are the days when live operators sat in front of a telephone switchboard all day patching in telephone lines and, in many cases, dialing the requested phone number. Those operators were some of the first telephone interfaces. Now, all kinds of things come to mind when one hears the phrase telephone interface. In place of cans, string and patch cables, we now have terms that include hybrid, conferencing, VoIP, PBX, SIP-trunking, T1/E1, ISDN, BRI, traditional telephone service, DSL, Wi-Fi, acoustic echo cancellation, digital dynamic EQ, adjustable smart leveler, symmetrical wide-range AGC, noise gating and pitch shifting — all of which have become available through the advancement of micro-electronics. The telephone interface vocabulary section of our minds has become so invaded that it is difficult to determine what's what, which unit accomplishes a given list of specifically required tasks and if its purchase would fit into an allocated budget. I hope to provide a guide through this telephone interface maze.

Basics defined

A telephone interface provides for a connection between a telephone device (wired or wireless) and a station's audio equipment. There are several manufacturers of telephone interfaces, and their applications are widely varied. The mention of a specific manufacturer's name or model of equipment is not meant to be an endorsement of product. Rather, it is to simply inform and educate the reader. Companies that manufacture telephone interfaces include AEQ, Comrex, JK Audio, Telos and many others.

The simplest and often easiest to use telephone interfaces are those intended for single-line use — either with a standard single-line telephone or a mobile phone device. Like all telephone interfaces, the single-line units allow the user to send audio to or receive audio from the connected telephone. The device has internal hybrid nulling that provides maximum isolation of sound between the caller and the in-studio host. The isolation, often known as acoustic echo cancellation, reduces or totally cancels the echo, the empty barrel sound that is sometimes heard on broadcasts that do not use proper telephone connectivity. Most interfaces of this type also have built-in automatic gain control (AGC) circuitry that works to keep the caller's volume at a consistent level. Additional audio control features found in some models include caller audio compression and limiting. Caller ducking, a feature whereby the caller's voice level is reduced when the announcer is talking, is another feature found on some models and offers the announcer improved control over the caller's volume.

Many interfaces incorporate some form of digital signal processing (DSP) for improved sound quality and ease of setup. Most will likely provide for analog and AES/EBU audio input and output connections. All telephone interfaces require some type of mix-minus circuit capable of providing caller audio from the device to the studio console or recording equipment. They also send the announcer audio to the caller without the caller being able to hear their voice. Otherwise, the caller would hear his own voice being sent back when speaking and become confused. Basic single-line telephone interfaces require an externally provided mix-minus circuit, which is typically generated in the studio console. Sophisticated interfaces may create the required mix-minus circuitry internally. Telephone interfaces are often used for remote broadcasts, news feeds or talk shows whether broadcast over radio or the Internet.

Climbing up a rung on the telephone interface ladder, we find portable single-line phone interfaces that include an audio mixer. Many units of this type can provide

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up to 15kHz mono audio over a standard telephone line when using a mating unit at the studio — and in some cases, nearly equal audio quality over certain mobile phone connections. Program and cue back audio can typically be sent over the same line. Devices of this type will often automatically scale their audio quality dependent on the performance and reliability of the connected line. For stations that require remote broadcast equipment for use at a sports or local business venue, interfaces of this type typically

Telos VX VoIP phone system

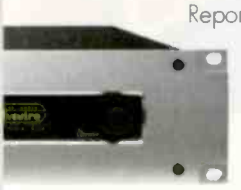
JK Audio BluePack

provide for the connection of one or more professional microphones, auxiliary audio inputs, a headphone jack for monitoring and, often, auxiliary contacts for remote synchronization of devices. Advanced features may include a built-in audio limiter and an audio output jack for recording or for connection to a PA system. Stations that require field audio mixing capability and seek a step up in audio quality will find advantages with interfaces that accept ISDN modules providing for the use of MP3 or G.722 technology.

Connection options

Our next step up the ladder leads to models with more inputs and outputs and connect to a greater variety of transmission modes. Such units are capable of transmitting mono, stereo or dual mono audio over POTS, DSL, cable, Wi-Fi, 3G cellular or satellite IP delivery services. For events of longer duration, internal power sources have improved for longevity of use through the implementation of lithium-ion battery technology. Connectivity and setup, even for the nontechnical person, has become increasingly quick and easy. Onboard LCD menu-driven displays make for straightforward selection of multiple transmission algorithm bit rates.

The proliferation of IP-capable codecs has simplified connecting audio from the field. At the 2010 NAB Show, wireless portable connectivity reached a new level of popularity and cost-effectiveness with devices and software for use with smart phones. Comrex showed ARC for Droid, and Tieline displayed ReportIT Live for the iPhone. Both provide a quality connection from the field for simpler remotes.



VoIP has come to the air studio. At the 2010 NAB Show, Telos unveiled the VX VoIP system. Gateway connections can be via T1/E1, ISDN and POTS or to a VoIP-based PBX or SIP-trunking telco service. With this unit, which is scalable for use in a few studios or dozens and capable of managing up to 80 lines, multiple calls can be conferenced and aired simultaneously.

In complete contrast to the high-capacity VoIP system, JK Audio's BluePack belt pack unit provides for "man-on-the street" interviews through a cell phone equipped with Bluetooth wireless technology. The unit includes a microphone preamplifier, headphone amp and a stereo line input jack for connection of an external audio source. The BluePack pairs to a Bluetooth-equipped cell phone in the same manner as that of a Bluetooth earpiece.

Modern Telephone Interfaces

Telephone-based communications have become a mainstay in broadcasting with their range of applications becoming increasingly varied. Whether using hard copper phone line, a handheld mobile device or satellite-delivered IP audio, the creative broadcast engineer is sure to find a telephone interface that meets the station's technical requirements.

Bartlebaugh is director of broadcast engineering, WKSU-FM/

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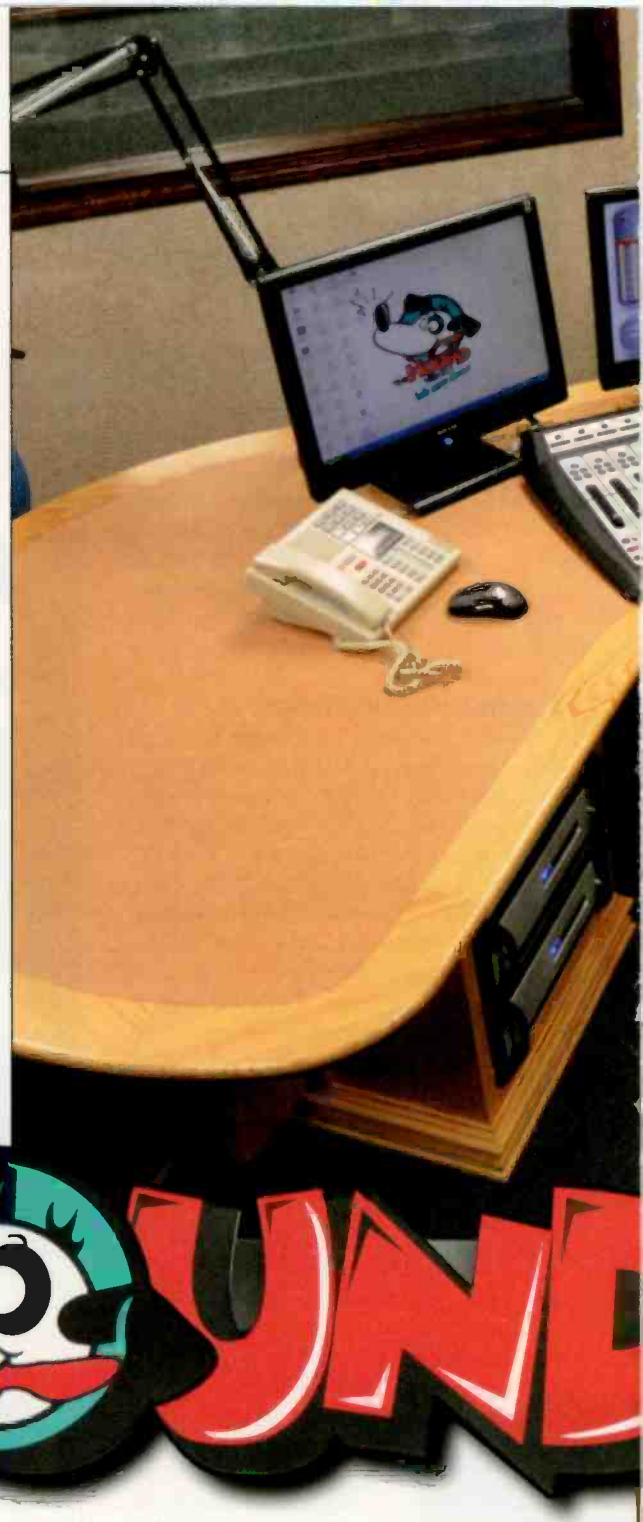
The Big Dog Gets a Facelift

By Joseph Portelli, CBRE



Denny Heindl is an interesting man. Born and raised in the small north-central Pennsylvania town of Ridgway, he has spent his entire life there. After his first radio job, a sales position working for the legendary Cary Simpson at WKBI in the early '60s, he left the industry and spent many years building a successful powdered metals company. Shortly thereafter, he purchased his own station and gave it the call sign WLMI – named after his business, Laurel Manufacturing Inc. He eventually sold WLMI to concentrate on his other business ventures. But, proving that once radio gets into your blood, it never leaves, he couldn't resist an opportunity to purchase the station near his home, WDDH – The Hound – a flamethrower serving 18 counties in Pennsylvania and Southern New York.

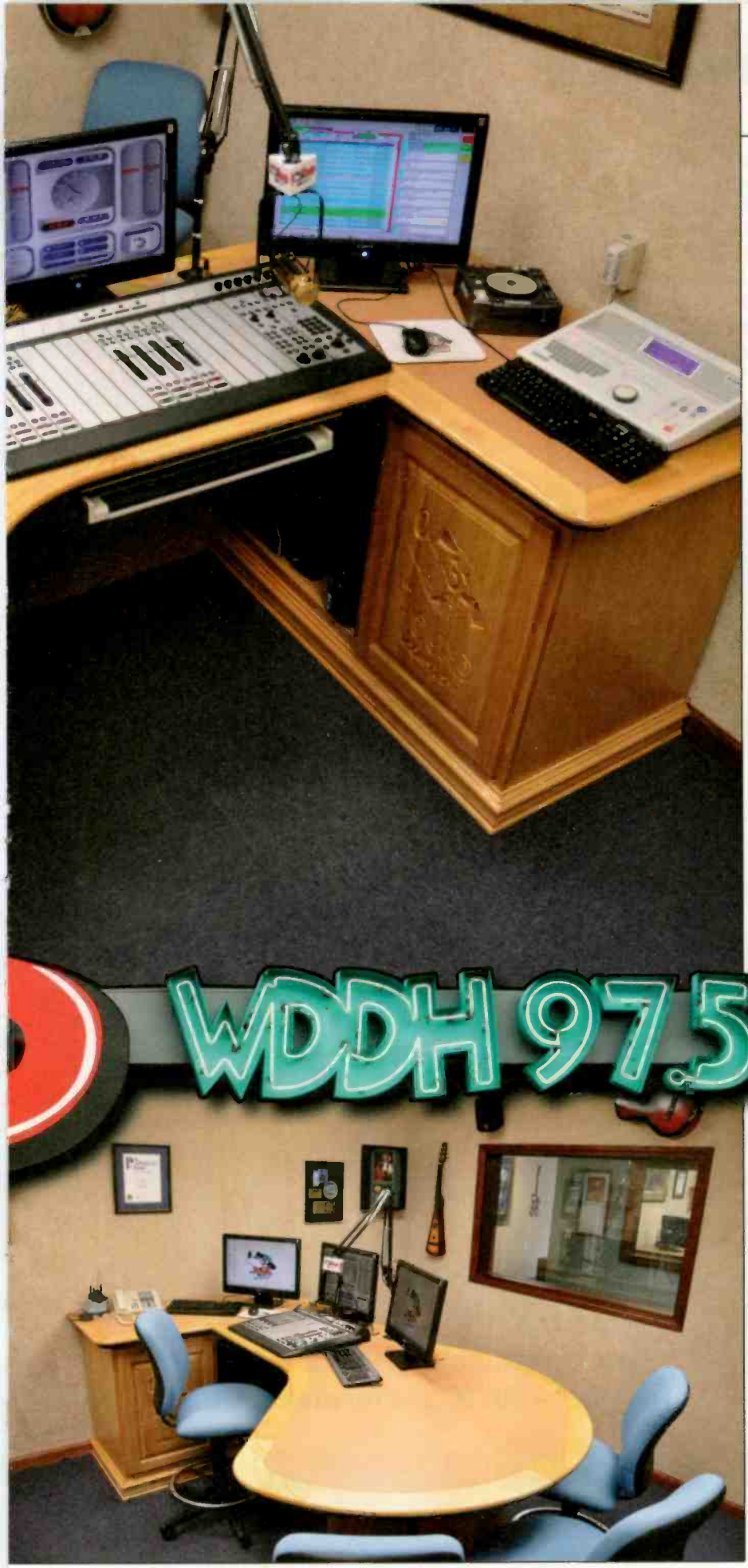
This is Heindl's second stint at ownership of this particular facility. His company, Laurel Media, had owned the station from 2001 to 2004. Itching to get back into the business, Heindl made a play for the station once again and is now running the show at WDDH. He is a minority owner of a Major League Baseball team and a local philanthropist. He is active in the day-to-day operation of the facility and hosts a Sunday public affairs program, the award-winning "Talk of the Town" show.

Aging Facilities

WDDH (95-7 The Hound) is a Class-B FM, licensed to St. Marys, PA. Originally built in 1986 as WKYN, the facility was wheezing along with aging analog consoles that needed constant repair and dated handmade chipboard and plywood furniture. The ceilings were full of hundreds of feet of unlabeled cabling of all types, and some of the building's electrical wiring was outdated and overly complex.

Another physical plant problem was lightning damage. The WDDH STL antenna is co-located with a cellular carrier on a tower across an empty field approximately 200 yards behind the studio building. Using a Modulation Sciences Composite Line Driver set, composite audio was fed to the studio to transmitter link through twinaxial cable encased in buried PVC conduit. The C-band satellite dish was at the base of this tower, with a long run of RG-6 though this same conduit back to the studio. This setup proved to be rather troublesome during thunderstorm season. Something needed to change; the long cable runs across the field needed to be replaced with something wireless.

To solve this problem, Laurel Media employed unlicensed wireless 2.4GHz point-to-point radios to extend a LAN to the STL building. Stereo audio is fed via APT Worldcast Horizon codecs running in uncompressed mode to the Omnia audio processor and STL transmitter in the building at the base of the STL tower. Also, the satellite dish has been moved to a location directly adjacent to the studio building, thus eliminating all of the cross-field copper connections. Since these changes were made last year, no lightning damage has occurred.



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The grand plan

Ownership wanted to completely gut both the production room and the WDDH control room and outfit them both with new custom-built studio furniture. The all-analog facility would be replaced with a digital audio network, providing flexibility and scalability for the future.

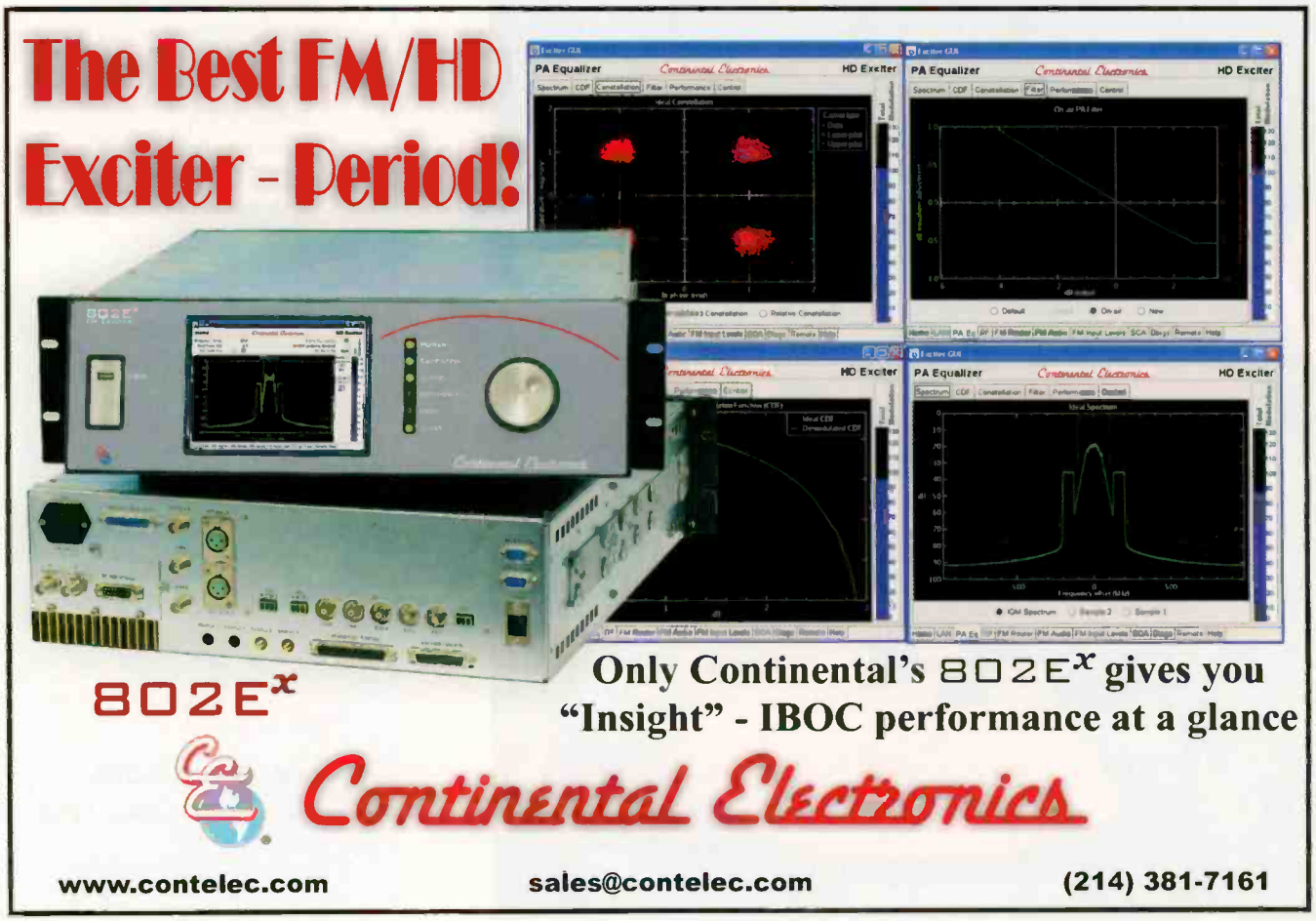
Laurel Media decided to use Axia Element control surfaces with PowerStation chassis in both control rooms. The PowerStation units integrate both analog and AES I/O, power supply, GPIO and a network switch into a 4RU chassis. The Axia Livewire network allows for simple, fast installation. Very little downtime was tolerable for this upgrade, so expediency was a necessity for this buildout. Each room was to be taken offline in the morning with the goal of a completely wired studio being available the same evening.

Notice the headphone hook on the right.

The Livewire network uses RJ-45 connectors for just about every connection – analog audio included. Standard off-the-shelf shielded CAT-6 cables are used for these connections, and the Radio Systems StudioHub+ system is typically used for termination of the cables to the various sources and destinations. Coming from a punch block world, this is a paradigm shift for me, but it works quite well and is extremely fast to implement. It's not quite as easy to create an orderly looking installation as it is with the typical cut and punch methodology, but by using the correct CAT-6 cable lengths and creative wire management techniques, it can be achieved quite nicely.

The control room has a PowerStation Aux chassis to handle the extra I/O and machine logic required for satellite programming. The rack room is equipped with an Axia analog node and a GPIO node to provide a contact closure interface to the Livewire system for satellite programming.

Much of the recording performed in the Laurel Media production studio is done with outside guests. Members of the general public aren't accustomed to using boom microphones; experience had shown that they typically are too timid to speak directly into the microphone, and



One of the custom gold-plated microphones

the look of a large microphone in a shock mount can appear threatening. Laurel Media opted to install three Sennheiser wireless units equipped with lavaliere microphones in this room to create a comfortable recording experience for visitors. Because the Axia network allows these sources to be used anywhere on the network, the wireless microphones would also see double duty in the control room for occasional on-air use.

Putting it all together

Setup of the digital audio system went smoothly for the most part. To get started, the entire Axia Livewire network was set up on the workbench. Programming of the network is made quite simple with the Web-based GUI built into the PowerStation units and analog/digital/GPIO nodes. All nodes were programmed with network addresses and channel numbers and names. During this process, a few questions arose and the Axia staff was quick to return our calls and provided excellent support. Both AES and analog sources were fed into the system for a two-week burn-in period after which installation commenced.

The owner's goal of the upgrade was to streamline the look of both the control room and production studio, eliminating as much equipment as possible. The Axia system makes this a breeze as it allowed us to eliminate all external microphone processors, distribution amplifiers and dynamics processors from the system. The integrated dynamics processing capabilities of the Axia system allow each operator to have his/her own customized settings for microphone processing. There is plenty of I/O on the PowerStation chassis, so external distribution boxes are not necessary. The result is a clean looking rack without a lot of visible adjustments.

The AudioVAULT automation system was upgraded from an AV100 system in 2008 to allow for greater redundancy and capacity. Integration into the new digital network was made via the AES I/O channels of the Digigram audio cards without any difficulty.

Prior to the upgrades, we had considered installing

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wiring trays in the building to allow for a neater installation. However, after careful consideration, it was decided that installing a tray for two or three CAT-6 cables would probably be a waste of time.

The furniture maker routed the station logo into the studio furniture.

Electrical work was performed by TSI of Ridgway, PA, and equipment installation and configuration was performed by JPP Communications of State College, PA.

The furniture was designed and built by Skraba Construction, a local custom woodworker/builder in Ridgway. Skraba was on-site during changeover days to assemble, install and cut custom cutouts in the countertops for the control surfaces. In addition, the station logo was cut into the kick panel in each studio.

Finishing touches

When all the equipment changes were finally in place, minor updates were made to each studio to improve the atmosphere. The rooms were outfitted with new carpeting, both on the floor and the walls, and new lighting.

There was one more touch the owner wanted. Heindl had decided that the microphones in his control rooms would look better with a gold finish. I was given the task of contacting Electro-Voice to inquire as to how we could obtain golden microphones, like the ones we have seen in use on a certain syndicated talk show. After speaking to several folks at Electro-Voice – being bounced from person to person, some of them chuckling at me – we decided that a new golden microphone was probably

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not going to come from Electro-Voice.

The station already used RE-27s, so it was decided that we would try to get them plated on our own. We stripped the RE-27 microphones down to the metal enclosures and sent them to a plating company. For a reasonable price, they came back with a durable 24-karat gold plating that looks stunning.

Network troubles

Several weeks after installation, panic occurred. The station suddenly lost audio, and the building LAN went down.

When I got to the station, I noticed that the port on the Ethernet switch that was connected to the Axia network was completely flooded. Unplugging this port restored both the station LAN and the audio. The crisis was solved for now, but administration of the Axia system was now cut off from the building LAN.

When the system was installed, the Livewire network was bridged from the rest of the network and connected at the station Ethernet switch. This kept the Livewire traffic away from the LAN but still allowed administration. The real-time clocks in the Linux-based PowerStation units need to be kept synchronized. This is performed using NNTP from an external time server.

A call to Axia confirmed to me that this is a problem, and that I should configure a separate computer to act as a NNTP server and put two network ports on that machine – one connected to the station LAN and one to the Livewire network. This configuration has proven to be completely trouble-free, and administration of the PowerStation units is available via the NNTP server computer.

In retrospect

This was my first experience with the Axia digital audio system and with the PowerStation units. Did we have any problems? Sure we did. Most of them, however, turned out to be operator (that would be me) error, which was quickly pointed out by the folks at Axia. We had the usual logistical problems that occur when studios are completely stripped down and rebuilt, but all things considered, it went smoothly with no dead air or missed traffic.

To see the control room live, visit the WDDH website at houndcountry.com and view the Studio Cam.

Portelli is owner of JPP Communications, a contract engineering firm based in State College, PA.

Equipment List

360 Systems Short/Cut 2000
APC BX1500G
Aphex 320A Compellor
APT Worldcast Horizon
Audemat-Aztec FMB80
Axia Analog Line Node, Element, GPIO Node, PowerStation, PowerStation Aux Expansion Chassis
Broadcast Electronics AudioVAULT, The Radio Experience Software
Broadcast Tools 8x2
Crown D75A
Denon DN-S1000, TU-1500 RD
Electro-Voice RE-27
JBL Control 1
OC White Pro Boom
Omnia audio processing
Radio Systems StudioHub+
Rane HC-4
Sennheiser EM-300 G3, ME-2, SK-300 G3
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The technology behind WDDH

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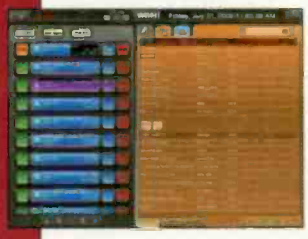

The WDDH project is another example of how the AudioVAULT automation system can evolve and adapt over time. In this case, the station underwent transformational change and the BE AudioVAULT system adapted right along with it. WDDH upgraded its AudioVAULT system in 2008 and operated it in its analog facility until the studio renovation. When WDDH cut over to the new facility, the AudioVAULT easily interfaced to an all-digital audio network and immediately took to the new digital digs. BE's The Radio Experience (TRE) also made the switch at that time as an RDS/HD data management solution integrated into the AudioVAULT. BE's latest AudioVAULT FleX automation system takes adaptability one step further with the ability to change screens and function tools on the fly depending on show, talent and any number of studio uses.

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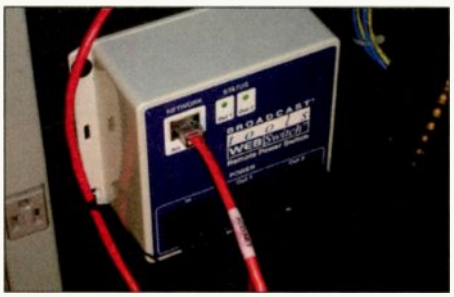
Tips, tricks, hints and more

By Chriss Scherer, editor

Remote reset

Michael Bradford, CPBE, Broadcast/Audio Services, Jackson, MI, encountered a problem with two ISDN codecs at the Michigan Farm Radio Network uplink in Lansing, MI, that was beginning to become a real pain.

Every now and then, one of the codecs would lock up or lose sync for no apparent reason. Of course this always happened right in the middle of a Detroit Tigers baseball game or Red Wings hockey game. Further, it always seemed to happen on a weekend or late at night. Usually an associate engineer, who lives only 20 minutes away, would go to the site and reboot the offending codec.



Sometimes, however, Bradford would have to travel all the way to the site (about 45 miles from his home office) to reboot the unit.

He says, "I guess I'm losing my sense of humor in my old age, but these trips were costly and the interruption of the games was making affiliates mad, not to mention the listeners who would lose coverage at the most inconvenient time."

That was when he ordered a Web Switch from Broadcast Tools. This Web-based dual-outlet ac controller is accessed via the Internet. The Web Switch comes with two CAT-5e cables: one is a cross-over cable intended for direct connection to a PC or laptop, while the other is a "straight through" cable for connection to a modem or 10/100Base switch and the Internet.

The Web Switch is self-powered with an EIA cable, and the two ac outlets are controlled separately, so each of Bradford's codecs could be monitored and controlled individually. The "quick start" document with the Web Switch was all he needed to get the proper IP address, gateway, sub-mask and other data entered with the direct connection to his office PC. Once he set up the user name and password and labeled the two switches, he was off to make the installation.

The Web Switch has mounting holes at each corner, which he used to mount it safely behind the codecs on the side-rails of the station's Middle Atlantic racks. Once the ac was connected and the CAT-5e cable connected to the ISP modem, the unit came to life immediately. He is now able to access the Web Switch, as can the program provider in Detroit, to reboot the offending codec from anywhere. No more 45-mile trips late at night, no more mad affiliates and no more listeners miffed at missing that shot-on-goal that won the game.

Need a light?

In the March 2010 installment of Tech Tips, I noted a handy little light called the Light Mine – a golf ball-sized LED light with multiple magnets around its sphere. This unique light got some attention, which made me think about other lighting options.

A 110Vac service light is always an option for lighting a tight space, and by using a compact fluorescent lamp instead of an incandescent lamp, the heat output is greatly reduced. But pulling a cord is not always convenient, and sometimes 110V is not available. That's where I found the Light Mine to be handy, but there are other options.

While walking the aisle of a hardware store, I saw the Stanley 3-in-1 Tripod flashlight. This unique light has three individual light sources and a stand that combine into a regular hand-held flashlight. The throat of the light has legs that fold out to form a tripod, and the three lamps have swivel heads to point the light where it's needed. The three lights can also be removed individually if needed. The flashlight runs on 6 AA batteries.

Another handy – or should I say hands-free – lighting idea is a head-worn light. Commonly used by hikers, cyclists and spelunkers, these lights are worn on the user's head. This style has the advantage in that light is shown wherever you look, so the light is automatically positioned as needed.

Still looking for more lighting ideas? Look to the music store. Battery-powered LED clip-on lights are commonly attached to music stands. These lightweight lamps can clip to anything less than 1" thick, and the slim gooseneck can be positioned to illuminate anything.

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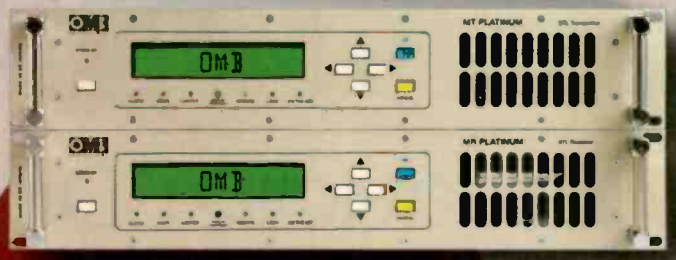
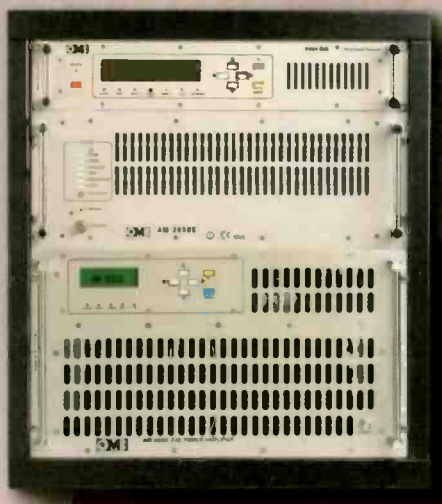


MT/MR PLATINUM >1GHz

is a high-performance Studio-to-Transmitter Link. It is made up of the 5W MT transmitter externally synthesized in 10MHz sub-bands with a step of 100KHz, and the MR double conversion receiver, that is externally synthesized, too. The MT is microprocessor controlled, and includes LCD display for the visualization of the most relevant transmission parameters (frequency (6-digit), forward and reflected power, modulation level), balanced Mono, Stereo (MPX). The MR receiver has the same visualization system as the transmitter. It includes balanced Mono and Stereo (MPX) outputs. Furthermore, the MT/MR Platinum STL includes a jumper in order to get a proper operation with digital signals.



EM 2000

is a 2000W FM transmitter made up of the EM 25 DIG exciter (or EM 20/30 exciter) and the AM 2000 FM amplifier. AM 2000 includes eight 300W high-efficiency MOSFET technology amplifying modules, fed by 2 independent switching power supplies, which are made to withstand the working conditions. The amplifying modules work independently thanks to a power combining structure that provides high isolation between them.

EM 10000

is a 10000W FM transmitter made up of the EM 25C COMPACT DIG exciter and three control units which combine the power of six AM 2000 FM amplifiers. AM 2000 includes eight 300W high-efficiency MOSFET technology amplifying modules, fed by 2 independent switching power supplies, which are made to withstand the working conditions. The amplifying modules works independently thanks to a power combining structure that provides high isolation between them.

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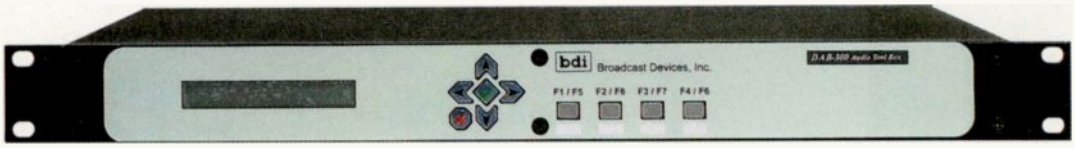

Broadcast Devices DAB-300

By Doug Irwin, CPBE AMD

For years the New York Clear Channel stations transmitting from the Empire State Building used BDI 3×2 composite switches to change STL feeds as necessary. With HD Radio, then PPM and finally our studio consolidation, we decided it was time to upgrade the capability of our STL switches so that several new requirements could be met: We now feed programming to our analog and HD Radio transmitters; Arbitron was pressing us to match PPM sources between analog and our primary (simulcast) digital; and we also wanted automated "smart" switching between three different sources.

I made up a block diagram of a switcher that would do what we needed. New York Director of Engineering Josh Hadden suggested I talk to Bob Tarsio of BDI to see if the company would build this new device for us. We needed five of them. I ran it past Tarsio and his team, and they proposed a semi-custom version of the ATB-300 Audio Toolbox, which became the DAB-300.

Performance at a glance

- Programmable silence threshold
- Front-panel menu programming
- Inputs: 4 analog composite, 4 AES3
- Composite-to-AES3 converter
- Synchronous AES switching between sources
- SRC on all inputs up to 96kHz
- Selectable output SR 32, 44.1, 48kHz
- Programmable alarm contacts
- Remote controllable

At its most basic, the DAB-300 is an automated AES3 switcher that will choose one of four AES3 inputs, and route it to all four AES3 outputs, based on basic configuration parameters. All inputs and outputs are 110Ω AES3. The unit occupies 1RU and is 10.25" deep. As you can imagine, rear apron space is limited, so the inputs and outputs are brought out to a breakout panel, which itself is 1RU. The remote controls are accessed via DB-25 connectors on the rear of the DAB-300.

When used in manual mode, the unit operates like any other switcher. Select the input on the front panel and press the take button. Beyond that, there are options to modify the signals that come in to and go out of it. Looking at each individual input, the following options are available:

- Swap left and right channels
- Generate mono from left or right channel
- Sum L+R
- Invert the phase of the left or right channel
- Modify the gain in the path by ±10dB

This capability exists on each input; the settings are not global. In addition, each of the four outputs can be adjusted individually for gain (±10 dB). The output sample rate is set globally by dip switch settings inside the DAB-300.

In its auto mode, there are several parameters that must be set: silence threshold and time delay. Both are configured via the front panel. (On our units, the time delay can be set as low as 10 seconds.) The scale on the threshold is linear, so I did my best to match it with what I consider silence to be. You also tell the unit if you want it to revert or not. When the unit I set in its auto mode, it will seek a source of audio on one of its other inputs in the event that it detects silence (either composite or AES3) on its primary input. If you configure revert mode, it will seek back to the primary audio source after a timeout period (which you also configure via the front panel).

By the way, you can change your selection of the primary source dynamically via the front panel. Whatever source is picked prior to selecting auto mode becomes the primary. This is handy in case what you normally consider to be the primary goes out of service or becomes temporarily problematic (for any number of reasons).

Taking control

The remote controls of the DAB-300 are what you would expect (for our semi-custom version we added some). By way of contact closures, you can change the inputs and there is status that reflects those changes so that you can tell what input is routed to the outputs. You are also provided with an input to set the unit to manual mode, as well as one to set it to auto mode. You will have to switch the unit to manual mode before changing inputs remotely. Unfortunately there is not a remote status to tell you what mode it is in.

Our plan was to use the DAB-300 not only as an analog composite switch, but as an AES3 switch as well. The two groups of switches in the DAB-300 operate in parallel and sync with each other. We have three analog composite sources, and each of those composite feeds has an AES3 replica. All six are fed to the DAB-300. When the unit is switched to the primary STL, our analog

transmitters and HD Radio transmitter are fed by the same audio processor (and same program source from our studio HQ). When switching to our backup STL, again the AES3 feed is a replica of the composite feed; this extends to our tertiary STLs as well.

The composite switch that is built-in to our unit feeds a four-output DA that has a fixed gain of unity. Another feature that we asked for was a set of status outputs (by way of relay contacts) that correspond to silence on all six STL sources.

The only caveat I have for potential users: Plug the DAB-300 in to a UPS. The unit has a switch-mode power supply that detects brief ac input hits. Unless the ac power is gone longer than about 3 seconds, the power supply will not come up.

We're very pleased with the functionality of our DAB-300s as well as with our experience with the team at BDI, who worked closely with us to meet our requirements. I have been told now that the engineering is done, our particular application is no longer semi-custom, and is available to other users should they have the same requirements.

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Irwin is transmission systems supervisor for Clear Channel NYC and chief engineer of WKTU, New York. Contact him at doug@dougirwin.net.

A connector break-out panel is available to simplify connections.

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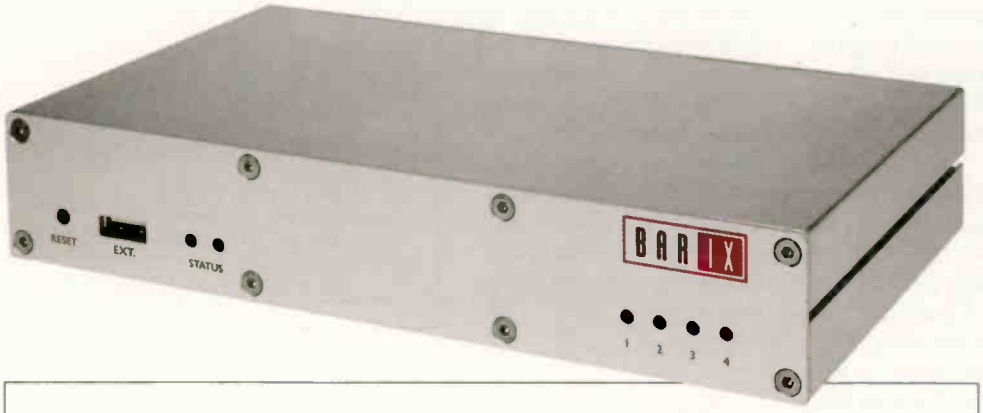

Barix Exstreamer 1000

By Kirk Chestnut, CPBE

The Internet daily redefines the boundaries and applications of audio delivery. Point-to-point, point-to-multipoint, multipoint-to-multipoint — the combinations are endless. Add to that the job of transporting timely data and contact closures. The Barix Exstreamer 1000 encodes and decodes audio, data and closures over IP at an affordable price. It is easily configured and robust. The firmware fills a low-cost niche for flexible STL operation, program syndication or Internet streaming.

Zurich-based Barix supplies audio, data and control products for a variety of industries. Its IP interface devices transport audio and closures for program syndicators as well as two-way intercom and control for public address and security applications.

Whether your data path is LAN, WAN/VPN, Wi-Fi or DSL, the Exstreamer 1000 can get audio there using a modest amount of bandwidth. Data bandwidth requirements range from 50kb/s to 2Mb/s with latancy ranging from 20ms to 300ms depending on the compression scheme used.

Performance at a glance

- Stereo encode/decode
- Supports MPEG-1 and 2 Layer 3 (MP3), PCM linear and A-law, µ-law
- 8-48kHz sample rate support
- USB 1.1 interface for flash memory
- Wide-range power supply input with low power consumption
- AES3 and balanced analog stereo I/O
- Two independent serial ports (RS-232 and RS-485)
- Four contact closure inputs and four relay outputs

The hardware layer

The Exstreamer 1000 can function as both an encoder or a decoder. It has both balanced analog and AES3 audio interfaces on DB9 connectors. Two data ports provide RS-232 (DB9) and RS-485 (Eurostyle) connections. There are four dry contact closures and a USB flash interface for local audio storage. The Exstreamer family of products are packaged in modular metal cases that can be rack-mounted or bracketed to a wall. It is powered by an external 24-48Vdc supply and uses very little power (about 8W).

Barix products are versatile and can be customized for specific applications like broadcast, public address and intercom/security. The Exstreamer can serve up high-quality stereo PCM linear streaming for broadcast transmission, or it can decode compressed audio streams and files such as MPEG-1 and 2, Layer 3 (MP3), A-law or µ-law with sample rates from 8kHz to 48kHz. It can stream audio continously as an STL or be modified instantly to store and forward audio from a playlist.

The software layer

The Audio Barix Control Language (ABCL, similar to BASIC language programming) offers a higher degree of control and customization. It can be used to monitor, switch audio sources or control audio levels. Sensing for silence, the ABCL program can switch to an alternate audio source on the Internet or play back audio stored locally on a USB drive.

A standard Internet browser is all that is needed to control and configure the codec. Pull-down menus display factory-designed applications, system settings, a reboot function and firmware updating.

The Web GUI Application menu displays the preprogrammed STL and store-and-forward operating modes germane to the Exstreamer 1000. Several other unique applications (not available on the Exstreamer 1000) are shown in the menu, including full-duplex audio, conference and Internet Speaker modes, which are applicable to other Barix products.

Put into use

When configured as an STL, the Exstreamer 1000 acts as a high-quality audio streamer. The source can be mic or line level and either mono or stereo. Depending upon the application and available bandwidth, the user may choose to encode audio as PCM MSB, PCM LSB, µ-Law or A-Law. Sample rates range from 8kHz to 48kHz.

The data buffer provides some degree of smoothing for less dependable IP connections. Master volume, mic volume and A/D amplification controls are provided for fine tuning levels.

The audio storage and playback function uses a local USB thumb drive or memory stick for storage. A master text file created and stored on the memory stick directs the behavior of the unit. It defines the location where playlists and audio files can be downloaded. This text file also defines the details of playback or restricted playback (day parting), file updating and device monitoring. File transfer via HTTP, FTP and RTP (Real Time Protocol) are supported.

Barix

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An extensive set of commands are available for customized control of audio playback, rotation, timing and volume levels. The Web browser can be used to make configuration changes on the fly and monitor current variables.

You might wonder if there are any known security vulnerabilities. The Exstreamer 1000 uses a proprietary kernel and TCP implementation called Cobos by Lantronix. It is built on the same source code as IP adapters (device servers), and it has been customized by Barix for further protection against certain DOS issues, making it appropriate for streaming applications. As an attack point, the functionality is very limited as opposed to a Linux or Windows system.

Out of the box

Basic functions like the STL mode are simple to configure and use. Advanced features such as the ABCL and FTP store/foward are a bit more esoteric but can be powerful tools once mastered. When powering for the first time, a human voice greets the user over the audio output port announcing the IP address of the unit. Customize the unit by recording and replacing the IP address announcement with your own voice.

The Barix website is replete with information on the device as well as sample configuration files. A wiki page provides additional topics beyond the manual. Technical support is currently limited to e-mail and/or long distance to Europe, but the fine folks in technical support are helpful and willing to be contacted via Skype should the need arise.

The reboot function was a very desirable feature; however, the device automatically reboots when changing between applications, thus there is a bit of a wait time before audio can be restored. Interestingly, Barix hosts a free service where one can remotely monitor the device for program delivery assurance. Should the IP connection drop, audio is restored within about a second once the connection is renewed.

Chestnut is assistant chief engineer at Entercom Kansas City.

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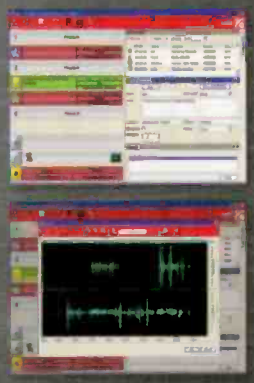

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Asymmetrical Sidebands for Maximum Coverage

By Philipp Schmid

The FCC's blessing of up to -10dBc digital injection ratios is a great step forward for HD Radio coverage, and many broadcasters are considering taking advantage of the elevated digital signals. Unfortunately, as many as 4,000 U.S. stations may not be able to take full advantage of the higher digital signal levels because of potential adjacent-channel interference. For these stations, the digital power may be limited to only -14dB. Fortunately, by implementing asymmetrical sidebands, many of these broadcasters can maximize their IBOC signals to achieve greater digital listenership. Figure 1 provides a breakdown.

Asymmetrical sidebands

Symetrical IBOC Power Distribution		Asymmetrical IBOC Power Distribution	
-14dBc	3,252	-14dBc	695
-13dBc	305	-13dBc	111
-12dBc	294	-12dBc	111
-11dBc	240	-11dBc	137
-10dBc	5,132	-10dBc	8,156

Figure 1. More than 4,000 radio stations could use asymmetrical sideband technology to achieve maximum digital listenership. Source: NPR Labs

Increasing HD Radio coverage

Let's take a look at the effects of increased IBOC carrier power levels. On-air tests with elevated carrier power levels reveal substantial increases in the HD Radio coverage area. Tests at Nautel confirmed a -20dBc to -10dBc carrier power increase produces a 30 percent increase in radial coverage of the HD Radio signal. Correspondingly, this translates into a 70 percent increase in coverage area with, potentially, an equivalent increase in HD Radio listenership matching or even exceeding a station's FM coverage.

Due to first-adjacent channel interference concerns, 44 percent (as calculated by NPR Labs) of all FM stations in the United States will not be able to take full advantage of the 70 percent coverage increase as they are limited to operating HD Radio carriers at -14dBc or below. With asymmetric sidebands, 88 percent of all stations can raise at least one sideband to the -10dBc level. Because HD Radio receivers decode both sidebands independently and can even operate on a single sideband entirely, asymmetric sideband operation is an effective way of reclaiming most of the 70 percent listenership increase. For example, bit error ratio (BER) tests at Nautel have shown a -10dBc/-14dBc sideband combination provides a coverage area increase comparable to running both sidebands at -12dBc. Figure 2 shows the spectrum display of a station running asymmetrical sidebands.

For stations wanting to implement asymmetrical sidebands, Nautel has developed HD PowerBoost, which is a suite of tools developed to aid HD Radio users in several ways. First demonstrated as a real product at the 2010 NAB Show, HD PowerBoost is an embbedded implementation of Nautel's unique method of peak-to-average power ratio (PAPR) reduction. This technology permits about 30 percent more hybrid power from a given Nautel transmitter, while achieving up to 7 percent greater operating efficiency. This eases the transition to elevated IBOC carrier levels

Inside Nautel PowerBoost

Several years of research have been applied to creating Nautel PowerBoost. Because the system takes control of the PAPR reduction, it is able to assimilate the HD Radio carriers on both sides of the analog host and regenerate them at whatever amplitude is required. HD PowerBoost with asymmetrical sidebands is expected to be available in the third quarter of 2010.

Doing More with Datacasting

By Jim Roberts

Often, broadcasters will implement RDS for the sole purpose of displaying song title and artist. However, it's quickly realized that once they've captured the listener's attention visually, showing only basic song data for the duration of every song is throwing away a huge opportunity for marketing the station and better serving listeners and advertisers.

It doesn't take long before most broadcasters wonder what else they can do with RDS or HD Radio data. Weather, traffic, stocks, sports scores, advertiser phone numbers, these are all excellent ideas. But how do you manage all that data? Most importantly, how do you do it in a way that best serves the listener and without it feeling spammy.

Luckily, there are software solutions to help you manage the data. Let's look at some of the concepts behind these solutions and some proven techniques for making the best use of the resulting data displays.

Alternating messages through interleaving

Displaying song artist and title data is good, but for the entire duration of every song, this seems like overkill. This is where the concept of interleaving comes in.

Interleaving is the process of rotating two or more messages at a time. Interleaving allows a station to display program associated data (PAD) such as title and artist, and to display non-PAD data such as programming notes, promotional information, weather and traffic updates, advertiser information and more. Interleaving can do more for a station than any other single data upgrade, and because it's all managed by software, it can be easy to do. Figure 1 shows how interleaving is applied as a song is played.

Keep in mind that any data strategy beyond scrolling title and artist will require the kind of management tools found only in good datacasting software, software that can synchronize what's being aired with what's being displayed. Also, most good datacasting systems will allow some form of date- and time-sensitive message scheduling. More advanced systems work in much the same way that music scheduling software works and even allow categorizing of messages. This opens up the ability to do such things as schedule more traffic information in the morning, more weather data in the afternoon and more sports scores in the evening.

Linking data to audio events

Event linking is another practice that can open up datacasting possibilities for a station. When datacasting software receives event data from the automation system, this data is generally limited; it's static and usually specific to that cut. Event linking allows that data to become more dynamic by linking alternate or additional text to a specific cut from the automation system. For example, when a Taylor Swift song plays, the data display could read "Taylor Swift in concert this Thursday, tickets still available." Linking messages to specific cuts allows a station to have more control over what information is displayed for each cut and to frequently update that information with enhanced data.

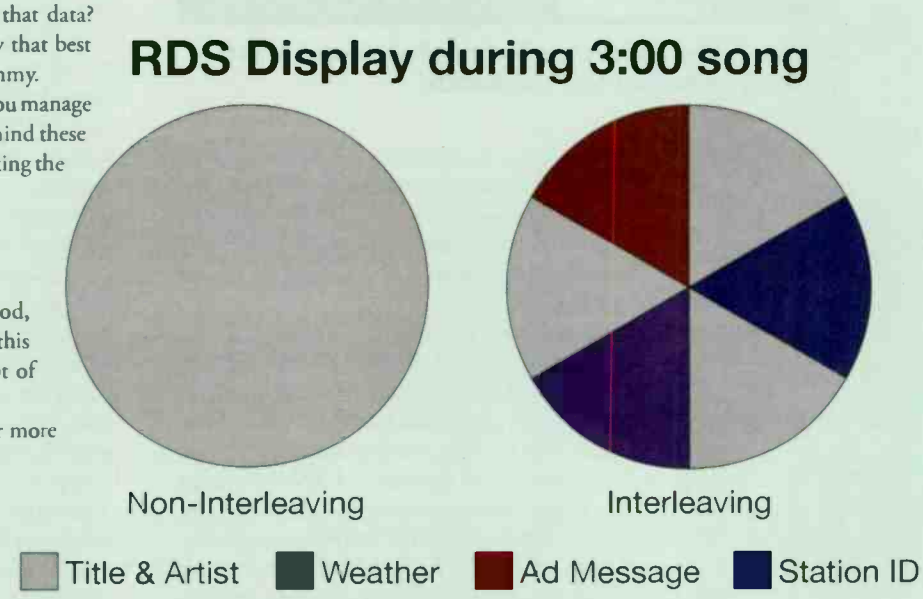

Figure 1. Data interleaving example for a 3-minute song.

Third-party data lookups

By using third-party providers, stations are able to look up information in other databases that might be useful for their purposes. In some cases, they may use third-party database lookups to "clean up" text already resident in their automation systems. This is done by comparing portions of the title and artist information, or cut from the automation system with a third-party database that has the information in the format

The *DAB Answer Series* is an ongoing series of articles that cover the technology of digital audio broadcasting.

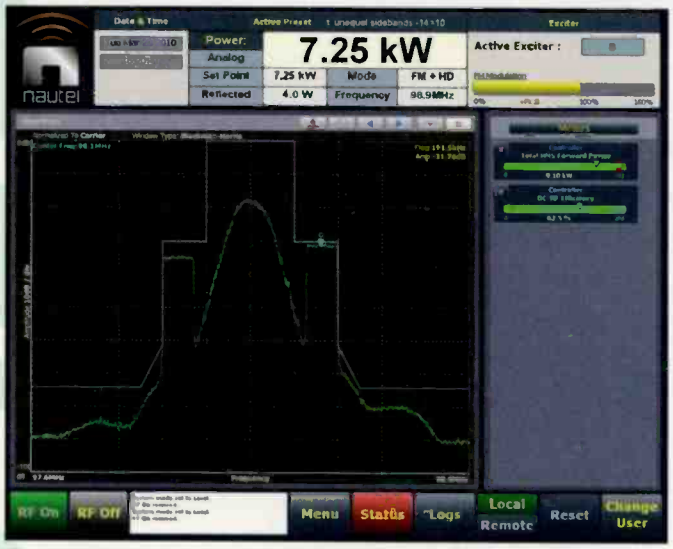

Figure 2. The spectrum display of a Nautel NV10 running asymmetrical sidebands.

for many broadcasters. To realize a 70 percent gain in listenership, many stations may require up to 77 percent of additional transmitter power rating. With HD PowerBoost, only 42 percent additional transmitter hardware is required to accomplish the same, effectively reducing the cost of HD Radio listenership.

HD PowerBoost also provides the ability to have asymmetric sideband power for those stations unable to increase above -14dBc because of an adjacent conflict on one side. A demonstration at the 2010 NAB Show showed a Nautel NV10 FM transmitter feeding a dummy load. This transmitter could operate at 10kW in analog mode, but at -10dBc in the normal hybrid iBiquity mode, output dropped to about 5.5kW. With HD PowerBoost, the power rose to 7.25kW. Then, still operating at about 7.25kW, the mode could be changed instantly to operate at -14dBc/-10 dBc, or other combination as requested.

HD PowerBoost implements a unique method of PAPR reduction; the iBiquity PAR is turned off via a software switch because the current iBiquity's PAR only processes the digital portion of the system. Nautel wraps the entire envelope into its peak reduction scheme with a processor that yields far greater efficiency than just dealing with the digital portion alone. Nautel offers this today and does not require any future release of iBiquity IBOC code to achieve asymmetrical capabilities.

Implementing asymmetrical sidebands

Implementing asymmetrical sidebands is possible today given two requirements. First, a station needs to request Special Temporary Authority (STA) from the FCC and show that one of the station's adjacent channels is clear of interference. Currently, the IBOC rules do not allow for this differential power, however, much like the earlier days when stations wished to use separate antennas for analog and digital, an STA was required until this became part of the rules. The general consensus among attorneys and consultants is that asymmetrical power will eventually become standard.

Second, the station needs hardware that can support asymmetrical sideband technology. A Nautel transmitter can be purchased with the HD PowerBoost option. Existing Nautel NV series transmitters can add PowerBoost by installing a replacement exciter circuit board and the necessary firmware and software.

If a station cannot achieve -10dBc on both HD Radio sidebands but could accomplish it on one side, it would be feasible using HD PowerBoost to then operate at -14dBc on one side and -10dBc on the other. This would yield an overall digital RMS power of 7 percent of the analog, or -12dBc effective symmetrical power. This would permit this station to maximize its digital coverage yet not create interference beyond what would be permitted. Stations that will operate at symmetrical power levels may also employ HD PowerBoost to gain efficiency or power output, but no FCC action is required in this case.

Schmid is a research engineer at Nautel, Hackett's Cove, NS.

Multicast Scoreboard

With WJFK in Washington and WKSU in Kent, OH, adding HD4 multicasts, an overall FM multicast overview is in order.

Seven HD4 signals? According to the iBiquity website, WIYY Baltimore also has an HD4. WKSU also transmits the HD4 stream on four of its translators.

needed for messaging. This can be especially helpful as data is often entered incorrectly or inconsistently. Things like "Mathews_Band, Dave – Ant's Marching [Radio Edit]" are fairly common in radio automation systems. By executing a data lookup from an outside source, the datacasting system can effectively clean up this data and provide it in a format for broadcast.

Another purpose of a third-party data lookup is to provide additional information that the automation system may not contain. This could include album title, concert information or even song or artist trivia. Figure 2 illustrates how lookup works.

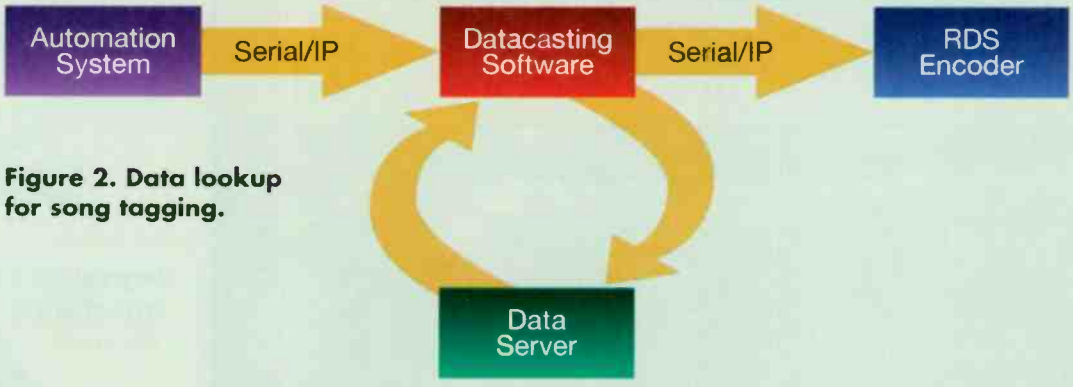

Figure 2. Data lookup for song tagging.

Giving listeners the ability to hear a song, tag it and purchase it later helps put radio back in the business of music discovery, a position that is being lost to the Internet and mobile applications such as Shazam.

RDS tagging isn't much of stretch for most broadcast stations either, thanks to the RT+ standard. RT+ is an open data application (ODA) that is used to identify placement of specific elements within Radio Text, such as news, lottery, stocks, sports and more. The original intent was that RT+ marked data could be buffered by the receiver for display in a specific area on the receiver, such as a studio request number, or at the press of a specific button.

In the case of RDS tagging, compatible devices use RT+ to specifically locate the song title and artist name. This RT+ data is then used by supported devices to find the title and artist data within the RT. This allows the FM listener to earmark their favorite songs playing on the air for purchase later.

Systems for tagging often include the concept of using a third-party data lookup to gather additional song information, such as album information and affiliate IDs required for revenue sharing with music vendors. Software is then used to manage the ODA data.

Expanding to social networks

Once a station has implemented datacasting tools to manage data for RDS, it only makes sense to look into other uses for this data. With the current popularity of sites such as Twitter and Facebook, it's easy to see the potential of social networking.

Most social networking services offer some sort of application programming interface (API). Several datacasting systems support these APIs. However, because these APIs are public, you can also build your own systems in-house. In addition, services such as Ping.fm and HelloTxt.com will give you access to a single API and, in turn, their service will feed most social networks. These services make it super easy (and free) for a station to push data to multiple social networks at once.

Avoiding the clutter

Once a station starts to implement one or more of these solutions, it quickly becomes apparent that guidelines need to be followed to avoid clutter and keep the listener from feeling like they are being spammed.

Most importantly, a station needs to give each message adequate time to display. No matter how fast a station pumps out data, some displays will move data faster and some move data slowly. To accommodate all of these, a good rule of thumb is to allow a second for each character with a minimum of 30 seconds for each message, no matter how short it is.

Then there is advertising. If we flood our displays with too many ads, they quickly lose their effectiveness and turn listeners away. A good practice is to adopt two types of datacasting ads: high-impact and linked events. A high-impact ad is a message that runs repeatedly throughout the day. Think of a flower shop on Valentine's Day or a car dealer the day of the big sale. This type of ad should offer a good value to the listener and feel like it's promoting an event rather than trying to push merchandise. The second kind of ad is a linked event. This is advertising information that is linked to an audio commercial, such as a phone number, website URL or even a coupon code. Because it's linked to the audio, the listener views it more like additional information than another ad.

With the right tools and concepts, the applications for datacasting are limited only by the imagination. Any station can literally change the face of radio by introducing one or more these techniques when adopting a good datacasting strategy.

Roberts is the product manager for BE's The Radio Experience, Quincy, IL.

by Erin Shipps, associate editor

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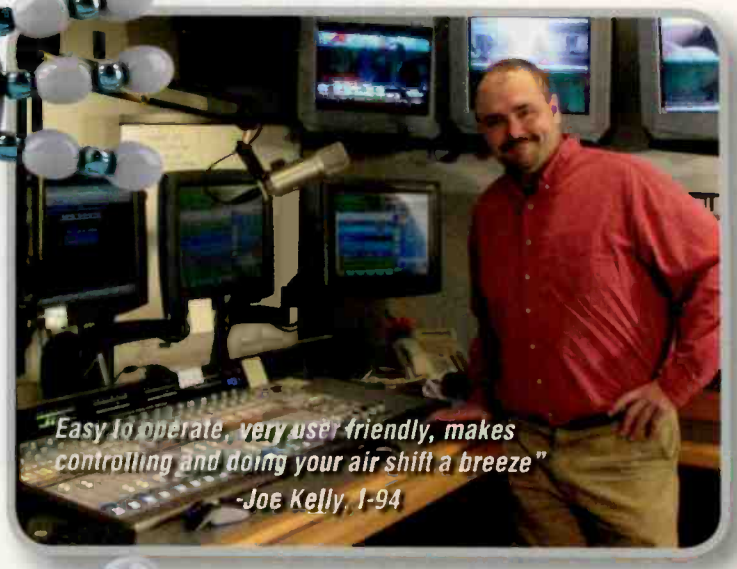

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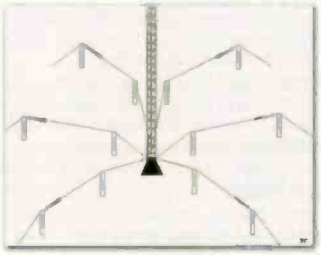

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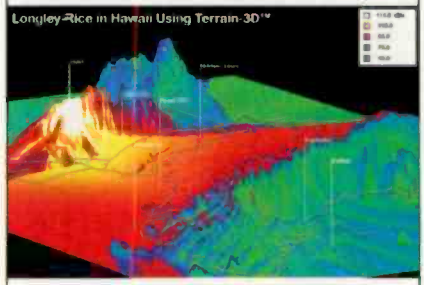

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Meet the professionals who write for *Radio* magazine.
This month:
Field Report, page XX.

Kirk Chestnut
Assistant Chief Engineer
Entercom Kansas City

Chestnut's radio career began the summer of 1974 when he built his first AM transmitter kit. He earned his bachelor of science degree in broadcast engineering from Bob Jones University. His first full-time board shift was on WOEL-FM Elkton, MD. Chestnut worked as a field engineer for the Bible Broadcasting Network then later joined Back to the Bible International as a recording engineer. In 1998, Chestnut moved to Kansas City where he has worked for Bott Radio Network, Sinclair Broadcast Group and Susquehanna Radio.

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This index is a service to readers. Every effort is made to ensure accuracy but *Radio* magazine cannot assume responsibility for errors or omissions.

by Erin Shipps, associate editor

That was then

WHAV Program Director Warren Greenwood takes an airshift from the main control room in June 1948.

The new transmitter and tower site in 1947; the mast is reserved for the FM bays, added about a year later.

Tim Coco, president and general manager of WHAV, sent us an article and photos about the construction and growth of the AM/FM combo station between 1947 and the early 1980s. He served as an announcer/engineer's helper/newsman from 1978 to 1980. His account covers the equipment used and tells a larger story of radio's history from transcriptions to 45s, mono to stereo, combos to breakups, tubes to solid state, etc. Check out his full article and images online at RadioMagOnline.com with the August issue.

Sample and Hold

Broadband Growth

According to the Broadband Forum, broadband growth was steady in 2009, with a pick-up in every region in the fourth quarter. With the addition of 58 million lines of broadband technology in 2009, there are now more than 466.56 million broadband customers in the world. The Asian market showed the strongest growth with China, the Philippines, Indonesia and Vietnam being the most significant contributors. Asia now accounts for 39 percent of the broadband market. The United States and Canada reported a steady growth throughout the year, while a slowdown in Central and South America contributed to a lower growth rate for the region. The region as a whole added 13.7 million customers in 2009. The United States, with 85,287,100 subscribers, was among the top 10 countries in the world.

Country	Broadband 2008 Q4	Broadband 2009 Q4	Yearly Growth	Market Share	Net Adds 2009
Asia	153,905,582	183,090,647	18.96%	39.21%	29,185,065
Europe	129,145,899	142,931,560	10.67%	30.61%	13,785,661
Americas	113,500,830	127,177,224	12.05%	27.24%	13,676,394
Middle East/Africa	12,269,412	13,718,675	11.81%	2.94%	1,449,263
Total	*408,821,723*	*466,918,106*	*14.21%*	*100%*	*58,096,383*

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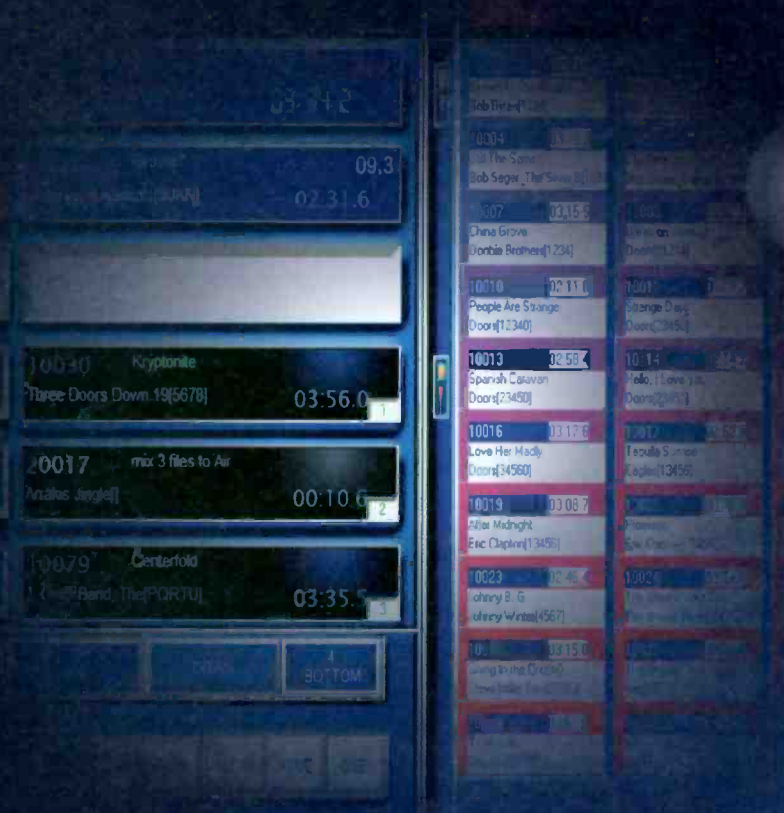

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Entravision currently has Wheatstone TDM systems in 5 of their markets –including Los Angeles where 27 surfaces provide programming for their eight Los Angeles area transmitter sites and seven satellite uplink networks.

Rick Hunt, Vice President and Director of Radio Engineering at Entravision Communications Corporation knows that taking chances with unproven or ad-hoc technology simply isn't feasible – that the ultimate cost of using less than the best can be detrimental not only to day-to-day operations but to their overall success.

"Entravision prides itself on delivering the highest quality content and programming to our loyal base of radio and television audiences, and we rely on the Wheatstone system as an important piece of our broadcast equipment. The system is versatile, easy to manage and one of the most advanced pieces of technology on the market. It also delivers an unmatched level of consistancy, ensuring that our systems operate the same way regardless of size or location."

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Give us a call or visit us on the web to learn more - we'd love to hear from you.

Rick Hunt, Vice President and Director of Radio Engineering at Entravision Communications Corporation, with one of their Wheatstone G5 consoles.

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