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BLADE-3 AN ENTIRE BROADCAST PRODUCTION STUDIO IN A SINGLE RACK SPACE



MIDI and AES70?

AES70 was ratified on January 4 as a rudimentary control standard for audio IP networking. Whereas AES67 gave us a means to move audio signals from point A to point B regardless of audio network brand, AES70 now offers a basic control standard that we can use to add third-party devices to the WheatNet-IP audio network. Think MIDI, only for the broadcast world.

IP audio network manufacturers have spent a great deal of time, money, and energy developing fully realized solutions that handle intelligent audio transport and control. For example, our WheatNet-IP audio network is a complete studio environment with control surfaces, navigator software, button panels, widget GUIs, audio controllers, and more that interoperate behind the scenes in ways that would give a cellular phone network a run for its money. We can control anything, conditionally if necessary, from just about anywhere in the environment.

Read the rest of the story: INN33.wheatstone.com

Your IP Question Answered

Q: Why is a distributed network like the WheatNet-IP better for redundancy than a centralized system?

A: Centralizing network management is a single-point-of-failure waiting to happen, whereas distributing network resources to every IP point naturally builds in redundancy. If one part of the network fails for any reason, the rest can keep on functioning. Each IP connection point (or WheatNet-IP BLADE) stores the configuration of the entire network onboard, which means that failover is immediate. And because WheatNet-IP BLADEs talk to each other, adding additional BLADEs onto the network is plug-and-play for easy system expansion.

For more IP Audio News: INN33.wheatstone.com



He'd Tell You, But Then He'd Have To, Well, You Know...

You know your audio processor is doing a good job when the engineer says he can't disclose the settings because he doesn't want them to leak out to his competition. We expect that with our AirAura, FM-55 and other Wheatstone processors. But with an I/O BLADE that connects together our WheatNet-IP audio network?



That's what they're telling us. To wit: "I don't want to tell the world what we're doing, but I can tell you we're using one of your streaming presets as our starting point," said Cris Alexander, the DOE for Crawford Broadcasting. He's referring to our BLADE-3s, which serve as I/O connection points in the WheatNet-IP network but also happen to have powerful audio processing on board. Ever the budget-conscious engineer, Cris installed the BLADE-3s as part of the WheatNet-IP system (with E-6 control surfaces) and then assigned them double duty as the processing for web streams. He is using BLADE-3s for processing streams in five markets - Crawford's clusters in Denver, Detroit, Birmingham, Chicago and Los Angeles - for a total of 14 streams. We're talking a very diverse group of formats that range from talk to urban.

Read the rest of the story: INN33.wheatstone.com



Talent Station Gets a Pretty Major Update

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To learn more: TS.wheatstone.com



SEE US AT NAB BOOTH N2530



TABLE OF CONTENTS

Some of the 55-plus miles of cabling in the Kim Komando plant.



On the cover: WestStar TalkRadio Network Technical Director Mike James works the controls of a Wheatstone LX-24; Kim Komando is on the set. The photo was taken the day before the studios went live.

CORRECTION: The March Facility Showcase, "KEXP's Seattle Home Is a 'Wild Mix of Old and New,'" incorrectly stated the name of the lead designer and architect for KEXP Seattle. The firm's name is SkB Architects.

FEATURES

- 28 **Facility Showcase**
America's Digital Goddess Looks Better Than Ever
- 34 **Trends in Technology**
Don't Stroll by These Transmitter Manufacturers

COLUMNS

- 6 **Viewpoint**
Read This Before Heading to Vegas
- 8 **FCC Update**
FCC Proposes Emergency Alert Rule Changes
- 44 **Tech Tips**
On to the Amplifier's Output Deck

DEPARTMENTS

- 12 **NAB Show Preview**
Broadcast Engineering Conference
Radio Technology Forum Sessions;
New Product Sampler
- 22 **Field Report**
Teenagers Really Love Having
DAD in the Studio
- 40 **Applied Technology**
NPR Goes On-Demand
With National, World News
- 50 **Sign Off**
Serendipity and the Spring Show

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 Hosa CBT-500 Audic Cable Tester. Send your entry to radio@RadioMagOnline.com by April 22. Be sure to include your guess, name, job title, company name, mailing address and phone number. No purchase necessary. For complete rules, go to RadioMagOnline.com.



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World Radio History

Read This Before Heading to Vegas

It's convention time again. If you are reading this edition prior to heading to Vegas, note that we've included some special features for attendees.

First, we've got a great session list previewing the NAB Show's Broadcast Engineering Conference. If you're a regular reader of either the print or online editions, I know you'll find this list compelling. Secondly, check out a selection of some new products, many of which will be brand new at the show. In this month's Trends in Technology column, we also discuss transmitter products. The North Hall booth numbers are included to make your planning a bit easier, too.

After a couple of days on the floor, kick those shoes off and read what the Wandering Engineer has to say about the NAB Show in Sign Off. Clearly, he's been to a few spring shows over the years.

Kim Komando has an incredible new facility



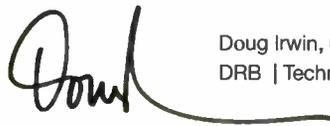
in Phoenix, Ariz., and we have a tour of it for you in our Facility Showcase. Those of you contemplating new builds must see this — and make time to see video gear at the show.

And have you heard of "the Netflix of Radio?" I'm referring to the NPR One app, which Fardau Van Neerden covers this month. Is this the future of our industry?

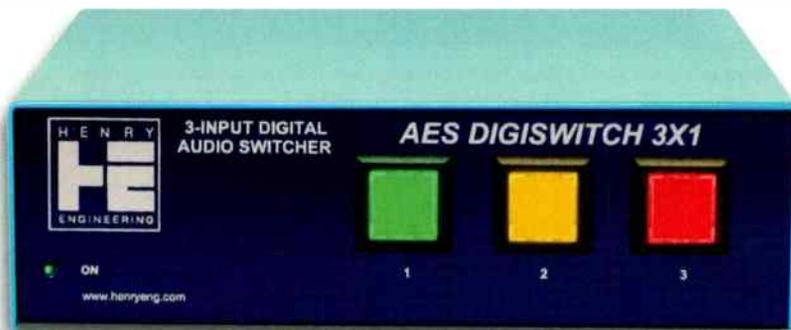
We're picking up where we left off last time with Tech Tips: Our transmitter rehab has now reached the final amplifier stage.

Lee Petro discusses changes the FCC is proposing with the EAS system. This is something you need to stay on top of.

Please say "hello!" if you see me on the exhibit floor or attending one of the BEC sessions. It will be great to meet you and get some feedback. 


Doug Irwin, CPBE AMD
DRB | Technical Editor

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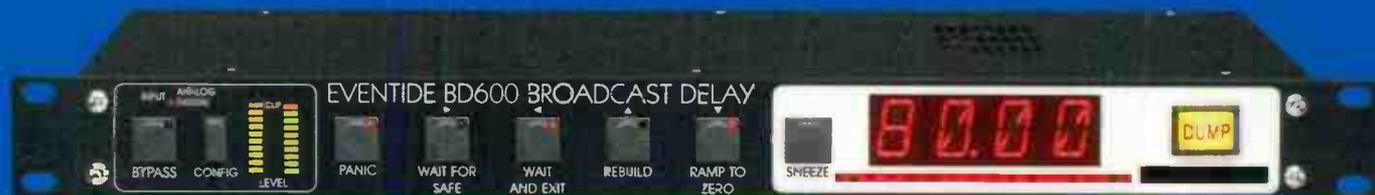
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Whatever your size, whatever your format, you can't expect to protect the integrity of your air and the foundation of your business without an Eventide Broadcast Delay in your rack.

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World Radio History



FCC Proposes Emergency Alert Rule Changes

by Lee Petro

The FCC proposed changes to the Emergency Alert System at its January meeting to make it more responsive to local needs and ensure the security of the system. The commission focused on four goals and sought comment on new rules utilizing new technology to improve EAS.

Improving Alerting Organization at State and Local Levels: First, the FCC is proposing the adoption of uniform vernacular and designations of the various EAS participants to eliminate confusion. Also, the commission

is proposing the adoption of a uniform template for state EAS plans and the creation of an electronic filing system for the submission of the state EAS plans. The FCC noted that the current paper-based state EAS plans are not uniform, which leads to inconsistent presentations. Instead, the FCC sought comment on the adoption of the model used by the state of Washington. It also sought comment on how to protect the information that is submitted through the new template-based system, suggesting that the use of the National Institute for States and Technology Cybersecurity Framework might satisfy these concerns.

Building Effective Community-Based Public Safety Exercises: The FCC seeks comment on revisions to the rules to permit state and local testing of live EAS testing. Generally, the use of “live” EAS header codes is prohibited, but the FCC is considering the possibility of permitting such use, so long as the use of “live” EAS codes is not misleading and does not cause public confusion. The FCC is concerned that these tests are not too frequent so to cause “alert fatigue.” The commission is also seeking comment how to make the testing accessible with individuals with disabilities and those with limited English language skills.

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Leveraging Advancements in Technology:

Next, the FCC is considering rules to better leverage technology to expand the distribution of EAS alerts to the public. First, it is considering changes to existing rules that require multichannel video programming distributor systems to either direct viewers to a designated channel during EAS alerts or whether MVPDs retain the authority to override EAS alerts on a selective basis. In light of the use of “smart” television sets and over-the-top devices, the FCC sought comment on how to ensure that the public is informed, and how to distribute EAS alerts to mobile devices such as LTE-enabled tablets. As noted, the FCC is also concerned that EAS alerts are able to be accessed by those with disabilities, and sought comments on the use of new technology to distribute wireless emergency alerts.

Securing EAS: Finally, the FCC is considering rules to secure the emergency alert systems. As discussed in

this column previously, the Enforcement Bureau has taken strong actions against incidents of EAS misuse, including the announcement of “zombie attacks” and audio clips that had imbedded EAS alerts triggering EAS alerts in multiple states. The FCC noted other false EAS alerts caused primarily through technical errors and inadvertent triggering of the system.

As a result, the FCC proposed rules that would require the adoption of the best practices established by the 2014 Communications Security, Reliability and Interoperability Council IV’s recommendations. The FCC would require EAS participants to provide annual certifications that they are complying with EAS best practices relating to (i) software patch management; (ii) account management; (iii) segmentation within the EAS system; and (iv) confirmation of compliance with common alerting protocol digital signatures that would prevent inadvertent EAS alerts. The

FCC is also considering the rules to require EAS participants to report

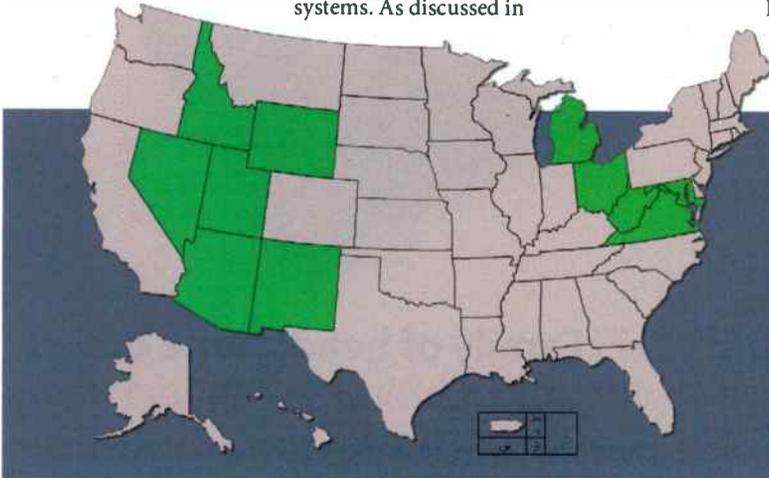


An alerting image on the FEMA website.

false EAS alerts and to take steps to prevent future false alerts. Finally, the FCC is looking whether software-defined network approaches could be developed to improve EAS security.

Commissioner O’Rielly dissented in part, raising concerns about the FCC’s proposed expansion of EAS rules into IP-based platforms, questioning whether the FCC has the requisite statutory authority, and in consideration of the costs of compliance with the new rules in light of the extremely rare initiation of national EAS alerts. The period for comments was not set at this writing. 

*Petro is of counsel at Drinker Biddle & Reath LLP.
Email: lee.petro@dbr.com.*



DEADLINES

June 1, 2016 — Stations with five or more full time employees in Arizona, Idaho, Maryland, Michigan, Nevada, New Mexico, Ohio, Utah, Virginia, West Virginia, Wyoming and the District of Columbia must place their Annual EEO Public File Reports in the station’s public inspection file.

June 1, 2016 — Stations with 11 or more full time employees in Michigan and Ohio file their Mid-Term EEO Report (FCC Form 397) with the FCC.

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presents challenges with regards to delay and data integrity. Various strategies can be deployed which can mitigate the effect of these network impairments. We examine these strategies, including differences in transport requirements between analog and digital FM MPX signals and the trade-offs they present with respect to bandwidth, scalability and delay.

Co-Presenters: Keyur Parikh, solutions architect, GatesAir; Junius Kim, engineering project manager, GatesAir

**HD RADIO DIVERSITY DELAY FIELD OBSERVATIONS:
THE NEED FOR AUTOMATIC ALIGNMENT**

SUN. APRIL 17 | 1:30 – 2 P.M. | S227

Audible blending artifacts are the top HD Radio complaint from auto manufacturers and consumers. This paper will cover some of the causes of drift and how those can be resolved. However, we have learned there are a myriad of potential problems that can cause drift that are out of control of any individual device that has been traditionally installed in the broadcast chain. What is needed is a systems approach to this problem. This paper will discuss implementing various combinations of hardware and/or software to provide continuous monitoring and adjustment of diversity delay in real-time to reduce or eliminate the objectionable blending artifacts impacting listeners.

Presenter: Alan Jurison, senior operations engineer, iHeartMedia

**NAB LABS ALL-DIGITAL AM TEST PROJECT - PART II,
CO-CHANNEL LABORATORY TEST RESULTS**

APRIL 17 | 2 – 2:30 P.M. | S227

Since 2012, NAB Labs has been conducting field and laboratory tests of the HD Radio all-digital AM system. The purpose of this test project has been to characterize the digital coverage performance and interference behavior of the all-digital AM signal under a variety of conditions, with the goals of better understanding the capabilities and limitations of this signal and to develop a technical record of this as-yet unauthorized service. This paper provides a brief description of the all-digital AM signal, then offers a summary of the co-channel laboratory test results obtained by NAB Labs.

Co-Presenters: Mike Rhodes, senior engineer, Cavell, Mertz and Associates, Inc; Dan Pyson, senior engineer, Cavell, Mertz and Associates, Inc; David Layer, senior director, Advanced Engineering, National Association of Broadcasters

VIRTUAL FUTURE OF BROADCAST AUTOMATION

APRIL 17 | 4 – 4:30 P.M. | S227

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for upgrades and maintenance, more secure storage of data, and redundant storage of your stations valuable data and configuration files. This seminar will discuss the advantages of virtualization and present a short case study of one or more stations/media groups using virtualized server. An emphasis will be placed on audio routing and how a virtual environment can help to protect a station in a time of equipment failure.

Presenter: Paul Stewart, technical support / R&D engineer, ENCO Systems, Inc.

WHEN NOT TO USE A MOMENT METHOD AM PROOF OF PERFORMANCE

APRIL 17 | 4:30 – 5 P.M. | S227

The adoption of the moment method proof of performance rules in MM Docket 93-177 was a monumental step forward into modern electromagnetic systems analysis for AM antenna performance. The process of this took an inordinate amount of time, but the result was a practical and scientifically valid set of procedures for avoiding the uncertainties and hazards of measuring magnetic field strengths in circumstances fraught with perils. But there are circumstances where this method shouldn't be used.

Presenter: Benjamin Dawson, president, Hatfield & Dawson Consulting Engineers, LLC

ARCHITECTING A STATELESS, VIRTUALIZED, ZERO FIXED COST BROADCAST FACILITY

APRIL 18 | 11:30 A.M.–12 P.M. | S227

In this paper, we will explore the necessary hardware and software configurations, cloud-based models, and on-demand coordination of necessary resources. This paper will highlight the usage of Flexible Media Clusters, Software Defined Networking and Network Function Virtualization, OpenStack, Packet Media Networking solutions to replace SDI, software defined storage and resource reservation layers to elastically and dynamically provide a highly scalable all-IP based broadcasting architecture.

Presenter: Tom Ohanian, development and media segment strategist, Cisco Systems

The following are some additional sessions within the Broadcast Engineering Conference that will be of interest to radio and multiplatform tech managers. For the full schedule, go to nabshow.com.

- **Broadcast Engineering Conference Keynote**
April 17, 9–9:30 a.m.
LVCC S219
- **A Federated System for Public Media Metadata Delivery**
April 17, 9:30–10 a.m.
LVCC S227
- **Digital MPX AES 192 in the Real World**
April 17, 11–11:30 a.m.
LVCC S227
- **Emulation, Expectations and Why Things Sound The Way They Do**
April 17, 1–1:30 p.m.,
LVCC S227
- **Real-Life AM Revitalization**
April 17, 2:30–3 p.m.
LVCC S227
- **The AES Loudness Guidelines for Internet Audio and What they Mean for Producers, Distributors and Listeners**
April 17, 3–3:30 p.m.
LVCC S227
- **The Elusive Signature Sound**
April 17, 3:30–4 p.m.
LVCC S227
- **Extending IP Audio to the Transmitter Using Part 101 or Unlicensed IP Radios**
April 19, 10:30–11 a.m.
- **Emergency Preparedness**
April 20, 9 a.m.–Noon,
LVCC S228
- **Continuity of Broadcast Operations During Disasters**
April 20, 9:30–10 a.m.
- **Cyber-Security and Network Integrity for HD Radio Broadcasting**
April 20, 2:30–3 p.m.
- **AM Bootcamp**
April 20, 2:15–3 p.m.
- **FM Bootcamp**
April 20, 3–3:45 p.m.
- **Amateur Radio Operators Reception**
April 20, 6–8 p.m.,
Westgate Ballroom B
- **Data Networks and the Broadcast Plant**
April 21, 9 a.m.–Noon,
LVCC S225
- **Troubleshooting the Broadcast IP Network**
April 21, 11:30 a.m.–Noon



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**NEWPRODUCTS
SAMPLER**

DaySequerra | TimeLock Series 2 Products

DaySequerra is out with Series 2 TimeLock products. It says the M4 TimeLock Series 2 and M4 TimeLock DDC Series 2 offer greater versatility in identifying and synchronizing diversity delay in HD Radio broadcasts.

"Diversity delay is the amount of program audio delay required to be inserted into the analog program stream (MPS, or Main Program Service) in order to match the inherent delay of the HD Radio HD1



program," the company says. "While this delay is typically about 8 seconds, it can vary."

The original DaySequerra TimeLock algorithm, used in its M4 and M4.2 products, measures time alignment of the MPS and HD-1 streams with accuracy to one audio sample. It said the new TimeLock algorithm maintains this precision with the added capability of working adverse conditions, including situations where an FM station is operating in mono on the legacy analog side and in stereo on the HD Radio side.

"Delay capability in the new TimeLock M4 DDC Series 2 is doubled to + 7 seconds, allowing a greater range of diversity delay correction even with extremely high HD Radio data payloads," it said.

"In addition, full SNMP support on both products allows broadcasters to create their own monitoring software, or integrate other monitoring systems with the new TimeLock series."

The M4 TimeLock is compatible with multiple Orban, Omnia and Wheatstone processors as well as GatesAir HDE200 exporter and the Nautel Exporter Plus.

The company is offering a free update to the Series 2 algorithm for existing M4 TimeLock and M4DDC units.

www.daysequerra.com

Belar Electronics | Automated Channel Scanning

Belar Electronics has added Automated Channel Scanning to its FMCS-1 modulation monitor.

A release explained: "Automated Channel Scanning was created based on a need to simplify on-air compliance and quality



monitoring in consolidated RF facilities. The automatic scan function cycles through up to six presets, making it perfect for networks operating multiple stations in a single market."

The company says the extension of this software function to the FMCS-1 brings more value to broadcasters who want to monitor multiple FM signals, or a mix of FM and HD Radio signals. The software-defined architecture allows existing FMCS-1 customers to incorporate Automated Channel Scanning in the field.

It quoted CEO Mark Grant saying, "Whether monitoring FM, HD or a hybrid across several stations, Automated Channel Scanning removes the need for separate units for each station, simplifying how engineers can receive, review and react to signal compliance and performance readings."

Also at the 2016 NAB Show, Belar will demonstrate Automatic Delay Correction software applications including Time Window Expansion and Delay Ramping.

Time Window Expansion expands the time window by up to eight times, and leverages an "auto range mode" to track the delay and open the correction window if the delay drifts outside the allotted range. Sample resolutions are automatically increased or decreased to pull the delay back within the window.

Delay Ramping is a gradual ramping feature for broadcasters correcting HD Diversity Delay with an audio processor. It drives smoother transitions between time adjustments, eliminating the perceptible jump that listeners experience as the broadcast shifts between analog and HD.

<http://belar.com>



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Teenagers Really Love Having DAD in the Studio

by Ronald Wittebols

There's a great deal of innovation that targets the commercial and non-commercial broadcast industries — most seemingly aimed at “big-time” operators or network content creators — but there's a niche for the smaller operator, too. ENCO Systems in Southfield, Mich., continues to refine its field-proven automation workhorse to provide unique operating solutions, some of which even a high school radio station can use to advantage.

WBFH/Bloomfield Hills is an award-winning, nationally-recognized public service station of the Bloomfield Hills School District, situated among Detroit's northern suburbs. WBFH is unusual in that it is a high school radio station, one of just 13 in the state of Michigan. It is staffed and run by teenagers and has been a fixture on the FM dial at 88.1 MHz since 1976.

The station has attracted a great deal of attention since moving in September from a

temporary converted-classroom studio in the back of the former Lahser High School to new, glass-walled, highly visible showcase studios smack-dab in the middle of the brand-new Bloomfield Hills High School.

As one can imagine, there have been a great many changes to the operations side of the program, but we continue to rely on the DAD automation system from ENCO.

WBFH has been using ENCO's DAD system and software for more than a decade and a half. ENCO's philosophy of continuous process improvement fits in with our mission statement to provide state-of-the-art technical equipment and real-world experience for our students, from which each can fashion a skill set that will transform them into great communicators, whether they choose to pursue a career in mass communications or to use their talents in other disciplines.

Some technical details: Our DAD System is configured for four studios; each has a computer that is linked to the ENCO DAD server, on which is all of our music and production material. It's a straightforward arrangement. We have about 4 terabytes of storage available at this time.



Senior Jonah Lopas does a quick rundown on current sports news.

EASE OF USE

We've seen the growth of DAD's power and versatility and are sold on its many virtues. Forget for a moment its many complex tools and powerful engine; the first consideration for us is ease of use.

WBFH educates and turns neophytes in to broadcasters. Although most youngsters have mastered smartphones and video games, the thought of being behind a microphone while driving a computer can be a bit intimidating, even for the most savvy teen.

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The work areas in DAD allow for quick access to playlists, music libraries and other convenient playback tools.

The Presenter component of the DAD system is graphically simple and easy to follow. The screen is divided in two: six automation slots on the left side of the screen and the ability to call up any number of other tools on the right. The clean lines and logical layout afford a quick-learn for someone using our DAD automation for the first time. We've had elementary and middle school-age children — as well as school board members — mastering the operation quickly. (We offer air time to all elementary and middle school students as well as district members.) A drag-and-drop motion has the host playing hit music in seconds and gaining on-air confidence in minutes.

CUSTOMIZATION

Of the automation systems on the market, DAD provides us the best tools with which to customize the look and feel of our automation system.

A right-click on the task bar of an open window allows our staff to change the colors and the font size of the screen graphics. This may not be that important from the broadcast engineering perspective, but that's an important factor when your school colors are purple, black and silver. Teens love to show their school spirit every chance they get.

HIT MUSIC. HOT TOPICS. SPORTS TALK. AND DROP BOX.

For the most part, music plays during the course of the broadcast day. The music is picked and processed by the many members of our music department. When processing music, there many tasks at hand: setting heads and tails, establishing segue markers, normalizing the cut and then sorting the music to the correct storage folder on the hard drive.

The Dropbox component of DAD ensures that tasks are completed uniformly. We set the rules and Dropbox takes care of everything from converting audio to injecting it in to the DAD library. Again, a drag-and-drop from one of our three production rooms sends the audio file to Dropbox and then off to our master server. (Desktop icons connected to our main server allow quick sorting and processing.) The same goes

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 ~Thomas A. Edison

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FIELDREPORT



Senior Matthew Brennecke, right, interviews Bloomfield Hills High School student Colin Barnes.

for audio production of our promos, public service announcements, liners and donor announcements.

WBFH is run completely by teenagers, and not every student has the time, the motivation or the patience to immerse him- or herself in the wonders of what DAD can do, and that's understandable. Our core student managers have simplified much of the daily process, enabling maximum efficiency from our staffers.

While concentrating on the best-of-the-old and the best-of-the-new music available, a great many of our staffers love to talk about current events, news and sports. The ability to create mini arrays of audio drops in Presenter allows our students to be creative by including actualities and sound effects during their broadcasts. Since teens often forget to arm the recording decks in DAD, the neatest feature for our managers is the timed audio background recording feature that lets us capture the sports events we cover as well as keepsake

programming featuring parents of our staffers on the air.

SUPPORT

The support team at ENCO has been outstanding. Not only do they have the patience to answer our questions and help us get back on track when an occasional curious teenager messes with some DAD settings, but team ENCO goes out of its way to offer advice on how to tailor their software to high school radio operations. Because of this, we recommend ENCO to existing and future online and low-power FM broadcasters in need of powerful software tool to succeed. It's helped WBFH become one of the most-recognized and celebrated community broadcasters in the state of Michigan. 

Wittebols is the WBFH assistant station manager/technical director for Bloomfield Hills Schools, Bloomfield Hills, Mich.

The winner is drawn from the correct entries for the issue two months prior. No purchase necessary. For complete rules, go to RadioMagOnline.com.

FIND THE MIC WINNER

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The mic is on the bottom corner of one of the computer screens

Cox Gets in the Stream

Cox Media Group, based in Atlanta, operates 59 radio stations in 11 markets, in addition to 14 television stations, seven daily newspapers and about a dozen non-daily publications.

Tim Clarke, senior director of digital audience (radio) for CMG, was tasked with the delivery of CMG's radio products across all web and mobile platforms in support of all listener preferences.

Tim made contact with StreamGuys, a service provider of live and on-demand streaming, podcasting delivery and software-as-a-service toolsets. The company is active in the development and deployment of technologies such as dynamic ad insertion, mobile streaming and detailed business and data analytics; it provides provide support to TV and radio broadcasters, podcasters, video and audio production companies.

Its SGSuite of products, now used by CMG, includes SGPlayer, an HTML5 multimedia player that is "custom-skinned" for each of CMG's stations. SGPlayer's metadata support delivers the relevant information that complements the audio stream, including song/artist data, album art, recently played tracks and social media links. SGPlayer is also an approved Nielsen SDK player, meaning that it will pass the data that Nielsen uses to measure audience size. This is especially important now that Nielsen's Digital Audio Ratings Service has been introduced.

The suite also includes SGrecast, which allows multiple users to turn linear broadcasts into podcasts of any length, with near-immediate turnaround to consumers.

StreamGuys' SaaS architecture integrates the company's business software platforms, including a custom package for enhanced royalty reporting. This allows Cox Media Group to deliver information to the RIAA and SoundExchange about when and where songs were played in an automated manner, simplifying workflow by eliminating manual data entry and paperwork.



StreamGuys

Included in the software package is SGreports, for in-depth audience analytics and stream metrics, along with detailed logging and reporting for ad payout and exposure. SGalerts

is used for e-mail-based notification of performance issues network-wide.

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World Radio History

America's Digital Goddess Looks Better Than Ever

by Marc Lehmuth

Video is changing radio. Many radio stations and networks are adding a video component to their programming these days. Streaming video, video podcast and subscription video services allow radio broadcasters to reach a larger audience like never before. The days of slapping a webcam in the corner of the studio are gone.

Some of today's radio studios look and function more like a TV studio than a radio studio, and Kim Komando's new \$7.5 million broadcast facility in Phoenix takes it to the next level.

Komando, "America's Digital Goddess," had called the WestStar TalkRadio Network's 6,000-square-foot studios in Phoenix home since 1994. WestStar syndicates nine specialty radio programs carried on more than 1,500 radio stations that touch more than 24 million listeners a week.

In 2014, Komando and her husband and longtime business partner E. Barry Young, WestStar's president/CEO, started making plans to build a new 24,000-square-foot broadcast facility including corporate offices, digital sales, entertainment, film operations, with a 24-hour network broadcast operations center, including all online operations. They wanted the centerpiece to be a 3,500-square-foot, 10-camera, HD-video studio to enhance their video component.

TEAM BUILDING

To build a radio studio in a TV studio for Komando, WestStar brought together an outstanding group of designers, engineers and integrators.

Innovative Show Design provided scenic design and integration, lighting design with more than 270 light fixtures and graphic packages for the project. Their portfolio includes sets and lighting designed for Super Bowl 49,



Kim Komando waves to technicians during a sound check in the new studios.

College Football Awards, NBA TV, NFL Draft and World Series of Poker and many more.

Technical Innovation Broadcast Solutions Group spearheaded the TV master control (production control room), machine room (technical core), audio master, studio pictures, lobby pictures and front entrance sign design and integration. Some of their projects include Encompass Digital Media, Digital Convergence Alliance, KTVA TV facility buildout, KXAS TV facility buildout, Primerica-Corporate Broadcast Studio.

Jim Hibbard of Pacific Mobile Recorders Studio Builders provided design and integration of audio acquisition, storage and

distribution throughout the facility. He was also responsible acoustical design of all the studios.

ROADWAY NOISE

This in itself is a major project. Acoustic material developments and technology have come a long way from egg crates and carpeted walls. Hibbard worked with architects and mechanical engineers to specify wall designs and HVAC specifications.

Most architects and mechanical engineers have no practical knowledge of acoustics, and most have never worked on broadcast facilities. Most of what they know is theory gained

in school. Hibbard bridged this gap between theory and practical applications with his 30 years of experience of designing and building some 400 broadcast and recording studios.

One of the design factors was isolation of the noise from a nearby major thoroughfare. This was accomplished by using some of the new techniques for studio construction, such as a low-frequency viscoelastic polymer material manufactured by Acoustiblock. This 3 mm layer of material over a standard stud wall equates to the sound reduction of 12-inch poured concrete. Used on both sides would produce the same isolation at 24 inches of solid concrete. As sound waves hit this material, they cause it to flex and it transforms the sound to a small amount of heat. The viscoelastic principle is isothermal adiabatic.

In addition to Acoustiblock, Hibbard specified two layers of QuietRock sheetrock. Each layer of this sheetrock reduces sound transfer by up to eight times that of regular drywall.



WestStar's fiber racks.

There was a combination of double wall and staggered stud construction with Rockwool insulation. Some of the walls were covered with Echostop perforated plasterboard to control the acoustics.

Hibbard had to pay particular attention to the HVAC design by adding additional supply

vents and damping down the system to slow down the airflow. In addition to the HVAC noise, the room had mostly hard surfaces like a concrete floor and a Plexiglas desk reflecting sound throughout the studio. Beside the acoustic material on the walls, Hibbard came back after the lighting was done and added

FACILITY FOCUS: WESTSTAR TALK RADIO, PHOENIX, ARIZ.



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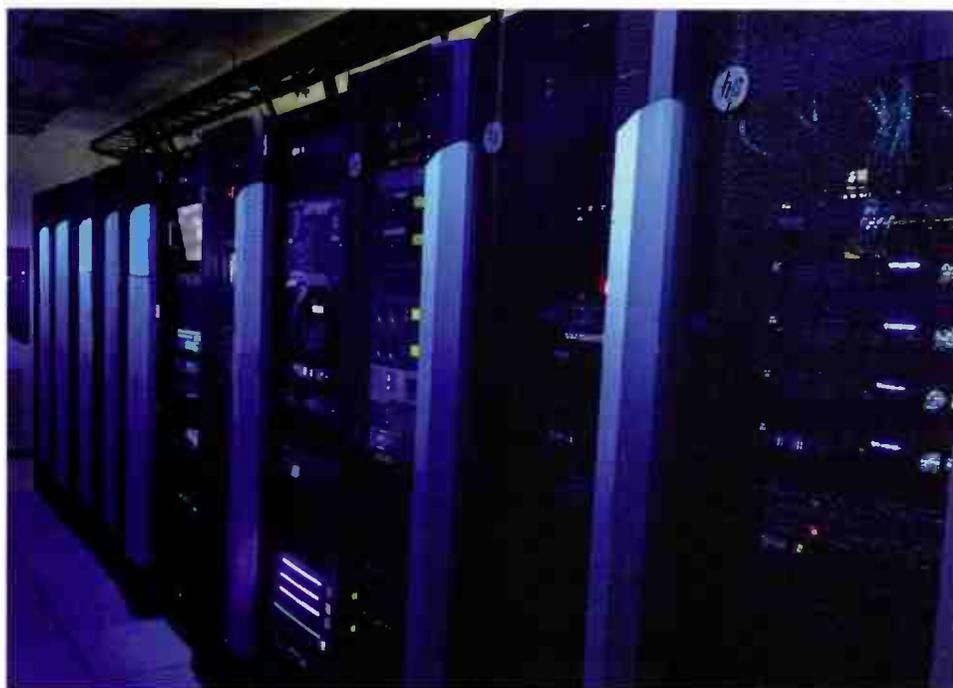
The "Kim Komando Show" can be viewed on her television network streamed over the Internet, and is distributed to 450 radio stations from an IP-based studio facility in Phoenix.

Each major studio is localized on its own edge Ethernet switch and has a WheatNet-IP BLADE-3 I/O interface. The switch is in turn connected to a core Ethernet switch located in operations control.

Just about everything and anything audio related is hanging off of, routed through, or controlled by a WheatNet-IP audio network, including consoles, audio sub-mixes, salvos to stop and start automation and satellite cues — even mic processing and IFB. For more see wheatstone.com/wheat-news/current-issue-television/3116-kim-komando-goes-ip-audio

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The WestStar racks are much like those at any radio station, with multiple generations of equipment represented. Everything from video monitors to Zephyr Classics to Wheatstone Blades all have their role in the system.

batting in the ceiling. Most of the batting used on the walls and in the ceiling was a recycled cotton material manufactured by several companies. This material can be left exposed due to its non-irritating properties, unlike fiberglass panels that must be covered.

On the studio walls outside the TV studio itself, walls were constructed with a framework that the cotton panels were wedged into, and then covered with tight fabric. Particular attention was made to the selection of acoustical tiles of the drop ceilings in the studios, to make sure they performed well in a studio environment. There was care taken to wrap the conduits in the studio to eliminate sound transmission. Hibbard's major objective was making these studios as quiet and dead as possible.

COMPLEX FEEDS

Because of the complexity of feeds, and back feeds needed for this project and the complex control and signaling required, Hibbard chose

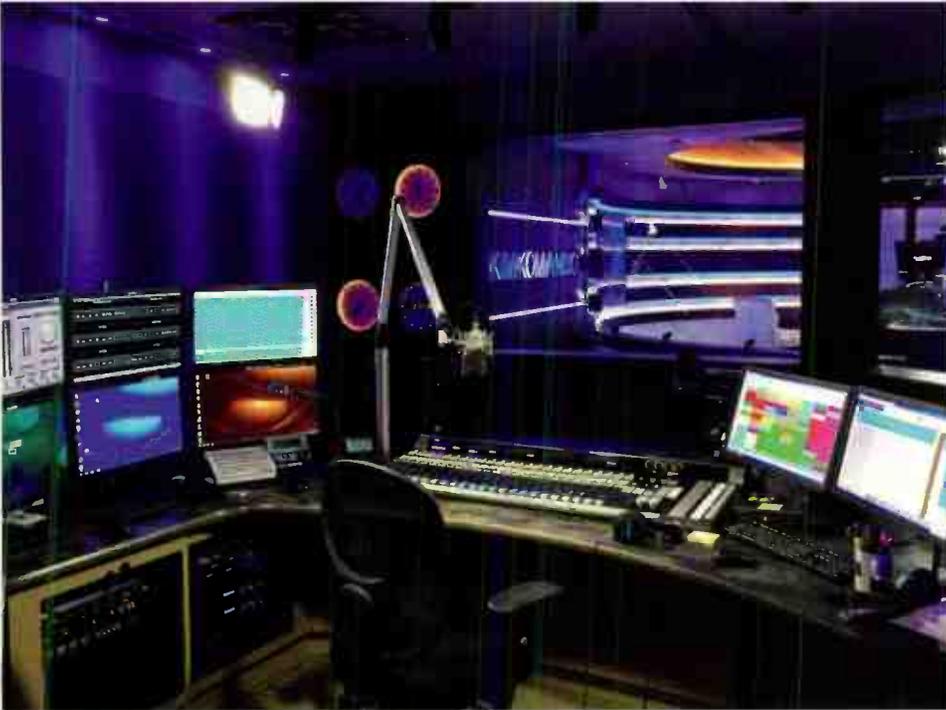
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Studio 125 Radio Master control with its Wheatstone LX24.

Wheatstone for the audio and distribution in the facility.

There are two LX24 consoles, one in each of master control and the control room studio on the first floor; one L12 in TV master control; and one L8 in each of production 1 and 2.

Wheatstone's M4-IP3 blades handle all of the microphone processing in the plant. All PC and automation audio utilizes WDM audio drivers with 128 virtual logic ports. Wheatstone's OLED Programmable Ethernet Button Panels handle all of the intercom and talkback needs, and interface

to the Clear-com TV intercom system. There are two Aura8-IP blades in the TOC to control and smooth feeds in and out of the facility.

During the show, TV master control takes a stereo bus from the Wheatstone LX24 in the radio control room. During commercial breaks, Komando will get up from the table and move around the set. The radio breaks are longer than TV breaks, so Komando and her guest use lavalier microphones to feed audio to TV during this time. Hibbard installed a Wheatstone L12 console in the TV master control where the TV audio technician mixes these lavalier microphones for these breaks. Because of the power of IP audio, the mix of these lavalier microphones can be potted up in radio master control, if Komando or her guests do not end up back at the desk in time.

Vince Fiola of Studio Technology Studio Furniture designed, delivered and installed the studio furniture for the project. Fiola worked with Hibbard to assure sightlines were

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FACILITYSHOWCASE

maintained and that ergonomic needs were met on the Corian-topped furniture.

This was accomplished by designing the furniture to allow for some adjustment to compensate for construction variations, and by cutting all of the console cutouts, monitor arm, microphone arm placements on site. Hibbard selected Yellowtec Mika arms and Heil Sound booms and accessories throughout the space. Attention to detail and ergonomics were priorities for the studio layouts.

CUSTOM CABLES

Hibbard approaches project planning differently than most integrators.

He doesn't have 100 percent of the design or layout of each and every wire in the plant before the install. He utilizes a general input list for sizing the system and specifying the equipment that is needed. He doesn't configure anything until he has the opportunity to observe the operators and then he configures the system around their needs. He has a general layout that he tweaks during the installation. He maintains a balance between keeping the client comfortable with how they are accustomed to doing things, while utilizing the power of new technologies.

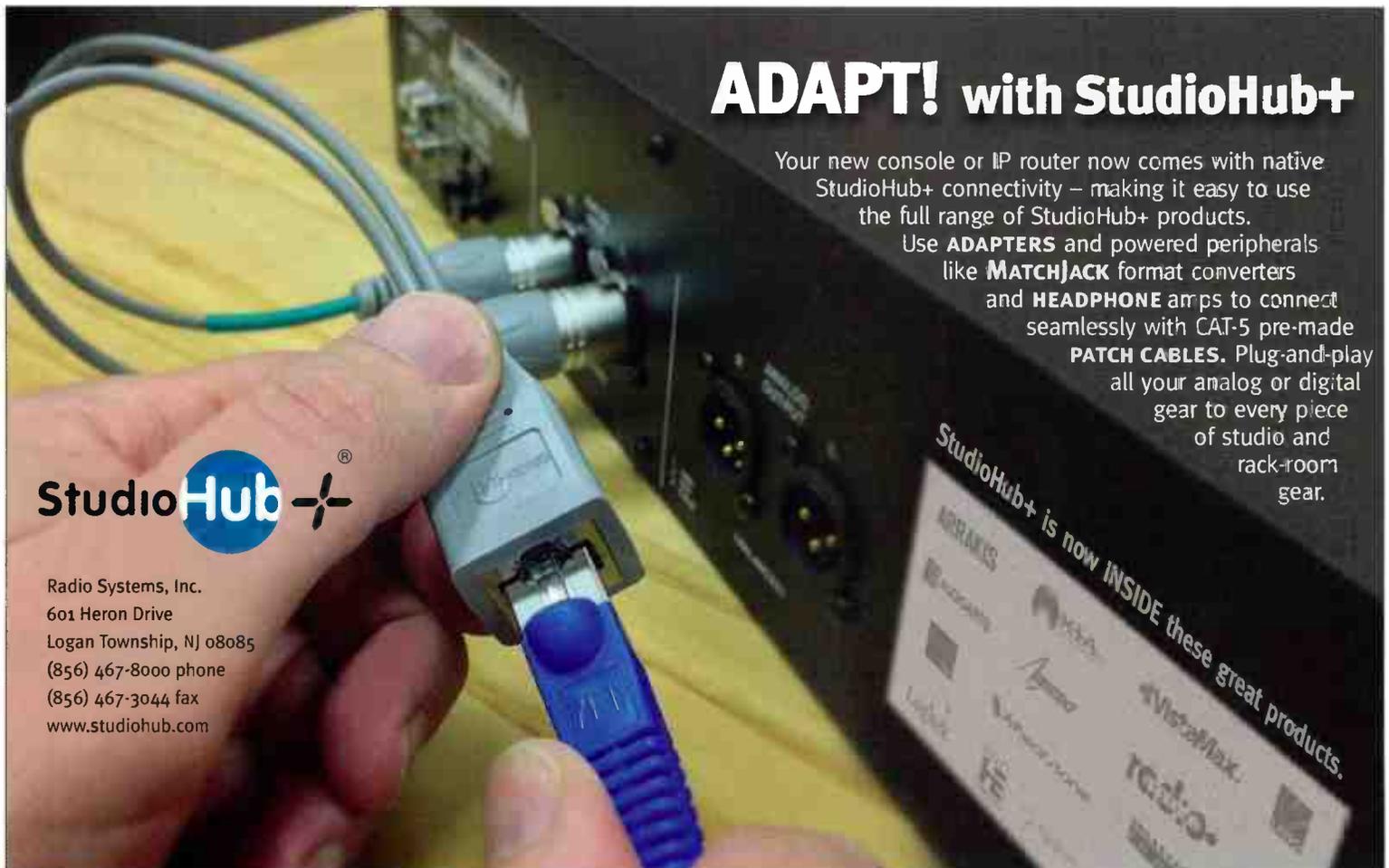
All of the net cues for the radio broadcast are handled through Wheatstone logic. The NexGen automation system provides these "closures" and turns off and on channels on the boards via the WDM drivers to Wheatstone. Button panels can augment or add closures as needed, directly into the IP system from anywhere. Net cues are connected to GPIOs in the Wheatstone system from satellite receivers to flash buttons for instant feedback of these cues to the



Studio 207, Radio Production A



Studio 209, Radio Production B



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operators. Wheatstone scripts can be written to monitor these return net cues and resend missing ones automatically in the event of a communication glitch.

With modern IP audio systems, there is no longer a need for rows and rows of punch blocks. Most of the wiring in these projects is point to point without the use of premade adaptors. Hibbard custom makes each cable for the project utilizing standard stranded shielded Cat-5e cable with a factory RJ-45 on one end and the connectors needed at the other.

ON-MIC

Hibbard uses a Neumann BCM 104 condenser microphone as Komando's main microphone, and the guests are on Neumann KMS 104 condenser microphones. As anyone that has used a condenser microphone in a studio knows, it will pick up spider footsteps from 10 feet. Hibbard added additional batting in the ceiling and was a lot more aggressive on the microphone processing, because TV is not miked as tight as radio. Hibbard chose Wheatstone M4-IP3 blades for all microphones processing, because the downward expansion is identical to the M1, which he utilizes any chance he can. He's also used these processors on the lavalier microphones for "The Rich Eisen Show" and "The Dan Patrick Show."

The TV side uses a Clear-Com intercom system with wireless belt packs to communicate with camera operators and technicians. Hibbard took all of the inputs and outputs of the Clear-Com system and switches it through the Wheatstone system. It became a hybrid intercom system between Clear-Com and Wheatstone utilizing the powerful mixers, built into each blade, to handle mixing and switching. For the phone system, Hibbard took a Telos TWOx12 system and replaced the ISDN cards with POTS cards. The telephone service comes in the facility via a T1 that is converted to POTS and connected to the Telos TWOx12 system.

Distribution of the radio program is via good old ISDN. Banks of Telos Xstreams and Telos Classic ISDN codecs carry the primary audio to the Westwood One TOC. In addition, WestStar uses Comrex BRIC-Links as a redundant path to the TOC.

WestStar needed reliable Internet service in their new facility. They installed two 1 gigabit fiber lines from two separate providers utilizing Border Gateway Protocol. This assures reliable

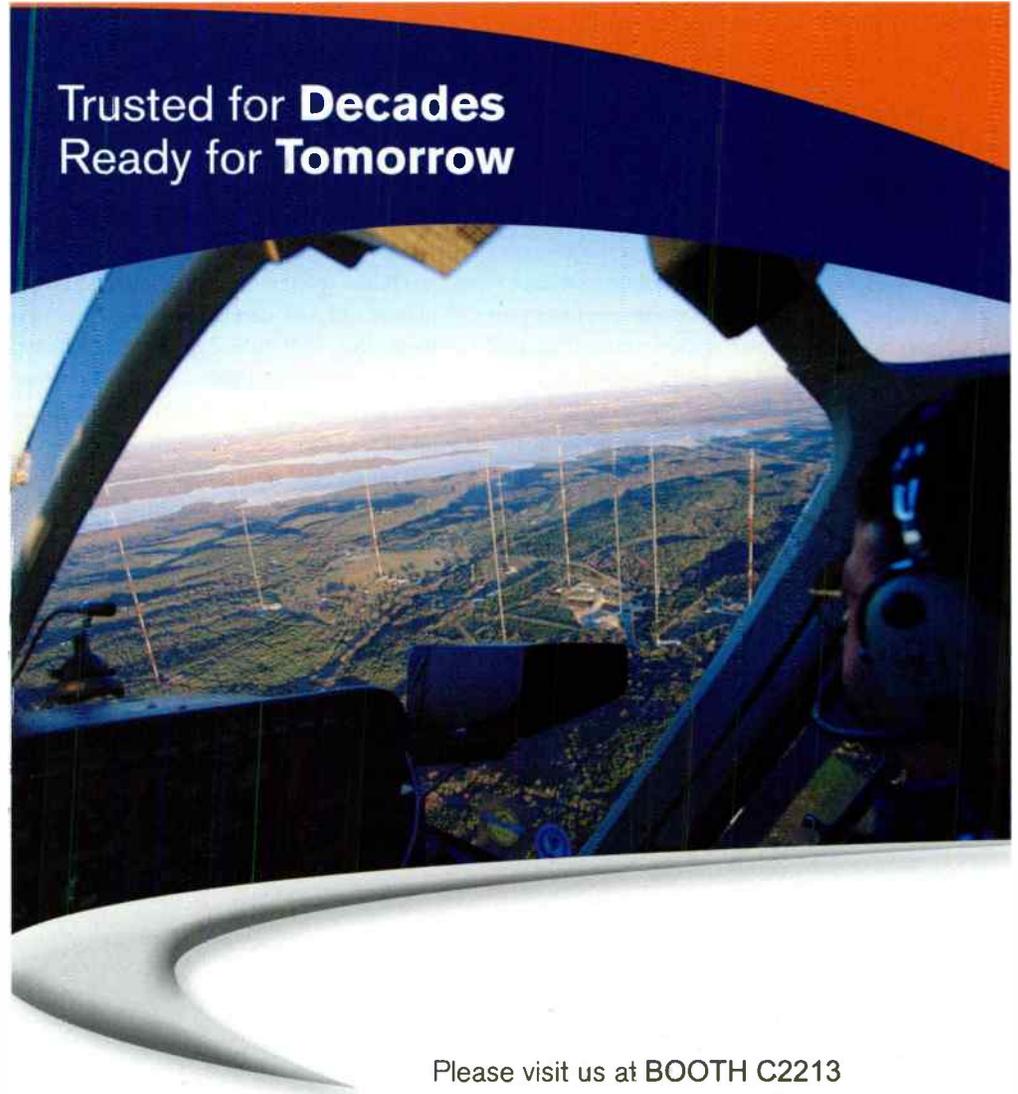
and redundant Internet service to support WestStar's in-house hosting of all its websites, audio streaming and the reliable delivery of the video broadcast to Tata Communication for video streaming distribution.

Radio continues to evolve and change to

maintain its place in multimedia entertainment. This new facility for WestStar TalkRadio Network and "The Kim Komando Show" is a perfect example of the marriage of radio and TV.

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Don't Stroll by These Transmitter Manufacturers

by Doug Irwin, CPBE DRB AMD

When I walk through the doors at the Las Vegas Convention Center, inevitably, I make a beeline for the transmitter manufacturers' booths. Most of my colleagues do the same thing.

Aside from consoles and routing systems, nothing represents a larger commitment on your part than the purchase of a new transmitter, and therefore, they deserve a particularly high level of study. It's easy to look primarily at the most well-known companies and then move on to the next item on your list; but there are other manufacturers out there worthy of your attention. In

this article we're going to look at many of them. I'm also including the booth numbers of the companies exhibiting at the NAB Show, which should make your floor planning a little easier.

Quite a few manufacturers offer AM transmitters and **Armstrong Transmitter** is one of them. Their X-500B and X-1000B models are rated for 600 W and 1200 W, respectively (output via rear panel PL-259 connector), and use up 7 RU of rack space (20-inches deep).

Using a PDM modulation scheme, the units are capable of 150-percent positive modulation

The Armstrong X-1000B—fitting in seven rack units.



peaks (remember — the legal limit is 125 percent). They perform at 80 percent overall efficiency (AC to RF out). Remote control GPIO remote control is accomplished via a rear-apron dB25 connector.

Armstrong also offers FM transmitters; the T series, which is a single-tube, grounded-grid design, comes in power levels up to 35 kW. Their line of solid-state transmitters includes the FM-2500B, the FM series B (up to 12.5 kW) and the series C (up to 6.5 kW).

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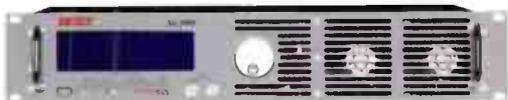
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Bext XL-2000

Bext (N5434) is probably best known for their XL-series line of solid-state FM transmitters. The XL-2000 can generate (as you would expect) 2000 W but uses only two rack spaces. Power is adjustable from 0 to full power, with soft-start control; APC maintains the output power at any preset level. (Type 7-16 female DIN output connector is its standard; 7/8-inch EIA flange connector is an option.)

The XL series features a “modular layout with plug-in, easily replaceable circuits and parts,” according to their literature, and also includes a low pass/harmonic filter that meets or exceeds all FCC and CCIR requirements. Access to settings and all readings is available on the front panel via menu display, but full remote control is also provided by way of IP. Options include AES input and internal stereo generator with a fast audio clipper.

Bext recently announced a 6000 W version of the XL series. As the name implies, it can generate up to 6000 W of RF, using four RUs.

The STX 10 is Broadcast Electronics’ newest solid-state FM transmitter, requiring 22 RU of vertical space in a standard rack (30-inches deep). It can be seen at booth N3030. STX 10 makes use



BE STX 10

of hot-pluggable power amplifier modules and power supply modules, and achieves 70 percent AC-to-RF efficiency. (If you are planning to transmit HD Radio, you would then equip the STX 10 with a STXe 500 exciter.)

The STX 10 can be accessed from any PC, tablet or smartphone and is also SNMP V2 and V3 compatible. In fact, BE announced the release of a direct connection interface with the Davicom remote controls, making use of the built-in SNMP agent in the STX 10, and the SNMP manager in Davicom’s DV-mini and the DV-208/216 remote controls. STX 10 can also be used in an N+1 system, or in a single frequency network, due to a delay feature in the exciter.

BE offers transmitters in five power ranges. The largest single-tube transmitter line is the T-series with a range of 20 and 40 kW; the S-series offers a completely solid-state solution in the 4 to 20 kW range; the solid-state C-series range is from 500 W to 5 kW; the STX-LP series range from 1 to 5 kW; and the STXe from 5 W up to 500 W.

BE produces two lines of AM transmitters: The A series (500 W to 10 kW) and the E series, at 2.5 or 5 kW.

BW Broadcast (N2838) has a growing line of transmitters.

Let’s take a look at the TX2500 V2. As the name suggests, it tops out at 2500 W, but perhaps more

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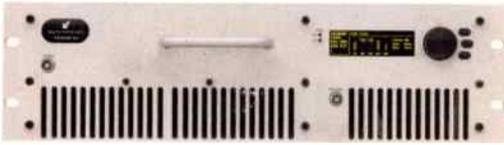
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BW Broadcast TX2500 V2



importantly, it's an all-in-one solution, meaning that it offers an exciter and power amplifier in one box, taking up three RU; the output connector is a 7/16-inch DIN. Additionally, the TX2500 V2 includes audio processing from BW, as well as its own stereo generator (although, since it has a composite input, you can use any processor/stereo generator combo to drive it).

It has one "slide-in" power supply module and is spec'd to run between 220 and 240 VAC. AC to RF efficiency is listed at 75 percent at the 2500W output level. The user-interface consists of 3 buttons, a rotary encoder, and a 256 by 64 graphics display.

Provisions for remote control include GPIO via rear-panel dB9 connector; remote control by way of rs-232; and remote control via IP (HTTP or telnet).

Continental Electronics (N3430) continues to offer the 816R line of FM transmitters and the 816-HD and 816-HDR lines (HDR meaning "HD-ready"). The 816R line covers the power range of 11 to 40 kW, using the same three-bay design for the last 30 years, with the 4CX15000A, the 4CX20000E or the 4CX25000C (depending upon power level, of course) driven by the solid-state IPA.

The 816HD family of transmitters is based on three different analog FM and HD power levels: the 816HD-20 for power up to 20 kW; the 816HD-25 up to 25 kW of power; and the liquid-cooled 816HD-28L for applications up to 30 kW of analog power.

Common features of the Continental line of FM transmitters are the single-tube design; solid-state IPA; SCR "soft-start;" automatic power output control; use of the quarter-wave cavity in the output amplifier; use of the



Continental's 816R series comes in red livery.

grounded screen grid circuit using screen neutralization; automatic filament voltage regulation; automatic power interrupt recycle; two independent VSWR protection circuits; and a positive-pressure cabinet, which helps to keep the inside of the transmitter clean.

If you are in the market for a lower power transmitter, then by all means visit **Crown Broadcast** at N3831.



The Crown E-250 allows for monitoring in the cloud.

The Crown E-250 (from Egreso — see below) supports both analog and AES inputs (sample rates up to 192 kbps) with built-in silence detection and automatic fail-over driving the built-in stereo generator. The E-250 also has a composite input so that you can make use any combination audio processor/stereo generator.

The E-250 also includes an integral RDS encoder and an FSK IDer (should you want to use it as a translator).

Crown has a line of stand-alone FM transmitters, as well, including the FM600. It's available in three configurations: The E is a basic exciter with composite input only; the T could be a good choice for the lower-power broadcaster because it includes a built-in audio processor and stereo generator; and the R is the translator option with built-in receiver.

Crown also offers a line of FM of higher power transmitters, including the FM1K, FM2K, FM4L and the FM10K.

Egreso (part of WorldCast Systems, N6134) has an extensive line of solid-state FM transmitters, from power levels as low as 100 W, to as high as 10 kW. Some of the common features in this product line are direct-to-channel digital modulation; built-in stereo generator; analog and digital audio inputs; silence detection and intelligent



Egreso FM 10 kW



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failover; GPIOs for local remote control; an embedded Web browser and SNMP for remote control; and a dynamic RDS encoder.

Perhaps more interesting are the ways in which the Eceso transmitters can be operated via IP; they could be particularly useful for those of you with a far-flung network of transmitters.

Advanced Measurement Interface allows the end user to see a real time dashboard that provides an at-a-glance overview of the transmitter performance. Built-in instrumentation enables detailed analysis of the RF spectrum, baseband spectrum, audio spectrum and peak meters, all displayed simultaneously.

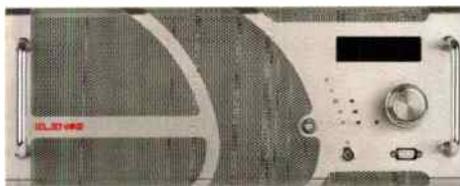
Expert Maintenance Reporting is a proactive service which sends regular reports on the status of parameters, such as temperatures, currents and voltages, plus information on the performance and lifespan of components such as the fan and power supply of the transmitter. The system works through a data cloud managed by WorldCast Systems.

Once access to the service is granted, the user can enable the EMR service on Eceso transmitters within seconds with an authorized account ID. From then on, the transmitters will automatically push reports to the EMR Cloud for centralization, in-depth processing and automatic notification.

Elenos (N1530) is offering a compact line of FM transmitters they've christened the Indium series, comprising the ETG 2500, the ETG 3500 and the ETG 5000, fitting in four RU of rack space and using a 7/8-inch EIA flange on the output. Included is a built-in exciter, with a composite input, meaning that any audio processor/stereo generator combination can be used; additionally, the ETG series includes a built-in stereo generator with analog and AES inputs (24-bit, 32 through 96 kbps sample rate, with automatic fail-over the analog).

More than 50 parameters are available on the front panel OLED display; configuration and adjustments can be done via the front panel as well. RS-232/485 access is available via the front panel; remote control can also be accomplished via GPIO or optionally via SNMP.

The ET Indium high power product line consists of FM transmitters in which the high power output is obtained through the combination of a suitable number of 4RU medium power amplifiers (5000W), a single ETG 2RU,



Elenos ETG Indium line

or dual set of 2 ETG 2RU exciters and a combiner for the power amplifiers. The overall RF power of the models in this product line ranges

from 10 kW to 60 kW.

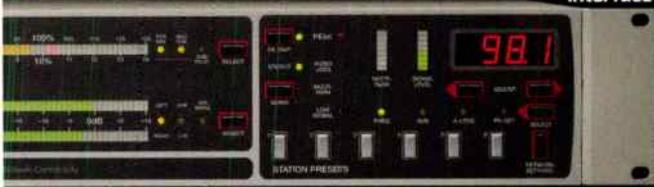
GatesAir (booth N2512) will be showing an extensive line of FM transmitters.

Let's look at the Flexiva FLX liquid-cooled transmitter range (for power levels between 5 and 80 kW). The FLX incorporates a heat exchanger that is "more efficient than air-cooled processes, especially at higher power levels,"

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according to their literature. The heat-to-liquid transfer process cools the power amplifiers without dumping the excess heat in to the space surrounding the transmitter, thus lowering the air conditioning needs, further reducing utility costs.

FLX includes redundant cooling pumps operating in a closed-loop design, with auto-changeover capability. The pump and heat exchanger motors are speed-controlled to lower operating costs and provide optimum cooling performance over an array of weather conditions.

Some of the Flexiva's other important features are as follows:

- For air-cooled versions: continuously variable speed fans optimize cooling; redundant internal cooling fans draw air from front to rear with ducted air options available
- Digital Ready: FM, FM and HD Radio, HD Radio-only



The GatesAir FLX, liquid-cooled version

- Maintains power up to 1.5:1 VSWR. Proportional VSWR fold-back for safe operation at reduced power into marginal loads (icy antenna etc.)
- Global control and monitoring via IP; the remote graphical user interface works with any PC, tablet or smartphone
- Full SNMP network control and monitoring support
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- N+1, Dual Transmitter and Main/Alternate and with automatic switching capability

GatesAir continues to offer AM transmitters as well — the line includes the Flexiva DX (10 and 15 kW); the Flexiva 3DX (25, and 50 kW); and, the Flexiva DAX (1-6 kW).

At booth N2522 you can see Nautel's newest transmitter line for FM, the GV series. It's completely solid-state and of modular design, so that

failures in one (or more) PA modules, or power supply modules or the user interface itself, will not take the transmitter completely off-the-air.

This year Nautel will expand the GV product line to include 60 and 80 kW models. All GV Series transmitters include Nautel's Advanced User Interface with 17-inch touch screen monitor and IP access; so whether you are on-site in front of the transmitter or at some other location, 100 percent of the AUI is available to help you manage the transmitter. With the AUI, you can configure and/or monitor the following:

- All the individual preset configuration: frequency, power level, HD power level, program audio input
- Dynamic RDS scrolling
- New oscilloscope instrumentation



The 40 kW model is part of the Nautel GV line.

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The Gamma comes in five power levels between 2 and 5 kW.



kW versions.

PTEK offers the ES Series of transmitters as well, with output powers from 300 W to 1200 W.

Rohde & Schwarz (SL1205) is a transmitter manufacturer that many of you are probably not familiar with —though it's one of the largest internationally. Their THR9 high-power FM transmitter line is liquid-cooled and can deliver FM output of up to 40 kW in one rack and 80 kW in two racks.

The THR9 transmitter family for band II attains overall efficiency values of up to 75 percent in analog FM mode; they incorporate redundant transmitter cooling systems; and they support the hybrid HD Radio standard (IBOC) as well as purely digital standards in band II (87.5 to 108.0 MHz).

I'm trying to decide which is more fun: Sitting down to dinner with business associates and friends that I see once per year — or standing at a transmitter company's booth, grilling sales guys with questions. At this year's NAB Show, I plan to consider that question once again. **0**



The Rohde & Schwarz THR9 family can be used for FM, HD Radio or DAB.

- Unique MER instrumentation
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- Logging of all events
- SNMP support
- Email notifications

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Nautel offers line of AM transmitters as well, known as the NX series, at the 5, 10, 25 and 50 kW levels. This year at the show they're introducing 3 and 15 kW versions to the NX series.

At the N4332 booth you will find the transmitter manufacture OMB. They offer a line of solid-state FM transmitters from the 500 W up to the 5000 W level. Their EM 5000 HE "hot plug" is comprised of three of their FMA 2000 HE power amplifiers, achieving greater than 73 percent AC to RF efficiency. As the name implies, the RF amplifier modules are "hot-pluggable" as are the power supply modules.



Modules are "hot-pluggable" for OMB EM 5000 HE.



Some of its other features are the TFT screen and touch keyboard to control and to visualize operational parameters; speed control of cooling fans according to temperature of power modules to optimize power consumption while minimizing dust accumulation and noise; advanced protection against load mismatches and fast protection in case of excessive reflected power and/or excessive input power; and, remote control by GPIO, RS-232, or optionally, IP (both HTTP and SNMP).

This is a power amplifier only and would require an exciter, such as OMB's EM 25 DIG Plus, for the complete system. The DIG Plus supports analog mono, composite, and (optionally) AES inputs. A built-in stereo generator is an option as well.

The PTEK (N4130) Gamma series of FM transmitters (between 2 and 5 kW) have the following common features: built-in exciter and stereo generator with analog inputs (with external composite input as well); FSK IDer (for use in translator service); frequency agility; AC power input accepts 208-264 V range; and front panel metering, with a local remote control interface. Four RUs needed up to the 3.5 kW range; seven RU for the 4 and 5

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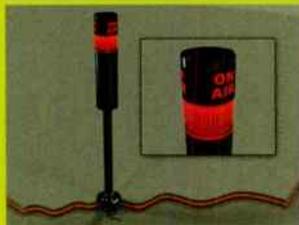
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NPR Goes On-Demand With National, World News

by Fardau van Neerden

We continue our series on the evolution of streaming technology. In this month's edition we cover the technical aspects of NPR One, an on-demand service that brings hand-picked stories from the entire radio network to mobile devices. We talked with Demian Perry, director of mobile at NPR, about what NPR considers the "the Netflix of listening."

Fardau van Neerden: What was the reason for developing NPR One?

Demian Perry: To remain relevant with digital

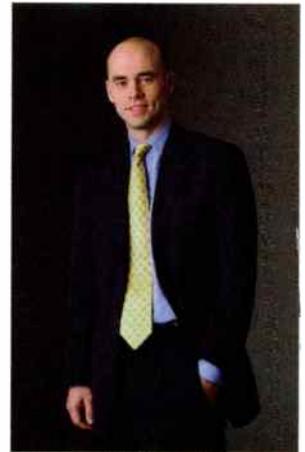
audiences seeking a pure-play listening app.

van Neerden: When did development of NPR One get started?

Perry: Early prototypes and requirements gathering began in 2013.

van Neerden: Did you look into existing platforms to meet NPR One goals?

Perry: Yes, but we demonstrated that we could get significantly higher audio engagement with a pure-play listening app.



Demian Perry is director of mobile at NPR.

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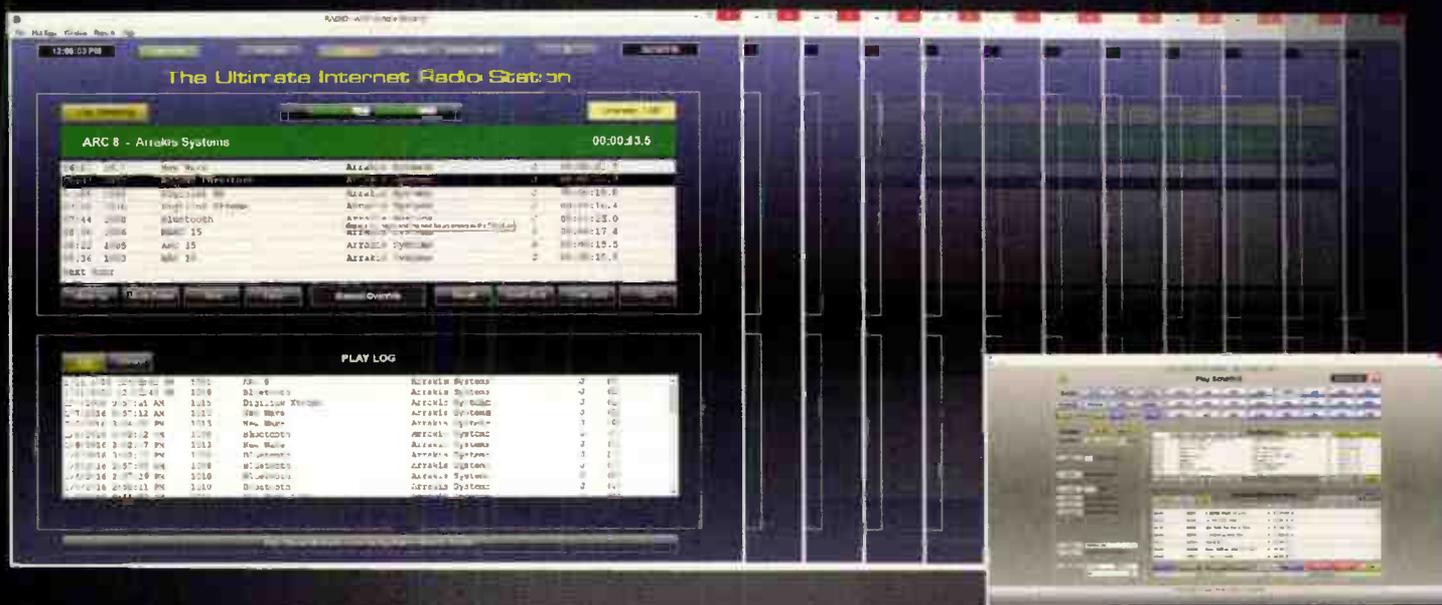
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World Radio History

FvN: Why weren't existing platforms suitable? And do you think that the industry is catching up in this area?

Perry: Whenever we present audio content alongside the transcript or an article adapted from the audio, our users almost always (at least 95 percent of the time) choose to skim the text and forego the audio. Remarkably, though, once a user starts listening to audio, nearly 90 percent listen all the way to the end of the story, and almost everyone continues listening past the original piece.

It's a bit like the way a dieter might be reluctant to try a dessert, but once they take the first bite, it's hard to stop. Our time constraints have made us all into media dieters, and we are all reluctant to commit to a broadcast experience (particularly over mobile). It's unfortunate because, unlike the way our bodies respond to a rich dessert, our minds are probably all a little better off the more we consume public media.

van Neerden: What challenges did you face during development?

Perry: The largest challenge was reconciling our experience as curators with the need to use some data science for content personalization.

van Neerden: How is content ingest workflow managed?

Perry: Through our existing, homegrown CMS [Content Management System].

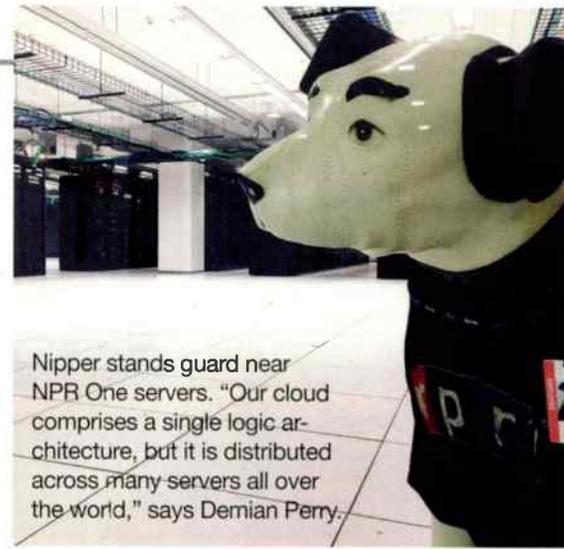


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Nipper stands guard near NPR One servers. "Our cloud comprises a single logic architecture, but it is distributed across many servers all over the world," says Demian Perry.

van Neerden: How long does it generally take for an item to become available for customers?

Perry: Less than 10 minutes ... it's a near-live experience.

van Neerden: How do you maintain a general level of audio quality when so many different local broadcasters contribute content?

Perry: Our stations set quality standards for the network, and we enforce those standards through algorithmic filters when possible. For example, we can set duration and recency filters for all ingested content. We also share ratings with our stations along with benchmarks, so that they can constantly improve their approach to storytelling and newsgathering.

van Neerden: Do you use cloud solutions for parts of NPR One?

Perry: All the logic is in the cloud, and much of the experience and cohort testing is also dictated by the cloud.

van Neerden: Do you use multiple clouds as a means of redundancy/failover/load-balancing?

Perry: Sort of. Our cloud comprises a single logic architecture, but it is distributed across many servers all over the world. We also have redundancy in our databases and caching layers to keep our service up in the event of a more catastrophic crash.

van Neerden: Are there any software as a service solutions that you use or do need to maintain your own application stack and use the cloud solely as a platform as a service?

Perry: The core listening service is a mix of open-source software and our own, homegrown, NPR-proprietary stack. For competitive reasons, we have to keep the individual components secret, but it will come as no surprise to people familiar with recent developments in data science that we are able to batch and cache personalization decisions. In other words, we are relying more and more on a "job server" approach to codify user content preferences on a nightly basis to simplify the next day's calculations.

van Neerden: How do you handle traffic? Do you rely on content delivery network, and if so, do you maintain your own CDN or use third-party?

Perry: We use a number of third-party CDNs.

van Neerden: Do you measure the user listening experience with client- and/or server-based metrics?

Perry: Yes, we use both. Client metrics are all third-party, but we have developed some homegrown cloud metrics as well.

van Neerden: How important is quality of service, and how do you manage that?

Perry: Very important! We track audio buffer times and dropouts, and measure API response times constantly. We manage through constant codec/protocol/bitrate improvements and heavy performance testing of loads that are many times our highest observed spike.

van Neerden: How important is search and recommendation and how did you develop this offering?

Perry: We use third-party search engines and have a homegrown recommendation service developed by our dev team with support from our data science team.

van Neerden: Can users download podcasts for offline playback?

Perry: Podcasts are automatically downloaded as the user is accessing them, and we are developing user-initiated downloads.

van Neerden: Do you use adaptive streaming technology or plan on doing so?

Perry: Yes. HLS is baked into the cloud for nearly all our audio.

van Neerden: Do you need to apply digital rights management on your content?

Perry: This is handled by our API, and in

some cases, through our contract agreements with platforms.

van Neerden: Do you plan to move into the automotive entertainment with NPR One (Apple Carplay/Android Auto)?

Perry: Yes. We already support both.

van Neerden: Do you plan to enhance NPR One with exclusive material?

Perry: We are already running exclusive content in NPR One, and we plan to expand exclusivity and early listens extensively in 2016.

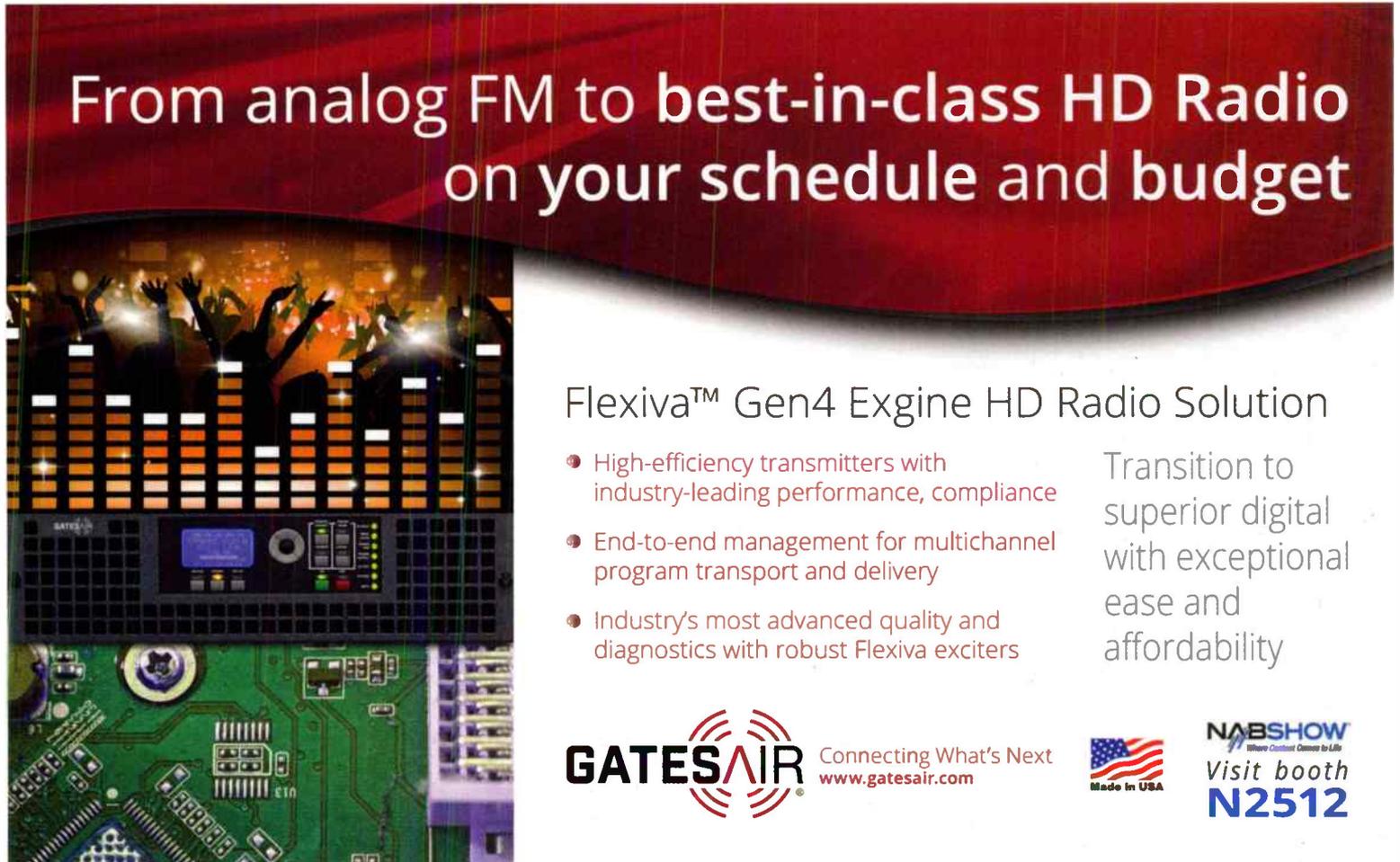
van Neerden: Do you think that NPR One is a step into fully on-demand (IP-based) consumption of content and eventually the end of linear broadcasting/programming?

Perry: What we're seeing in the music space, at least, is that digital listeners overwhelmingly prefer the on-demand user interactive

model. This is evidenced by the relative popularity of services like Pandora relative to live music streams.

But there are many things that are different with news and talk content. Unlike music listeners, our listeners don't like to hear the same thing twice, and with news there's certainly value to a true live experience. We also know from user surveys that many of our listeners value a host and the sense of community that comes from hearing the same thing at the same time as everyone else. These are problems that are hard (though not necessarily impossible) to solve in a service like NPR One.

So I guess we're not sure whether on-demand will dominate news the same way it has dominated music, but we've decided as a network that we can't afford to sit back and see what happens. We have to actively try to disrupt ourselves so that our news mission will remain relevant, regardless of the direction our audience takes. 



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by Doug Irwin
CPBE DRB AMD

On to the Amplifier's Output Deck

In this series, we've discussed whether an old transmitter was even worth fixing, followed by some techniques I've used to repair high-voltage power supplies; analysis and repair of control circuitry; and analysis and repair of the final amplifier input circuit. We've now reached the amplifier's output deck.

As I wrote previously, working with transmitters that use any kind of high-voltage (whether AC or DC) is inherently dangerous. *Never work on transmitters when alone or tired.* Take every precaution, and then take every precaution again.

At this point, you should be reasonably certain that the circuitry described in the preceding installments is functional. You'll never be 100 percent sure, of course, until you have the transmitter up and running normally.

There are more similarities than differences, from transmitter make and model to transmitter make and model. I can't describe the work you could have to do on every single transmitter out there, of course, so I need to emphasize common elements. Most of the problems you will encounter are not make/model specific anyway.

CLEANING AND MECHANICS

The first thing to do is to make sure the output side of the amplifier is clean, with all particulate matter removed. If you have not done this before, note that cleaning fluid used to remove "stuff" from the inside of the transmitter should a) evaporate quickly and b) not leave any residue. For this purpose I generally use isopropyl alcohol.

Take every precaution, and then take every precaution again.

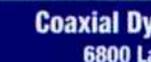
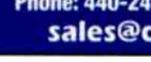
Be sure that all mechanical adjustments actually respond to their front-panel controls. These could be gear-driven, or motor driven; in either case, test them and don't bother going on until they're working.

In my work with transmitters I have found a lot of the silver coating on parts in the output network is tarnished. I have never encountered any issues with tarnish. *Do not* use any harsh methods to remove it; in other words, don't use anything like sandpaper (even fine-grit) in an attempt to "clean" silvered components. All you will end up doing is taking the silver off, which will likely lead to other unintended consequences. I sometimes use Scotch-Brite or a similar product to clean finger stock along doors and hatches, but that's it.

THE TUBE SOCKET

The aging tube socket is one of the most frequent sources of problems in any vacuum tube amplifier. The finger stock, arranged in concentric rings, make up connections to the tube itself, and often get broken and (due to gravity) end up in other parts of the socket. For this project, your tube is still out of its socket anyway; so, using as much light as you can, and an inspection mirror if necessary, inspect the socket for missing finger stock pieces and if too many of them are

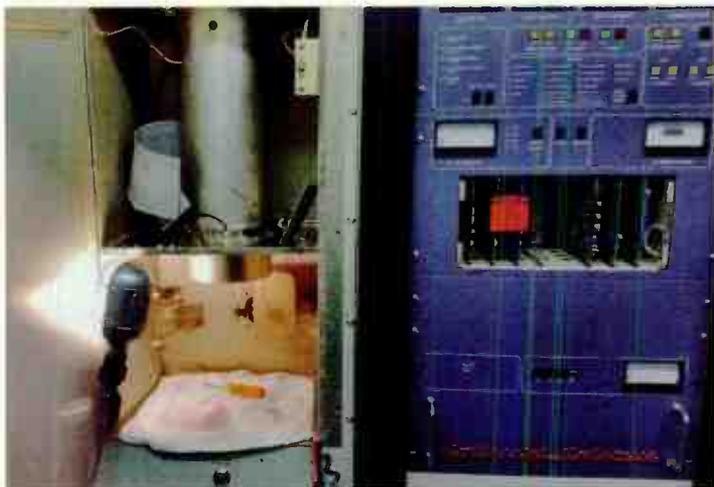
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If you are not working directly in the socket, cover it to keep screws, nuts and washers from falling in, which could make for a bad night.

gone, find out if you can get a new socket.

Screen bypass capacitors that are either connected directly to the screen grid ring (like doorknob caps) or even made up of a thin layer of dielectric material sandwiched between layers of the socket can and do fail. In the case of the former, get replacements and change them out. In the case of the latter, you'll be forced to get a new socket. Be forewarned

that the "sandwich layer" bypass caps can fail under operating (i.e., screen voltage ON) conditions, but seem completely fine otherwise.

INPUT AND OUTPUT ACCESS POINTS

As you likely know, any amplifier can turn in to an oscillator if its output-to-input isolation is less than its gain. In other words, if I have an amplifier with 20 dB of gain, but only 19 dB of isolation between its output and its input, I will (at best) have an unstable circuit on my hands. Some transmitter manufacturers attached "finger stock" or RF gasketing around the inside "boundary" of the hatches so that the hatch itself doesn't pass RF. The point is to keep the openings (even when they are closed) from diminishing the output-to-input isolation of the amplifier. As such, they're very important to the stable operation of the amplifier.

Both RF gasketing and finger stock are fragile and have a tendency to break, or come off, the door hatches over time, so be careful with them. If they are missing, you'll need to replace them.

Next time we'll look at high-voltage capacitor issues, tuning, neutralization and harmonic and spurious content. 0

The author is engineer/project manager for iHeartMedia Los Angeles and tech editor of Radio magazine. Contact him at doug@dougirwin.net

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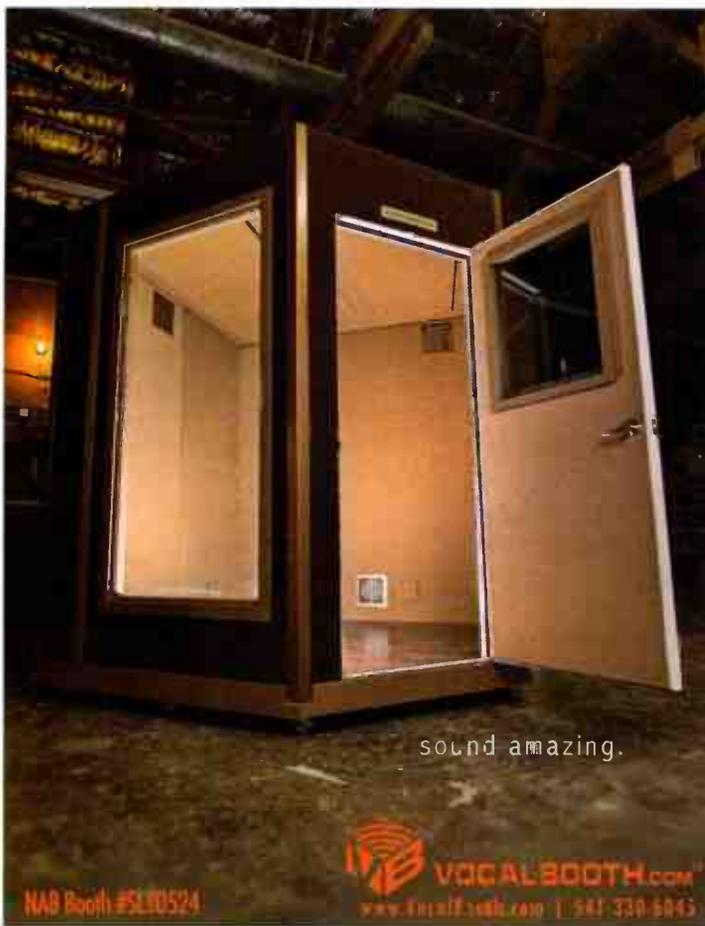
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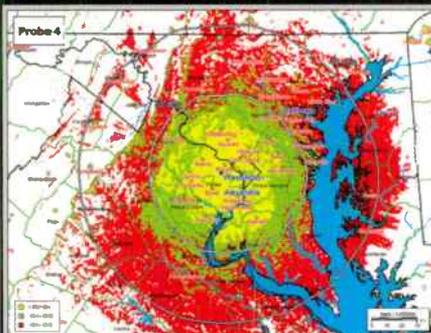
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Serendipity and the Spring Show

by The Wandering Engineer

My GM can't figure out why I'd go to the NAB Show and burn up half my vacation time. She's sure that this is all about that for which Las Vegas is famous.

Gambling? Engineers don't do this well because they can do the math. She'd maybe help a little with the expense, if I brought back some real value to the station. She wants to know what that is.

That's not so easy, not because I don't know, but because we have no common language or experience when it comes to such things. It's in my job description to interpret things, so I tell her that I'll visit some vendors, ask why they haven't fixed whatever, buy some stuff on a discount, learn about ways to save money and make more of it. It's half-true.

Then the rationalization: It's Las Vegas, so the cheap rooms are really cheap and flights are a near giveaway.

If you're a vendor, the sales manager will want a schedule of every customer meeting and expects that every minute has a plan and purpose. Piles of virtual paper will be generated and badges scanned. The smart sales managers know it's more about giving his team the excuse to call their customers, as the plans rarely come together. Even the dumb ones won't care when the serendipity kicks in and the lead list grows with unexpected opportunities. Still, every vendor I know will call and ask for help to fill their meeting list.

I'm a big disappointment as a customer because I never use NAB Show time for someone or something I can accomplish from home. I don't see the point of hanging in a clique with my local SBE buddies and particularly vendors that might buy lunch and spend some serious time with me here at home. Still, we play the game. I'll send an "I'm sorry I missed our floor meeting ... please call on me as soon as you



Talkin' HD Radio and NextRadio at last year's show.

are back" note when I get home. I write these before I leave and save them in "drafts."

NAB will send out the floor plan and schedule of sessions. OK ... the Saturday SBE Ennes program is a must, but it makes my head hurt worse than a hangover. (It's a good hangover.) There will be a few other sessions to take in. That is the end of the structured time for me.

My floor map isn't all marked up. I'll wear the same comfortable shoes that I have worn only this week for more than a decade. They used to be a bit un-dressy for the older NAB costumes, back when almost all badges had call letters on them; now that few badges have call letters, and a logo shirt or simple blazer is cool, the shoes are a bit over dressy.

NAB Show is about serendipity. The less I plan, the better it is. Who knows who you will run into and under what circumstances? It's not about what you expect, it's about what you can't even imagine.

These colloquia present many opportunities for therapy and exercise. I like that people wear badges; it's a small industry, but between the time of our first NAB Show when we know no one and this next one... well there are a thousand people in this industry for whom I remember everything but their name. I'm face-recognition-challenged and

name-impaired for people I only see a few times a decade. The badge gives context. Otherwise, I'll make the connections about an hour after we part.

It's a flood of people and images and ideas. My imagination soars. I day-dream half the time I'm there. It will take all year to implement the great ideas I think I'm having. For some reason in one of those sessions, the diagram of the solution for some vexing problem comes to mind, and I scratch it into my notebook before it fades. For the other 51 weeks of the year, we work in a near vacuum, but here, we'll share hints and tricks and sentiments.

My career trajectory has changed at NAB Shows. It's the ad hoc dinner. It's the chance meeting. It's the committee meeting. It's the disruptive device or concept. It's the great idea I didn't know I could have.

But mostly it's passion for broadcasting. I don't know that going to NAB Show makes me a different kind of broadcast engineer, or if I go to NAB Show because I am a different kind of engineer. It really doesn't matter does it? 

The Wandering Engineer is an industry stalwart who has been in broadcasting since the days of Marconi and Tesla. He gives his thoughts on the current state of broadcast engineering and the broadcast engineer.

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