



Hammer at the Plate

Kyle Hammer, age 23, gets to indulge two passions: baseball and radio engineering.

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HE-AACv2 Lowdown

Jan Nordmann of Fraunhofer calls it a new pathway to high-quality mobile Internet radio.

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A Broadcaster's Ginsu Knife

It's intended for electrical contractors but can make your life easier too.

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Radio World

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The Newspaper for Radio Managers and Engineers

May 6, 2009

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▼ The fascinating, shadowy sequel to the story of a historically interesting World War II-era transmitter.

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▼ Who's making what in the world of transmitters?

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NewBay Media

Unified Theory: HD-R Power

NPR Labs, Now Working More Closely With iBiquity and Commercial Groups, Explores a 'Managed' Power Hike

by Leslie Stimson

WASHINGTON NPR Labs has begun lab tests and could begin field work this month as part of its further studies related to a possible digital FM power increase in the United States.

Proponents say regulatory approval of a voluntary power increase is needed to improve digital signal coverage before HD Radio portables arrive on the market, expected this fall.

Opponents say raising digital power will interfere with FM analog signals, essentially shooting terrestrial radio in its own foot because most listeners will still hear radio via analog signals for a long time to come.

See POWER, page 3 ▶

'I've Tried to Serve The Profession Well'

Jack Sellmeyer Is NAB Engineering Achievement Award Recipient

by Randy J. Stine

McKINNEY, Texas Speaking on a cell phone while traversing wide-open stretches of roads in west Texas on his way to see a client to help with a studio rebuild, Jack Sellmeyer is quick with a story and not shy about sharing his opinions about why AM IBOC is doomed and how broadcasters in large communities have lost touch with their listeners.

It's easy to see why many of Sellmeyer's colleagues consider him one of the greatest raconteurs of broadcast technical history. His 50-year career clearly has given him a privileged view of broadcast evolution.

You also can understand why Sellmeyer is the recipient of this year's NAB Radio Engineering Achievement Award. The honor is bestowed upon industry leaders for significant contribution to radio engineering.



See SELLMAYER, page 6 ▶

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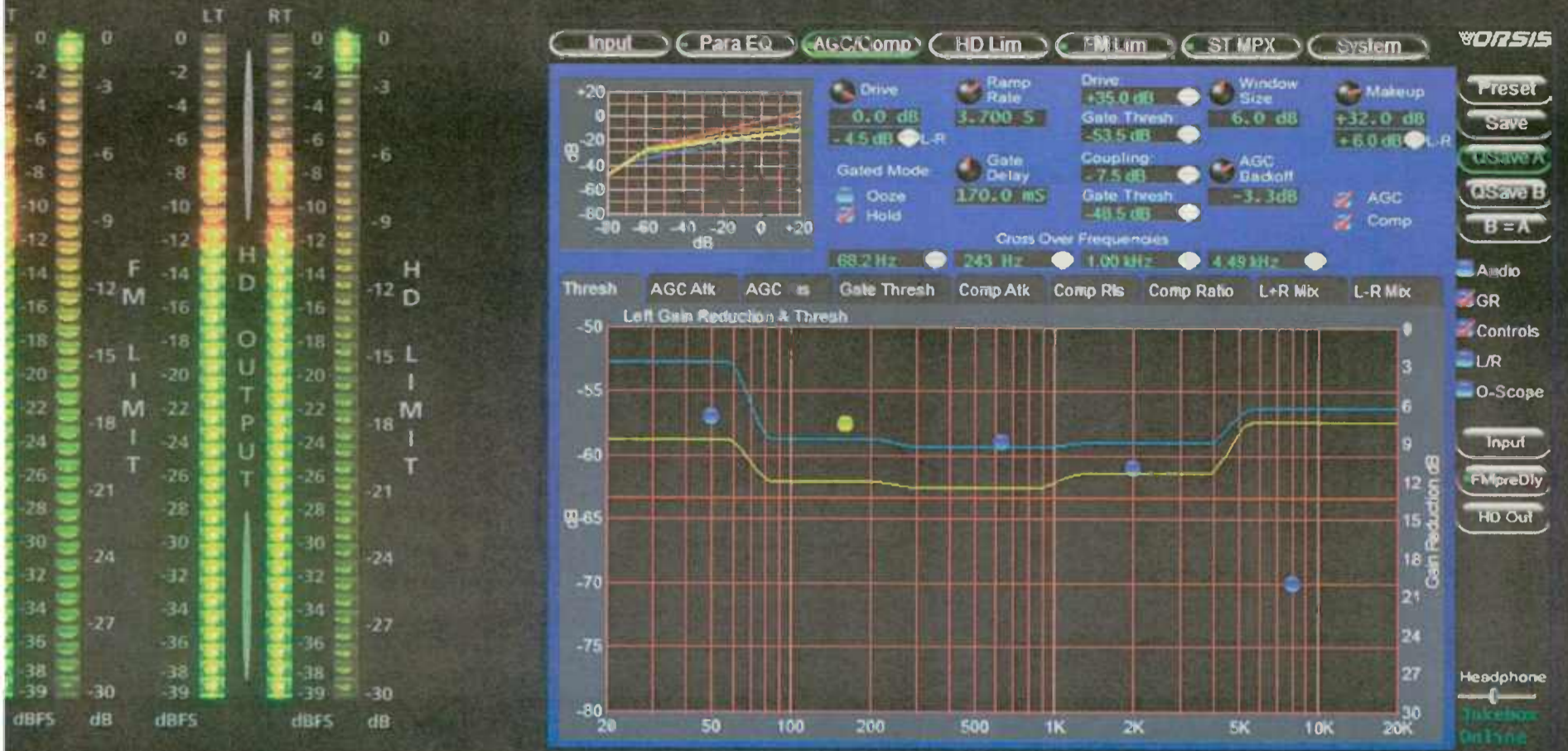


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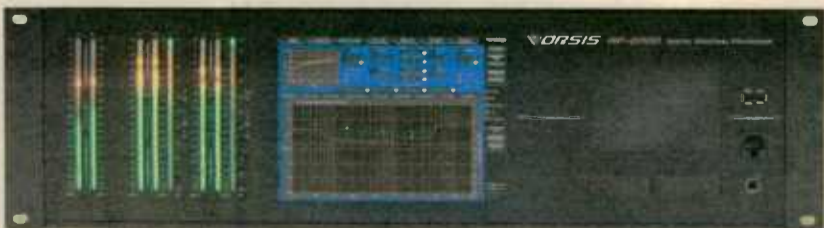
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Power

► Continued from page 1

Both commercial broadcasters and iBiquity Digital are involved in the new NPR tests. That's a change from last year when commercial broadcasters and iBiquity turned in test data in a joint filing to the commission while NPR filed its own test data and the two ended up with different, in some cases conflicting, results.

iBiquity and some large radio groups that have converted stations said their studies — showing predicted and actual results if digital power were increased by up to 10 dB (to minus 20 dB) — proved that the risk of harmful interference to existing analog service would be “minimal.”

NPR Labs data, on the other hand, “showed at least 16 percent of noncommercial stations would experience an impact to more than 20 percent of the population within their protected coverage area by falling below the signal-to-noise ratio where listeners rated the audio as good,” according to Mike Starling, vice president and chief technology officer of NPR and executive director of NPR Labs.

The new tests, funded with a \$350,000 grant from the Corporation for Public Broadcasting, are being conducted in a “collaborative and open fashion” with commercial broadcasters and iBiquity, according to Starling. Indeed, there's a working group in charge of test activity and a larger peer review group looking at

plans and procedures.

Included in the working group are the radio companies that first filed at the FCC last year in support of an FM IBOC power increase. These “joint parties,” including Clear Channel, CBS and Greater Media, “have a decision-making role” and a say over the project, according to Starling.

It wasn't clear in April whether funding would come from iBiquity or commercial broadcasters. However both have offered resources for the effort, meaning

iBiquity President/CEO Bob Struble has said IBOC stakeholders are trying to figure out exactly what a “well-managed” digital power increase would mean.

Starling concurred, saying the goal is to identify a “managed” way to raise digital power levels that will be acceptable to all of the stakeholders, including regulators, iBiquity and those with interference concerns as well as those pushing for the highest possible power level.

The efforts will establish industry recommendations for the amount of power

The goal, according to Starling, is to define what the stakeholders believe to be a managed digital power increase.

personnel, facilities and, in the case of iBiquity, test equipment and test vehicles.

What is a 'managed' increase?

CPB and associations such as the Consumer Electronics Association, the North American Broadcasters Association, the International Association of Audio Information Services and the Association of Public Radio Engineers are members of the peer review group. The testers report to this body.

The six-month tests are being conducted to figure out the best approach to increase digital FM power.

increase needed to improve digital radio coverage while protecting the existing analog FM system and its subcarriers.

In some cases, commercial facilities and their technical personnel may participate in the tests. The commercial entities are comfortable with NPR Labs doing the actual testing, he said, adding that other stakeholders may observe some of the testing.

Collaborating makes sense, he said. “We've got the same interests at stake. We all want to see HD reach its potential and serve the public.”

See POWER, page 8 ►

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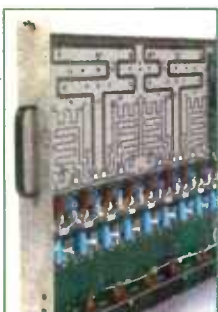
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How Much 'Oomph' Is Enough?

From the Editor



Paul J. McLane

I'm trying to assess whether I have the "oomph" to return to close to a full-time schedule, possibly returning to radio. I'm on full disability. I had a herniated disc that I knew about but chose to stay away from surgery prior to my accident, fearing its own risk of damage.

I am somewhat ambulatory for short distances with a walker, but choose to shop the big box stores with a wheelchair. Hand dexterity is pretty much shot; for example I was 40+ words per minute pre-injury, now it's under 15 — still usable, as long as major speed isn't needed. I have to take lots of Lyrical/Neurontin to avoid "pins and needles" and leg spasms.

working in the IT department at a college. (I sure don't have the stamina to keep up his schedule!) He was doubtful.

So the question I'm pondering is whether my involvement on a part-time basis (officially less than 15 hours per week) would be enough. My actual involvement may end up being more like 25 hours per week, but still, I'd be nervous with this arrangement if I had controlling interest.

Would you think if I moved from a walker to a power scooter, at least while on the job, it would help in the stamina department? If I might ask, was your injury lower down the spine? In a way, I feel fortunate that my injury was "incom-

I find that the belief that I can do 'it' is at least 80 percent of the actual doing.

— Jim Withers

Prior to my injury I was a traffic reporter in Des Moines for a number of years and worked for a while in the business office at the local DM Clear Channel outpost, WHO et al. Back in the 80-90 days, I was part of an effort to add a C2 to the Ottumwa-Oskaloosa area in southern Iowa. In 2000, as part of a "mid-life" crisis, I did a "table-top" drop-in of a class A in a small Midwest town.

I've been contemplating options to somehow start working again, since I'm still some 17 years off from official retirement age. As you might imagine, I'm reluctant to work in a traditional employee-employer setting and run the risk of being let go, then suffering some major speed bumps getting back on Medicare and Social Security.

I've been talking with a friend about whether I have the stamina to put the station on the air. He owns a couple of small-market FM stations in addition to

plete," but not so much with the C5-C6 injury spot. All of my appendages work, but none of them very well!

I look forward to your feedback. Also thought I'd add that while looking through my bookmarks I found your RW article on financing stations. Needless to say, it's another good resource.

Withers: Russ, thanks for the nice comments. Although I guess every disability is different, there do seem to be quite a few similarities.

I have Muscular Dystrophy, a very slowly progressive disease, affecting my arms and legs, so over the past 10 years — I was diagnosed 31 years ago — I have had plenty of time to adjust to the change in my abilities. Like you, I went from very high-speed typing and Morse code transcription (I'm a "ham") to hunt and peck!

I'm not sure how to advise on your "oomph," as you call it. As for myself, I

find that the belief that I can do "it" is at least 80 percent of the actual doing, so I'm pretty sure (based on your e-mail) that you could accomplish what you need to in order to get the job done.

The more serious concern, in my mind, is making the enterprise pay off! You reference my series of articles on financing a deal. Finding a station that you can afford, that will generate real cash flow quickly, and getting it with a reasonable debt load is the whole deal. It would be a disaster if you found that you could work around your disability, only to find out that the bank could care less about those things ... they just want their money paid back on time.

My only other advice is to be careful. I meant what I said in the article about my wife: she literally panics when she thinks I might be trying a bit too hard to poke around in the 8000 Volt power supply. And a disabled guy will turn into a burnt french fry just as quickly as an able-bodied guy, so stay well away from the HV stuff.

With regard to Social Security disability, it is my understanding that you are allowed to make up to a certain amount of income every month before they cut your disability payments. Look into the resources and FAQs at ssa.gov.

Finally, I applaud your guts. Your "normal" (and mine) requires a fair amount of positive thinking. I'm always impressed when I meet other folks who can pull that off.

See DISABILITY, page 25 ►

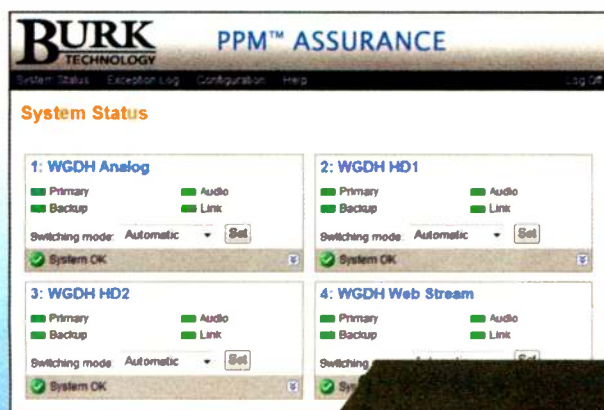
Russ Johnson and Jim Withers Share Thoughts on Managing With a Disability

The following exchange was prompted by the article "Don't Be Blind to the Possibilities" by Jim Withers in our April 8 edition. I share it with permission. The e-mail came from Russ Johnson of Cañon City, Colo.

Johnson: As a recent "recipient" of a spinal-cord injury, I found your article quite interesting, Jim.

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Public Radio Listeners Talk Tech

Satellite radio doesn't look like much of a threat to public radio growth "at this time" because the satcast technology "suffers unique challenges."

Meanwhile HD Radio has had a "miniscule" impact on the public so far and the technology is "fraught with several practical barriers that may hamper future growth."

These are two key findings of the Public Radio Tech Survey for the past year, conducted by Jacobs Media and sponsored by the Public Radio Program Directors, Integrated Media Association and NPR.

Some 30,000 public radio listeners from a total of some 80 stations were queried in the fourth quarter about a range of technology.

satellite radio subscription while 3 percent said they're absolutely going to drop it.

Forty-seven percent of those surveyed were aware of HD Radio.

Some 3 percent of respondents age 25-54 said they own an HD Radio and 4

ubiquitous and are gateways to texting and other multi-media activities. The iPod is "a game changer" and is owned by more than half of public radio listeners.

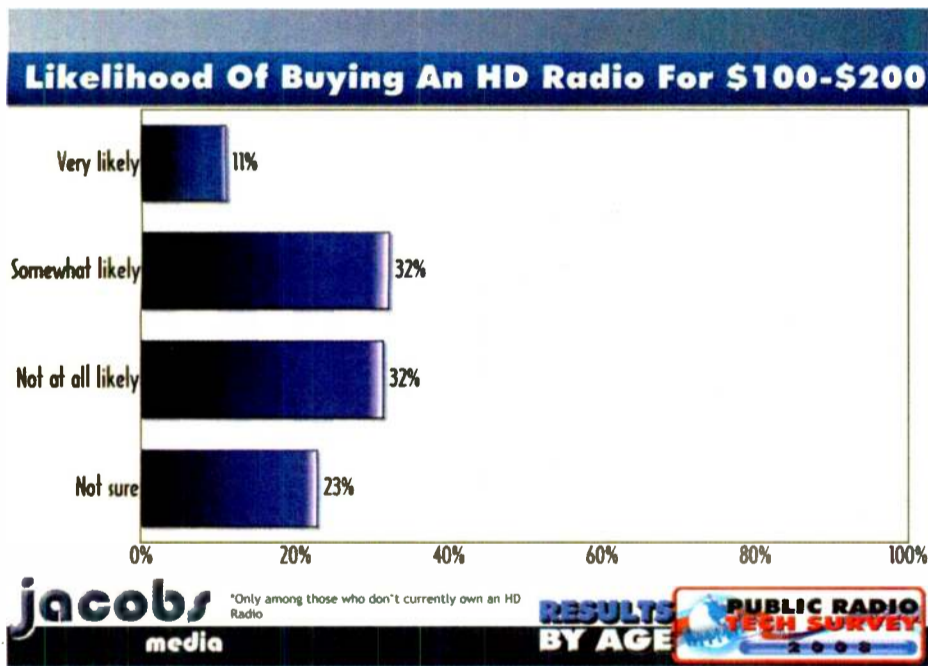
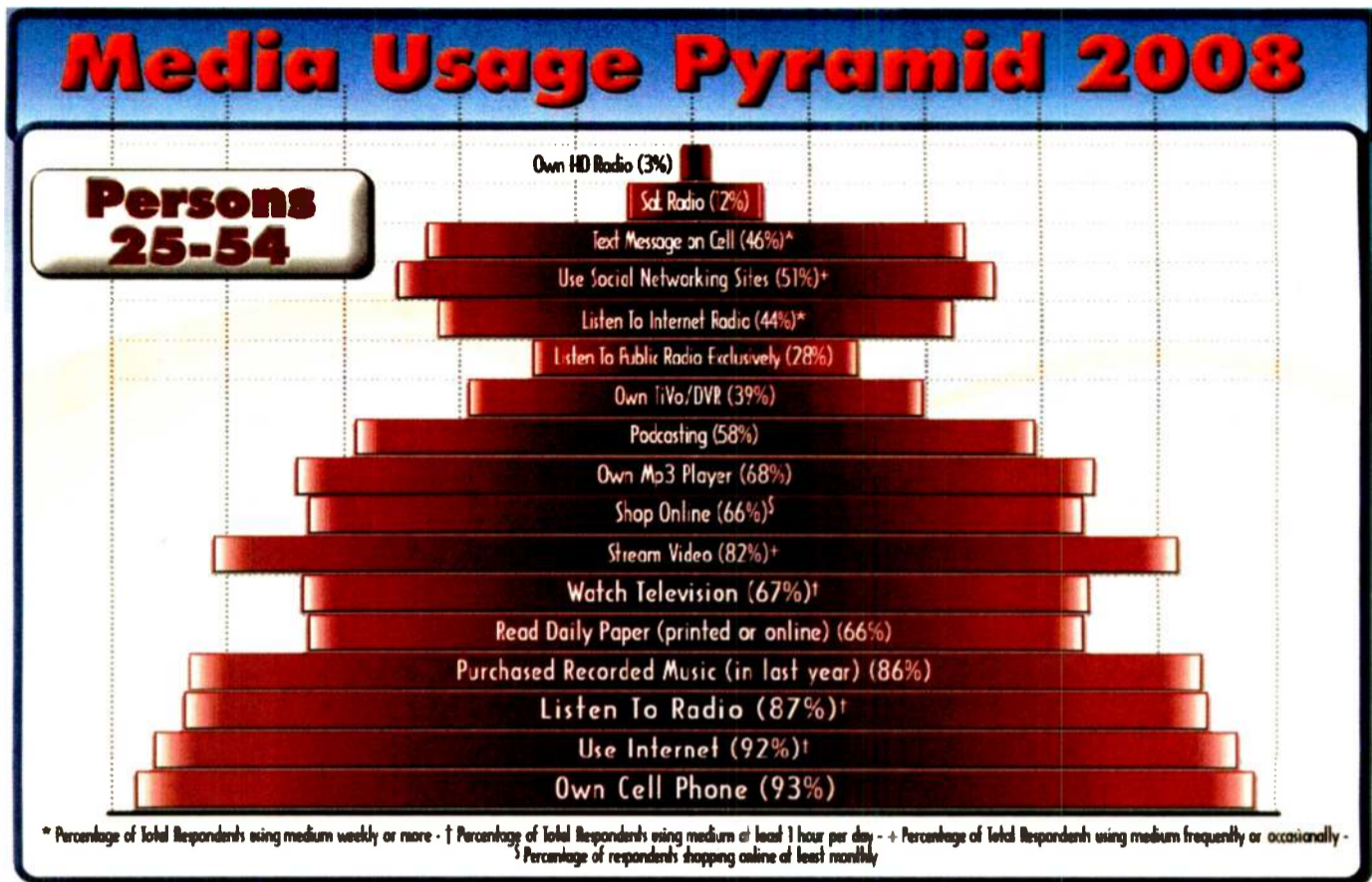
Streaming video, meanwhile, has rapidly become a major source of entertainment

and information, according to the findings, which are posted on the PRPD home page: www.prpd.org.

The survey also asked respondents about their fears about the economic downturn and concluded that the poor economy is affecting purchase decisions.

— Leslie Stimson

The iPod is 'a game changer' and is owned by more than half of public radio listeners.



The point is to help public stations, which paid for the data, better know their audience so the stations can spend their dollars wisely and invest in "technology that is congruent with audience usage, while considering future trends," states Jacobs in the findings.

Jacobs also conducts an annual tech survey among rock-formatted stations.

This is its first big tech survey for public radio; it was released in March. Future annual surveys will be able to trend the data for existing technologies, while providing the flexibility to include new gadgets and media as listener habits change over time, the company said.

Satellite radio plays a role in the overall media usage spectrum but is far from a mass-appeal outlet. Only about one in 10 (about 12 percent) currently subscribes to Sirius XM, according to the survey.

Of those satellite radio subscribers, 49 percent said they'd likely continue their

percent of those 55+ did, according to the survey, which describes HD Radio as still in the "embryonic" stage. Of the 3 percent who own an HD Radio, a total of 55 percent said they were satisfied with it vs. 7 percent who were not satisfied.

When asked the likelihood of buying an HD Radio for between \$100 to \$200, 11 percent said they were very likely to buy, 32 percent said they were somewhat likely to buy, 32 percent said they were not at all likely and 23 percent weren't sure.

Of those features desirable in a car, 85 percent chose AM/FM radio, 32 percent chose an iPod with an MP3 connector, 20 percent chose a GPS navigation system, 11 percent said satellite radio, 9 percent said a DVD player, 7 percent chose HD Radio. That's slightly ahead of the 6 percent who chose wireless Internet and 3 percent who chose Sync, an in-car system from Ford and Microsoft.

Cell phones, meanwhile, are becoming

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FM BROADCAST TRANSMITTERS

Sellmeyer

► Continued from page 1

Sellmeyer, 68, has a diverse résumé rich with broadcast technical experience, from manufacturing and design contributions with the Gates Radio division of Harris Intertype and later working for Collins Radio, to more recently his years in private practice as principal engineer with Sellmeyer Engineering.

"This has been a very rewarding experience. It's a great thing to be able to do the work you love," he said.

Sellmeyer said he was fortunate to have some of the kings of broadcast engineering as mentors through the years, including Bob Silliman, Jules Cohen, Louis King, Don Everist and Bob duTreil Sr.

That was pretty heady stuff for a young man from Carlsbad, N.M., who worked his first radio gig as a board op for his hometown radio station while still in high school and then held several chief engineer positions while putting himself through college at New Mexico State University and Arizona State University. He even had the chance to build several broadcast facilities while still in school.

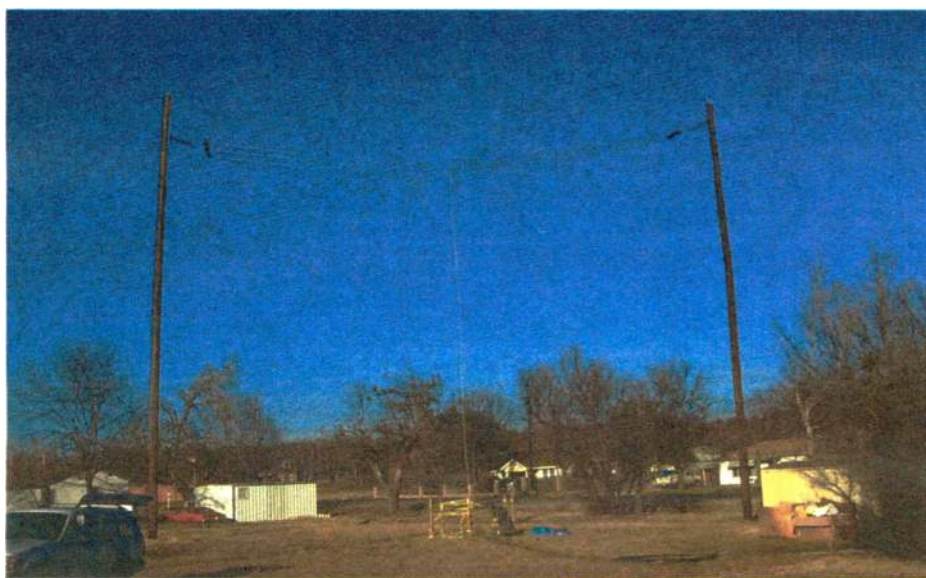
"I supported myself through college and was fortunate to work for some very good operators. I actually had a pretty good standard of living while in school."

Sellmeyer joined Collins Radio Company in 1966 after graduating from Arizona State with a Bachelor of Science degree in electrical engineering. He worked first in product support and then field service positions. Sellmeyer traveled to radio stations that used Collins equipment to assist in troubleshooting unusual problems and restoring operations.

"I was really more interested in the manufacturing and design side of the business."



Sellmeyer, right, with Jim Jones, chief engineer of KSWA(AM) in Graham, Texas, after adjustment of the antenna coupler for an emergency 'Tee' antenna, a top-loaded vertical antenna after a tornado lopped off the upper two thirds of the tower.



The emergency antenna at KSWA

Jack's work implementing AM stereo was one of the pioneering efforts in getting the industry to recognize the importance of bandwidth for optimum AM performance.

— Ben Dawson, Hatfield & Dawson

Gates/Harris

After a short stint with Granger Associates in its Bauer Broadcast Division, where he developed design specifications for a new solid-state FM stereo exciter, Sellmeyer moved to the Gates Radio Division of Harris Intertype in 1969. There he worked in the FM engineering department.

"I enjoyed product design very much — the whole design planning process where you set the objective for a project and then actually see it in production and have success in the field."

Sellmeyer developed new modulator and automatic frequency control modules for the TE-1 solid-state FM exciter to correct frequency stability problems.

"It became the TE-3 exciter used in the entire Gates/Harris FM-XXH3 model transmitters," Sellmeyer said.

Other projects for Gates/Harris included advanced development of high-power amplifiers and design work on the FMX-

70 exciter.

Nationwide Communications was successful in hiring Sellmeyer to be chief engineer of its Cleveland combo in 1970. He managed a department of 12 technical personnel and executed construction of an addition to the WGAR(AM) transmitter building to accommodate new studio and office facilities for operations and management at the station.

By 1973, Sellmeyer's product design skills had drawn the attention of a former employer. He was recruited to rejoin Collins Radio, which had been acquired that year by Rockwell International. He was named senior engineer in FM exciters and on 5 kW and 1 kW pulse-width modulated transmitters.

Sellmeyer worked with Forest Cummings at Collins to design low-level solid-state circuit boards used in the Collins 828E-1 pulse-width modulated 5 kW AM transmitter. Sellmeyer was listed as co-inventor on three patents Collins

attained for the technology.

"I worked on cost reduction programs for the 1 kW AM transmitter and the 2.5 kW FM transmitter. I also increased the power rating of the existing 2 kW FM transmitters to 2.5 kW."

During Sellmeyer's seven years with Collins, he developed a series of three automatic control systems for use with the Collins line of parallel AM and FM transmitter systems, involving the application of TTL logic to provide automatic switching of FM exciters and RF power amplifiers.

"I was also one of the engineers involved in the design of the Collins 828E-1 pulse-width modulated 5 kW AM transmitter." He also developed a series of audio consoles, the 212P and 212R series, for the radio market in the mid-1970s.

Collins Radio

"I provided engineering support to assist the law firm defending us. My work included forensic analysis of purported problems with a particular line of Collins equipment. We were able to successfully defend the company in the suits," Sellmeyer said.

Collins Radio, which produced a number of high-performance solid-state commercial transmitters and provided communications for America's space program, began to struggle financially by the late 1970s. Rockwell International eventually sold the division to Continental Electronics in 1980.

"Things had deteriorated at Collins

Past winners of the NAB Engineering Achievement Award are listed. Beginning in 1991, radio and TV winners were named; radio winners are shown.

1959 John T. Wilner
1960 T.A.M. Craven
1961 Raymond F. Guy
1962 Ralph N. Harmon
1963 Dr. George R. Town
1964 John H. DeWitt Jr.
1965 Edward W. Allen Jr.
1966 Carl J. Meyers
1967 Robert M. Morris
1968 Howard A. Chinn
1969 Jarrett L. Hathaway

1970 Philip Whitney
1971 Benjamin Wolfe
1972 John M. Sherman
1973 A. James Ebel
1974 Joseph B. Epperson
1975 John D. Silva
1976 Dr. Frank G. Kear
1977 Daniel H. Smith
1978 John A. Moseley
1979 Robert W. Flanders

1980 James D. Parker
1981 Wallace E. Johnson
1982 Julius Barnathan
1983 Joseph Flaherty
1984 Otis S. Freeman
1985 Carl E. Smith
1986 Dr. George Brown
1987 Renville H. McMann
1988 Jules Cohen
1989 William Connolly

1990 Hilmer Swanson
1991 George Marti
1992 Edward Edison & Robert L. Hammett
1993 Robert M. Silliman
1994 Charles T. Morgan
1995 Robert Orban
1996 Ogden Prestholdt
1997 George Jacobs
1998 John Battison
1999 Geoffrey Mendenhall

2000 Michael Dorough
2001 Arno Meyer
2002 Paul Schafer
2003 John W. Reiser
2004 E. Glynn Walden
2005 Milford Smith
2006 Benjamin Dawson & Ronald Rackley
2007 Louis A. King
2008 Thomas B. Silliman

Radio. Rockwell International didn't have the same type of vision for its radio division and they were increasingly focused on yearly budgets and revenue plans. They became focused on how much business they could grab month-to-month. There was no long-term planning."

After the sale of Collins Radio, he used the opportunity to form Sellmeyer Engineering, a broadcast engineering consulting firm. For nearly 30 years in private practice, Sellmeyer has focused on AM allocations, FCC applications, transmitter plant design and construction supervision, and AM directional antenna design and measurements.

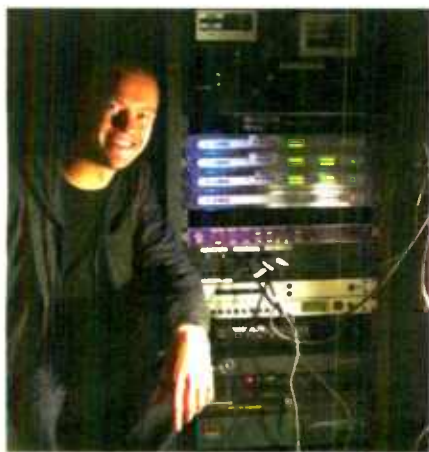
"I've never thought of myself as doing anything better than another guy. I'm efficient at many things. I've tried to serve the broadcast engineering profession well."

Sellmeyer has been a frequent contributor. See SELLMAYER, page 8 ►

The Metropolitan Opera sets the standard for great sound. And it's chosen ACCESS to let the world listen in.



Photo: Jonathan Tichler/Metropolitan Opera



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—Matthew Galek, Broadcast Engineer for The Metropolitan Opera

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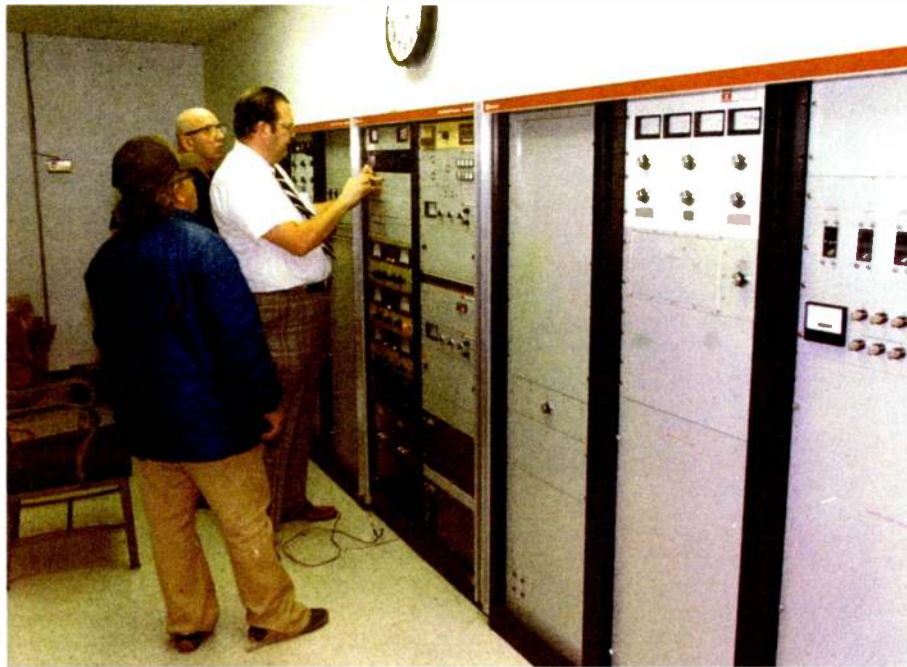
Sellmeyer

► Continued from page 6
 utor to NAB-sponsored workshops and seminars related to AM directional antennas and remains active in numerous professional organizations.

"Education is the key to success for any broadcast engineer. I've learned so much from working with Ben Dawson and Ron Rackley, Tom Silliman and Tom King. I knew Bob Orban when he was in grad school at Stanford. I knew he was a very bright guy so I learned what I could from him. I learned from all of them. My advice to any young engineer is to become involved in your profession."

AM IBOC concerns

Sellmeyer, who recently cut back to a half-time workload, seems to have an educated opinion on numerous broadcast topics. He said he has little confidence in the success of AM IBOC and thinks the interference issues are likely too large to overcome.



Sellmeyer, right, works in 1979 with Glenn Callison, retired director of engineering for McLendon Corp., rear, and an unidentified colleague at the Carrollton, Texas, site of what was then KDNT(FM), which used a Collins 45 kW transmitter.

'Operators used to be in touch with their community and their listeners. They still are in small markets.'

"I think the hurdle is too high and impossible over the long haul if you maintain existing services. I do not think it is a viable system. We made a huge mistake by duplicating the clear channels at night," Sellmeyer said. "The interference is compounded when you have day-time licensees and others that do not comply with power reductions at night."

That thought led Sellmeyer to make another observation. "Operators used to be in touch with their community and their listeners. They still are in small markets. That was once true of large and

medium markets, but they got off track over the past two decades."

Colleagues within the broadcast engineering community said Sellmeyer is deserving of the NAB award.

"Jack is quite soft-spoken, but don't let that fool you. He's a man with great professionalism and confidence — a confidence built on decades of experience in the business," said Tom King, president of Kintronic Labs Inc., whose father Louis also has won the award.

King said Sellmeyer was knowledgeable in FCC allocation, RF antenna sys-

tem design and mechanical installation details. "Kintronic Labs has benefited greatly from our longstanding relationship with Jack."

Ben Dawson, managing partner of Hatfield & Dawson Consulting Engineers, said, "Jack's work implementing AM stereo was one of the pioneering efforts in getting the industry to recognize the importance of bandwidth for optimum AM performance."

Dawson said Sellmeyer "did implementation and tune-up work for several complex antenna systems for our firm, which turned out very well."

Sellmeyer and his wife, Jeannine, have been married for 40 years. The couple has two adult sons and lives near McKinney, Texas.

This year's recipient of the NAB award on the television side is Sterling Davis, vice president of engineering for Cox Broadcasting, who is also active and respected within the radio broadcast engineering community.

Power

► Continued from page 3

At the same time, he said, "We're mindful of the interference consequences that might not have surfaced at first blush."

Hopefully, by this summer the industry will be in a position to nail down some spacing allowances for a well-managed power increase, he said, with data to back up recommendations to the commission. A unified submission would be "ideal," he said.

"Hopefully, we will know how close we've come to that when we interpret the results."

The new testing includes a combination of lab testing and field work.

While test sites for critical spacing testing hasn't been solidified, some participating stations are confirmed. NPR Labs plans to obtain additional data on indoor reception improvements at various power levels (-20 to -10 dBc) using FMs WXXU and WGUC in Cincinnati, KUHF in Houston and certain stations in Minneapolis.

Commercial broadcasters and iBiquity are involved in the new NPR tests.

One study will look at mobile sensitivity calibration. What happens to perceived audio quality in the mobile listening environment? "Do things like road noise, fans and heaters have an impact on perceptibility," Starling asked. While the question has debated for decades, "We want to do controlled tests." Towson University's Dr. Ellyn Sheffield is heading up this endeavor.

NPR Labs is also testing SCA analog reception capability to determine whether turning up digital power is compatible with radio reading services, which operate at 67 kHz and 92 kHz.

Another study involves indoor and mobile testing to figure out "what you get for each increment of a digital power increase," he said. The lab will test what happens to the analog and digital signals when FM IBOC power is increased incrementally. Testers will look for empirical evidence of analog interference within protected contours at intermediate power levels.

New NPR President/CEO Vivian Schiller said it is "critical" to complete the testing and resolve these important issues and protect existing analog FM service.

Test participants that have been selected so far include American Public Media and Minnesota Public Radio, St. Paul; WABE(FM), Atlanta; WAMU(FM), Washington; WBGO(FM), Newark; WDUQ(FM), Pittsburgh; WFAE(FM), Charlotte; WNYC(FM), New York; WTMD(FM), Towson/Baltimore; WXXU (FM), Cincinnati; WUKY(FM), Lexington, KY; WUSF(FM), Tampa; KJZZ (FM), KBAQ(FM), and Sun Sounds Radio Reading Service, Phoenix; KQED(FM), San Francisco and KQEI(FM), Sacramento; and KUHF(FM), Houston.

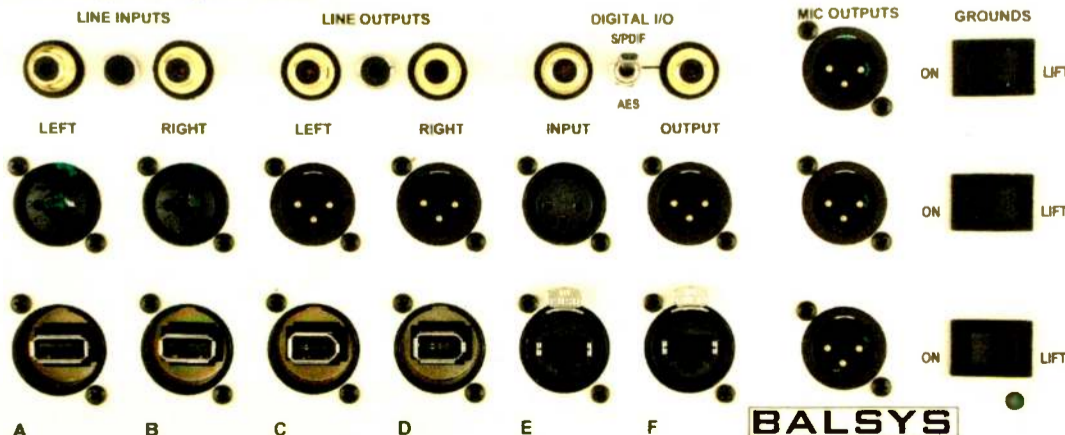
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NEWS WATCH

Console Makers Klotz, Euphonix Form Alliance

Digital console makers Euphonix and Klotz Digital formed an alliance for operations in North America.

Euphonix will market and sell Klotz Digital's range of broadcast products on the continent. The alliance was described as a strategic engineering and sales partnership.

Klotz's strength is in broadcast consoles and live production networking. Euphonix on the other hand majors in studio recording and post-production, they said.

Euphonix CEO Martin Kloiber said, "Euphonix will be able to coordinate both companies' product lines to end users as well as system integrators, offering a complete technical solution and seamless customer support."

Klotz Digital founder and CEO Thomas Klotz said, "From now on Euphonix and Klotz Digital will be able to provide all-embracing, flexible and reliable broadcast network solutions for TV and radio stations, including large-format digital audio production consoles as well as compact consoles and audio distribution networks."

FCC to Get a 'Clue' About Ownership

WASHINGTON The Federal Communications Commission is expanding the information that station owners must provide regarding their race, ethnicity and gender.

It also wants to widen the pool of owners who need to provide this information.

The data it has is old and incomplete, commissioners said, as they adopted an order to broaden reporting requirements so the agency can assess the state of minority- and female-owned stations more accurately.

"The official word is: We don't have a clue," said Acting Chairman Michael Copps as the FCC voted on April 8 to make the change.

It adopted changes to reporting requirements on FCC Form 323, "Ownership Report for Commercial Broadcast Stations," filed now by full-power commercial AM, FM and television broadcasters to identify their organizational and ownership structures and to provide information on owners' race, ethnicity and gender.

Reporting changes include dropping the filing exemptions applicable to full-

power commercial stations owned by individuals or partnerships of people (rather than partnerships made up of companies). LPTV and Class A television stations are now required to file ownership information on Form 323.

Owners must now give the FCC more information on all their attributable broadcast holdings, though the agency has not changed its attribution rules.

Owners must file Form 323 by Nov. 1. Information must be current as of Oct. 1.

The commissioners also voted on a Notice of Proposed Rulemaking to expand the scope of station owners who must file race, gender and ethnicity information.

Robert Ratcliffe, temporarily acting as Copps' liaison to the Media Bureau, told Radio World that noncommercial stations and low-power FMs are exempt from reporting requirements because their ownership rules are different from those of commercial stations. In the NPRM, the FCC proposes dropping the Form 323 exemptions for non-coms and LPFMs.

Thirteen Automakers Now Committed To HD Radio

NEW YORK Land Rover is making factory-installed HD Radio receivers available to its U.S. customers across the 2010 model year product line.

HD Radio technology will be integrated into the factory-installed audio systems that already feature options for satellite radio, CD and MP3 player connections.

Land Rover is the 13th auto brand to carry the technology.

Also, BMW said it's expanding its HD Radio offerings to include IBOC technology as standard in its 2009 Model Year 7 Series and 6 Series vehicles. The coupé and convertible are in dealerships now.

Both the HD Radio car announcements came out of the New York International Auto Show in April.

News Roundup

NOPERFORMANCETAX.ORG: As part of its battle against a performance royalty on copyrighted music, the National Association of Broadcasters has created a Web site devoted to the issue. At www.noperformancetax.org, stations can download spots opposing the performance royalty and find online banner ads to use on station Web sites and sample letters to members of Congress. The site provides users with background info from broadcasters' perspective, video clips from congressional hearings and Capitol Hill events, NAB news releases and news media coverage.

The front page of the site boasts an interactive graphic made up of hundreds of gold and platinum albums on display in stations. Record labels present the albums to stations as a sign of appreciation for promoting their music and driving sales.

JACK JENKINS: Illinois engineer Jack Jenkins, credited by his peers with helping to create the broadcast cartridge machine industry, died at 77. Industry colleague Andy Rector described Jenkins as a mechanical genius who could take a complex concept and reduce it to a simple, reliable design. Rector is part of a group who has been working on a Cartridge Machine Reunion in the fall.

"The concept was to recognize Jack and others that pioneered the cartridge machine and, thereby, made a very significant contribution the broadcasting industry," according to Rector. He's going ahead with plans for the reunion as a way of remembering Jenkins. Reach Rector at: arector@acceletronix.com. In addition to his wife Rita, Jenkins is survived by several children, 16 grandchildren and three great-grandchildren.

RFR FINE: The FCC denied a request by CBS Radio to drop or reduce a \$10,000 fine against WQYK(FM), St. Petersburg, Fla. for violating the maximum permitted exposure limits of the radio frequency radiation rules.

CRIGLER HONORED: Communications lawyer John Crigler of Garvey Schubert Barer has been honored by the National Federation of Community Broadcasters, recognizing the attorney for his "extraordinary dedication and service to the NFCB and to all community radio, and for his unstinting advocacy on behalf of community radio before the FCC and other regulatory agencies." Crigler is the author of the NFCB's "Public Radio Legal Handbook" and contributes to other NFCB publications, including "The NFCB Guide to Underwriting"; his articles have appeared in Radio World as well.


NASB/DRM USA: The National Association of Shortwave Broadcasters and the Digital Radio Mondiale USA association will unite in Nashville on May 7 and 8 to share facilities for annual meetings (www.shortwave.org/meeting.htm). Nashville-based WWCN and Franklin, Tenn.-based World Christian Broadcasting are local event hosts. TCI International, Media Broadcast, Continental Electronics, VT Communications and Thomson Broadcast & Multimedia have sponsored events within the meetings. For reservations contact NASB Secretary Dan Elyea at fsiyfr@okeechobee.com.

IAAIS CONFERENCE: Planning is underway for the annual conference of the International Association of Audio Information Services, to be held this year in Cincinnati, in cooperation with Cincinnati Radio Reading Services and the Cincinnati Association for the Blind and Visually Impaired.

Workshops are planned on topics such as training volunteers, the future of the radio reading service listener, Web harvesting and grant writing. A demonstration of the Dice Electronics Digital Radio Receiver/Digital Radio and discussion of alternative delivery systems are also planned. The IAAIS conference (www.iaais.org/conference.html) is June 3-7 at the Hyatt Regency in downtown Cincinnati.

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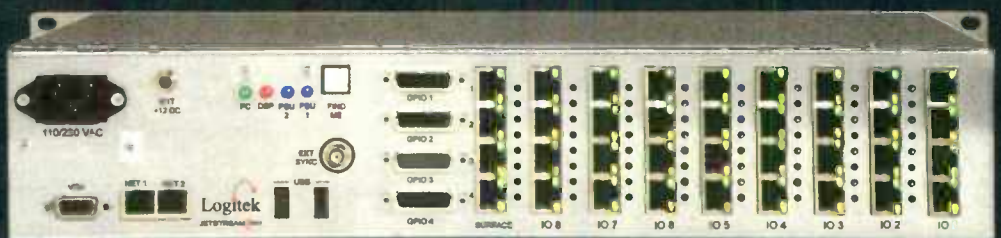
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World Radio History

Workbench

Radio World, May 6, 2009 Past columns are archived at radioworld.com

Try This Broadcaster's Ginsu Knife

Made by SOG for Electrical Contractors, It Can Be Helpful For Your Next Wiring Project

by John Bisset

Chuck Bullett, market chief for the Cumulus San Francisco stations, made a great find at the local West Marine store the other day whilst shopping for a good rigging knife for sailing.

SOG Knives (sognives.com) makes the "Kilowatt." Pictured in Fig. 1, this knife is intended for the electrical contractor, but it's now found a home on Chuck's belt. (SOG originally stood for Studies and Observation Group, a military group for covert operations in the Vietnam War.)

Not only does the knife slice and dice his California orange at lunch, it has multiple wire stripping tools, from #10 to #24 conductors. It is *not* a multi-tool, which the company made famous among broadcast engineers. It does not have screwdriver implements but will be a quality instrument in the hands of a skilled wiring craftsman.

Chuck finds the tool great for stripping Cat-5/6 cable,

as you can see in Fig. 2. But the knife will also work on good old Belden 8451, which is the same size as a piece of #14 THHN. Zip, and the jacket is off.

Chuck writes that he simply can't speak highly enough about the knife. He's been stripping a lot of RG-58/59 and RG-6 of late, and this meets the need as well. Insert the coaxial cable into one of the appropriate through-holes and use the tool's knife blade while rotating the tool around the cable being stripped; there will be a clean strip with no dreaded nicked conductors.

It also has a great sculpted handle with a cool, albeit

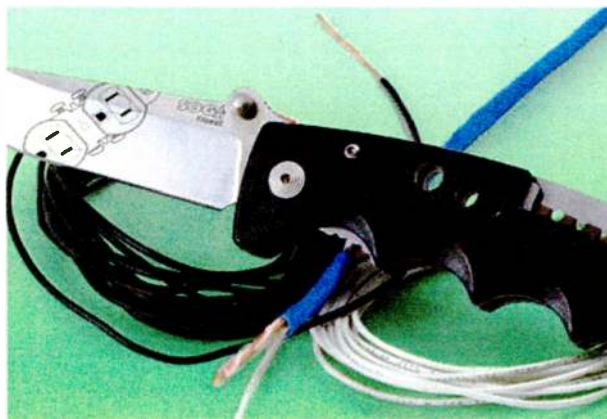


Fig. 2: In addition to its cool look, the knife is practical.

meaningless, schematic as well as a belt clip that resembles an electrical or radio tower (you decide). The special "flip to strip" Cat-5/6 razor stripper feature on the bottom of the tool is what sold him in the end.

Thanks, Chuck, for sharing this great find with *Workbench* readers. It sounds like SOG and West Marine will earn a few new customers through this knife.

Chuck Bullett can be reached at chuck.bullett@cumulus.com.

Not long ago I wrote that the simple ideas are really some of the best. Buc Fitch also reminds us that what is old often is new again.

Buc recently realized that there was no audio coming out

of the speaker in his CT Technology two-way radio test set.

He knew he should be receiving NOAA through the speaker, but the box was mute. It turns out that the problem was a blown speaker. Apparently the damage had occurred because the volume ran at max for long periods of time so he could hear the audio in loud and noisy environments such as transmitter buildings. The speaker is only 3 inches and the "grill" is a couple of slots cut in the cabinet side.

What he needed was a flexible external audio jack that would accommodate both a speaker and readily available pair of stereo headphones.

Fig. 3 shows a little circuit application. Buc says although he hadn't used it in 15 years, it works perfectly in this circumstance.

Essentially, one uses a 1/4-inch stereo (ring and tip) headphone jack to solve the problem.

Buc offers two solutions. What he installed, and prefers, is the top version. If you want to power a small

See CIRCUIT, page 21 ▶



Fig. 1: The SOG Kilowatt slices through wire insulation with no nicks.

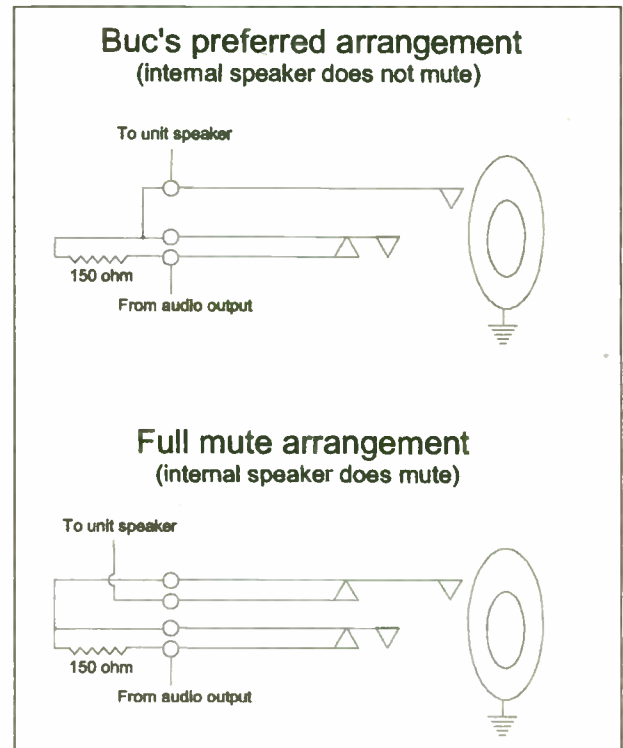


Fig. 3: An easy jack modification for multiple uses

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World Radio History

PowerStation™: the new console system from Axia.



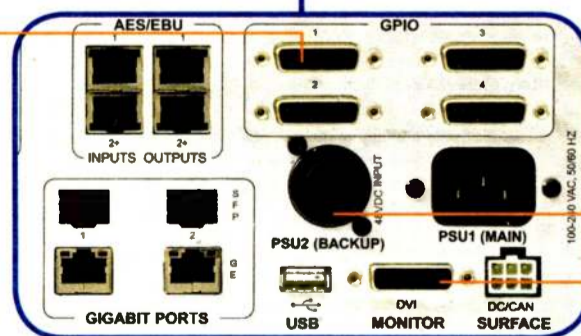
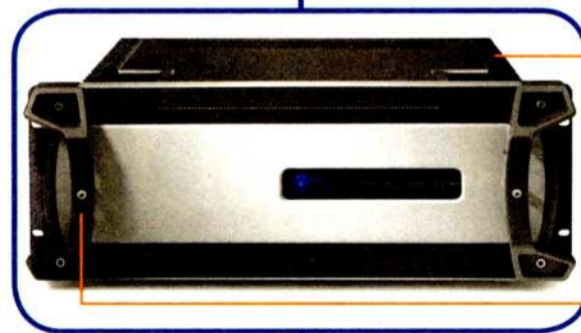
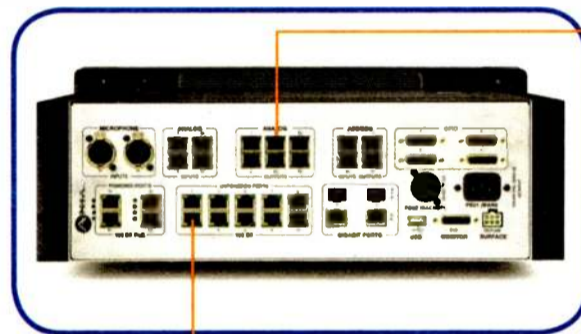
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All stops removed • Twenty years from now, you'll have forgotten this ad. But you'll still have your PowerStation, the full-featured one-box IP-Audio console/router system hardened with **industrial-grade components** and redundant power capabilities. Tough enough to take a football to the groin and keep on going. PowerStation **minimizes setup** and **maximizes "bang for the buck."** Engineered without compromise for broadcasting without interruption.

Easy as π • PowerStation combines a console DSP engine with audio and logic and a network switch, **all in one box**. As its name implies, there's a whole lot o' muscle inside that burly frame, but that doesn't mean it's complicated. In fact, setting up PowerStation **couldn't be easier**: connect your studio gear with standard CAT-5 cables, connect your console with just one cable, name your sources and set preferences with a browser, and you're ready to rock. PowerStation makes building studios about 3.14 times easier than ever.

GPI Oh! • **GPI/O ports are built in** to PowerStation — no breakout boxes or add-on converters needed. One day, you might not even *need* logic ports: more and more products from companies like 25-Seven Systems, Audio Science, ENCO, Google Radio Automation, International Datacasting, Omnia Audio, Radio Systems and Telos (to name just a few) use the Livewire™ standard to send their audio and logic control directly to Axia networks over a **single CAT-5 connection**.

Everything's included • Yeah, we said *everything*: PowerStation combines half-a-dozen essential tools into one compact unit. No hidden extras to buy, no "gotchas" after purchase. Inside that muscular chassis you'll find a **bulletproof mixing engine** capable of handling consoles up to 40 faders, a beefy power supply (with optional **redundant power**), machine control ports, and **audio I/O**, all in one box. And of course, since it's from Axia, the IP-Audio experts, a studio built with PowerStation can stand alone — or it can become a part of a large network quite easily. Thanks to **PowerStation Simple Networking**, you can daisy-chain up to 4 PowerStations directly for easy multi-studio installation without the need for a separate core switch. Just another way Axia makes IP-Audio easy.



E-I-E I/O • Finding space in the equipment racks is like living in a barnyard: too many chickens, never enough coops. So our team of obsessive designers fit **an entire studio's worth of inputs, outputs, logic and network connections** — plus an advanced DSP mixing engine and a massive console power supply — into just 4 RU. There's inputs for 2 mics, 4 analog inputs and 2 AES/EBU inputs, with 6 analog and 2 AES outputs. 4 GPI/O logic ports round things out. Want even more? Just connect the PowerStation Aux to instantly *double* the I/O — or plug some Axia Audio Nodes into its **built-in Ethernet switch**.

Fan free • PowerStation is **silent and fanless**. Because studios today are already full of PCs, laptops and playout servers clicking, whirring and generating heat — who needs more of that? Not only is there no in-studio noise with PowerStation, those **big extruded heat sinks** are just plain cool. No pun intended (or maybe it was. We're like that, you know).

Built like a tank • Remember when consoles were built to last? We do. At Axia, we're all about the long haul. **There are no compromises**: PowerStation uses only best-of-the-best components. Like studio-grade Mic preamps and A/D converters. A rigid, steel-framed, EM-tight chassis that shrugs off RF like Walter Payton brushing off tackles. An industrial CPU designed for high reliability in harsh environments. Beefy extruded heat sinks. Big, brawny handles to make rack-mounting easy. (And it looks cool, too.)

Redundant power redundancy • The power supply is the heart of any broadcast equipment, right? That's why PowerStation is **hardened against failure** with a **super-duty power supply** that sports enough amps to power an arc welder. And for those of you who like to wear a belt *and* suspenders, there's even a connection for **redundant auxiliary backup power** — with automatic switchover, naturally — that kicks in if it's ever needed.

Screen play • Yep, that's a DVI connector. **Your favorite monitor** — standard or widescreen — plugs in to present the console operator with Axia's "so easy an overnight jock could do it" **info-center display**. Meters, timers, fader assignments, mix-minus settings and more, all on-screen, on-demand.

You're covered • Axia has the most comprehensive warranty in the industry — **5 years parts and service**. And (not that you'll need it), **free 24/7 technical support**, 365-days-a-year. We've got your back, my friend.

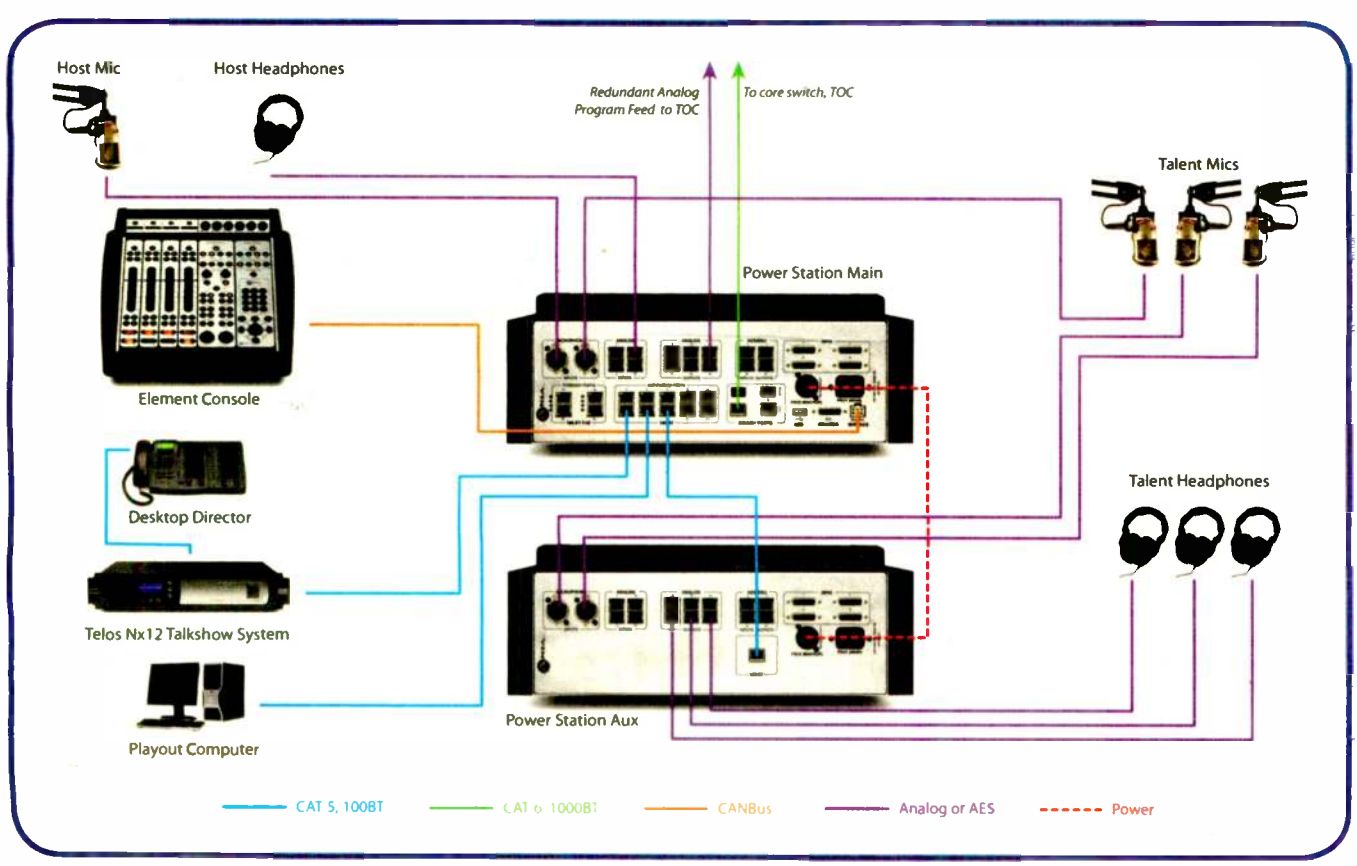




Element 2.0 • With more than 1,000 consoles already on the air, Element is a huge hit. And now, thanks to suggestions from our clients, it's better than ever. Element 2.0 has cool features like Omnia™ **headphone processing** presets to give talent that "air sound", **super-accurate metering** with both peak and average displays, **one-touch phone recording** with automatic split-channel feed, **automatic mix-minus** for every fader, an eight-channel **Virtual Mixer** that lets you combine multiple audio streams and control them with a single fader, and metallic bronze or silver module overlays. And we haven't even begun to tell you about Element's **Show Profiles** that instantly recall talent's favorite settings, its **built-in Telco controls**, fully-integrated **talkback/IFB** and **Mic processing** by Omnia. And durable? Element is nearly indestructible, ready to take whatever pounding ham-fisted jocks dish out and keep going. You want examples? Element's **avionics-grade switches** are rated for more than two million operations. What look like ordinary rotary controls are, in reality, **bullet-proof optical encoders** — no wipers to wear out or get noisy. The silky-smooth **conductive-plastic faders** actuate from the side, not the top, so dirt and grunge stay out. The **high-impact Lexan** module overlays have their color and printing applied on the back, where it **can't wear or chip off**. The frame is made from **thick aluminum extrusions** that are stronger than truck-stop coffee. To find out even more about Element, visit AxiaAudio.com/Element/. Grab some coffee and prep for a good, long read — remember, our marketers get paid by the word.

Come together, right now • Now that you know what you can do with PowerStation, let's build a studio. The diagram below shows how a typical Talk Studio might look. Mics and headphone feeds plug into the built-in Mic inputs and Analog outputs... your playout PC, using the **Axia IP-Audio Driver** for Windows®, connects to a built-in Ethernet port... and so does the Telos Nx12 Talkshow System (which sends 12 lines of caller audio, mix-minus and take/drop/next commands over **one skinny CAT-5 cable**). Send a **backup audio feed** to your TOC for extra peace of mind. And after all that, there's still plenty of I/O left to plug in the turntables for the Saturday night Oldies show.

The standalone network • You want your console to be more than just reliable — you want it **built like a battleship**. You want the absolute peace of mind that comes from knowing your gear will **never let you down**. And if you take one studio down for maintenance, you want the rest to be completely unaffected. So we designed PowerStation to be the world's **first networked broadcast console that doesn't need a network**. It's completely self-contained: sure, it plays nice with others, but unplug its network cable and it keeps right on truckin'. Build just one studio, or a dozen, at any pace you choose — your PowerStation network is ready to expand when you are.



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AMERICAN SHORTWAVE

A Sequel to the Philadelphia Story

We Learn More About a Historically Fascinating Transmitter From Philadelphia

by **Adrian M. Peterson**

Was it deliberate disinformation during the hectic, sometimes shady days of World War II? Was it a change of plans on the part of decision-making personnel? Or was it just a case of bad memory regarding events of long ago?

You may remember that we presented the story of Philadelphia shortwave station W3XAU-WCAI-WCAB in Radio World's Aug. 15, 2007 issue, part of RW's "American Shortwave" series of occasional articles in cooperation with the National Association of Shortwave Broadcasters.

To review: the CBS shortwave station was launched as a 1 kW home-brew unit in the back room of a radio shop in downtown Philadelphia in 1932.

During the following year this low-powered shortwave transmitter, W3XAU, was moved out to suburban Byberry and a year later again the unit was moved to Newtown Square, where it was co-sited with the huge 50 kW medium-wave transmitter, WCAU.

In 1936, the shortwave transmitter was re-built into a 10 kW unit with two V type antennas (early versions of the popular rhombic, we would guess) beamed on Europe and Latin America.

Programming for shortwave W3XAU was taken from the CBS nationwide network and from local Philadelphia productions at medium-wave WCAU. In those pre-war days, a 10 kW shortwave signal could be heard widely; contemporary monitoring reports and QSL

cards indicate that this international relay station was often heard throughout the Americas and over in Europe, as well as "down under" in Australia and New Zealand.

In August 1939, at the time when the FCC required all shortwave stations in the United States to adopt regularized and approved call signs, CBS redesignated this shortwave transmitter as WCAI. However, two weeks later again, CBS implemented the usage of another call sign, WCAB.

Even though CBS requested the FCC to grant approval for an increase in power to the mandated 50 kW level, this request repeatedly was denied, and shortwave WCAB finally went silent at the end of December 1941. Thus a CBS international voice in Philadelphia was unceremoniously closed, though the international CBS programming was taken over by a new and larger shortwave station located at Brentwood on Long Island.

We concluded our 2007 article in good faith with the following:

"However, that is not the end of the story. The large new international shortwave station at Brentwood was taken into service with OWI-VOA (Office of War Information & Voice of America) programming less than two months later, on Feb. 24, 1942 and the 10 kW unit in Philadelphia was packed up and sent over to England for use by the BBC in

London. How interesting it would be to find out what happened to this famous American transmitter while it was in service over there."

Northern route

We pause now for a moment or two and we introduce the question: What really happened to this historic shortwave transmitter?

Was there some sort of a clue hidden in the information from the memory of station staff in that long-ago era? Had the

vided a solution to the enigma.

The answer? Transmitter W3XAU was in reality sent to a secret location near Toronto in Canada, where it was installed at Camp X for daily communication with Bletchley Park in England.

Camp X

This was a secret spy training facility during World War II, so secret that even the current experienced radio personnel in the area do not know all the answers to this day.

The article in QST magazine, dated January 2006, states that a radio transmitter, code-named Hydra, was installed at Camp X in Canada for secret communi-

it a change of plans on the part of senior wartime personnel to have the installation of the transmitter diverted from England to Canada? No, we suggest, not at all.

Was it then a cover up to state that the transmitter would go to England for work with the BBC war effort when it was known that the real intended usage was for Camp X in Canada? In view of the fact that Camp X was such a secret wartime location, we would suggest that this was indeed the real answer.

We might add as far as Hydra is concerned that Camp X was established at Oshawa, 25 miles east of Toronto, and it was opened on Dec. 6, 1941, one day before the infamous attack on Pearl Harbor.

Encrypted

The initial transmitter that was installed at Camp X in mid-1942 for spy communication was a 1 kW unit, apparently medium-wave, that was acquired from Toronto and rebuilt into a 2.5 kW shortwave facility.

The reason for choosing shortwave for communication with England instead of the established undersea cable link was for security purposes; it was feared that German submarines might be able to tap into cable communications. The wireless traffic from North America to England during the Hydra era was usually encrypted with Typex, and subsequently Rockex, cipher machines.

After the 10 kW shortwave unit from Philadelphia was refurbished, it was installed at Camp X in the one large building on the property, a building that had windows placed at 7 feet above ground level, for security reasons. The installation of the larger transmitter apparently was late in the same year, 1942.

Three large rhombic antennas were in use for transmitting to England (and at times to Latin America), and for the reception of incoming shortwave signals. As part of the local coverup, it was stated that the large rhombic antennas were part of a facility for broadcasting the programming of CBC, the Canadian Broadcasting Corp.

The usage of the Hydra shortwave transmitter extended well beyond its original World War II service.

When the war ended, Hydra was taken over by the Royal Canadian Signals as the Oshawa Wireless Station for use during the Cold War. The station was finally closed in 1969, worn out and no longer serviceable.

What ultimately happened to Hydra, the fascinating historical transmitter from Philadelphia, after its World War II and Cold War service in Canada?

In view of the fact that none of the original buildings are left standing at Camp X near Toronto, we guess that the mighty 10 kW shortwave transmitter that had been on the air under the successive call signs W3XAU, WCAI, WCAB and Hydra was simply and unceremoniously scrapped.

For photos of Camp X, see <http://tinyurl.com/dasp72>.

Dr. Adrian M. Peterson (ex-KA9YPQ) N9GWY is a board member of the National Association of Shortwave Broadcasters. Since 1944 he has written several thousand articles on radio history, published in 25 languages. ●



The Spirit of WCAU, a pamphlet from the 1930s, courtesy of Charles A. Higgins.

transmitter actually been transported over to England for use by the BBC? Or was this an item of disinformation intended to cover up real plans for its intended usage?

The Web site for the Broadcast Pioneers of Philadelphia states clearly that the shortwave transmitter was dismantled and sent overseas to aid the BBC war effort.

E-mail communications with colleagues at the BBC in England indicate that they have no record of the usage of this transmitter in England. At that stage, they say, the BBC was using transmitters with a rated power at 100 kW, not 10 kW. They also state that the black propaganda stations in England during World War II were using transmitters rated at 7.5 kW, not 10 kW.

The noted radio historian Jerome Berg states that he has no information regarding the subsequent usage of the 10 kW shortwave transmitter from Philadelphia. Berg has recently released the second and third volumes in an authoritative three-part series on the history of shortwave broadcasting and reception from the beginning right up to our era.

However, as these enquiries were buzzing across the Internet, the Philadelphia radio historian who used to work with the medium-wave and shortwave transmitters at the WCAU complex, Charles Higgins, came across a recent article in QST magazine that pro-

vided a solution to the enigma. The answer? Transmitter W3XAU was in reality sent to a secret location near Toronto in Canada, where it was installed at Camp X for daily communication with Bletchley Park in England on 15 MHz; thus it was indeed a shortwave transmitter.

In this article, Gil McElroy states that the original transmitter at Camp X was a 2.5 kW unit and that a 10 kW unit was provided courtesy of WCAU in Philadelphia and subsequently installed.

The only 10 kW transmitter on the air with WCAU during that era was certainly the shortwave relay unit. As a confirmation, the photograph of the 10 kW shortwave transmitter Hydra bears a striking similarity to the 10 kW shortwave transmitter that was previously on the air from suburban Philadelphia as shown on one of their pre-war QSL cards.

Thus, the available evidence indicates that the Philadelphia shortwave transmitter that was "dismantled and sent to England for secret work with the BBC" had instead been installed at secret Camp X near Toronto.

According to William Stephenson in his book "The Secret History of British Intelligence in the Americas, 1940-1945", the Philadelphia 10 kW transmitter was "overhauled" before its installation as Hydra at Camp X in Canada.

Was it then bad memory on the part of staff that served at the Philadelphia station during World War II that led to the incorrect story? No, not at all; in fact we suggest that they relayed accurately the information that was given to them. Was

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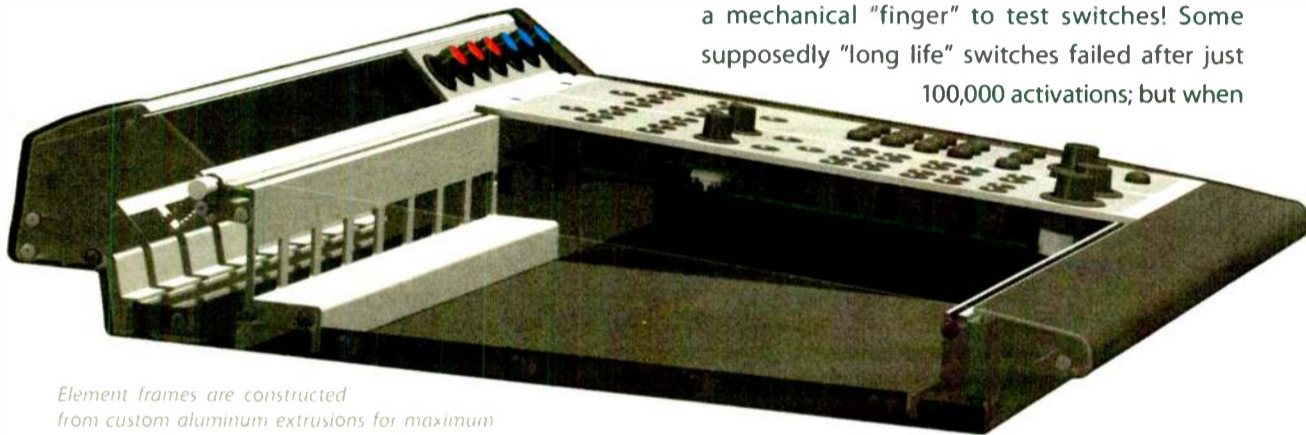
sticking the Lexan to the top of the module like some folks do, our overlays are **inlaid on the milled aluminum module faces** to keep the edges from cracking and peeling — expensive to make, but worth it. For extra protection, there are **custom bezels** around faders, switches and buttons to guard those edges, too. Which means that Element modules will **look great for years**.

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our guys found the switches used in Element, they shut off the machine after **2 million operations** and declared a winner. (The losers got an all-expense-paid trip to the landfill.)

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Envisioning U.S. Radio With an EPG

Let's Conclude Our Series By Considering Real-World Radio Implementations

In previous issues we've been looking at the NAB FASTROAD Radio Electronic Program Guide proposal. Let's conclude our examination with some potential application issues and opportunities. (As noted prior, I am a consultant to this development effort.)

First, let's look at some concerns that broadcasters might have in putting an EPG system into use. A primary issue involves the additional staff burden that compiling and feeding data might create. To minimize this problem, it will be helpful for radio automation/playout (and perhaps also traffic systems) to feed existing data to the EPG system via some sort of consistent or standardized interface.

Other worries include the continuous care and feeding of multiple publishing outputs to which each station would regularly want to deliver its EPG data, and any embargo of proprietary programming data that a station might want to enforce prior to release.

At your service

These matters are best handled by the creation of a service bureau for EPG management.

In this scenario, stations would send a single stream of data — via one of the

On-air trials of the service in the Boston and Providence, R.I., markets are scheduled for later this year.

selected "standard" interface formats noted above — to a single, external organization, which would in turn reformat and deliver the EPG data to all desired publishing media.

This would include sending the data back to the station — or to another appropriate station (or stations) in the market — for insertion into the HD Radio EPG datacast stream there, as well as any online portals providing radio EPG services for the web and mobile/wireless delivery.

Agreements between stations and service bureaus could also set protections and release schedules as necessary to embargo data in cases where program schedules are combined and delivered over multiple (potentially competing) stations in a given market.

The NAB FASTROAD Radio EPG proposal envisions an open marketplace by which one or more service bureaus might interoperate. Alternatively, a station group might elect to establish its own service bureau for its stations.

In any case, the service bureau would alleviate a significant burden for ongoing operation and management of EPG data, allowing stations to provide only a sim-

ple, raw data feed, and let the bureau do all the heavy lifting of formatting, error-correcting and distribution to multiple publishing agents (the population of which would likely change over time as popular portals came and went).

Such a service bureau model is in operation for Radio EPG in the U.K. DAB environment, and similar processes are already implemented in the U.S. for scrubbing and tagging of RDS and HD Radio program-associated data. The EPG service bureau would be a natural outgrowth of this metadata architecture.

The market problem

You may recall that several of the EPG delivery proposals discussed last time involved the transmission of a pre-aggre-

vide quite different coverage, not to mention the many drop-ins, short-spaced, adjacent-market and directional variations that exist.

Thus a single "market EPG listing" might include many stations that are not currently available at a given listener's location in that market area. This could provide a poor user experience in which the listener sees a desired program on the EPG, but then tries to tune to it (or worse, sets a recording of a future program), but finds the channel unavailable — or at least too weak to be listenable. Conversely, there may be stations that are available to a fringe listener from a neighboring market that are not shown on the "market EPG" currently loaded in the receiver.

The mobility of radio makes this problem even worse due to its dynamic nature. Some stations on the EPG that are available at the start of a drive across

The Big Picture



Photo: Gary Meyer, BBC

by Skip Pizzi

both broadcasters and receiver manufacturers. The Service Bureau model above, coupled with optimization of automated processes and the necessary interfaces, are suggested to reduce broadcasters' burden.

For receivers, there is a potential tradeoff between cost of EPG implementation and user experience, so the proposal suggests various methods of scaling

Feature	Description	Memory requirements	Display capability
Available Stations	Most basic EPG function: EPG shows list of currently receivable stations, updated as program offerings or mobile reception conditions change. (Scalable as text or graphical "grid" or "bricks in the wall" display, as receiver allows.)	Low/Medium	Low, Medium or High
Now Playing	Supplemental, not redundant, to PSD. Includes currently tuned station "now playing" data, such as verbose format description, program title, segment title, host, guests, artist or song detail.	Low	Low
Tagging	Store ID of program or segment found in EPG for later online search (e.g., subsequent podcast download).	Medium	Low
Favorites List	User marks favorite stations, programs, events, personalities for EPG info display, and/or for detailed download or updates.	Medium	Medium
Follow the Program	For portable/mobile receiver, when moving out of currently tuned station's coverage area, EPG searches for another receivable station with same program at same or later time. (Dual tuner helpful.)	Low	Medium
Find	User can seek certain programs or content features and instruct radio to tune to them directly whenever they are discovered.	Medium	Medium
History/Recent Station List	EPG remembers stations recently or most often listened to and automatically generates a "favorite stations" subset; EPG can display more detailed program data for these stations.	Medium	Medium
Look Ahead	Select station in EPG, get look-ahead window (for next few hours of programming). For multicasting station, EPG looks ahead on all of the station's services in a single view.	Medium	Medium
Respond to Advertisement	While advertisement runs on EPG, user presses soft key to initiate action (particularly useful with Internet connection.)	Medium	Medium/High

The table lists a few of the uses suggested by the NAB FASTROAD Radio EPG proposal, including the relative memory requirements and display characteristics required. For the latter, "Low" = 1 or 2 line text display (e.g., handheld phone form factor); "Medium" = 3 or 4 lines of text or small graphical display (e.g., PDA or small tabletop receiver); "High" = 5 or more lines of text or large graphical display (e.g., in-dash or back-seat car video, large tabletop receiver, or home theater).

gated set of program schedules for some or all of the stations in a market. This would allow receivers quickly and easily to obtain the entire EPG for the market in a single datacast, as opposed to collecting it piecemeal by gathering each station's data one at a time.

Consider the consequences of this in the real world, however. Unlike most terrestrial TV allocations, radio stations' coverage zones are often not uniformly distributed over a given market. Various classes of both AM and FM stations pro-

town may not be available at the destination — and vice versa. Thus the EPG proposal suggests a few methods by which a receiver can attempt to dynamically filter (by geolocation or otherwise) market-level EPG data to provide as accurate as possible a listing to match current reception conditions.

Implementation costs and benefits

The proposal also attempts to minimize costs of EPG implementation for

EPG display to multiple receiver display types (ranging from one or two lines of text to a full graphical/video display), and includes several schemes for latency reduction (dual tuners, always-on or scheduled-background EPG data collection, and non-volatile RAM).

All of these either incur additional costs or run up against other design constraints, however. The proposal nevertheless envisions methods of implementing at least baseline EPG service with

See EPG, page 21 ▶

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World Radio History

YOUNG ENGINEERS

Hammer Steps Up to the Plate

Young Engineer Combines His Love of Technology and Baseball

by Ken Deutsch

One in an occasional series of articles about engineers who defy traditional stereotypes.

Kyle Hammer, age 23, can't decide which he loves more: baseball or radio engineering. Fortunately he doesn't have to pick one because he is able to combine his love of both endeavors.

After freelancing for a number of baseball teams, Hammer got his full-time dream job as game-site engineer for the Minnesota Twins about a year ago.

"Kyle had a fascination with radio equipment at an early age," said Lee Hammer, father of Kyle and program director of San Francisco's KNBR(AM). "At age seven he would help me home-test some remote broadcast gear, and he loved to put on the headset and turn the dials."

One day Kyle's dad became a "block off the old chip."

"When I was young I'd follow my dad to games and help him plug things in," the younger Hammer said. "By the time I was 13, I was beginning to figure out which mic had to plug into which input. When I made a wrong move, my dad would make a little noise, and that told me I was doing something wrong."

"Years later when I was working and he was helping me out, I was watching him set the equipment up, and he hadn't done it in a while. Then it was my turn to make the little noises to let him know that he was doing something wrong. It was hysterical!"

"My father was a huge influence on me."

Getting his game on

Kyle Hammer's employer is the Minnesota Twins, owner of the Twins Radio Network (TRN), comprising 78 stations in five states. "Twins Territory" is second in number of affiliates only to that of the New York Yankees. Working with Kyle in the booth are two others, the air talent; back at the TRN studios in downtown Minneapolis are a producer, two board operators and a couple of interns who assist with the games, pre-games and post-games at home and away.

"Whether the game is over in 8-1/2 or 15 innings, there are different scenarios that require me to keep in contact with the producer and the studio," Hammer said.

"Is there a player waiting to be interviewed and is he all set with wired or wireless two-way headset? Are highlight clips ready? It's more complicated than you might think."

There are about 187 games each year, 162 during the regular season and 25 in spring training. Hammer spends about four months on the road annually. Because he is not married, he doesn't feel guilty about spending so much time away from the Twin Cities. In the off-season he ditches the cold winds of Minnesota for sunny California, where he picks up extra work in the booth for other teams. He also has two family dogs there that are always anxious to see him again.

Learning curve

"I always like to make things more fail-safe," said Hammer.

"With IP here. ISDN lines are getting harder to obtain, and our broadcasts only use ISDN. The biggest problem I have with IP is that I need it to be stable enough to keep us on the air for five or six hours at a time. There is also a concern with latency. A lot of people at the ballpark lis-



As a lad.



Proud papa Lee Hammer.

ten to the radio in the stands and they need zero latency. What the people hear is important to me.

"I have heard demonstrations of audio over IP and its amazing quality. I just don't know yet how well it will work for a long broadcast with a lot of people on the network."

The young engineer had some other thoughts about equipment.

"There are so many broadcasts that are sports-related," he said. "NFL, NBA, NHL, MLB, college sports and more. There are a lot of technical products out there, but not many designed for our market: sports radio. The stuff that is designed for us — particularly the communications gear — is impractical. This is a pet peeve of mine. Why can't we have as much to choose from as the music stations?"

Hammer does not have a degree in engineering, though he is studying with the Society of Broadcast Engineers, the goal of which is eventual certification.

"I don't want to stop learning, and I try to soak up as much knowledge as I can," he said. "Fortunately people are always willing to help me."

The thing about college

"In my experience, colleges don't do a good job of teaching engineering for radio," he said. "At my college the professor worked at a station that was the flagship of the San Jose Sharks. He was back at the station and I was setting up the equipment at the stadium. I called him to see if he could dial me up on the (Telos) Zephyr and he didn't know how to do that. I've known how to

do that since I was 10! In college they teach theory, but I want to know how to fix something if it goes down."

Hammer had the chance to do just that when he was setting up equipment for an NFL draft with his father.

"We tested everything and it was fine, but until you go live, you never know," he said. "The head coach came in and sat down at the mic and it went dead. I jumped up and unplugged the cough switch and plugged the mic right into the console and it worked. My job is to know what's the most likely thing to fail."

Hammer is more than just a remote engineer; he is beginning to do a little design work as well. The Twins are building a new stadium, set to open in 2010, and he has made a number of suggestions.

'In college they teach theory, but I want to know how to fix something if it goes down.'

"In Baltimore they built a ballpark about 15 years ago and those designers had very little foresight in terms of wiring," he said. "There were no lines from the booth to the dugout, for example. We can't know what will happen in five or six years. That's why we need to look at these things with an open mind."

In with the new

Because he had an interest in broadcasting from age 6, RW asked Hammer how he suggested the industry bring more young people into the field.

"Just expose them early," he said. "I was fortunate enough to grow up with it and gain the experience of playing with things early on in my life. My middle school had a TV station and every morning we would broadcast announcements as well as news from the previous day and even highlights from our athletic teams."

"I think we need programs like these that allow young people the opportunity to be around the medium."

It's up to them to catch the bug."

Andy Price is director of game presentation and broadcasting for the Twins Radio Network. He described Hammer as "a guy who is not just 'plug and play. He is a step ahead of us in terms of thinking about what's coming up around the bend."

Mark Durenberger, a Radio World contributor deeply involved in the design of the Twins Radio Network, was an early advocate of hiring Hammer.

"From the beginning he showed a curiosity about the project and had ideas on how he could contribute. He showed up for his interview with schematic diagrams! His approach to the broadcasts is 'belt-and-suspenders-and-belt'. We've never had an outage with Kyle in the booth. I'm involving him in our technology designs at the new stadium and he definitely supports 'cutting-edge.'"

Not surprisingly, another fan of Kyle is his father.

"I knew Kyle was ready to engineer on his own when he was about 17. I was producing and engineering for the San Francisco Giants, and I flew Kyle down to L.A. for a weekend series with the Dodgers," he said. "On the first day, we got the gear up to the booth, and Kyle set up and pre-tested everything while I just sat and observed."

"If I had let him, he could have run the whole broadcast."

Ken Deutsch is a former broadcaster who says his only connection to sports is having once tripped over a cable at Toledo Mud Hens stadium.

Comment on this or any article. Write to radioworld@nbmedia.com.

Circuit

► Continued from page 12

external speaker with a single circuit connector, you insert the plug until you connect with the "ring." In this situation the amplifier output is available in parallel with the internal speaker.

If you want to power a stereo headset, you insert that plug until it is fully seated. When the tip connection is made, the in-circuit switch puts a 150 ohm resistor in series between the amp output and the two channels (ring and tip to ground) of the headset running in mono. The resistor protects the headset from excessive level and provides more vernierity on the volume control.

The second wiring version pictured operates the same as the first, except the in-circuit switch of the ring removes the feed to the internal speaker. This puts the total amp power into the external speaker.

Buc Fitch can be reached at fitchpe@comcast.net.

Ray Fantini works for Salisbury University's Television Department but also does broadcast contract work on Maryland's Eastern Shore.

He writes that for the last few months he has been doing work on a couple of old transmitters, a Gates BC-1 and a Collins V-20. A couple of hams he knows got these transmitters and have disassembled them. They are in the process of restoring them to almost new condition, and Ray lent a hand. You can see some of the BC-1 restoration in pictures at www.dxham.com/Gates%20BC1-E/.

Ray Fantini can be reached at rafantini@salisbury.edu.

Steve Tuzeneu is a staff engineer for the corporate offices of WAY-FM. Steve writes to express concern about new broadcast equipment and RS-232 connectors.

Steve observes that many broadcast equipment manufacturers are still making equipment with RS-232 connectors, which are a dying breed.

When you purchase a new laptop or desktop, your new computer only comes with USB ports. Although you can often get a USB to RS-232 adapter, many times they won't work. It is Steve's hope that manufacturers will keep the USB connectors in mind as new products are developed. Manufacturers, tell us what you think.

Steve Tuzeneu can be reached at stuzeneu@gmail.com.

John Bisset has worked as a chief engineer and contract engineer for 39 years. Reach him at johnbisset@myfairpoint.net.

EPG

► Continued from page 18

minimal additional cost burden to an IBOC receiver or an Internet-connected device.

Several potential business models are also enabled by the EPG, including possible revenues earned by carriage of other stations' EPG data, promotional opportunities in dynamic EPG text, or even inclusion of text or graphical ads on the EPG screen (as found on some TV EPG systems).

Use cases & trials

The NAB FASTROAD EPG proposal spells out a variety of potential uses contemplated for stations' application of the

service. A few are reproduced in the table here.

In general, these include all the features one might expect in a traditional, TV-like EPG, plus some interesting, radio-specific variants, such as "Follow the Program."

Like RDS, it is imagined that a broadcaster could implement many of these features, whereas a given receiver may only display a few of them, and with varying combinations of features implemented on different devices. Also like RDS, the level of such selective feature implementation may expand over time.


To break through the chicken-and-egg problem, it is recommended that broadcasters lead the way by starting with a fairly rich implementation, and wait for receivers to catch up. The ability to pres-

ent a relatively complete display of features immediately via a PC browser client may help speed the EPG feature-growth process in IBOC receivers or other devices, and provides immediate value to the broadcaster regardless of dedicated-device development time.

On-air trials of the service in the Boston and Providence, R.I., markets are scheduled for later this year. Many broadcasters in those markets have already indicated their interest in participating, and prototype receivers are now being developed, along with other software and interfaces required.

Look for coverage of this important demonstration in upcoming issues of Radio World.

Skip Pizzi is contributing editor of Radio World.



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GUEST COMMENTARY

Pubcaster Uses Satellite to Distribute HD-R

Nevada Public Radio: A Case Study Using The Nautel Reliable HD Transport System

by Paul Anderson

The author is with Elaine Jones Associates, writing on behalf of Nautel.

LAS VEGAS Operating a group of radio stations spread over a large geographic area can present challenges unlike any others. Nevada Public Radio does just this in a sprawling area covering south and central Nevada and southwestern Utah.

Nevada Public Radio is the licensee of six radio stations. All are full-service FMs and the extended spacing between the locations prevents the use of traditional STL links in all but the two local stations in Las Vegas.

Because of this geographic challenge, Nevada Public Radio Director of Broadcast Operations Phil Burger has used satellite links to feed the four outlying stations with analog programming content. Fig. 1 shows the vast geography that Nevada Public Radio serves.

"The installation of satellite receivers at the remote stations took about a year, with most of the work done in 2002," said Burger. "Bill Garban of Las Vegas installed the [3.8 meter] dishes. Our contract engineer, Warren Brown, handled the audio. Other than the fact that these are remote, mountaintop sites, it was not

that difficult."

The prospect of HD Radio offered some opportunities to provide additional programming service to the distant stations. In Las Vegas, KNPR is an all-news/talk format. KCNV is an all-classical music station. The distant stations have broadcast the KNPR format but it has not been practical to develop additional station licenses to rebroadcast the KCNV format in the distant cities due to the smaller populations.

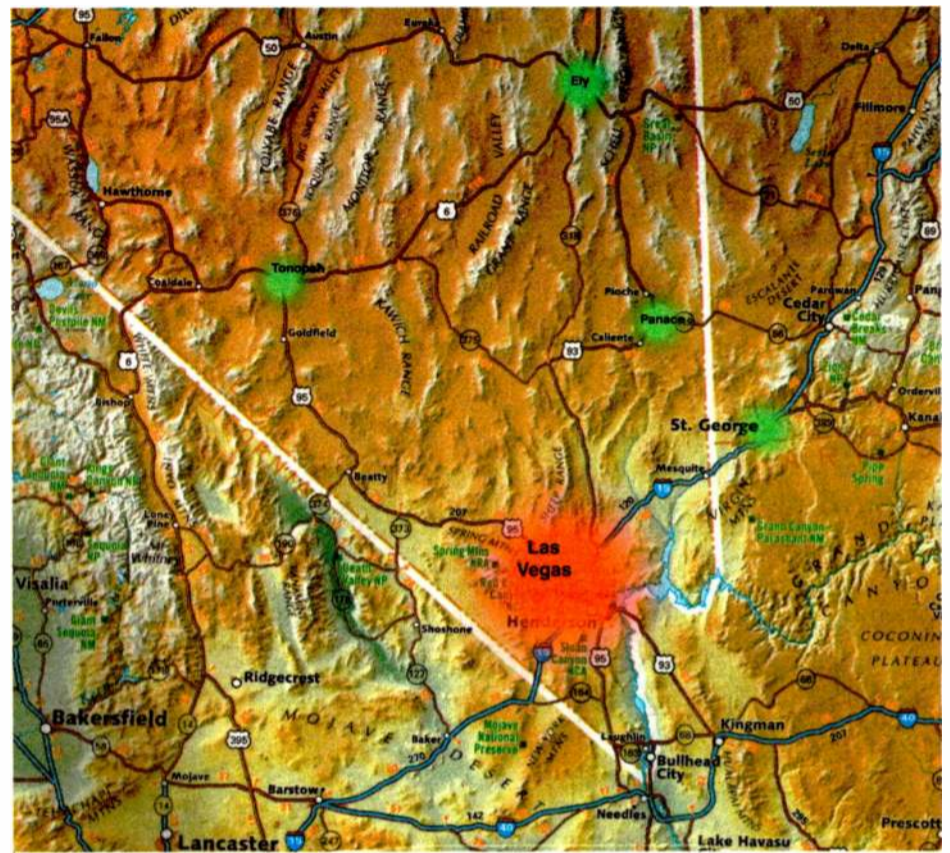
"We were among the first in the nation to go IBOC," said Burger, adding that KNPR was the original Las Vegas test station for Lucent Digital Radio's technology.

KCNV started IBOC transmission in December 2004. At 650 watts TPO it was relatively easy to convert the Nautel FM2 transmitter to IBOC, he said. All six stations in the Nevada Public Radio group are running an FM analog and an HD Radio signal. Five run the identical FM+ HD signal and KCNV transmits a separate FM+ HD stream. Most of the HD conversions were accomplished by the fall of 2007.

The multiple program capability of HD Radio was the answer to providing alternate programming to those other audiences. The problem was that there were no STL links possible, and no tele-

phone, T1, any wired services or even cellular service available at most of the outlying transmitter sites. It seemed

satellite was the only way to distribute the HD programming, just as it was in the case of Nevada Public Radio's analog service. Looking at the data bandwidth requirements of the combined HD programming Ethernet link, Fig. 2 on page 24 shows the



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Fig. 1: Nevada Public Radio Coverage

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large data bursts followed by extended periods of no data being sent. Analysis of the HD stream with data packets up to 19 kilobits shows that a 1.5 megabit link is ideal to allow the bursts of data.

This much data space on satellite is quite expensive. Using a narrower data channel can be problematic because maintaining the integrity of the data stream is important in HD transport. A 99.999 percent data integrity level still equates to a 1-1/2 second audio dropout every two days.

Thus, 99.99 percent is one dropout every four hours. Lowering the data channel bandwidth requires re-formatting the HD data stream itself to smooth out the bursts. This leads directly to the Nautel Reliable HD Transport system.

Fig. 3 shows the Nautel RHDT stream compared to the standard E2X HD stream. RHDT sends the data packets in a more uniform manner with more timing packets added.

Instead of requiring a peak bandwidth of 1.5 megabits, the same HD information can be sent in a consistent 150 kilobits-per-second stream. Even allowing for resending data and more frequent clock packets, a 200 kHz satellite channel is quite adequate.

Resending lost data is not a burden
See NEVADA, page 24 ▶

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Radio World's HD Radio™ Scoreboard

The HD Radio Scoreboard is compiled by Radio World using information supplied by iBiquity Digital Corp., the HD Digital Radio Alliance, BIA Financial Network and other sources. Data reflect best information as of late January. This page is sponsored by Broadcast Electronics. HD Radio is a trademark of iBiquity Digital Corp.

HD Radio Gives MPB More Options

Many radio organizations are embracing HD Radio. But very few have done so more enthusiastically than Mississippi Public Broadcasting. The reason: The multiple broadcast channels supported by HD Radio have resolved something of a programming split personality for the network and its eight Class C FM stations.

"Prior to getting HD Radio, we were doing block programming that alternated between news/talk and classical music," explains Bob Buie, MPB's deputy executive director for technical services.

Adds Jason Klein, director of radio, "The problem is that the audiences for each format really didn't mix well. In fact, you might say that whenever we made one audience happy, the other one became unhappy — and vice versa."

HD Radio changed this. By upgrading all eight stations to broadcast in HD Radio, MPB now has the extra channels it needed to split the warring formats. Today MPB's analog FM/HD1 radio service carries news/talk, with the exception of a classical music show at noon. As for the classical music format? It's been moved to the network's HD2 channels.

Of course, this move required new technology to be installed to replace the 25-year-old transmission systems. "Low-level combining was chosen as the preferred method and MPB staff collaborated with their consultant engineering firm of Kessler and Gehman Associates throughout the project," says Buie.

The major components were new Jampro antennas with pattern optimization and Continental Electronics' digital/analog FM transmission systems, Nautel exciters, Orban processors and PSI IBOC importers; the work was funded in part by grants from the Corporation for Public Broadcasting's Digital Distribution Fund and PTFP, Public Telecommunications Facilities Program.

MPB has fielded a lot of irate calls from classical music lovers since moving classical onto HD on Jan. 8, 2008, but considers the results



Bob Buie, left, and Andy Caston are shown at the installation of a new transmitter for WMPN(FM) in Jackson. Caston is site engineer for the station.

well worth it.

"Once we got past their ire, our classical listeners were happy to hear about MPB Music Radio, our HD Radio 2 station created just for them," says Klein.

"Meanwhile our news/talk audience, which is the majority of our listeners, was pleased to have the FM/HD Radio 1 channel reserved for 'MPB Think Radio' as we have branded our news/talk format."

Of course, MPB's classical listeners need HD Radios to hear the music they love. No problem: MPB has gone out of its way to find out which retailers are selling HD Radios.

Although the station can't advertise this information on-air, it is able to share it over the

phone and online.

"We've been helped by the fact that Sony has come out with an HD Radio and that major retailers such as Best Buy are moving into the HD Radio category," Buie says. "HD Radio is becoming known to consumers in general, and that is helping us a lot."

To drive the conversion further, MPB is offering Radiosophy HD Radios as premiums to listeners who donate money to the station during pledge drives.

"We had an 'Ah ha!' moment there when we realized that we could use our pledge drive to get HD Radios out to our listeners, and thus increase our listenership in HD," says Klein. "We are breaking even on this deal, but it is worth it to get HD radios into our broadcast area."

Without ratings data, MPB does not know how many of its listeners have made the move to HD Radio. "However, the feedback we are getting is very good, and the demand for our pledge drive HD Radios is very strong," says Buie. "So I think you can say that HD Radio has been nothing but good for MPB, solving our format challenges while making our listeners very happy."

— James Careless

The HD Radio Bottom Line

	Last Year	Last Month	Current	
On the Air	1,660	1,885	1,894	Total U.S. stations: 14,124 exclusive of LPFM and translators
FMs Multicasting	863	1,017	1,017	

Nevada

► Continued from page 22

with this scheme and Nevada Public Radio sends a consistent 195 kbps stream on its 200 kHz segment. With the reduced bandwidth multiple HD streams could be sent on the same link allowing shared uplinks for multiple stations.

In using Nautel Exporters and Exciters, implementation of RHDT was easy for Nevada Public Radio since the data stream balancing process occurs right in the Nautel HD Radio Exporters

interruptions than with the standard iBiquity Digital data format.

The characteristic clear weather of the Nevada region is not prone to interruptions of the satellite signal except for occasional thunderstorms in the summer and snow storms in the winter. These interruptions occur for analog satellite links as well as data links so the service reliability of HD compared to FM analog does not change for the distant stations. KNPR plans to winterize the satellite dishes at the remote locations to further minimize downtime caused by weather.

In a unique decision, KNPR opted to use satellite HD delivery for its local Las

Nevada Public Radio Stations

KNPR	88.9	24.5 kW	Las Vegas
KCNV	89.7	550 W	Las Vegas
KWPR	88.7	3 kW	Ely
KLNR	91.7	1 kW	Panaca
KTPH	91.7	1 kW	Tonopah
KSGU	90.3	2 kW	St. George, Utah

and Exciters. Users of other brands of HD systems can insert Nautel RHDT Units at each end of the path to gain the benefits of the system.

The balancing process allows a time buffer to be set so that packet retransmissions can occur before the programming goes to air. In the case of the distant sites, there is no channel for resend requests so the programming just goes to air.

At the studio site a Radyne satellite receiver is able to monitor the 200 kHz satellite segment, and, coupled with an RHDT unit, make resend requests based on the integrity of that path. Any packets lost in the uplink or downlink can thus be resent. In practice, KNPR has found that the path only averaged about one dropped packet per week on the Ku band system.

In this and other installations, users report that the more uniform flow of data with RHDT has resulted in fewer dropped packets and resulting program

Vegas signal. This allowed the public broadcaster to retain its present STL analog link for the local stations.

The delay differential between STL and satellite is matched using the exporter delay and delay in the Omnia audio processor with different values for each to make up the quarter second difference added by the satellite path.

Now KNPR's local audience as well as listeners in the other cities can select from additional program choices:

- HD1 is the regular KNPR news/talk format
- HD2 duplicates the KCNV classical format. This extends the coverage of the format in Las Vegas since KCNV has much lower transmitter power. In addition the format is now available in the distant cities.
- HD3 presents an alternative news/talk format as counter-programming to the

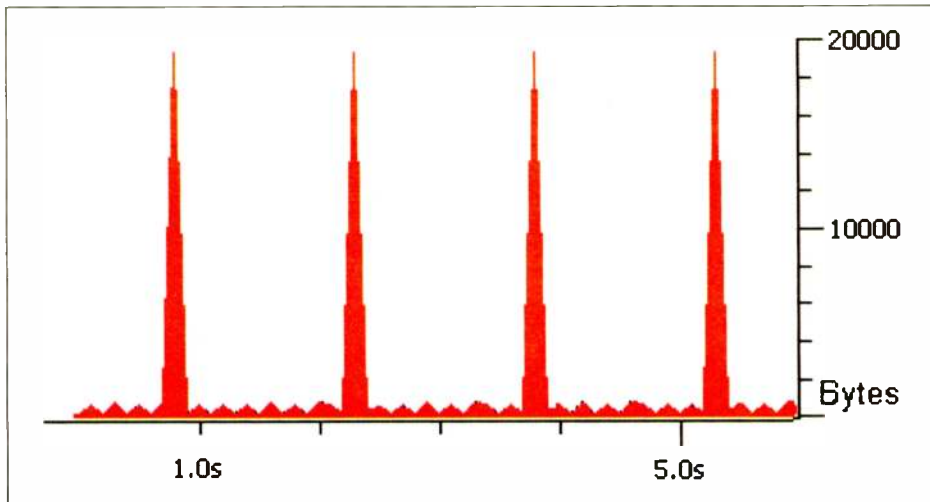


Fig. 2: iBiquity E2X Data Bursts

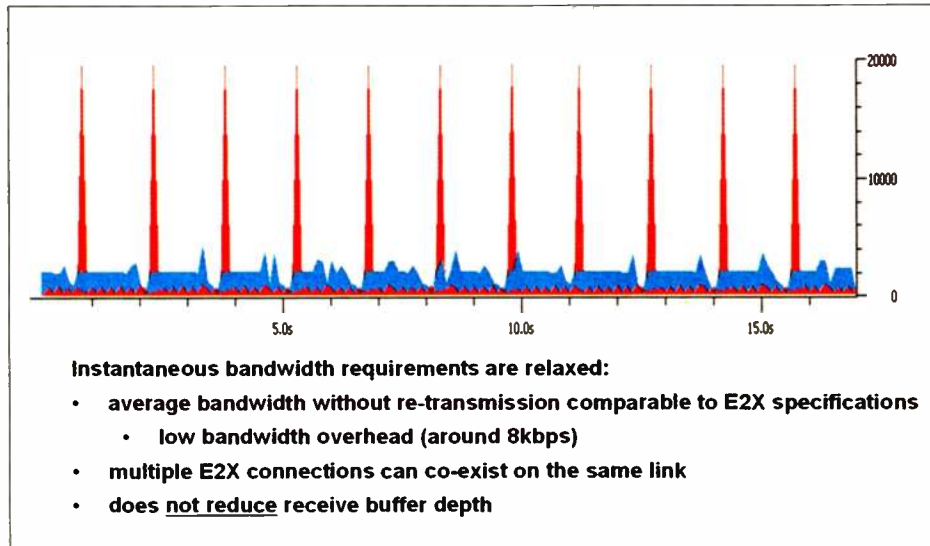


Fig. 3: Rebalanced HD Stream Using RHDT

main channel. This represents an added program choice in all the areas served.

KNPR is planning to drop the analog satellite signal eventually. The RHDT system allows for extracting the main HD1 channel to present an analog feed to the exciters. The HD satellite feed will therefore serve both analog and HD feed functions.

Talking about the installation and the RHDT system, Burger said, "I think early on the software engineers at Nautel realized that in the real world of broadcast radio the studio/transmitter link can vary from station to station. They wanted to make the process of data delivery to transmitters easier — and they did it."

"Nautel's RHDT protocol is the key to making this system work," he said. "It creates a more reliable data stream that uses less bandwidth. Without it, we would have to lease three times the satellite bandwidth, at three times the cost. RHDT keeps the bandwidth requirements low and provides reliable data transport. That's the only way we can afford to provide HD signals to remote transmitters."

Adding HD meant splitting the satellite signal for the FM audio and for the Radyne DMD20 receiver. "Then it was a matter of replacing the old analog transmitters with the new Nautel HD transmitters and plugging everything in," said Burger.

The work on KNPR, KTPH, KLNR and KWPR was completed with CPB digital conversion grants. Those four stations combined for a project total of \$450,000, with approximately 80 percent paid by CPB.

KSGU was built as a new station in 2005 and only required an Engine upgrade on the Nautel exciter and the Radyne receiver.

In addition to their main digital stream, all six Nevada Public Radio stations are also transmitting two multicast signals each.

Nevada Public Radio is successfully using satellite as a delivery mechanism for multiple HD program services to far distant transmitter locations. The Nautel Reliable HD Transport system makes the feeds more reliable at a lower cost with more savings in the future as the analog satellite link is dropped.

Tech Bulletin: New PSD Implementation

Best practices to help HD Radio stations set up their dynamic or station Program Service Data are the subject of a recent technical bulletin from iBiquity Digital Corp.

The information is meant to coincide with a station's adoption of iTunes Tagging.

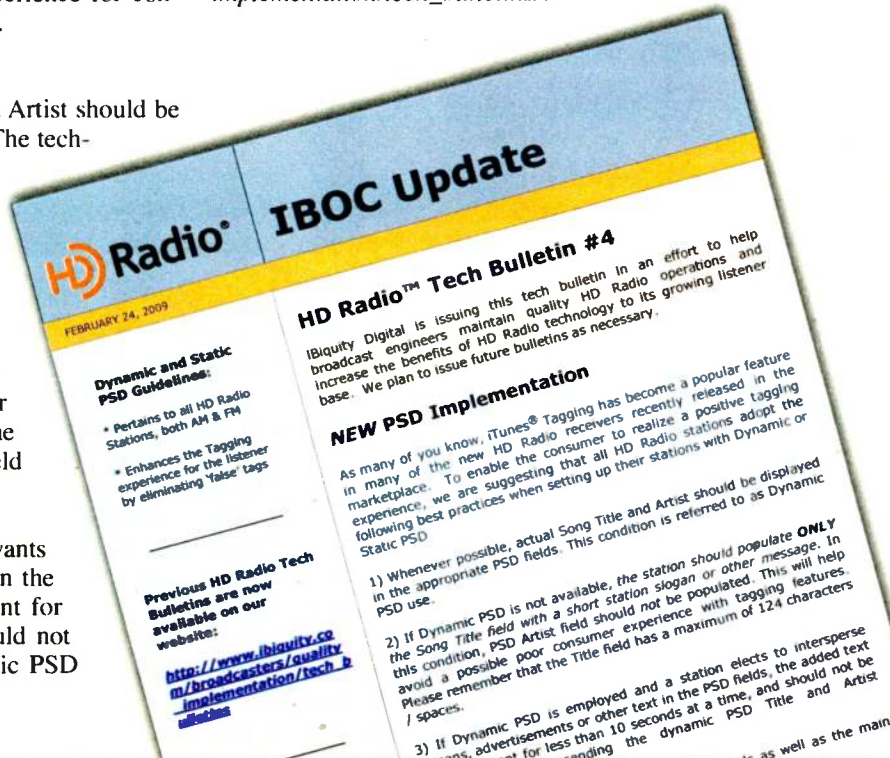
The guidelines pertain to both AM and FM stations; iBiquity says they enhance the tagging experience for consumers by eliminating so-called "false" tags.

Details from the tech bulletin:

1. Whenever possible, actual Song Title and Artist should be displayed in the appropriate PSD fields. The technology developer calls this Dynamic PSD use.
2. If Dynamic PSD is not available, the station should populate only the Song Title field with a short station slogan or other message. In this condition, PSD Artist field should not be populated. This will help avoid a possible bad consumer experience with tagging features, states the company in the guidelines. The Title field has a maximum of 124 characters/specs.
3. If Dynamic PSD is used and a station wants to intersperse slogans, ads or other text in the PSD fields, the added text should be sent for less than 10 seconds at a time, and should not be repeated before resending the dynamic PSD Title and Artist information.

4. These guidelines apply to multicast channels as well as to main program service.

More Tagging information is at www.ibiquity.com/broadcasters/tag and previous tech bulletins are at www.ibiquity.com/broadcasters/quality_implementation/tech_bulletins/.



Disability

► Continued from page 4

Johnson: Jim, thanks for getting back to me. I'd have to say there's no "easy" way to acquire a disability. At least with a slow onset like MD one can plan ahead more; but I'm guessing that's a double-edged sword as well.

I like your statement that the belief that I can do "it" is at least 80 percent of the actual doing. I try to follow with that, although I also scare my wife with some of the things I attempt.

No HV, or RF for that matter. My training and upbringing were business-oriented. I remember my dad sweating bullets to keep things going in January and February, the slow time of year in the ag-supply biz.

I'd like to stay as active as I can and begin working, even if only part-time, to give my 11-year-old daughter a sense that money doesn't just come automatically at the beginning of the month. Don't get me wrong, though. Social Security disability has been a blessing.

For now, I'm content to let the ownership issue "simmer on the back burner." I've been a Midwesterner most of my life, but the Albuquerque-like climate of Cañon City is hard to beat for me. Snow and ice generally disappear here in a couple of days. Cañon City has the warmest winters in Colorado.

Assuming funds were in place to put a station on the air (and that's still a big if!), I feel it may still be hard to run it from a distance, even with the Internet. In theory the tools are there to run a business from just about anywhere, but I'm not sure that's possible for radio. What's your opinion on this?

Withers: Well, Russ, running a station from a distance is a challenge, but it can be done (although it is absolutely necessary to be able to travel to the station a few times a year. I slug it out on a two-hop flight three or four times a year to visit my station in Corpus Christi.) A couple of things make this doable:

First, you need a top-notch computer guy at the station and a good Internet connection, with streaming capability. I listen to my station every day (during local programming only, though, since a streaming license from the music license guys is ridiculously expensive). You can also have spots and air checks sent to you periodically via e-mail or other downloads, so you can hear what things sound like.

Second, I keep some of the ops here with me, most notably traffic and billing. Having the traffic system here allows me to audit who is on the air and when, how many discrepancies we have, how the programming is integrated, etc. And billing, of course, is the lifeblood of the station, so you need to keep track of that every day.

At the end of the day, Russ, radio stations are pretty simple things from a strictly technical standpoint. The station will percolate right along without much day-to-day tweaking. It is the business side of things — which you seem pretty comfortable with — that requires the attention.

If you have done the due diligence and can come up with the money and service the debt, I say "full speed ahead"!

Comment on this or any article to radioworld@nbmedia.com.

NEWS WATCH

TCI Acquires Tower Data of Kline Towers

IRMO, S.C. Tower Consultants Inc. acquired exclusive rights to the Kline Towers drawing portfolio.

TCI was founded in 2005 by President Jean-Alain Lecordier, former VP of engineering at Kline, and CEO Greg Kelish, former VP of operations at Spectrasite Broadcast Group. TCI stated, "Kline Towers, started in 1953 by Kline Iron & Steel of Columbia, S.C., had the reputation as one of the best tall tower providers in the USA." Lecordier said the acquisition "gives us an opportunity to provide current Kline Towers owners with an extensive range of services" from structural analysis and tower modifications to maintenance. TCI acquired the portfolio from Liberty Industries. Terms were not disclosed. Kline itself was acquired by Dielectric five years ago.

Transactions Seek Lows

CHANTILLY, Va. For the first time in recent memory, the value of radio station transactions in a given year has fallen below \$1 billion, and transactions remain far below their level of the late 1990s. BIA Advisory Services reports that 769 stations sold in 2008 for an estimated \$700 million. It noted that in 2002 the same number of stations sold for \$5.4 billion.

The new year is pacing even lower; through March, 164 stations sold for a total of \$46 million.

In 1999 1,705 stations were sold for \$28.5 billion.

"Cornered by weak radio station sales in the first quarter of 2009 and all of 2008, the radio industry's sole opportunity for valuation growth relies on the ability to transform itself into a blended operation of broadcasting, online and other activities," BIA stated. "Stations with more than just over-the-air offerings provide the foundation for appraisals that raises its value above their competitors not involved in these other activities."

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Buyer's Guide

Tech Updates



Inside

Radio World

Transmitters

May 6, 2009

USER REPORT

Broadcast Electronics Serves a Legend

Wyoming Elements Are No Match for BE T Series Transmitters

by **Charles (Chas) Dozier**
Director of Engineering
Legend Communications
of Wyoming

CODY, Wyo. Legend Communications purchased a new **Broadcast Electronics** FM 25T transmitter for KGWY(FM) in March 2006. It was a replacement for an old BE FM 30 (not even an A model) that had stood on the floor for more than 25 years.

Prior to Legend buying the station, the transmitter had received little or no maintenance and the few that had poked around in it did more damage than good. So it was time to retire the old gal, and we wanted a replacement that would also

stand the test of time.

We knew BE transmitters were reliable because in addition to the FM 30, we also have a BE FM 30A that is sitting on a lonely mountaintop in the Bighorn Mountain range in north central Wyoming. At an altitude of 10,000 feet, the site can be a real challenge to access at certain times of the year, so transmitter dependability is a must.

Some winters we'll go four or five months without so much as changing a filter. Power outages can drag on for days up there, allowing building temps to plummet into the sub-zero range. Yet, when the power finally comes back on, that little transmitter purrs back to life without missing a beat.

It still boggles my mind that it continues to come back to life, but year after year that little transmitter chugs along in that brutal environment.

Two other good reasons we went with BE were timing and price. BE had our new FM 25T transmitter on site in three weeks and at a very reasonable price.

Installation was a breeze. We had the transmitter wired and plumbed before the electrician finished rerunning the primary feeds. The initial power-up sequence went smoothly — everything right where factory specs called for. And that's pretty much where it's been since.

Stability

We did finally have a tube wear out after a little over two years, but when we swapped it out for a new rebuilt one, there was very little tuning that needed to be done. That's one of the great things about BE transmitters; they're stable. That might be an understatement — more like rock solid.

If you're constantly tuning on a BE transmitter it's probably because of one of two reasons: Either you have a load problem or you're a "tinkerer," in which case my advice would be to put your hands in your pockets and let the transmitter run.

Metering in the BE T Series transmitter is all nice big analog meters that are well laid out, allowing the engineer to meter

lots of parameters, on the rare occasion that you do need to tune one up. The new IPAs are the latest MOS-FET technology and have been no trouble. The transmitter comes standard with disposable air filters. I know this seems like a small thing, but some of "the other guys" insist on putting washable air filters in all of their transmitters. In the 25 years I've been in broadcasting I have never been to an FM transmitter site that had running water.

Another really nice thing that might not seem like a big deal is just how quiet these transmitters run. That big blower motor really does run quiet with BE's "high volume, low pressure" scheme. It's sure nice to be able to hear your cell phone ring while you're on site, and more importantly, not have to step outside to talk, especially when it's 20 below out.

The inside of the cabinets themselves is
See LEGEND, page 29 ▶



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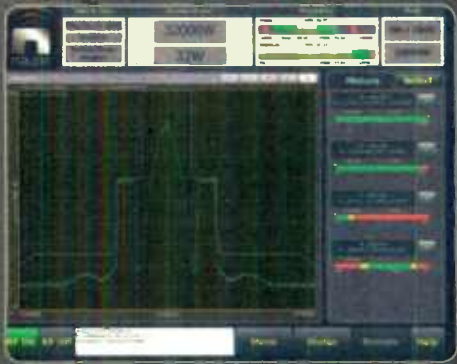
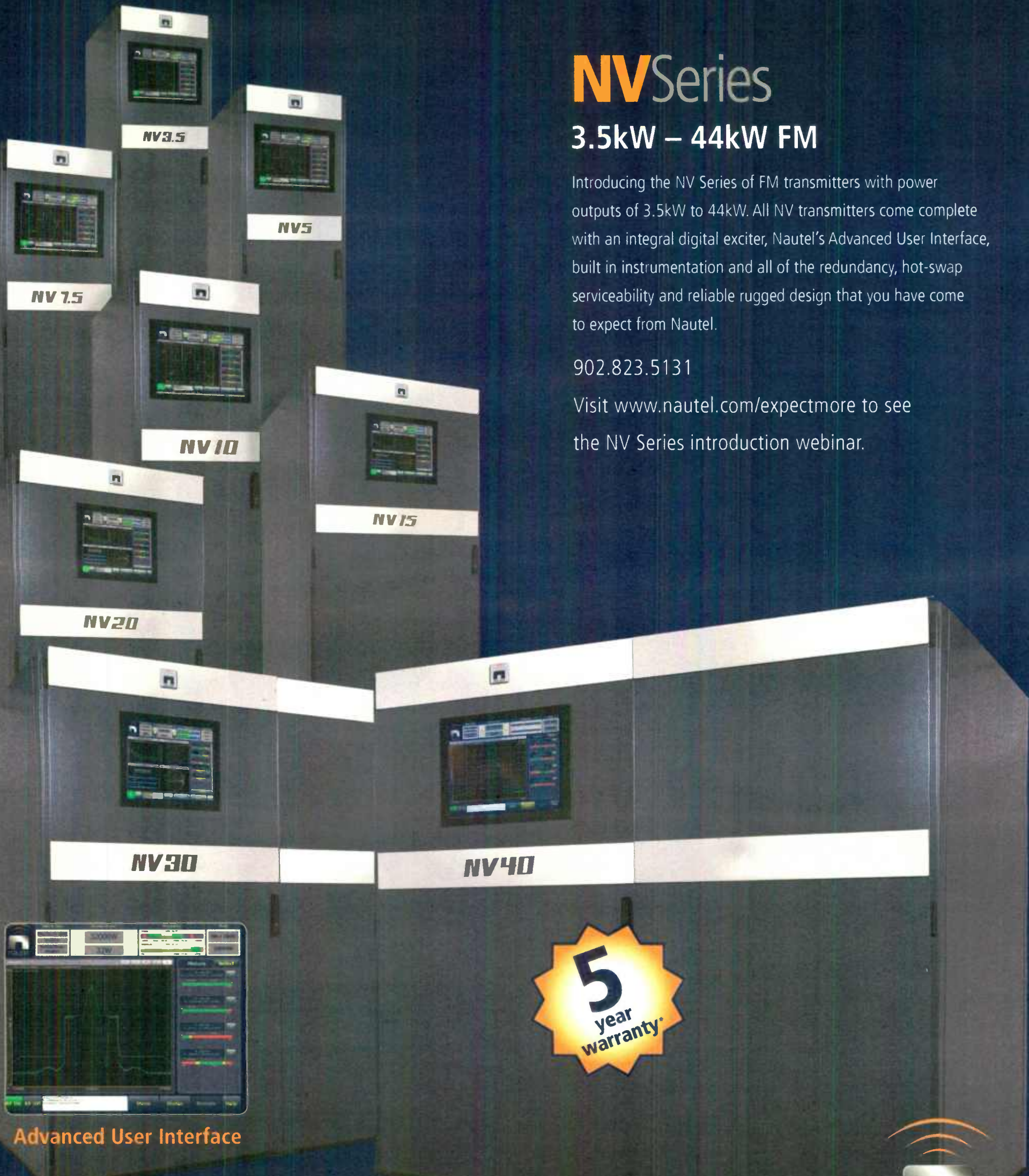
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USER REPORT

Nautel NV40 Wins Big for Univision

*Reliability, Automation and Ease of Use
Add Up to a Sure Bet for Vegas Broadcaster*

by **Manny Garcia**
Chief Engineer
KISF(FM)
Univision Las Vegas

LAS VEGAS KISF(FM) is a regional Mexican music station serving the city of Las Vegas and is part of the Univision Radio Group transmitting the Piolin network. Our station is a Class C facility with 32 kW TPO analog/27 kW analog+digital output.

As part of our ongoing Black Mountain consolidation project, where 10 FM stations are being set up to transmit from a master antenna, we started looking at a replacement of our old transmitter.

Although this 27-year-old model was operating within parameters, it was going through successive parts replacement and its operation was becoming more expensive. We also found that trying to add HD capabilities to it was less cost-effective than acquiring new equipment with native HD capabilities.

Useful features

In addition to HD Radio operation, we wanted to merge non-high voltage solid-state technology into our operation at a cost-effective range, and were looking for an architecture that provides high redundancy for good reliability. A group of Univision engineers began evaluating options that are available for our power level and cost requirements. After an extensive analysis

we chose the NV40 transmitter from Nautel.

The NV40 is a single-cabinet FM transmitter that offers the highest solid-state power in the industry. It includes a digital exciter with pre-correction, a plug-in upgrade to the HD Radio Engine and a 17-inch AUI (Advanced User Interface) touchscreen interface for full control of the transmitter both locally and remotely.

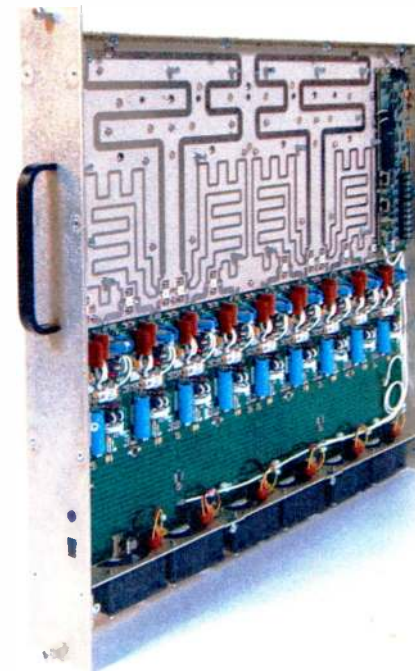
We were attracted to the NV40 by its small footprint, extensive redundancy and hot-swap



serviceability, and also liked the fact that everything was included in a single cabinet right down to remote control access. Among the useful embedded capabilities of the NV40, the most significant are the AUI and its Web interface, the use of the Importer, Exporter and Exciter GU inter-



The author is shown with the Nautel NV40.



NV40 Power Module

faces for HD, and the exciter's internal RDS capabilities.

From an engineering standpoint, due to Nautel's multiple power module approach one of the most attractive capabilities is the fact that there is no single point of failure at the IPA (internal power amplifier) level.

As an engineer dealing with tube transmitters (and solid-state), my experience has been that it is likely that when a single-point failure brings a transmitter down, the IPA is the culprit. In the case of the NV40 one can sleep a bit better knowing that if one of those IPAs fails you still have another 15 (or one per PA) and the transmitter is still on the air. The same can be said about the power supplies and the PAs; redundancy is a plus.

Remote access is also important to us. Our KISF transmitter site is located at Black Mountain, on the southeast corner of the Las Vegas valley, about 16 miles southeast of downtown. Access to the site is through a service road recommended for 4x4 vehicles, meaning it isn't easy to get to the site, so we rely heavily on remote capabilities.

We have been using external remote controls with the old transmitter as well as with the current backup transmitter over a 5.8 GHz Harris Aurora link. Now with the NV40 we rely on its AUI Web interface to control it, using the same 5.8 GHz link. We still have our Burk ARC-16 to do RF switching and to control our backup transmitter but we have plans to migrate the control of our older transmitters to the NV40 remote control functions.

Remote operation

I'm pleased with the capability of monitoring multiple parameters in the NV40 and love the ability to monitor even from home, using the AUI Web interface, the IPA and PA current, voltages, forward and reflected power levels at different stages, as well as temperature and even the speed of the cooling fan.

Though we use external VSWR sensor alarms, it is good to know that the transmitter itself can give you accurate VSWR readings at different stages.

The cherry on top of the sundae, though, is the built-in spectrum analyzer on the AUI screen. Borrowing analyzers was becoming harder and harder, and having it there and being able to use the Web interface and see it from anywhere is a wonderful thing.

There are a few things I'd like to see implemented in this product. An intake vent on the front doors would help with temperature control on the PAs, and I'd really like to see BlackBerry software to access the AUI.

But on the whole, I'm very happy. Nautel's customer support is exemplary. The sales engineers were precise and helpful on addressing our transmitter issues and implementing solutions for us; the technical support people made our preconfiguration and installation process smooth.

At first every new technology is difficult to assimilate but with the support of Nautel's tech people along with the practicality and straight-forwardness of the NV40 architecture, our installation was a good experience. I'd say with little hesitation that KISF now has the best signal in Las Vegas.

For information, contact Nautel at (877) 662-8835 or visit www.nautel.com.

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TECH UPDATES

Ecreso Launches Transmitter Line

The new Ecreso Next FM product line has been designed to replace the existing 1 kW to 10 kW FM transmitter line.

The new 3 RU power amplifiers are more space efficient, producing 1 kW instead of 500 W. This line is composed of easily interchangeable modules that are hot-swappable. Each module is redundant and includes two MOSFETs with an independent power supply.

The new Ecreso FM transmitter product line can be controlled via an RS-232 local interface or via TCP/IP (with Scripteasy and Easy Link support built in). The line complies with ED, FCC and CCIR standards.

The Next FM also includes a two- or four-band audio processor, a basic or advanced audio backup solution, a basic or full RDS encoder and audio-over-IP; it supports the new Scripteasy software for telemetry. The API Easy Link enables Next FM users to monitor and control the amplifiers using a serial connection. Settings can be remotely configured and controlled remotely via TCP/IP.

Ecreso offers three-year warranties and 24/7 support from its Miami office. For information, contact Ecreso/Audemat at (305) 249-3110 or visit www.ecreso.com.

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Legend

► Continued from page 26

incredibly spacious. Lots of room to move around and everything is marked clearly. BE redesigned the grid circuit of the newer models of transmitters, which should further stabilize the final amplifier. The PA input now just has a single adjustment, making PA tuning that much easier.

The one thing I might change in the design of the BE transmitters is that I'd like to see metering of screen volts available on the remote controls. It's kind of nice to know just how hard a transmitter is running the tube to make power, especially when the site is a remote site. I've modified my FM 30A by tapping a metering circuit designed for the optional computer interface, which works quite well, but it took a little experimenting to get it just right. Now I have a high-limit alarm set on my remote control that alerts me if the transmitter is cranking up screen voltage to make power.

I really can't say enough good things about the BE T Series transmitters. I also run several of BE's AM transmitters (BE AM 1A models), which are pretty much plug-and-play transmitters. I've never had a problem with them either, as long as the load is correct. Broadcast Electronics continues to design and build transmitters for the real world and as long as they do I'll continue to buy them.

For information, contact Broadcast Electronics at (217) 224-9600 or visit www.bdcast.com.

Continental Rounds Out HD Radio System With New 800' importer

At the heart of Continental Electronics HD Radio systems are the 802E⁺ digital FM exciter, the 800E⁺ embedded exporter, and the 800' importer.

The 802E⁺ and 800E⁺ were introduced at the 2008 NAB show and are shipping with every Continental 816HD transmission system. New from Continental in 2009 is the 800' importer, completing the HD Radio delivery system.

Continental's 802E⁺ digital FM exciter can incorporate an optional internal embedded exporter, providing an integrated analog and HD solution for stations not requiring a separate HD exporter. Utilizing a unique adaptive real-time precorrection algorithm the 802E⁺ provides high HD quality and performance. Features include stereo generator, delay and an LCD screen.

The 800E⁺ embedded exporter uses DSP technology to pro-



vide reliable signal generation without the need for hard drives or operating system. Accessible through Web browsers, the 800E⁺ is compatible with unidirectional and bidirectional IP-based STL systems and is only 1 RU in height.

Continental's 800' importer adds supplemental audio content from automation systems and other service providers as well as program-associated data (PAD), and it supports iTunes

Tagging. The 800' is two rack units in height: it incorporates a CEC sample rate converter for greater audio input stability. It has dual Ethernet ports, can incorporate up to two audio cards and is plug-and-play compatible with the CEC 800E⁺ embedded exporter.

For information, contact Continental Electronics at (214) 275-2319 or visit www.contelec.com.

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USER REPORT

WRJL Installs Harris to Expand Coverage

Z10CD Allows Gospel Station to Broadcast Throughout Northern Alabama and Beyond

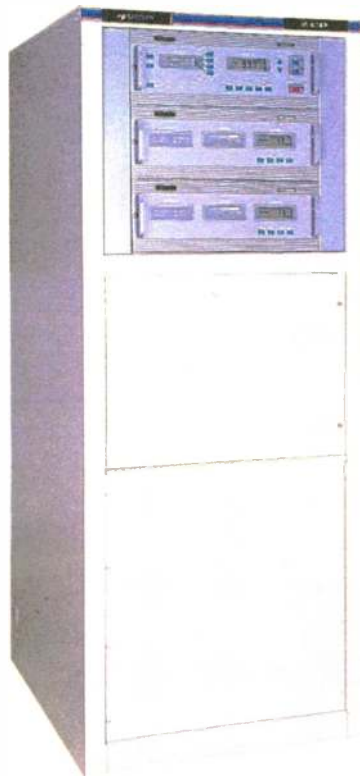
by Greg French
Chief Engineer
WRJL(FM)
Rojo Inc.

HUNTSVILLE, Ala. WRJL(FM) is a small radio station on the Appalachian Plateau in northern Alabama, just south of Huntsville, broadcasting to an area with approximately 1 million potential listeners, including parts of southern Tennessee. The station is a classic family-run operation, first hitting the airwaves about 20 years ago as a 1 kW AM station.

Harris faithful

WRJL took the leap into the FM world in 1996. My father took it as a good sign when he found out the frequency 99.9 FM would be ours, as he said it was nearly 100 percent gospel. Harris was our choice of transmitter then and was again in January when the station's signal was boosted to expand its audience reach. The power increase meant that the station needed a new transmitter, and the situation dictated that the job be done quickly. We believed the Harris Z-Series Z10CD transmitter was the right choice, and our faith quickly was rewarded.

The station first installed a 6 kW Harris 5CD transmitter after moving to the FM dial. We knew we wanted to reach a broader audience and applied for a power increase from the FCC as soon as the 6 kW license was granted. It took nearly a decade to get the permit for the increase to 25 kW, and in the interim, we considered selling the station. A last-minute change of heart left us with the three-year construction permit close to expiring.



The 5CD was very reliable, and that track record was a major reason we again turned to Harris. Other factors include Harris' excellent technical support. We all know that technical problems always seem to happen at midnight on a weekend. It is comforting to know that someone at Harris will be available on the phone when calling for support.

Installation of the Z10CD was not difficult. The transmitter arrived at the station on Jan. 12, and we had it installed four days later, swapping out the 5CD

and placing the new transmitter in the same spot.

Things have come a long way since 1996 in regards to transmitter design. The modular design of the Z10CD is a major plus, with 18 power modules that include two hot-swappable amplifiers apiece. The transmitter will even run at lower power on a single module.

Start-up

Initial start-up began with one module, adding other modules one by one to slowly raise the power. This allowed us

pliant exciter, the Z10CD offers the station an efficient upgrade path to HD Radio broadcasting. It also protects the station's investment by allowing reuse of the DigitCD analog exciter as a redundant exciter in the future.

The transmitter upgrade had an immediate effect on sound quality, and we realized there were shortcomings in our end-to-end audio chain. The station uses fiber optics for STL transport and the studio equipment is up to par, but it quickly became apparent that an audio processor upgrade was required.

Other audio challenges originate from the music, which is played from a computer system. WRJL is a southern gospel station, and most of the music was origi-

Initial start-up began with one module, adding other modules one by one to slowly raise the power. This allowed us to test the system with the station's old antenna without the risk of frying any equipment.

to test the system with the station's old antenna without the risk of frying any equipment.

It was clear we made the right choice as soon as we heard the signal coming from the Z10CD through the old antenna. The tower crew then installed the new antenna and transmission line, and the transmitter was on the air by Jan. 20, 2009, at the licensed power of 25 kW.

The Z10CD, coupled with the Harris DigitCD exciter, provides excellent reliability and performance for the FM service today, and while HD Radio is not part of this round of upgrades, it is something we look forward to utilizing in the future. With the addition of an HD Radio-com-

nally recorded for an old AM station. Lower quality settings were used because the AM station was unable to broadcast with much fidelity, and hard drive space was very expensive in those days.

The station is now re-recording its entire music library. Processing the 30,000 songs will take much longer than the Z10CD installation, but combined with the new processor and antenna, our signal really grabs the attention of our listeners when those old gospel songs are broadcast. Thanks to everyone who helped us pull off this upgrade in record time.

For information, contact Harris Broadcast at (513) 459-3400 or visit www.harris.com.

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USER REPORT

Bext Goes Over the Border

FB Series Offers Higher Power In a Compact Package for FM Station in Reynosa

by **Jorge Brenes**
General Manager
XHRYA

REYNOSA, Mexico In the spring of 2008 I purchased a Bext FB series radio broadcast transmitter for 90.9 XHRYA, an FM station in Reynosa, Mexico, just across the Texas-Mexico border.

The transmitter was installed in May with a sim-

ple and straightforward installation and has been working flawlessly since.

model we purchased, although now Bext has a newer, even more space-saving version, in which the exciter is built into the same 4RU enclosure of the amplifier itself.

For our application, we selected the model FB 2000, which produces 2 kW of power. The RF output connection is a standard 7/8-inch EIA flange and the low-pass/harmonic filter is built in. The amplifier is completely solid-state and broadband, with a step-by-step, menu-driven LCD display on the front panel.

From the LCD screen on the front, users can read everything from RF power to individual status of each internal MOSFET and each power supply section, with event history, overall electrical efficiency

and many other parameters.

Additional front-panel LEDs report basic functions and alarms, if any. On the front there is also a BNC connector for RF monitoring purposes.

I liked the lockout function from the front panel. After setting the parameters, the user can lock the unit so that unauthorized persons will not be able to access the menu. I also liked the stainless steel used for the construction, which feels solid and keeps looking as sharp as it did on the day we installed it.

The unit is cleverly protected from excess reflected power, excess temperature and various overloads by means of gradual RF power foldback. Should the faulty condition go away, output power automatically goes back to the level to which it was originally set.

Internally, the unit is modular, with multiple RF

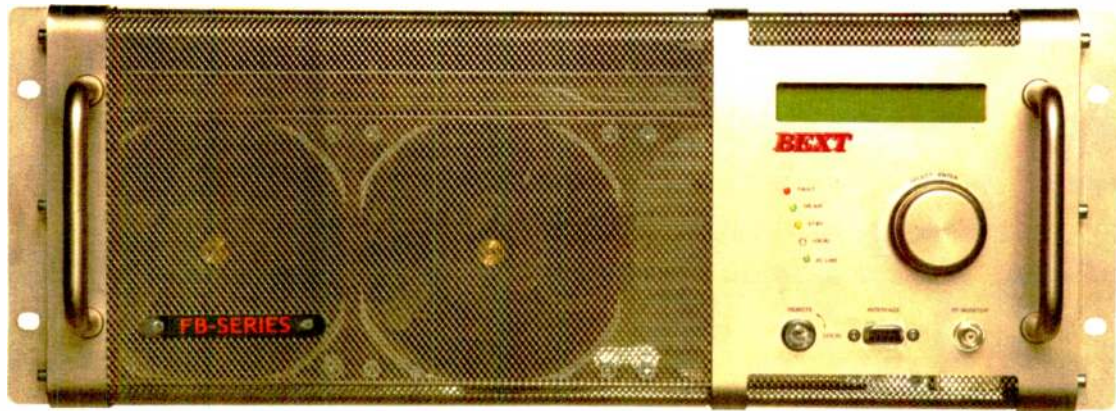
modules and power supply sections, offering convenient redundancy and ease of module replacement whenever necessary. Because of this modular architecture, the unit will keep broadcasting, albeit at reduced power, in the event of a failure of either one RF module or one power supply section.

The exciter section is frequency agile and just like the amplifier section is easy to operate through a menu-driven LCD display. The unit can be remotely controlled by standard analog contacts or by PC through an instant hyperterminal/TTY-ANSI communication that requires no software loading.

The electrical efficiency of this transmitter is very good, exceeding a remarkable 70 percent overall, which explains why the unit produces almost no heat.

This transmitter has run continuously without a single hiccup ever since we installed it and we have been very happy with it. We have since chosen Bext once again when the need for more broadcast equipment presented itself.

For information, contact Bext at (888) 239-8462 or visit www.bext.com.



Bext FB Series

ple and straightforward installation and has been working flawlessly since.

The FB Series from Bext is a relatively new, remarkably compact series of FM solid-state transmitters, available in power levels of 2 kW, 3.5 kW and now 5 kW.

Space is always a premium at transmitter sites, so the compact overall size was a factor in our choice. As a side benefit, the small size and lightweight made it easy to transport and install the unit.

The cabinet size for the Bext FB series is the same for all power levels, consisting of a rack-mountable stainless-steel enclosure measuring only four rack spaces in height (just seven inches!) for the RF amplifier section. A slim single-space Bext Lex series exciter is used to drive the amplifier

TECH UPDATES

JT Communications Offers FM Exciter Options

JT Communications offers two solutions for broadcasters looking to replace old exciters at a minimal cost.

The FMT-30 exciter utilizes proven technology, without glorified "extras" that boost the cost, the company says. The FMT-30 is frequency agile in 100 kHz steps between 88-108 MHz. It is adjustable from 0-30 W output and has VSWR, over-voltage/current protection and a front-panel multifunction LED meter for monitoring. A front-panel switch can also be remote controlled as an option from the rear terminal strip.

The exciter retrofits in almost all upgrade conditions and performs as a main or backup exciter.

If the station engineer wants to cut expenses further and has the knowledge to do so, JT Communications offers the PLFM-100 exciter module. Basically, this is a self-contained PLL modulated oscillator with +20 dBm (100 mW) output. The PLFM-100 is part of the FMT-30, but JT Communications also provides this part as a standalone product.

Installing the PLFM-100 requires the engineer to modify the existing exciter by removing most of the exciter's complement and connecting the PLFM-100 to the final amplifier stage.

The PLFM-100 operates from a single 12V supply source, and contains 75 μ S pre-emphasis and composite inputs, making it stereo compatible. For optimum performance, the PLFM-100 should be installed in a shielded enclosure, which would then be installed directly into the existing exciter. Application notes on specific exciters are available from JT Communications at no cost.

For information, contact JT Communications at (352) 236-0744 or visit www.jtcomms.com.



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TECH UPDATES

PTEK Gets Smart

PTEK's new Smart series of transmitters debuted at the 2009 NAB Show. Initially the series will consist of the 3.5 kW, 5 kW and 10 kW outputs, all of which have hot-pluggable power amps and power modules. They can operate in FM analog, FM+HD hybrid or HD Radio-only mode.

The Smart series has a small footprint and is designed to address broadcasters' immediate requirements. With its flexibility, the company says, the Smart series future-proofs a broadcaster's needs with upgradeable HD options should they choose to do so down the road. The PA modules are identical and interchangeable among all power levels in the Smart Series. They can be replaced while the transmitter is on the air.

Useful features include an IP interface, LED status indication for quick operational verification and a cooling system that includes internal blowers pulling air from the front through a removable filter, and exhausting in the rear.

PTEK products are designed and manufactured in America. The company's products are used in FM broadcast, federal government and military applications.

For information, contact PTEK at (408) 448-3342 or visit www.ptekpower.com.



BE Scalable Low-Power, Low-Cost Transmitter

Broadcast Electronics' new STX LP low-power transmitter takes a bite out of booster, HD Radio and replacement or backup transmitter costs.

Introduced this year, the STX LP is a scalable, feature-loaded low-power FM transmitter. Features include scalable architecture, redundant backup controller, IP connectivity and an internal exciter, all of which BE



says can run up the cost of low-power transmitters when provided separately.

The STX LP is scalable in power from 1 kW to 5 kW, so broadcasters can scale power to existing broadcast needs now, yet prepare for any low-power contingency later. For example, broadcasters can purchase the STX LP 1 kW transmitter for backup now, then add one or two PA modules later for an HD Radio signal or main signal upgrade.

Power upgrades are done in the field simply by adding PA modules. Because the STX LP is frequency-agile, the broadcast frequency can be changed in the field as well. There is no need to purchase another transmitter as power or frequency requirements change.

The STX LP is designed with technology found in BE's C Series, S Series and T Series transmitters.

Key features include a redundant fan design for extended system reliability and hot-pluggable transmitter modules with built-in emergency backup controller for continued, uninterrupted service should a failure occur. Along with a standard exciter built in, the STX LP includes an input port should broadcasters want to add an existing exciter. The transmitter comes with a composite input and two SCA ports as well as one RDS port. An optional stereo generator is available.

This small, 3 RU transmitter includes IP connectivity for configuring and monitoring operation remotely from any laptop or PC, which can be especially beneficial for single-frequency networks.

For information, contact Broadcast Electronics at (217) 224-9600 or visit www.bdcast.com.

OMB Has EM 5000S

OMB offers the EM 5000S, a solid-state 5 kW FM transmitter.

Features include foldback SWR protection, programmable automatic power control to save energy and onboard memory of alarms and events.

The company promotes the system for its improved design that features three 2 kW power amps, exciter and control units in a single cabinet.

Also from OMB is the MRI 15 Portable FM Transmitter, aimed at backup and military uses, religious orders and small communities.

It includes a four-channel audio mixer and externally synthesized FM transmitter that can provide a 15 W signal. The LCD display shows parameters like forward power, reflected power and FM-band modulation level in 10 kHz steps. It works with internal or external 12 VDC power supply or with AC power supply between 110-220 VAC.

OMB is headquartered in Spain where it recently opened a new facility. Its U.S. offices are in Miami.

For information contact the company at (305) 477-0973 or visit www.omb.com.



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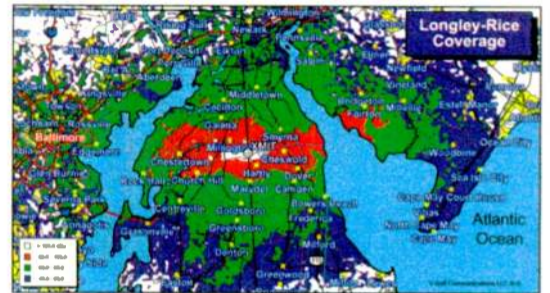
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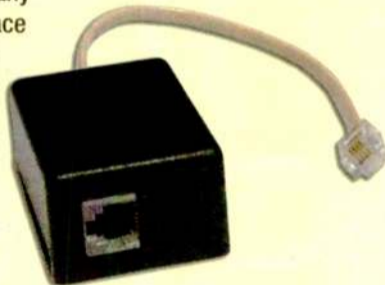
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GUEST COMMENTARY

HE-AACv2: Soon to Be A Household Name

Fraunhofer Calls It a New Pathway to High-Quality Mobile Internet Radio

by Jan Nordmann

The author is director of marketing & business development in the Audio & Multimedia Division of Fraunhofer USA Digital Media Technologies.

An increasing number of consumers are using mobile Internet radio to tune into radio streams delivered in IP packets to mobile devices — for example, the iPhone — over wireless networks (EDGE, 3G, WiFi, etc). The listening experience often happens on the move with headphones, or in the car with the phone connected to the integrated stereo unit.

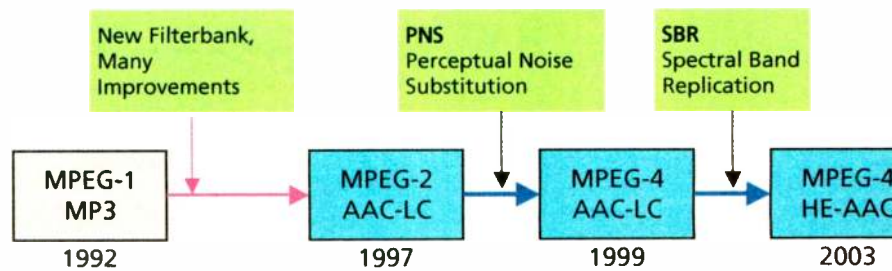
ing new services come on-stream.

In short, this is a trend that shows no signs of peaking despite inevitable competition from other methods of delivery such as MP3 players and traditional analog radio.

However, as a variety of stakeholders — broadcasters, operators, service providers and end users — will know all too well, the emergence of Internet mobile radio has not been unencumbered by difficulties.

In particular, the high-bandwidth requirements of the first generation of services have had negative implications for the stability and audio quality of the

AAC Codec Evolution



Evolution of M

Now, thanks to a major audio technology implementation from Fraunhofer IIS, a rewarding new phase of development for mobile Internet radio is in prospect.

Mobile Internet

The age of mobile Internet radio has well and truly arrived. Accustream media research reported an increase in listening hours for music radio online to 4.85 billion in 2007, up 26.1 percent over 2006. An even more dramatic increase can be expected for 2008 and 2009.

The same study shows advertising-related revenue estimated at \$80 million for calendar year 2007, up by 194 percent over 2006.

Often listened to on foot or in the car, the new-generation radio services — delivered via the iPhone and other portable devices — offer equivalent or even superior quality to conventional digital radio services, and allow broadcasters and their partners to reach substantial audiences that traverse demographics.

Consumers can conveniently enjoy an almost unlimited number of programs anywhere — worldwide. The wide content spectrum encompasses local stations, music-only formats, and news and talk radio. iTunes tagging and similar services enable consumers to instantly purchase the music, played on the radio, in numerous download stores.

As Radio World recently reported, Internet radio apps now represents eight of the top 20 applications on Apple's App Store, and there is an extremely good chance that this figure will increase even further during the next few years as excit-

listening experience. For a consumer base increasingly used to the reliability and high quality of conventional digital audio, this has without doubt been a source of unhappiness.

The situation has been particularly acute for those users who access Internet mobile radio from their cars. High-end in-car audio is taken for granted these days — and rightly so when the automotive systems can rival their domestic equivalents in terms of quality and specification. Once again, however, the end-user experience has sometimes fallen short of expectations.

The need to resolve these problems is becoming more urgent as ever-greater numbers of broadcasters and service providers enter the fold. The ability to operate services that don't require a broadcast license or special receiver hardware and work independently of region is likely to prove particularly attractive to those broadcasters struggling to survive in an era of reduced advertising revenue. The service costs involved with Internet radio are, among other factors, determined by the number of uni-cast streams and the required bitrate.

Minimizing bandwidth requirements, reducing operating costs per listener and boosting audio quality are vital if Internet mobile radio is to realize its full potential. It is precisely these issues that R&D and software house Fraunhofer IIS — whose numerous audio credits include the development of MP3 and the co-development of AAC — has sought to address with one of its latest innovations: the MPEG-4

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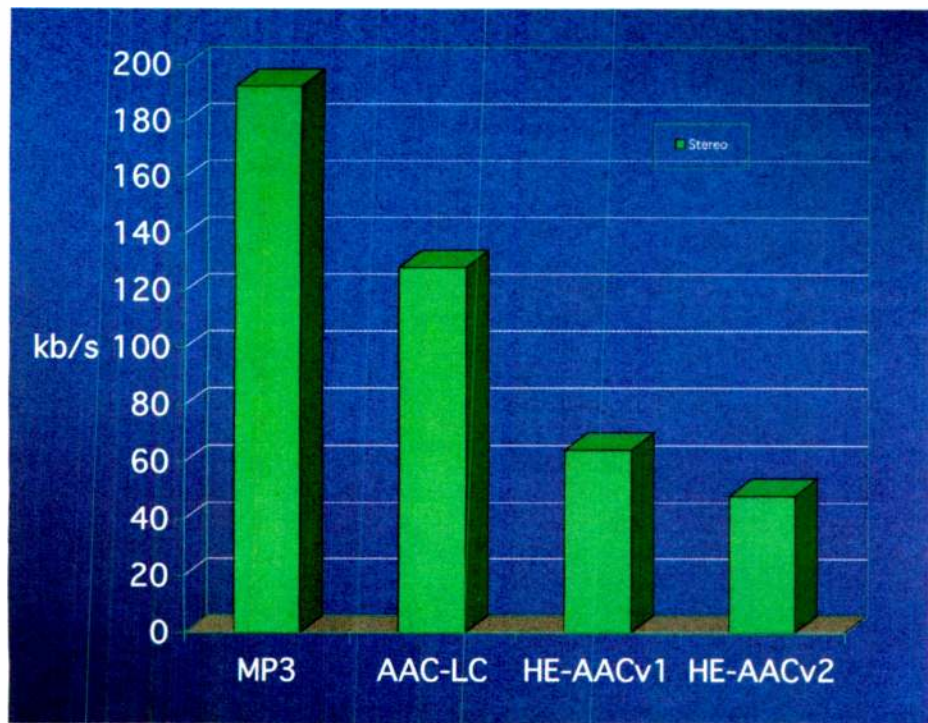
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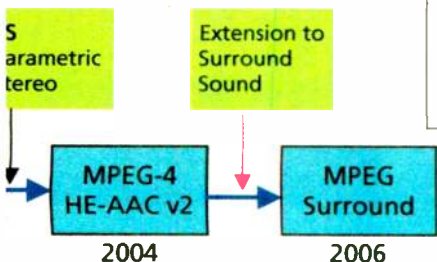
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- MPEG-2 AAC: Broadcasting (ISDB)
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Audio Codecs Over Time

High Efficiency Advanced Audio Codec (HE-AACv2), aka eAAC+.

Low bitrate, high quality

Enhanced service stability and a more satisfying listening experience are among the cited benefits of deploying the HE-AACv2 codec.

An increasingly popular choice for mobile multimedia applications including Internet radio, HE-AACv2 is part of a large family of audio technologies available for the Fraunhofer iPhone Software Development Kit (SDK) that also includes MP3 and AAC encoders/decoders, as well as MPEG Surround binaural decoders for surround Internet radio on the move or in the rear seat of a car.

Foremost among the advantages of the HE-AACv2 codec is a reduction of the required bitrate that can be as high as 25 percent for entertainment-grade quality, and 50 percent for near-CD quality, compared to legacy codecs.

This results in an overall bitrate requirement of 32 kilobits per second for stereo signals. The technology also enables increased stability and quality of service, and allows the elimination of dropouts and extended buffering. In addition, the codec clears the way for the operation of more individual streams or stations over the same bandwidth.

Cognizant of the growing pressure to facilitate high-quality, efficient mobile applications, Fraunhofer recently announced that it was enabling licensees such as radio stations, service providers and media player developers to implement optimized SDK HE-AACv2

decoder libraries on the iPhone OS and other mobile platforms. Encoders and a versatile set of streaming tools are also available.

Forward to the future

If HE-AACv2, the international MPEG standard, is not yet a household name, it soon will be. The codec has already been deployed in embedded devices used for radio, TV and music download applications. Among other high-profile credits, the codec has been specified for 3GPP music download and streaming applications and mobile TV standards including DVB-H, DMB Europe and ATSC-M.

Other major applications are in the pipeline, and Mobilaria's "Tunin.FM" as well as broadcast engineering services provider Modulation Index are already using the Fraunhofer HE-AACv2 extensively in their iPhone Internet radio applications.

"We have been working to make radio stations sound great for over 25 years," said Greg Ogonowski, president of Modulation Index and co-developer of the Orban Optimod audio processors.

"Most iPhone applications are satisfied to make your station sound poor, even those that claim HE-AAC support. Our custom iPhone player has gone the extra miles to reliably supply the highest quality audio, directory services and integrated PAD to your mobile listeners. We combine the Fraunhofer HE-AACv2 decoder, Tuner2.com directory services and standards-based RTP transport to give your listeners the best possible experience.

ience. You are loud and proud on the air, and we get you there on the iPhone as well."

Few would contradict the observation that mobile Internet radio has a long way to go until it realizes its full potential. Many mobile users have yet to wake up to these new generation services, perhaps having only recently adjusted to the world of conventional digital radio. In addition to audio services, more and more video streams will be delivered over wireless networks in the future, which will increase the bandwidth constraints even further.

The straightforward combination of HE-AACv2 audio and the H.264 video codec will address these issues in the near-term; however, only the deployment of 4G networks over the next few years will allow a mass-market penetration in the long run.

Surrounded by sound

For those broadcasters and service providers prepared to go "the extra mile," there is also the opportunity to implement surround Internet radio. Once again, Fraunhofer IIS offers audio codecs that enable these services.

Principle among these are MP3 Surround and MPEG Surround. The use

of these codecs enables radio stations to stream true 5.1 surround sound at bitrates as low as 48 kbps. Additionally, these services are backwards compatible to stereo devices, ensuring that listeners yet to upgrade to the latest surround systems are not excluded from the party. The codecs' ability to render surround sound virtually on common stereo headphones allows consumers to enjoy a multi-channel audio experience on their iPhones or other mobile devices — wherever they may be.

Mobile Internet radio — surround or otherwise — constitutes a new technological world, and any trepidation felt by broadcasters and their partners at its arrival is entirely understandable.

However, no one needs to draw a cut-and-dried scenario of the versatile ways of bringing radio to listeners. Most traditional radio broadcasters will offer Internet radio services as a supplement to their existing broadcasts. Exciting new opportunities await; and thanks to developments by companies including Fraunhofer IIS, the technology to realize them is now in place.

Comment on this or any article. Write to radioworld@nbmedia.com. Contact the author at jan.nordmann@dmf.fraunhofer.org.

◆ **READER'S FORUM** ◆

I Need an Article

In a recent back issue of Radio World there was an article about booster transmitters and how their coverage could be improved by both audio and carrier synchronization. Now that article has become of interest here at KWMR(FM). Is there any chance it might be available online or may the relevant back issue be purchased?

*Richard Dillman
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RW now posts complete, archived recent back issues in digital edition form. Visit radioworld.com and click on Resources, then Digital Edition.

The article in question, "FM Boosters and SFNs: The Synchronize Everything Approach" by Tim Bealor of Broadcast Electronics, appeared in the Dec. 10, 2008 edition of Radio World Engineering Extra.

Bootleg Radio

I enjoyed Robert Kegerreis' article ("The Story of Bootleg Radio 1610," Jan. 1).

I had a similar adventure that went undetected for quite a while. We were on the air for about four years, 1961 to 1965. It was in Greencastle, Pa. I was 14 when this all started.

My friend was the son of our school superintendent. He got me interested in electronics. His basement was full of neat stuff from the U.S. Army depot at Mechanicsburg. His father would take him there on occasion to bid on surplus stuff for "educational purposes." Some

of it was used at school in physics and science classes.

Well, some of that stuff got diverted to our projects.

I have no idea of how much power we were running. It could not have been more than a few hundred milliwatts. We used a 12BE6 penta-grid converter as an oscillator-modulator. We got the idea from Popular Electronics magazine. It worked very well, and the audio quality was very good. Back then, broadcast band crystals were easy to find. We were on 670 kHz.

The plate tank circuit was a ferrite variable loopstick. We tuned it with a small neon bulb I glued to the coil for max brightness.

We made our own power supply; I remember it was 250 volts DC. No solid-state parts. We used the telephone line as an antenna with the theory that if the signal appeared to be coming from everywhere, it would be impossible to trace.

The town was about a square mile at that time, and we covered most of it with a nice signal.

The scheme was finally detected when my friend's father noticed Christmas music playing in the background of a telephone call on a December morning. He called the phone company to tell them what a good idea it was. Of course they knew nothing about it; and they could hear the music as well.

A service truck from Bell of Pennsylvania pulled up in front of the house later that day. His truck radio was tuned to our station. The rest is easy to figure out.

We did not get into that much trouble but "WGS" went dark.

*James Pollock, P.E.
Haddon Heights, N.J.*

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Quadrature Shift

Should Radio's Ownership Model Move From National/Vertical to Local/Horizontal?

Most readers will recall the 1996 deregulation that allowed the U.S. radio industry to begin what has since amounted to a massive consolidation.

Radio groups that had been limited to owning 40 stations at most nationwide quickly grew into far larger entities amassing hundreds of licenses under a single ownership, with the largest topping out at more than 1,000.

While many radio stations once had been independent or part of broader local firms (often including TV stations), the consolidation boom moved most stations into new companies that were consisted largely, if not exclusively, of other radio stations. The economies of scale from such unified operations were expected to keep radio competitive with other established and emerging media.

Now, perhaps an unlucky 13 years later, we see the flip side of that equation, in which the risk of such "verticality" comes calling. With all of their eggs in one media basket, some of these radio groups are feeling the pain of their highly leveraged, narrowly placed bets.

The current economic downturn certainly is a catalyst for this, but the system seems almost designed to fail given such circumstances. It may be time to change the ownership model within which radio stations operate.

This does not necessarily imply a return to the earlier, pre-deregulation model. Perhaps radio can strike the proper balance by shifting from large, radio-only companies to smaller, local media-focused organizations. In other words, instead of radio stations being consolidated with other radio stations in

other markets, apply the economies of scale by grouping radio stations with other media assets in the same markets or regions.

Some small-town radio operators we've talked to have moved in this direction already, buying local arts weeklies or other publications and media properties in their towns, thereby serving as a one-stop shop for local (or other) businesses to place all their advertising for the region. One sales force provides its customers with advertising delivered across multiple local outlets in a single media buy.

Taking this model "upmarket" might conflict with some advertising agency business, but this new approach removes some of the need for such middlemen, and thus better serves the advertiser. At some levels it could also run afoul of cross-ownership rules, but even the liberal-minded Acting Chairman Michael Copps has hinted that the commission might be open to another try at such deregulation, and this time the courts or Congress might let it actually happen. It's amazing what changing circumstances can do.

We do not advocate simply trading one form of hegemony for another; but we continue to believe that radio's greatest asset is its localism. Its ownership model should be one that allows this feature to shine brightest and be optimally leveraged. Instead of radio stations being stacked atop one another in an ever-rising national tower of (dubious) power, consider rearranging them into multiple branches of locally rooted media trees.

— Radio World

◆ READER'S FORUM ◆

Make HD2 Free

My suggestion on how to "resurrect" HD Radio from the doldrums is for iBiquity to allow all its HD customers to use their HD2 and HD3 for free.

That's right, no royalties on HD2 or HD3. They would give incentive to the stations to go out of their way to use the extra streams for new and untested waters.

They could serve the public interest by putting a low-bitrate simulcast of their local NOAA Weather radio station on the HD3 and let the local college kids play with formats on the HD2. This would give some college "youngsters" a reason to listen to radio when they can't get the Internet stream of the innovative HD2 audio.

Worst case, at least put the audio of their AM sister station on an HD2 or HD3 feed — another bonus for the listener.

It's time to break free on the royalties from iBiquity and let the stations run with it now that they've spent all the money on the hardware. They need to offer the HD2 and HD3 channels to get more people talking about what is better, as most stations aren't using their HD on FM to its full potential.

John Pavlica
Toledo, Ohio

The Truth About Guitar Cable

It was a wonderful article by Steve Lampen, "The Truth About Guitar Cable" in Jan. 14 RW. Just an observation, if you please.
Anyone who listens to guitar or

who plays it can clearly hear the differences between an acoustic guitar and an electronic guitar. The acoustic instrument sounds mellow, round, full. The electronic variant has a comparatively harsh sound.

Now, anyone who has ever played with function generators knows that square waves sound less pleasant than other waveforms. The distortion, as we think of it, is due to the rich content of odd order harmonics. By comparison, instruments that sound mellow are rich in even order harmonics.

Steve points out that the highest frequency fundamental produced by a guitar is 1319 Hz. To produce at least the timbre of the electronic pickup, it's reasonable to think that the third and fifth harmonic would be important. The third harmonic is 3957 Hz, which is nearly reproducible via a standard POTS phone line. The fifth harmonic is 6595 Hz, still not an amazingly high frequency.

On the other hand, suppose you used a cheap guitar cable and could not reproduce frequencies above 1500 Hz. Your guitar would sound more raspy with the lower frequencies (the low E would be 329.75 Hz except for the need to tune slightly

off due to perceptual criteria that make precise frequency differences sound wrong) than with higher frequencies, because the harmonics would be absent.

On the other hand, if your cable passed up to 2700 Hz but not as high as 4000 Hz, it might sound more acoustic due to the absence of odd harmonic content, but the presence of second harmonic content.

I grant that this is all guesswork, as I have not done any testing to determine these impacts or effects. After all, we all know that theory and practice do not necessarily match up in the field.

Tom Norman, CPBE
Sr. Engineer
Burst
Centennial, Colo.

April Fool

You had me going for about 10 seconds ("Researchers Propose Energy Harvesting," March 25).

Great article! I just hope no elected officials read it. There might be some unnecessary regulations proposed!

Bob Radil
Independent Broadcast Engineer
Northford, Conn.

April 1, 2009

Researchers Propose Energy Harvesting

Transmitted Power From Decades of Broadcasting Built to Highest Levels, Reaching Steady State

By Dr. Mead Citron

According to sources within federal research laboratories, considerable attention is now being given to the residual levels of radio frequency (RF) energy present in the environment.

The basic problem being studied is that all of the RF signals from decades of high power transmission leave a residual amount and continue to propagate nearly endlessly. The result is that the cumulative levels have been increasing.

As stated by one source, "While the instantaneous levels of energy, what has been discovered is that the steady state levels of energy without sun and LHP, have been slowly increasing from year to year."

transmissions at the same frequency. Consider how a group of soldiers marching across a bridge are able to make the bridge resonate to the point of destruction by maintaining a steady cadence. Once the resonance condition exists, it is easily maintained and magnified.

Worsening matters is another phenomenon referred to as sympathetic resonance where transmissions at one frequency contribute to the amplification of another.

new source of revenue to broadcasters to help defray costs, especially in the current economic times.
Dr. Citron also stated that his lab is experimenting with capturing stray ambient light for energy harvesting applications. The impetus for light energy harvesting is due in part to the amount of light pollution that occurs, especially near metropolitan areas.

Experiments have been conducted with various surface collector designs for

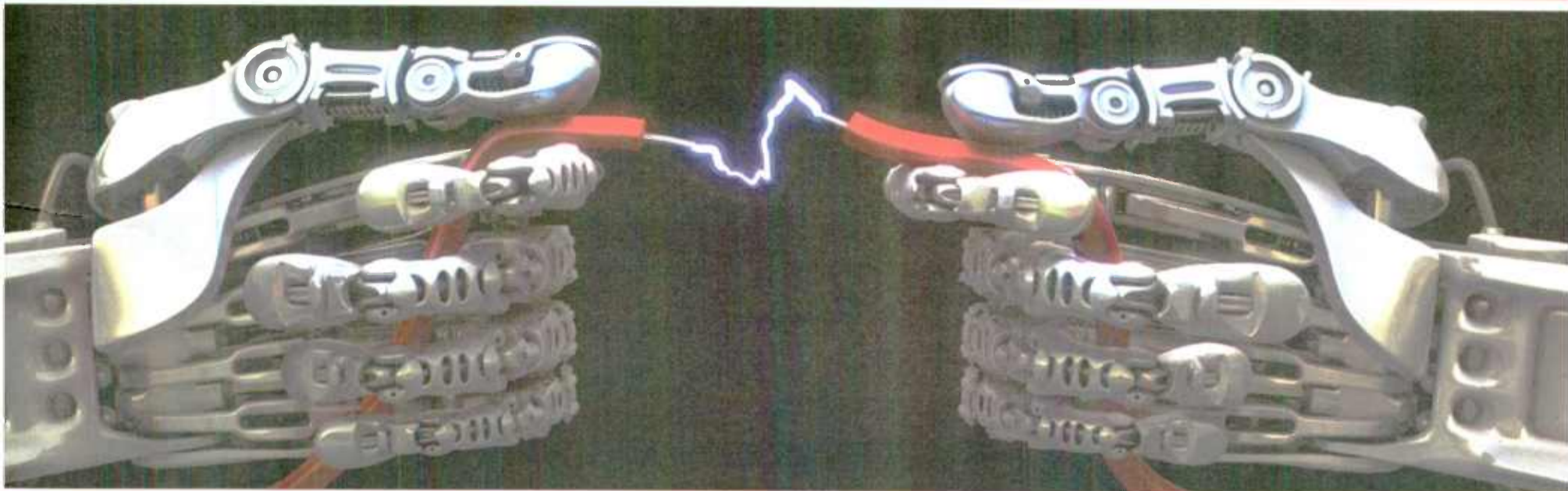
and by reducing global warming caused by excessive carbon dioxide buildup from artificially induced photosynthesis.
Another proposal being considered, according to our sources, is that a one week moratorium on all RF transmissions is being considered in order to let down the current steady state RF levels die down to negligible levels.

Scientists suggest that there exists a threshold above which the increase in signal level due to dynamic loading resonant reduce levels below the threshold so that transmitted signals will be diminished.
Though not made public, the National Oceanic and Atmospheric Administration (NOAA) has developed a record of historical steady state levels at a number of other meteorological data. They have shown that the RF levels are reduced during rain and snow, which indicates that precipitation serves to absorb some of the atmospheric energy. Global

If a law were to require recycling of unused signal, an energy harvesting device with a modulation scrubber could be used to return a signal to a clean tone at carrier frequency that can then be reused and remodulated by a station.

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~ Jim Franklin, Program Director
WVBO, Appleton/Oshkosh - Wisconsin



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~ Matt Scurry, Operations Manager
WWFN/WHLZ Florence SC



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~ Leslie Whittle, Program Director
KRBE, Houston - TX

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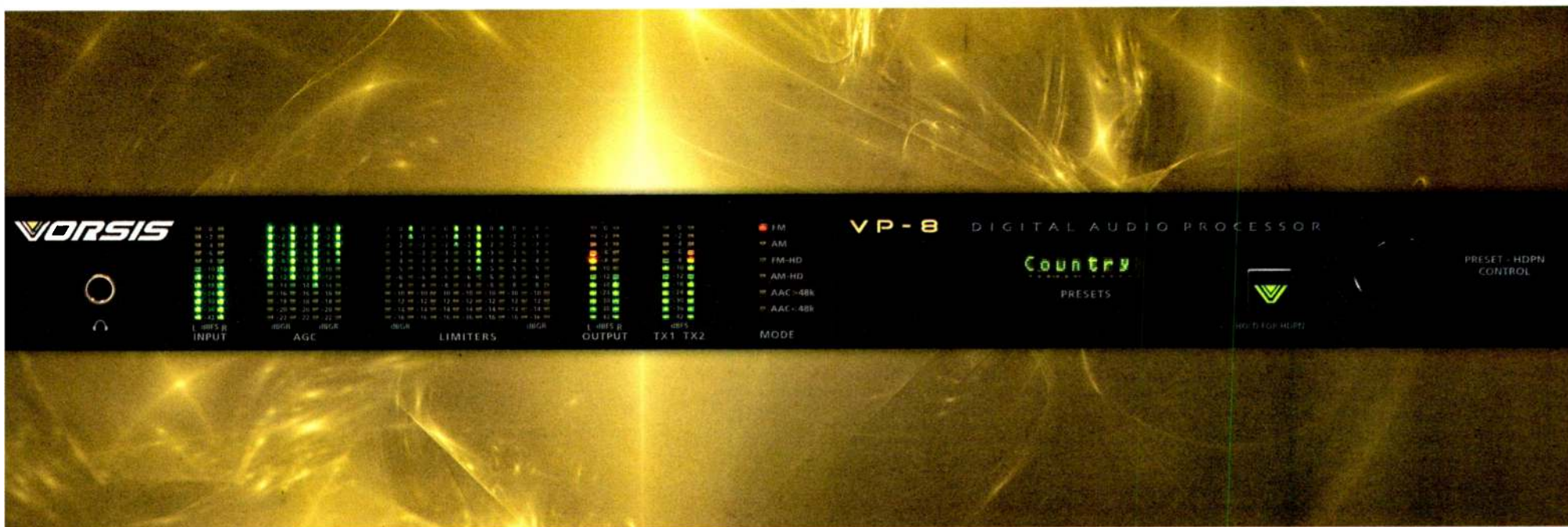


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