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$2.50 | The Newspaper for Radio Managers and Engineers | April 12, 2006

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Stations Put HD Radio to Work

The real-world implications of digital permeate the NAB Broadcast Engineering Conference. Our special day-by-day preview
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Shown: Image from presentation "Design Considerations and Real-Life Performance of a Multichannel Analog/Digital FM Antenna/Combiner System" by Henry Downs of Dielectric Communications.

NEWSMAKER Q&A

David Rehr: 'Big Dog' Is Going to Growl

WASHINGTON Turns out "the beer guy" has a sense of humor.

For instance, at NAB2006, reporters have been invited to "Nab a beer" with David Rehr, the former president of the National Beer Wholesalers Association. He's now the president and chief executive officer of the National Assocation of Broadcasters, replacing Eddie Fritts.

Rehr, 46, has been on quite a learning curve since he stepped into the big office at 1771 N Street NW in December. He's been traveling the country, meeting with broadcasters and their advertisers, to learn about the pressing issues facing radio and TV.

The search committee selected Rehr for the top job from among 80 potential candidates; among his attributes, members cited Rehr's aggressive lobbying style on Capitol Hill as well as his formidable expertise at raising large amounts of money and making those funds work for members of the beer wholesalers group.

Rehr has gone on the offensive for radio. He informed record labels that source encoding is an unacceptable

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◆ NEWSWATCH ◆

Entercom — First 'Payola' Shoe to Drop?

NEW YORK Entercom was the first in what observers believe will be several radio groups implicated by New York Attorney General Eliot Spitzer's payola probe.

He filed in March the first of what he said would be several lawsuits concerning alleged payola by radio broadcasters. In a nearly 30-page complaint with an additional 64 pages of exhibits filed in the State Supreme Court in Manhattan, Spitzer alleged that Entercom illegally traded air time for monetary payment as well as for gifts and promotional items.

Last year, Sony BMG agreed to pay $10 million and Warner Music Group agreed to pay $5 million in similar investigations by Spitzer, who has also issued subpoenas to eight other radio groups: Clear Channel, CBS Radio, Citadel, Cox, Cumulus, Pamal Broadcasting, Emmis and ABC.

"What makes this case especially egregious is the extent to which senior management viewed control of the airways as an opportunity to garner illegal payments from record labels," Spitzer said.

In documents and e-mails cited in the complaint, Entercom executives discussed strategies for supplementing radio station budgets with payments from independent promoters and record companies, alleges Spitzer, who is a 2006 Democratic gubernatorial candidate in New York.

A spokesman for Entercom said the company has rules in place that prohibit payola and the company has cooperated with the attorney general's office in this investigation.

"Entercom is a company that believes in playing by the rules and does so. Now that the attorney general has filed this civil action we are confident that the issues will be fully and fairly resolved by the court," said the spokesman.

In e-mails released by the attorney general's Office as part of Spitzer's documentation for the Entercom lawsuit, a program director at one station complained about the practice of using a CD previews program to generate payola:

Details

"The CD preview load for this weekend is crazy!! ... People are hearing the same songs every hour or two. Are the few dollars earned with the CD previews worth killing our TSL on the weekends?"

Spitzer's office purports an Entercom executive responded: "These are not optional. They come from corporate and generate millions of dollars for Entercom."

Spitzer also criticized the FCC for not doing enough to stop payola.

"Almost a year after payola was exposed in significant detail, the FCC has yet to respond in any meaningful way," he said, calling the agency's "inaction" "especially disappointing."

Commissioner Jonathan Adelstein supported Spitzer's efforts and said, "Given the voluminous documents pointing to major, systematic violations of FCC rules, the penalties should be commensurate with the crime. We can't let any violators get away with a slap on the wrist."

He noted that the commission began its own payola probe a year ago.

Full FCC Seen Ahead

WASHINGTON The FCC was expected to be back up to its full complement of

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First Expands Its New RF Lab

by Leslie Stimson

DALLAS A relatively small broadcast owner in Texas is moving aggressively to stake out another business, seeking to position its new in-house technical lab as a resource of RF propagation expertise for itself and other companies. It also hopes to influence RF regulations.

First Broadcasting launched its Spectrum Innovation Lab in December, as reported here. Now it has hired all three employees of a Washington-area consulting company and moved two of them to Dallas.

It describes the growing new lab as "the country's first technical facility devoted exclusively to the study of digital and analog RF signal propagation including the development of sophisticated software tools to predict and measure such signals." The goal of the lab is the improvement of radio station coverage and signal quality, according to its mission statement.

The lab is the second RF research facility to be launched in the radio industry in the last few months; NPR Labs was started last fall to research digital signal propagation for noncommercial stations. While the latter is focused on the digital transition mostly for FM noncommercial stations, First Labs says its scope is a little broader, with both analog and digital projects for FM and AM stations.

Costs of the First lab are in excess of $1 million a year. While the lab is focused on radio in 2006, it plans to put together a test plan for TV in 2007, said First Broadcasting President/Vice Chairman Gary Lawrence.

Coverage increases; capital outlays

First has hired the entire Denny & Associates team to work with its lab. Robert Denny Jr., P.E., has been named senior vice president of technology and will direct the company's technical initiatives, including the lab.

Bert Goldman, who recently formed his own engineering consultancy, remains honorary chair of the lab. The new hires supplement his involvement, said Lawrence.

Growth in staff is a result of new business for the lab, he said. "We are regularly contacted by broadcasters wanting to join us as venture partners. That means we need to continue to add resources." First is exploring 50 to 100 joint ventures, projects he says entail analyzing virtually every signal in a market.

First has hired Al Kenyon as director of technology and project management division and Tiffany Ligon as technical analyst. Denny will shut down his consulting engineering business, begun in 1994, to join First. Denny and Ligon are moving to Dallas while Kenyon remains in the Washington area.

Kenyon was head of the Broadcast Technical Services Division at Denny and is a former senior vice president at Clear Channel Radio. He will head the new Washington office for First Labs, though lobbying continues to be handled by its Washington law firm Akin Gump. First expects the Washington office to open in June.

Lawrence said Denny, founder and CEO of the company that bore his name, has expertise in signal propagation, facilities design and computer analysis. He described Denny, also the former president of broadcast engineering firm Jules Cohen & Associates, as "one of the industry's finest technical minds."

"They'll be working on analog and digital signal propagation, with a focus on issues related to digital radio," Lawrence told Radio World.

Business model

First Broadcasting is a partnership of investment fund group Alta Communications and First Broadcasting Investments LP. The broadcast company owns 16 stations, according to its Web site. First's chairman and CEO is Ronald Unkefer. The lab's clients will be both First's stations and others.

The First lab now has approximately 10 scientists and technicians, supported by back-office staff. It uses software created by its employees that projects signal propagation in tandem with field data.

"Currently we do it for ourselves and our joint venture partners," he said. Other broadcasters who have arranged access to the lab facilities include publicly traded groups, minority broadcasters and small independent owners, he said.

The First lab's business strategy, when working with stations other than its own, is to enter into confidential joint ventures with broadcasters and other clients. First Broadcasting bears the costs associated with joint ventures, assuming the risk and insulating its partners from financial loss, he said.

Its financial arm assigns a value "per pop," the population gains that are possible with an improved signal as projected by the lab's engineering studies.

"We only share in the upside we create if improved 'pops' are confirmed," Lawrence said, in which case First shares in the profits with clients.

Lawrence said has said that among First's goals are to "effect positive changes in the regulations regarding RF spectrum allocation and management."

Asked about success stories, First points to the successful completion of a counterproposal to a proposed rulemaking that upgraded an FM station from a Class A to a Class C in a top 5 market. Through the work of the lab, according to the company, the station increased coverage by nearly 2.5 million people, growing value to the owner and improving the number of listeners served.

The company declined to identify specific clients.

Lawrence described Bob Denny as 'one of the industry's finest technical minds.'

Newswatch

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five commissioners shortly, after telephony executive Robert McDowell sailed through his commission nomination hearing. The Senate Commerce Committee approved him on a voice vote in March and analysts believed soon after he would win Senate confirmation.

McDowell is senior vice president and assistant general counsel with CompTel, which represents many Bell competitors, including Internet phone providers.

Like Chairman Kevin Martin, McDowell has worked for the Bush administration. He served as counsel to the Bush-Cheney Florida Recount Team in 2000 and leading advance teams for the president and Mrs. Bush in 2004. McDowell is a graduate of Duke University, as is Martin.

The addition would give Martin a Republican majority as he moves to tackle issues such as media ownership deregulation.

McDowell told members of the Commerce Committee that he would "commit to promoting competition in all markets," encourage private-sector solutions and remove barriers to entry if confirmed to the commission.

"All Americans should be able to take part in the digital revolution," whether from cities or rural areas. He said his father grew up on a farm near the Texas-Mexico border in an area that had no electricity. It was common, he said, for his dad to disconnect the car battery and bring it into the house and so they could power a radio.

McDowell lives in Northern Virginia on what's left of the farmland he grew up on. The telephony advocate assured senators it had been several years since he had had to represent telephony companies before the FCC and that he could remain impartial on such issues.

Sen. Byron Dorgan, D-N.D., supported the nomination. He said consideration of media ownership limits is the most important issue facing the agency.

The FCC has been evenly split at two Republicans and two Democrats for sitting commissioners since Martin became the agency chairman in March 2005 after the resignation of GOP chairman Michael Powell.

From the Editor

Paul J. McLane

10 Reasons to Make a CEO Smile

How would you feel if the head of your department sent a memo to your co-workers as well as the top managers throughout your company, singling you out by name for your talent, hard work and dedication from among 750 co-workers? Pretty darn good, I bet.

If the company then sent the announcement to the media, including this newspaper, and posted the news on its corporate Web site, you'd feel mighty proud.

Ten engineers at Clear Channel had that experience recently.

During my decade at Radio World, I have bemoaned a lack of recognition for radio engineers. The problem persists. But I'm pleased to see more exceptions — the recent nod to Steve Griesbach as "employee of the year" at a Cumulus cluster; the new award honoring an outstanding woman in broadcast engineering from SBE and the American Women in Radio and Television.

When we find such efforts, I like to spotlight them.

Regional input

At Clear Channel, a program of naming Radio Engineers of the Year started three years ago under Jeff Littlejohn, who has since been named executive vice president for distribution development. Now the awards are run by Senior Vice President of Engineering Steve Davis.

Davis told me he takes nominations from his nine regional VPs of engineering so each part of the country has a chance to be represented, not only those where, year after year, big storms thrust certain engineers into the spotlight. He also attempts to come up with a list that represents the range of work done by engineers in markets big and small, where the skill sets required are so different. With input from Littlejohn, Davis makes the selections and names a national winner.

When you consider that the company has, very roughly, 750 engineers in 250 markets, to be named to the list is a notable honor.

"I've gotten a lot of support from our managers and [Radio President/CEO] John Hogan as well, who backs this," Davis told me. "Some of the managers said, 'This is wonderful, there should be a program like this for program directors and traffic directors.' I leave that to others."

Winners win free travel, lodging and admission to the NAB convention, where they'll be saluted at a private gathering. They get a plaque, and Davis will write each a personal letter to save — "Hopefully not to seek another job somewhere!" he said, laughing.

"We talk about the difficulty of finding good engineers. The pay scale *is* going up; engineers in most markets are fairly paid; but engineers often still feel like the unsung hero at the station. It's nice to recognize these guys. Engineers are often not singled out enough."

I agree.

Now, a smart company will pay to send its best engineers to NAB; you don't need an award program to justify that. (How about a paid *vacation* for winners?) But the Clear Channel approach to recognizing its engineers is a good one. And if you're running a large company's engineering staff, you can't afford to send every engineer to NAB; you're already obliged to choose among them. Why not make the trip a prize to be aimed for?

Davis tosses off, almost as a joke, that he hopes winning engineers won't use the honor to look for work. But let's face it, a lot of managers think this way: "I'm not going to do anything that will help this engineer find work elsewhere, or call my competitor's attention to my employee assets," they might think.

I'm glad Clear Channel is looking beyond such self-serving — and ultimately self-defeating — arguments. The employees who are eager to jump from your ship aren't the ones you treat well. They're the ones you treat poorly.

Has the attitude toward engineering changed at Clear Channel? Davis thinks it has, as the mergers that built the company recede into the past.

"We've come to see how important good engineering is to our success and how hard it is to find good engineers. They need to be considered managers; they are crucial to the operation of a station."

'Out of the box'

Here are the winners, with excerpts of what Davis and their regional VPs of engineering had to say about them in his internal memo:

Northwest/Sunbelt: "David Williams led the way in 2004 and 2005 with the HD rollout for the entire region … David is consistently thinking out of the box to get things done in the most efficient and economical way. He understands budgets and deadlines. He has spent countless hours in zoning meetings, preparing and presenting exhibits in support of a much-needed tower for our stations. Dave communicates."

David Williams

Ted Foster

Rockies: "Ted Foster does it all. He is the chief engineer and ops manager. He changes oil in the trucks, cleans the buildings and the transmitters. He runs the board and does remotes and he even has a couple of sales accounts! He is busy all the time and yet found time to get his SBE Certified Broadcast Radio Engineer certification last year. … His GM says she would not know what to do without him."

Mid West: "Steve George is way above the average in his ability to build and troubleshoot/repair RF issues. He is highly trained and skilled in the area of computers and IT issues. … Steve and Greg Gade have completely rebuilt the Omaha studio facilities, replaced and retuned a tower in the 50 kW KFAB AM array that employs open wire feedline and a vintage phasor. He has worked on implementing HD Radio on both the day and night on KFAB. … Steve is in the middle of constructing a new combined site for KXKT(FM) and KQBW(FM). … He designed the building and the antenna system; worked with the local TV station on the terms of the lease, the tower crew on the coordinating of the antenna installation, with vendors on the equipment; and did the budget planning for this project when it was submitted to San Antonio."

Steve George

Central: "Jeff Bennett … runs a top-notch engineering department covering the seven stations in the Dayton, Ohio, market along with one AM in Springfield, Ohio. … Jeff has executed the HD rollout for four of the FMs and added HD-2 to those stations on the accelerated time line set for the end of 2005. Jeff has helped in surrounding markets

Jeff Bennett

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Recognition

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with emergency issues as they come up where the smaller market does not have the engineering staff … Always thinking of the bottom line for the market and of the quality and reliability of the on-air product."

Northeast: "Ken Neenan supervises engineering for the state of New Hampshire. He has successfully consolidated two markets: Portsmouth and Manchester; maintains and services nine unique transmitter sites spanning the state and into Maine, and has hired and attracted engineers to radio service who would have otherwise had little interest in our field. … Ken has volunteered his own free time to assist in buildout projects in Albany, N.Y., Binghamton, N.Y. and Boston. He volunteered to help with Katrina recovery efforts and spent a week in New Orleans."

Ken Neenan

Mid South: Homer Wilson. "WHUB (AM) lost its tower to vandalism. … Homer and Ben [RVPE Ben Brinitzer] discussed the options and they decided to try and get a long wire mounted on telephone poles. Given the day was a Sunday and a holiday week, it didn't seem there was much hope of achieving this quickly. … With *no* on-site help, Homer headed out and found wire at Lowe's, spent a few hours stringing it to a tree about 200 feet from the transmitter building and without any test equipment, managed the miracle of getting the station on the air at 50 watts within six hours of the failure. By the next morning the station was operating at 50 percent of its licensed power, tuned correctly into the makeshift antenna. Homer accomplished this without test gear. Within 24 hours after that he had rallied the city to put up two telephone poles and string the permanent wire, and had the station on at full power and a near-perfect antenna match!"

Homer Wilson

Southeast: "Richard Petty is our market engineer in Baton Rouge. He also oversees our engineering operations in New Orleans. … While we sent a lot of help to Baton Rouge following Hurricane Katrina, Richard was the 'glue' that held everything together. At one point, we had 17 stations originating from his studio complex in Baton Rouge! Richard's role was crucial in making 'United Radio of New Orleans' a reality. … There were many heroes in the Southeast Region … as we were hit by four *more* major hurricanes, but Richard did a yeoman's job when it comes to going 'above and beyond' the call of duty."

Richard Petty

Mid America: "Tom Rusk is our contract engineer in Little Rock, Ark. He built five HD stations in his market at the same time, by himself. All five were substantially completed with almost no outside help. Tom has been with Clear Channel on a contract basis for many years but is more like a full-time employee in terms of his dedication to our stations, his long tenure and the time he puts in. Tom exemplifies the best in contract engineering."

Tom Rusk

Southwest: "Ken Meek, chief engineer of our Rio Grande Valley stations in Texas, has been devoted to his craft for over 45 years. … The people around him, whether in sales, programming and management, love working with him. … Ken has moved two stations to new sites and at the same time added four more stations. He even persuaded his wife, since he had no assistant engineer, into helping him wire the facility! … When they completed the install of the stations the GM was so impressed he gave them both a bonus … he and his wife donated the full amount to the mission across the border for the poor. … Ken's FMs were the first Clear Channel stations to go IBOC in Texas and are still the only IBOC stations in the valley. He did the IBOC HD2 installs on schedule working overnights even with sickness falling upon him; the day after the install he found he had pneumonia but still was so proud when he finished he called from his hospital bed to tell our RVPE Gil Garcia that everything was complete."

Ken Meek

National Engineer of the Year: Charlie Wooten. "We will all remember 2005 as the year of three devastating hurricanes. Charlie Wooten, our director of engineering in Panama City, Fla., played a major role in keeping our Florida panhandle and southern Mississippi radio stations on the air, and leading the recovery effort, through all of them.

Charlie Wooten

"Sometimes Charlie was drawn into the fray simply because his stations were in a storm's path. But at other times, when it was clear that his own market would be spared the worst of the storm, Charlie headed *into the storms* to help our stations stay on the air, and to make repairs and construct makeshift facilities as needed to continue to provide vital service to the communities we serve. Many of our other engineers have done the same; however Charlie stands out, not only because of his eagerness to volunteer and head into the most devastated areas, sleeping on transmitter and studio floors, and working unbelievable hours, but because he has already been honored twice by Clear Channel Radio as 'Small Market Engineer of the Year' for doing the very same thing for two years running! … He exemplifies the very best in the radio engineering craft: technical expertise, calm and leadership during a crisis, inventiveness and field expediency, and a positive 'can do' attitude."

Ted Foster's GM says she 'would not know what to do without him.' That's probably true of all 10 of these engineers.

On the phone with me, Steve Davis gave Wooten the ultimate engineering compliment, calling him "akin to a MacGyver" in his resourcefulness at solving problems.

Tell the world

On March 15 Davis e-mailed the above comments and more to the company's radio engineers, radio senior vice presidents, regional VPs and general managers.

Thanks to the company's IT infrastructure, Davis said, he can type an e-mail and reach thousands of people. "It's almost like running a little newspaper," he said. "I'm in a good position to publicize this."

The company also distributed a summary version to the media via its PR firm, and posted it prominently on its corporate Web site. Yes — Clear Channel paid someone to put out a press release about engineering.

Congratulations to the winners and to Clear Channel's managers for understanding why this kind of program is so important.

If you are responsible for an engineering department, consider the lessons of this program.

One thing I know: you shouldn't wait for non-technical ownership or managers to come up with this idea on your own. I sense that these successful award programs consistently are coming from the engineering community itself, which finally has learned that if we want our industry to start respecting engineers more, the initiative will have to come from within.

◆ NEWSWATCH ◆

Arbitron Sets Sights On 2008 for Top 10 PPM Rollout

NEW YORK When Nielsen Media Research informed Arbitron in March it decided not to partner on commercial development of the Portable People Meter system for audience measurement, some radio groups became nervous about what that meant for prices for a radio-only product.

Arbitron has contract proposals out to several stations for a radio-only PPM system that would include an increase over their current contracts of roughly 40 percent to 60 percent, depending on market size and the specific products being purchased, a spokesman confirmed to Radio World.

The company has established a rollout timetable and says it will begin using PPM in the top 50 markets, starting with Houston in July and continuing through the top 10 markets by fall 2008, and plans to expand to the rest of the top 50 markets two to three years after that.

Several advertising agencies have pledged support for PPM and two broadcasters, Spanish Broadcasting System and Beasley, have committed to using PPM in several markets, although the agreements do not commit Arbitron to a timetable for deployment.

Arbitron President/CEO Steve Morris said his company is disappointed Nielsen decided not to partner with Arbitron to deploy its Portable People Meter system, but that the decision was not unexpected.

Nielsen, which has developed its own TV-only version of an electronic audience measurement system, said it intends to adopt a "portfolio" strategy for TV ratings.

The two companies first discussed a joint radio-TV-cable ratings approach in May 2000. Arbitron has said there would have been economic benefits to a joint approach to PPM deployment.

Arbitron said it is prepared to work with TV and cable directly on additional non-currency services that use PPM. Arbitron has been developing PPM as a radio-TV-cable measurement system.

Finalists Named In Ratings Scrum

NEW YORK Even though Arbitron has made progress with PPM (see above), some broadcast groups want to learn if other ratings companies might have a better methodology for measuring ratings electronically. A committee of radio groups evaluating electronic ratings systems has winnowed the field of entrants to three: MediaAudit/Ipsos, MediaMark Research and Arbitron.

The MediaAudit/Ipsos system is a smart-phone based ratings service. Radio One, Clear Channel, Cox and CBS have agreed to encode their broadcast signals in Houston as part of a test of the MediaAudit/Ipsos service to be followed by a full-market test this summer in Houston, where Arbitron has been employing its PPM electronic ratings service.

The evaluation group said the three finalists now move on to the next level of scrutiny. They were to make presentations about their systems in late March.

The committee particularly is interested in using cell phones as measuring devices. A live test period is planned to begin in spring with implementation expected this year, according to the group.

Clear Channel Radio had issued an original request for proposals last June, with a deadline in December; it then convened this evaluation team of industry players.

$3.9 Million in Indecency Fines Levied by FCC

WASHINGTON The FCC proposed a total of nearly $4 million in fines to resolve more than 300,000 consumer complaints about TV indecency. The companies involved had 30 days to pay or appeal.

The actions represent the first proposed indecency-related fines released by the agency since 2004.

The most well known case involves the 2004 Super Bowl half-time broadcast when Janet Jackson exposed her breast. The commission has upheld its earlier $550,000 fine against 20 CBS stations. Though the network agreed to a previous settlement of several other indecency cases, it had maintained the incident was not actionably indecent.

The FCC has again disagreed with CBS, and stated that it also "holds that CBS consciously and willfully failed to take actions to prevent the broadcast of the material, and that CBS is responsible for the halftime show."

CBS said it stands by its earlier statements. It could appeal to the FCC and the federal courts.

The FCC proposed fines representing $3.9 million, including a record $3.6 million for stations that aired a show depicting teenagers engaged in group sex. The decisions address complaints about nearly 50 television programs broadcast between February 2002 and March 2005. The commission believes the actions "provide further information for broadcasters about the kinds of material that are and are not prohibited under the FCC's indecency and profanity standards," according to its announcement.

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COMREX

Rehr

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solution to the so-called broadcast flag for content protection. He advised FCC Chairman Kevin Martin that the cross-ownership ban is archaic and needs to be lifted, and that XM Satellite Radio's planned acquisition of wireless spectrum should be blocked.

Under his leadership, NAB is taking credit for the introduction by several senators of legislation that would require the FCC to codify that satellite radio is a national-only service and may not offer locally originated services on nationally distributed channels. A similar effort began earlier in the House.

"It is crystal clear," Rehr stated, "that both XM and Sirius — with nearly $1 billion in combined losses last year and having failed as a national programming service — are skirting the intent of their original FCC licenses. This bill holds satellite radio accountable to those licenses."

He also has said the commission should treat satellite radio the same as broadcast radio in regards to indecency.

Rehr, a former congressional GOP press secretary, is also focused on radio's digital transition. He's talking to his counterpart at the Consumer Electronics Association, Gary Shapiro, and others about how to encourage the inclusion of HD Radio in new digital devices. He was in New York City to attend the announcement of the formation of the HD Digital Radio Alliance on his second day at the new job. A Boston Acoustics Recepter HD Radio outside Rehr's office has a sign on the top that reads 'Embrace the Future, the Power of HD Radio.'

Under Rehr's stewardship, the trade group is moving away from referring to itself as a lobbyist for broadcast interests because the word could be seen as reactive and defensive — and is instead calling itself an advocate for stations. The word suggests that NAB is on the offensive and frames the debate and its direction, according to Rehr.

In his first radio trade press interview, Rehr looked at home in his new surroundings; he seemed animated and at ease with questions as he spoke with Radio World News Editor/Washington Bureau Chief Leslie Stimson in his new office.

RW: How does it feel to be the new head of NAB? You've also been traveling quite a bit.

Rehr: It's very humbling. It's a great organization, representing great people, and it has a great deal of responsibility. The more I travel and meet our members and interact with them, frankly, the more humbled I am.

To give you an example of some of my experiences, I went up to Philadelphia and met with David Fields from Entercom, a large, publicly held radio company. So I got that perspective. Then I went to Carthage, Texas, to see Jerry Hansen. He and his wife run a radio station in Carthage, very small, maybe six full-time employees in a town of some 5,800 people.

I spoke at the RAB meeting and that was really my first public meeting was with radio people there.

RW: At the RAB you probably heard a lot about radio being in a sales slump. Radio is up against MP3 players in the dash; iPod adapters are in the car, satellite radio is too. Are there ideas that made an impression on you about how radio can combat all these threats?

Rehr: I come out of an industry that has zero to negative growth. Now on the one hand, we want double-digit growth. We want advertising sales to increase, but I kind of got the impression at the RAB meeting from some, that ... it's going to be double-digit and we're just going to keep growing in the future. ...

Some of the people I talked to talked about growth; but (said) that growth has slowed. ...

(We should) try to ensure that we have a competitive edge, or at least the people who make the advertising decisions understand the power of radio. ...

Something that particularly drives me nuts is everybody says, "Internet, Internet, Internet! Click-through rates!" I go on the Internet all the time. I click through it; I don't buy it. Where, if I listen to something on radio —

I just think it's a better experience and a better investment for advertisers. But we need to be sure that the advertisers and the agencies get reconnected with the power of radio. That's part of it; I think getting new people to advertise is part of it.

Photo by Leslie Stimson

Rehr: We want every broadcast signal to be on every device possible. That gives people immense choice. [But] we'll all have to work harder at competing.

RW: What is NAB going to do to help the digital radio rollout? The organization is behind HDTV; what's it doing for HD Radio?

Rehr: NAB is extremely committed to making HD Radio a terrific success. We don't want to duplicate what Bob [Struble] and Ibiquity are doing, or, frankly, what Peter Ferrara is doing and the HD alliance. They're doing a great job. The way we're approaching it is we're trying to encourage it, promote it, talk with as many people about it. ...

Over time as I get more involved in this, you'll see more proactive activity on the part of the NAB with HD Radio.

RW: Are you pursuing more close relationships with Gary Shapiro at CEA? Sometimes NAB and CEA have tangled. With the content protection issue going on with the RIAA, it would seem NAB and CEA could be aligned on that.

Rehr: I've met with Gary. I think that we'll have a good working relationship. There'll be times that we agree to disagree, but we won't be disagreeable, because on many issues we stand together, and we stand pretty strongly together.

It's up to us to ensure that Gary, the folks at CEA and the manufacturers understand that the right thing to do also will be profitable for them. Promoting HD Radio, those pieces of equipment, although the price is going to fall over time, probably will end up making their manufacturers more money than some of their other devices. ...

Although we would hope that our Detroit friends would hasten, speed up, encourage — if we have to cajole them, to get more HD Radios in cars.

RW: Does NAB have a sense of what the FCC's going to do about HD Radio as far as when it's going to roll out final rules, whether those might include the ability to go AM digital at night and also multicasting?

Rehr: I don't want to speak for Commissioner Martin, but we've been talking to the FCC about those issues. My suspicion is once you get the full complement of the FCC, you'll see some action.

I've met with all the sitting commissioners to date. There's kind of a backlog because everyone is waiting, basically in the whole telecommunications, broadcast, cable industries ... the logjam should be broken with the addition of a fifth commissioner.

RW: Are there similarities between this job and your last one?

Rehr: Yes. I've been in Washington for 25 years. I worked on Capitol Hill. I know how the process works. Beer was as heavily or more heavily regulated than broadcasting. So I understand how to move within a highly regulated industry.

In most communities in America, your beer distributor is a highly visible, highly community-oriented person, as is your local TV affiliate owner, general manager or radio station owner. So there are a lot of similarities. Now I think the broadcast issues, frankly, are a little more complicated. And I recognize that.

Over the last few years, actual consumption of beer is flat to declining. So you have costs going up. Close your eyes and say, "What industry are you in?" Revenue is flat to declining and costs are increasing. It *could* be broadcasting. It *was* beer. ...

RW: What will you do to build radio membership and get back some of the groups that have left?

Rehr: We will build the membership base. We are looking at all of our programs now. And it will evolve, probably over this year.

NAB is a big organization and I don't want to get anyone's expectations raised that it's going to be better tomorrow, in 24 hours. It's going to take awhile to work it all out. But my commitment is just looking at every program and service and making sure that it is the maximum value it can be for the member.

See REHR, page 10 ▶

'Over a 10-year period, we will slowly and systematically build better relationships with existing members of Congress, and get involved in races for the House and Senate where we elect people who are pro-broadcaster.'

"We were building brand-new studios. Why use the same old tech?"

"Our company bought a station in San Diego, and we had to move the studios. Since the station would be a part of our Southern California network, we needed equipment

that could quickly re-route multiple audio signals – from satellite, T-1, ISDN and remote vehicles – to different destinations.

"I knew how expensive routing equipment was. I also knew we'd regret buying a system with fewer capabilities just to save money.

"More than anything, we wanted to avoid limiting our operations with the use of conventional routers. Most of those systems force you to plan, during installation, for every signal routing configuration you might ever possibly need. If your needs change, you either have

to re-wire or settle for operational compromises. Not very user-friendly! Making sure that the system was easy for non-technical air talent to understand and operate was critical, too.

"Axia addressed all these concerns.

"With Axia, setting up new routing configurations is easy; you just save new routes in software and recall them when you need them. SmartSurface makes controlling our many different audio sources and destinations very straightforward and uncomplicated; our air staff loves it!

Hi-Favor Broadcasting
KSDO - 1130 AM

"And expanding the network couldn't be simpler. Just plug in more audio nodes and boom! you've got more inputs.

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

"Here's the kicker: Axia cost about half what we would have paid for a conventional router. We're very pleased, and plan to expand the network to our second control room. My advice? Get Axia. You won't be disappointed."

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

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Rehr

▶ Continued from page 8

Really, the first week on my job, we went through this budget of a $44 million trade association. This is what I told the staff: Every expenditure we make, we need to think about it from the perspective of a small, single radio station owner in Grand Isle, Neb. And if *that* person thinks it's a good investment of funds, we should do it. If there's any question, then we shouldn't.

We're going to be doing, for the first time ever, a membership survey in June to get their feedback on our programs. To evaluate how they perceive our programs as a baseline. And it's my intention every three years to do a similar survey, to demonstrate that we've actually added value in our programs. Sometimes we might think that we're communicating something great, but we might not be. We need to know that.

One of the things that I've told all our people here and what owners and group heads will find when they meet me is, I'm not one of these guys that likes it sugar-coated. I like you just to tell me straight up, how you see it, what the truth is, because I can't determine how to improve things unless I know how people really feel.

***RW:** And how radio is going to survive...*

Rehr: I think we need to ratchet up in telling people all the good stuff we do.

We have to do that and then, finally, we're going to broaden and expand on the great reputation that NAB has as a grassroots lobbying powerhouse.

We're in a new competitive playing field. Satellite has lobbyists in DC now. Other technologies have lobbyists in DC and NAB has always been "the big dog." Now, we're going to be the big dog with other dogs around us and we're going to growl. And perhaps bite a whole lot more. Because we need to get the desired result; because the future of the industry is at stake.

***RW:** We can't just sit still while other technologies are going forward.*

Rehr: I've found during our state leadership conference that our people are phenomenally nice, extremely generous and committed. But sometimes that works against you on Capitol Hill. Sometimes you have to be the pesty gnat and tough, and tough-minded.

***RW:** You've been successful raising money at the beer wholesalers association. Do you have plans to have NAB's Television and Radio Political Action Committee raise more and do more?*

Rehr: Yes. The theory at the beer wholesalers, and I think the theory that broadcasters will come to not only accept but really to be committed to, is that we need to elect people to Congress who are either from our industry or who understand our industry or who are passionate about industry.

In my 25 years in Washington, I've always found it easier to make the sale, with people on Capitol Hill, who know you and who are for you going in, than trying to find somebody who is, really, your adversary, and explaining to them why they're wrong. Most people don't want to admit they're wrong.

So, over time — and this is not going to be something, again, that happens in one year, two years, one election — but my vision is, over a 10-year period, we will slowly and systematically build better relationships with existing members of Congress, and get involved in races for the House and Senate where we elect people who are pro-broadcaster.

Rehr's Sugar-Coated Style — Not!

David Rehr grew up in the Chicago suburbs and listened to White Sox baseball games on the radio. Growing up, he gleaned much of his information from the medium, because his mom would listen to news talk during the day, he said.

"Now that I'm here, I think back about the contribution that both radio and television has made, just on me and the impression that it's left, and it's been phenomenal," he said.

"My wife and I have young children. I hope 40 years from now, one of them will get up and say, 'Radio has made a difference in our life, too,'" said Rehr, referring to his wife Ashley and their four children.

After attending St. John's College in Minnesota and getting an undergraduate degree in business administration, Rehr headed to Washington in 1981 to work for former Rep. Vin Weber, R-Minn., as a press secretary.

He joined the National Federation of Independent Businesses in 1986 as a lobbyist. He moved to the National Beer Wholesalers Association in 1992 as vice president of government affairs and became its president in 1999.

Rehr is an aggressive lobbyist and fundraiser, according to several published accounts. Indeed, NAB cited Rehr's leadership for helping the NBWA to win many legislative battles over the years on behalf of small businesses and entrepreneurs. The NBWA's political action committee donated $2.3 million to federal candidates in the last election cycle, ranking fourth among all such organizations and ahead of the $882,000 contributed by TARPAC, according to the Center for Responsive Politics.

Along the way he earned a doctorate in economics from George Mason University.

— Leslie Stimson

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U.S. Stations Enjoy Access to Published Music Without Performance Royalties, But This Could Have a Downside

by Skip Pizzi

Much has been made recently of the swell deal that U.S. radio stations have in their free access to published music. Although small royalty payments are paid by broadcasters to *composers* of songs played on air (collected via ASCAP, BMI and SESAC), the more substantial payments paid by broadcasters in other countries to performers and record companies for rights to air *recordings* of those songs are not levied on radio stations in the United States.

This is because the U.S. is one of the few countries where a *compulsory license* is in force for such airplay, which affords any broadcaster the right to use published music content on air without permission of, or compensation to, the recording's rights holders.

Sounds like a great arrangement, right? How can you beat that deal? Broadcasters get to play what they want, and the records chosen generally get a great boost in popularity and therefore experience increased sales. Broadcasters choose music that they think will attract listeners so they can sell their ads for the highest possible rates, and musicians (and their record companies) sell more records as a result.

Changing context

In recent issues we have explored what could happen to this tenuous quid pro quo if sales of records were replaced by off-air recordings (and subsequent editing) of digital broadcasts. If the expected increase in record sales from radio airplay never happened, the arrangement would lose its balance. That would certainly be a bad deal for record companies and musicians, but not a big problem for broadcasters.

Now let's consider how radio stations' part of this bargain could be turned against them, however. Here, as before, a good way to understand the situation is to compare radio stations with their counterparts in the TV world, where content licensing works quite differently.

Television stations (or their affiliated networks) obtain the content they broadcast via individually negotiated licenses, which generally include hefty royalty payments to the content's rights holders. A key and standard component of these licenses is *exclusivity*, by which only one station — or network of stations — can broadcast the licensed content for a given period of time. TV networks further enhance this exclusivity by allowing only one affiliate per market.

This stands in stark contrast to the compulsory license model of radio, where everyone can feed freely from the same trough. Yet exclusivity of content is arguably the prime reason for broadcast TV stations maintenance of their relatively high viewing levels, even while the number of competing channels continues to increase alongside them on cable and satellite TV systems. There is only one place to see your favorite TV series, news program or sports event, and no matter how these programs may migrate around the dial, they are only found on one channel at a time.

Now you can see the dark side of compulsory licensing: zero exclusivity. Potentially every radio station has access to exactly the same music content, all the time. To differentiate their services, stations have to add a bit of unique continuity, but for many listeners this is simply interstitial content that they have to tolerate so they can hear the music that they're really waiting for.

(Even the statutory license for music on satellite radio — by which performance royalties are paid, but without licensing negotiations — carries this same attribute of non-exclusive access.)

Although they probably don't consciously realize it, audiences understand this distinction. Most listeners think nothing of the fact that they can hear the same song on two different classic rock stations in town (or on one or more satellite radio channels), and therefore tune between them in hope of asynchronous continuity breaks. Meanwhile, they know that the current season of "West Wing" only runs on one station in town.

Now you can see the dark side of compulsory licensing: zero exclusivity.

Breaking the model

This lack of exclusivity has not disadvantaged radio stations terribly because there has been a finite number of frequencies available in any given radio market. Under these conditions, market forces have prevailed to keep the number of directly competing formats in a given city to a very small number. A typical arrangement might produce 20 different formats over 30 radio stations in a major market, for example.

But what happens when new wireless distribution technologies like MediaFlo, Modeo, WiMax, Mobile WiMax and even HD Radio multicasting add to the already established and growing satellite radio competition, with all of them carrying the same music content on similarly formatted services? How will your country music be better than their country music? Can your local talent compete with their national talent?

Obviously some new thinking will be needed to create, brand and promote exclusivity in a station's service if it is to flourish in this coming age of increased competition. We've already seen some hints of this with bold new formats that cross traditional boundaries, but these too can be imitated easily, so more ideas will be required.

Such thinking could include a sharp increase in market-exclusive deals for acquired content, the development of homegrown radio talent, and more focus on local musicians and their performances in town. It could even lead to a break from the full-time format-styled programming paradigm, and a move toward more scheduled program blocks — like TV stations (or some public radio stations) do.

All of this could engender a renaissance in local radio. It may be just what the doctor ordered for the veteran services as they become surrounded by ever more new kids on the block, with everyone singing from the same songbook.

Skip Pizzi is contributing editor of Radio World.

The Big Picture

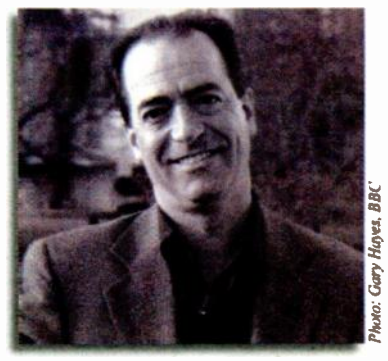

Photo: Gary Hayes, BBC

by Skip Pizzi

MARKET PLACE

Burk Announces Factory Training

Burk Technology announced its next all-day factory training session, set for June 5, at the factory in Littleton, Mass. The training is intended for broadcast engineers, contractors and managers responsible for coordinating operations at transmitter plants, as well as to dealer representatives.

Attendees receive training knowledge on Burk's transmitter remote control systems, software and accessories. "Special attention is given using software tools and TCP/IP connectivity to complement the station's existing control, monitoring and logging procedures," the company stated. "Current and prospective users also gain insight into new system capabilities and helpful 'tips and tricks' to save time and increase operating efficiency."

The event is free; breakfast and lunch are provided.

For information contact Bonnie Christiansen at (800) 255-8090 or e-mail bonnie@burk.com.

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TRAVELS WITH SCOTT

First Stop: Radio in Los Angeles

by Scott Fybush

From the time I was in middle school, visiting what was then WRTK(AM) at its four-tower directional array next door, no vacation has been complete without at least a few stops at broadcast facilities.

But when Paul McLane invited me to share some of those journeys in a new Radio World column, one destination rose to the top of the pack. Just like Randy Newman sang, "I Love L.A."

photos by Scott Fybush

Mount Wilson at sunset. The tower is KCBS(TV/FM).

Wired up

At least on the surface, the nation's second-largest radio market isn't the place to go if you're looking for much of a sense of history. Where studios are concerned, Los Angeles doesn't spend much time looking back.

NBC's historic West Coast headquarters at Hollywood and Vine? Long gone. KFI's Art Deco studio plant on Vermont Avenue? A parking lot. Even the Columbia Square facility on Sunset Boulevard, a West Coast hub for CBS since 1938, has a date with the wrecking ball soon; KNX Radio has moved out, as *RW* reported in the Nov. 23, 2005 issue, and ground has been broken for a new studio for KCBS(TV)/KCAL(TV) as well.

Look beneath the surface, though, and there's some neat radio history lurking in some less conspicuous corners of the City of Angels.

For instance, the old Odd Fellows Hall on Washington Boulevard, overlooking the Santa Monica Freeway just south of downtown L.A., is, as best I can tell, the oldest AM transmitter site still in use anywhere in the country. KGFJ(AM) went on the air here in 1924, and 82 years later, the station (now KYPA) is still there, using what may be one of the last inverted-L wire antennas in the country. It tried moving a couple of years ago, diplexing with KBLA(AM) up in the hills near Dodger Stadium, but the signal from the old site worked better, and so there it's stayed.

Or perhaps you're looking for a five-tower directional array with a warehouse constructed around the tower bases? Head east of downtown to the City of Industry, and gawk your eyes out at the "Towers Industrial Park" on Don Julian Road, just off the Pomona Freeway, where the five sticks of KTNQ(AM) and KTLK(AM) poke up 475 feet above the rooftops of the park's two huge buildings.

Blame the high price of L.A. real estate for this one: the towers were there first, going up in 1975 as part of a project to turn KTNQ — then George Storer's KGBS — from a daytimer into a 24-hour operation. The warehouses were built a decade or so later, with Ron Rackley's talents called upon to design a ground system that included acres of chicken wire lining all the walls and rooftops of the buildings. The towers themselves are still conventional base-insulated towers — but the bases now sit in 25-foot-deep "wells" inside each building, accessible only via a ladder down from the roof.

Just in case that wasn't complicated enough, Jacor came along in 1997 with an urgent need to boost its KXTA (1150) to 50 kilowatts to meet the terms of a new contract with the Dodgers and only a couple of months to make it happen. In the space of 56 days, the KTNQ site became a diplexed facility, with the KXTA (now KTLK) transmitters in what had been the KTNQ garage and five new ATUs carefully lowered into place (by a "trolley wire" between two cranes) up on the rooftops.

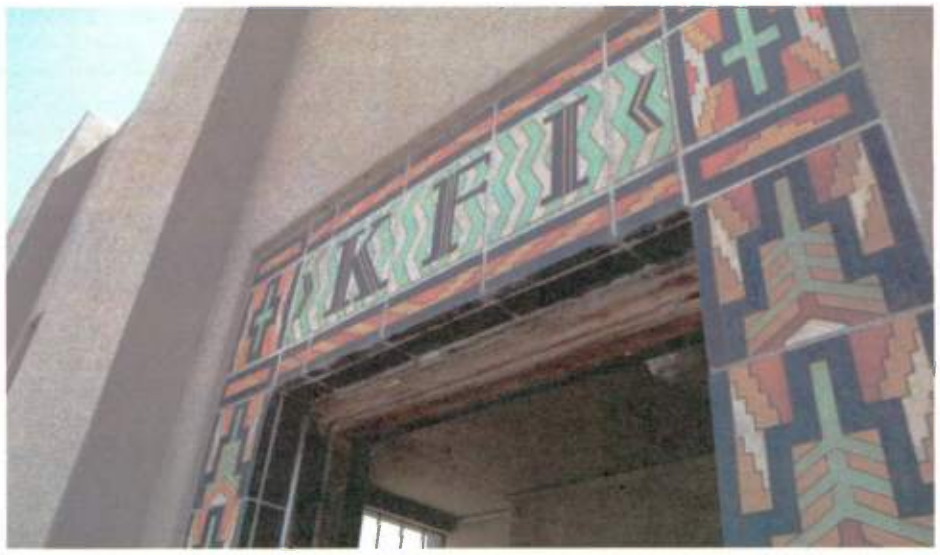
The workers in the industrial park have no idea, for the most part, what those towers overhead — or the wire grid suspended 25 feet above the parking lot between the buildings — is for. In a Los Angeles Times article about the site in 2001, one worker speculated the towers were there to warn airplanes away.

Art Deco

Such a warning device, if only it existed, might have saved another distinctive L.A. tower site from disaster.

I was fortunate to have seen the KFI(AM) site in La Mirada, on the Los Angeles/Orange county line, before a plane crash in December 2004 killed the pilot of a Cessna 182 and his wife and sent the 750-foot tower crashing down. And while it wasn't until after the tower collapse that I finally got inside the transmitter building, in the company of chief engineer Tony Dinkel, this site, built in 1931, was — and is — remarkable even from the outside.

There's the transmitter building, with its amazing Art Deco tilework around the front door depicting radio waves emanating from a tower. (Someday I'd love to find duplicates of those for my bathroom.)



Art Deco tilework around the front door at KFI.

Up in the second-floor transmitter room, you can still see the marks on the floor where the original RCA 50B sat for three decades — and the hole in the ceiling where a sniper, stationed at the site to protect it from enemy attack during World War II, accidentally discharged his weapon.

Outside, the orange groves that surrounded the neighborhood in 1931 have given way to warehouses and the hum of busy I-5 a block away. Just as at KTNQ/KTLK, the land here was too valuable to sit empty — in the 1980s, a warehouse complex was built right under the guy wires, and it was a miracle that the area was deserted and the buildings were left almost untouched by the whipping guys when the tower came down that sad Sunday morning.

Someday, with plenty of luck and lots of legal bills, KFI will get the permits it needs to rebuild the big tower. Until then, the station is making do with its short backup tower at 25 kilowatts.

See LOS ANGELES, page 16 ▶

"Connect POTS to ISDN? You've got to be kidding!"

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Instead of proprietary algorithms, we chose **MPEG-standard *aacPlus*®**, the same coding used by XM Satellite Radio, Digital Radio Mondiale, Minnesota Public Radio, Apple Computer and many others to deliver **superior audio at low bit rates.** (An optional ISDN interface lets Xport connect to Zephyr Xstream with Low-Delay MPEG AAC, or with nearly all third-party ISDN codecs using G.722.)

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KFI Chief Engineer Tony Dinkel with the base of the tower after the plane crash.

In the studio at KNX, Columbia Square, before the big move.

KTNO/KTLK's towers rise above the industrial park. A screen of wires extends over the parking lot between warehouse buildings and serves as part of the grounding system; it ties into chicken wire that lines the walls and roofs of the buildings.

Los Angeles

▶ Continued from page 14

There are plenty of other interesting sites I've seen over the years in multiple visits to L.A., and plenty more on my list for future trips. It's a good thing the drive down to L.A. from the NAB convention is relatively short!

Up on the mountain

We can't leave southern California without mentioning the one site that keeps bringing me back, visit after visit: the mighty Mount Wilson.

More than a mile above sea level, yet within view of the ocean (when the smog's not too heavy), the tower farm on Wilson is an hour's drive, and a world away, from Pasadena and Glendale down below. And in the company of well-connected engineers like Marvin Collins, who was chief of KFI and of KOST(FM) up here for many years, and Burt Weiner, who built several of the sites here and operated the mountain's first ham repeater, the doors open at many of the transmitter buildings.

After repeated visits, I think I can even pick out which antennas among the forest of RF at the center of the tower farm belong to which stations.

Somehow, it seems as though no matter how early I start up to Mount Wilson, it's always dusk by the time I'm ready to leave, driving back down the hairpin curves of the Angeles Crest Highway into the sea of lights that stretch out all the way to the Pacific Ocean, far below.

In the RF jungle at Mount Wilson.

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And now, Axia has a cool new modular control surface: Element. Scalable from four to forty faders, you can build the ideal surface for every studio. Element's abundant outputs and flexible architecture can be switched between stereo and surround mixing. Its info-rich user display, built-in router control, and integrated phone and codec support simplify the most complex shows. You'll never outgrow it.

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Increase Efficiency — Add Cooling

by John Bisset

It won't be long before transmitter buildings that lack air conditioning will turn into hot houses in many parts of the country, as higher daytime temperatures approach.

Faced with an older AM building with outside ventilation but no air conditioning, WILK(AM) Chief Engineer Ray Russ added a box fan to his 5 kW dummy load.

Fig. 1 shows the fan mounted below the load resistors, providing forced-air cooling and reducing transmitter building heat when the auxiliary is being tested. Five kilowatts of RF energy converted to heat is nothing to ignore. A side benefit is to increase the load efficiency by adding to the standard convection cooling. Similar cooling can be added to other equipment to improve airflow and efficiency.

Equipment racks can be installed with ready-made fan panels from Middle Atlantic to gain similar efficiencies. In fact, that manufacturer now has a new series of ultra-quiet fan panels, with two or four thermostatically controlled quiet fans, that provide cooling but minimize noise. Several models also provide a remote "overtemp" indicator, ideal for notification of a cooling issue before the equipment fails.

While we're talking about cooling, don't forget to add a spare fan for your FM exciter. Buy it now so it's on the shelf; it's cheap insurance. Most exciters won't work long, if at all, after the fan gives out. A spare sitting on the shelf can minimize off-air time should the fan fail.

★ ★ ★

We've all dealt with the problem of drinks and food in the studio.

Here's how Paul Shulins and his staff at Greater Media's Boston cluster handle it. Seen in Fig. 2, a caddy located outside the door of each air studio offers plenty of room for snacks and drink cups or cans. The center hole leads to a trashcan hidden underneath and accessible by the front door.

By providing a place to store refreshments, the cluster has cut down on the problem of food and drink inside the studio on the console. The caddy also eliminates any excuse that there's no place *but* the studio to store such items.

Fig. 3 shows a novel use of a D-ring, also found at Paul's stations. The ring is just the right size for holding a spool of cross-connect wire, paying out as long a piece of wire as you need, without kinks or loops. I've seen this strategy using long bolts or screws, but the D-ring permits the spool to spin easily, so the wire can be pulled to any location on the punch block wall.

By the way, Paul Shulins will present a paper at this year's NAB convention dealing with the issues of the 8-second HD radio delay. If you've converted to HD or plan to, his paper is a good tutorial of issues to expect, and how he and his team handled them.

Paul can be reached at *pshulins@greatermediaboston.com.*

★ ★ ★

Fig. 1: Add a box fan to improve dummy-load cooling.

Fig. 2: A drink and snack caddy keeps refreshments outside the studio.

Fig. 3: A D-ring efficiently holds a spool of cross-connect wire.

Frequent *Workbench* contributor Paul Sagi works in Malaysia but encounters many of the same problems that we have in the States.

Recently, he was repairing a piece of equipment and had to replace a wire because a heat-producing component near it had singed and dried out the insulation. The insulation was actually cracking and falling off. Usually, Paul covers the replacement wire with braided fiberglass sleeve.

Because of Murphy's Law, the piece of sleeve on

See WORKBENCH, page 20 ▶

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Workbench

▶ Continued from page 18

hand was too short; and it was a public holiday, so the stores were closed.

After digging around in his toolbox — and cranium — Paul decided to wrap the wire with several layers of Teflon pipe thread tape, also called "plumber's sealing tape." Teflon resists heat and chemicals and the tape is cheap. Several years later, back inside the same piece of equipment, Paul reports that the wire is still as good as new. The Teflon tape did a great job.

Paul Sagi can be reached at *pksagi92@gmail.com.*

★ ★ ★

Fig. 4: A plastic bottle prevents arcing until a suitable replacement can be installed.

Speaking of engineering ingenuity, there's such a thing as tower rigger ingenuity, too.

Faced with arcing to a tower leg from a skirt wire, one of our contributing contract engineers needed a standoff insulator. The tower rigger didn't have an appropriate standoff insulator with him, or at least not a factory-made one. The engineer who sent Fig. 4 wasn't sure of the breakdown voltage of an empty water bottle, but wondered if it would be higher if the paper label were removed!

The bottle stopped the arcing problem. Let's just hope this doesn't remain a permanent fix!

★ ★ ★

If you plan to attend the Dayton Hamfest, you might want to arrive a day early for Broadcasters General Store's second annual equipment show.

Held on May 18 at the Dayton Mall Holiday Inn beginning at 8 a.m., the event is free, but registration is necessary. Contact Cecile Gibson at *cecile@bgs.cc* for more information or to register.

John Bisset has worked as a chief engineer and contract engineer for more than 30 years. He is northeast regional sales manager for Broadcast Electronics. Reach him at (571) 217-9386, or jbisset@bdcast.com. *Send faxed submissions to (603) 472-4944. Submissions for this column are encouraged, and qualify for SBE recertification credit.*

NEWS WATCH

News Roundup

SBE said the FCC clarified various aspects of the commission's ruling specifying the automatic termination of broadcast auxiliary licenses.

The clarification letter from the Wireless Bureau, SBE said, confirms that Part 74 licenses are subject to automatic termination provisions. The effect on modified licenses is the modification could be terminated for failing to timely notify the commission the construction is done. The best means of protecting old license parameters is during the period after a modified license is granted but before the modified facilities are constructed, according to SBE. The Clarification Order is on the SBE Web site: *www.sbe.org.*

RANDALL MAYS is now president of Clear Channel Communications Inc., taking over from his brother, Mark, who remains chief executive officer. Randall Mays served as a director of the company since April 1999 and was most recently EVP/CFO. He retains his CFO title.

After suffering a stroke in 2005, Lowry Mays, the founder and chairman, relinquished his position as CEO to son Mark, who had served as president/COO since 1993.

JK AUDIO has moved into a larger facility, still in Sandwich, Ill., which is outside the Chicago area. The building was designed around JK Audio's office, R&D, manufacturing and warehouse needs, according to President Joe Klinger. The new address is 1311 E. Sixth Street, Sandwich, IL 60548. Phone and fax numbers remain the same.

NAUTEL'S new chief executive will attend NAB2006. Telecom executive Peter Conlon joined Nautel Ltd. as president and chief executive officer. Conlon is former CFO of Positron Fiber Systems Corp., which was acquired by RELTEC Corp. in 1998. Conlon succeeds Scott Campbell, who left the transmitter manufacturer in 2005.

V-SOFT COMMUNICATIONS will hold its fourth annual training seminar for engineers, April 22–23, at the Circus Circus Hotel in Las Vegas. Seminar topics include station upgrading, single frequency networks and boosters, interference analysis and move-ins.

Information is provided by vendors and users. E-mail radioworld@imaspub.com.

Wheatstone said **Entercom's** Westwood, Kan., facility took delivery of one of the largest Wheatstone digital audio and control networks to date. The equipment list includes two Wheatnet 4864s, five Bridge routers and 15 studio router cages along an ensemble of 19 control surfaces made up of a combination of Generation-3s, G4s, G5s, G6s and G8s. In addition, 18 prewiring packages will be provided for the rack room and studios.

Separately, **Clear Channel Radio Atlanta** completed installation of a Wheatstone Generation digital audio network/control system. The facility is home to seven stations and is in the process of replacing analog equipment with digital. There are 18 studios; the facility also services the Atlanta Braves Network and contains the CC Corporate Creative Service Group. Mike Lawing is director of the cluster's engineering and IT. ...

International Datacasting Corp. said it received a "significant" order from **Westwood One** to provide a new digital audio distribution system for the broadcast of sports programming to its top 100 U.S. markets.

The system was online for Westwood One's live broadcast of Super Bowl XL from Detroit, IDC stated.

Westwood One sports programming includes the broadcast of NFL, NHL and NCAA games as well as special events such as the 2006 Olympic Winter Games. The network is based on IDC's SuperFlex Pro Audio suite of DVB-IP satellite datacasting products. It includes a Datacast XD Content Management and Distribution system and the new Production Manager for "live assist" programming for switching between live and pre-recorded content.

Conrad Trautmann is Westwood One VP of engineering and information technology. ...

The Associated Press launched a video service for member Web sites. MSN provided the video engine. New York's all-news station **WINS(AM)** took part in beta testing and is using the APOVN product online, AP stated. ...

Logitek reports several sales including a Mosaic digital console system to **WSJM(AM)** in Benton Harbor, Mich.; a Remora digital console system to **KMXT(FM)** in Kodiak, Alaska; a Remora system with two 10-fader surfaces to **KCUK(FM)** in Chevak, Alaska; a Mosaic digital console system to **WFCJ(FM)** in Miamisburg, Ohio; a Mosaic system to **Relevant Radio** in Green Bay, Wis.; a Remora system with two 16-fader surfaces to **WRBZ(AM)** in Raleigh, N.C.; and a Remora system including three control surfaces to **C-Span** in Washington. ...

Dielectric Communications said **WODJ(FM)** bought an antenna and transmission line in launching the first local signal licensed to serve the central West Michigan community of Newaygo.

Dr. John Alan is chief engineer of Citadel Broadcasting for Grand Rapids, Mich. "We only had six weeks to construct WODJ after we acquired the license from another party," the company quoted him as saying. The station launched last summer and serves Newaygo and Muskegon counties plus the surrounding area and Lake Michigan shoreline communities. The 12-kW DCR-H5 half-wave spaced FM antenna is side-mounted at 500 feet on a 1,100-foot tower, with transmission line also from Dielectric. ...

Netia said it would deliver a custom digital audio archiving system to the **Sudanese Radio & Television Corp.** The broadcaster has historic recordings in its audio libraries spanning several decades. SRTC's system will also embed metadata coming from its database systems. Netia said 20,000 open-reel tapes and thousands of CDs and MDs will be digitized. ...

Dalet said the **Arab Radio and Television** (ART) network chose DaletPlus News Suite for a new sports channel newsroom. It will be deployed in Jordan Media City in Amman, Jordan, with the cooperation of the Dalet local business partner, Mediators General Trading.

Wheatstone prepares to ship a large order to Entercom Kansas City.

HD Radio News

Radio World — Covering Radio's Digital Transition — April 12, 2006

ADA to Ship HD-R Tuner

Page 24

GUEST COMMENTARY

Surround, Past, Present and Future

Robert Reams is co-founder and chief technology officer of Neural Audio Corp. In this commentary he discusses questions he says he hears frequently from broadcasters.

What surround sound opportunities have opened up with the ongoing adoption of the HD Radio format?

Audio capture and playback performance is better than it has ever been. Wonderful-sounding recordings, based on state-of-the-art digital technologies, are being provided for the fortunate few who have access to systems that are worthy of these magnificent achievements.

But these wonderful recordings are seldom the first version of any content to which a consumer is exposed. It is usually delivered to them through promotional avenues that demonstrate, to varying extent, compromises in bandwidth, image, dynamic range and fidelity. There have been recent improvements in the inevitable compromise, hopefully reaching that magic point in performance where enough of the artist's original intent is sufficiently communicated to inspire the consumer to seek out and purchase the untainted, original recording.

Modern signal processing technologies have evolved sufficiently in sophistication and economy to enable the transmission of surround sound content over satellite and terrestrial radio.

Who cares?

Broadcasters — Surround systems (like Neural Audio's) were created specifically for transitioning the stereo broadcast infrastructure into one that could interoperate with surround.

Stereo Purists — A properly executed downmix, when reproduced through a stereo loudspeaker system and auditioned within the sweet spot, produces an image that is truly enveloping. In fact, phantom images emanate from points in space that convey the intention of the original 5.1 mix.

Owners of Existing Home Theaters — A properly executed downmix can be reproduced through a matrix decoder. All mix elements appear where they are supposed to be. There is crosstalk, but the result is generally a satisfying representation of the original work. The more advanced matrix decoders deliver a surprisingly enjoyable performance.

Content Providers — 2-D downmixers are an excellent choice because of the similarity to the image construct of naturally occurring 2-D stereo and compatibility with already prevalent "legacy" content. This greatly simplifies the integration of 2.0 and 5.1 content within the transmission plant and allows both legacy 2.0 and 5.1 downmixes to be broadcast at an unimpaired bit rate.

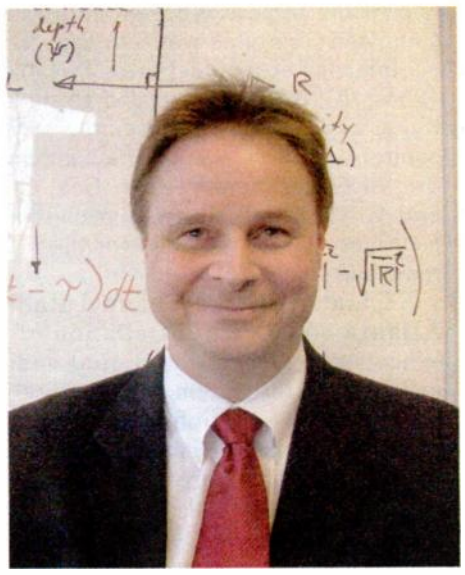
Owners of Future Surround Systems — When a 2-D downmix is reproduced via n-channel rendering (such as Neural Surround), the original work is recovered with the extended image stability that is a feature of multiple "hard" sources. Independent tests and adoption by consumer electronics manufacturers corroborate this.

Surround sound ... is indeed a 'killer app.' However, without giving the broadcaster access to the technology in a way that makes tactical and fiscal sense, it is likely to become a 'killed app,' at least for terrestrial radio broadcasters.

What are the new challenges that 5.1 and digital audio present to broadcasters? How does good digital audio processing become a key partner when adding extra "bits and bites" to an audio stream?

Broadcasting spatial content requires more sophistication than broadcasting mono. Multipath will inflict the same damage on 5.1 spatial programming that it does on stereo. In turn, proper management of 5.1 spatial content will result in the same benefit as stereo.

Mitigation of multipath with satcasting, DAB or IBOC pays a high dividend over analog in that 5.1 and stereo content will be immune to multipath induced image modification. Lossy compression is a necessary part of digital broadcasting. Intermodulation distortion caused by aggressive processing means more spectrum to code; making an already bit starved codec's performance worse. Broadcast processing must be configured for minimum intermodulation distortion while maximizing the image redundancy of content.



Robert Reams

As surround systems emerge, what approach is each system taking with their connectivity to existing surround formats?

Surround sound, in and of itself, is indeed a "killer app." However, without giving the broadcaster access to the technology in a way that makes tactical and fiscal sense, it is likely to become a "killed app," at least for terrestrial radio broadcasters.

Surround is a concept that is new and unfamiliar to some broadcasters. Recently, surround technologies have been classified into two groups:

"Matrix" technologies (composite group) possessing the logistical advantages of ease of implementation and stereo/ analog interoperability although

See 5.1, page 24 ▶

Radio World's HD Radio™ Scoreboard

The HD Radio Scoreboard is compiled by Radio World using information supplied by iBiquity Digital Corp. and other sources. The data shown reflect best information as of March 15. This page is sponsored by Broadcast Electronics. HD Radio is a trademark of iBiquity Digital Corp.

HD RADIO IN NEW YORK CITY

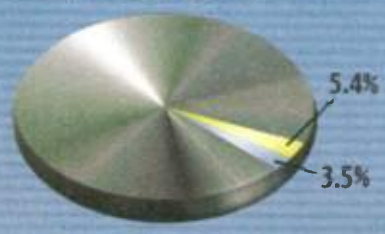
Station	Freq.	Format	Licensee	On Air	HD2 Format
WOR(AM)	710	News/Talk	Buckley Broadcasting	Yes	
WABC(AM)	770	News/Talk	ABC Radio	No	
WNYC(AM)	820	Noncom News	WNYC Radio	Yes	
WPAT(AM)	930	Ethnc/Intnl	Multicultural Radio	No	
WEPN(AM)	1050	Sports	ABC Radio	No	
WADO(AM)	1280	Spn/Nws/Spt	Univision Radio	Yes	
WZRC(AM)	1480	Ethnic	Multicultural Radio	No	
WBGO(FM)	88.3	Jazz	Newark Public Radio	Yes	
WFUV(FM)	90.7	AAA/Folk	Fordham University	Yes	
WNYC(FM)	93.9	News	WNYC Radio	Yes	
WPLJ(FM)	95.5	AC	ABC Radio	Yes	'70s Oldies
WQHT(FM)	97.1	Urban CHR	Emmis	Yes	
WRKS(FM)	98.7	Urban AC	Emmis	No	
WHTZ(FM)	100.3	CHR	Clear Channel Radio	Yes	New CHR/New Top 40
WCBS(FM)	101.1	Jack	CBS Radio	Yes	Oldies
WQCD(FM)	101.9	Jazz	Emmis	No	
WNEW(FM)	102.7	AC	CBS Radio	Yes	News
WKTU(FM)	103.5	CHR/Rhymc	Clear Channel Radio	Yes	Country
WFAS(FM)	103.9	AC	Cumulus Broadcasting	Yes	
WAXQ(FM)	104.3	Clsc Rock	Clear Channel Radio	Yes	Deep Cuts Classic Rock
WWPR(FM)	105.1	Urban	Clear Channel Radio	Yes	Power Espanol
WCAA(FM)	105.9	SpnAC/Rhymc	Univision Radio	Yes	
WLTW(FM)	106.7	Lite AC	Clear Channel Radio	Yes	Lite Classics

The HD Radio Bottom Line

	Total Licensed	On the Air
	1,218	740
Last Month	1,173	712

Market Penetration United States

13,599 AM & FM Stations *(excludes LPFMs)*



Licensed by iBiquity and on the air

Licensed by iBiquity and not on the air

Number of FM Stations Multicasting: **209**

5.1

▶ Continued from page 22

their performance is less than ideal;

"Parametric" based technologies (parametric group) promising the performance necessary to satisfy the surround savvy consumer although they require the radio station to completely re-tool, offer limited interoperability (no upmix feature) with stereo and are not analog compatible. Most recently, proponents of the parametric system have announced their implementation of the same features as the matrix systems. While the release of their "unsteered"(composite group) system clearly will have some benefits, big questions remain on how the consumer experience will be affected when the systems switches from a parametric playback of a surround mix to a matrix upmix of an artistic stereo or mono mix in real time.

"Watermark" technology (composite group), possesses advantages of both methodologies: ease of implementation, stereo and analog interoperability and discreteness in an existing, available product. This is the approach that Neural has taken. Making a case for the third category, a radio station may purchase a downmix appliance and an image packing/codec pre-conditioner appliance, spend a couple of days for orientation and voila, they are broadcasting surround!

The benefits of the watermark technology are:

— Total down time during installation: maybe a minute (I've seen it).
— Retraining for the desk operators: zero.
— Time and expense for replacing/retooling the server: zero.
— Time and expense for infrastructure rewiring: zero.
— Cost of re-tooling web-cast or podcast: zero.
— Danger from mono/stereo/5.1 cross fades: zero.
— Training for creating stereo compatible surround content: maybe a half of a day.

The bottom line: watermarked surround technology is easy, safe and affordable to implement. Of course, the broadcaster may choose to purchase additional "bells and whistles" to modernize their infrastructure, but they don't have to until it makes fiscal sense. Ease of adoption is key.

For the receiver manufacturers, the risk of distributing another "orphan format" is not acceptable. That is, the technology must benefit sources of content other than HD Radio exclusively.

AM stereo receivers were not beneficial beyond that of receiving AM stereo. Receiver manufacturers are not going to risk dedicating resources to any "one trick pony." Surround must be beneficial to existing content and provide benefit for a consumer's existing CD, MP3 and iPod libraries.

For any surround format to gain acceptance, it has to provide benefits beyond that of a captive broadcast technology. That's a tremendously important driver for adoption with the receiver manufacturers.

Why is there so much confusion surrounding matrix vs. non-matrix approaches?

Spatial compression is not new. The earliest versions of downmixers are close cousins to "quad" era technologies utilizing all-pass filters, summers and differencers. Newer technologies, derived from modern advances in psychoacoustics and signal processing have spawned a new class of downmixers that posses all of the attractions of "matrix" style downmixers:

— interoperability with stereo;
— compatibility with "blind" transport and legacy infrastructures;
— cross compatibility with competitor's platforms;
— low cost and;
— low risk of implementation.

In addition to these already attractive attributes, this newer class of downmixer (watermark) offers the advantages of: a) greater immunity to image concatenation errors: the ability to survive several upmix/downmix cycles without wrecking the image; b) spectral energy preservation: the ability to retain the frequency response of the original source under any downmix condition; c) unconditional image stability: the ability to contain a (down) mix element in it's appropriate image sector, regardless of the phase, timing or polarity of the original content being downmixed.

These advances in technology allow downmixing of music content with a 100 percent success rate, regardless of how the content was mixed, mastered, copied or compressed. Once the content is in the form of 2-D stereo, it may be stored, routed, saved, auditioned or broadcast as ordinary stereo content.

This has great impact on the adoption of the content, whether at the server level within the broadcast infrastructure or the consumer's CDs, iPod or MP3 player. Any technology that requires a total replacement of the de facto standard distribution infrastructure and consumer storage formats will be met with great resistance.

For any surround format to gain acceptance, it has to provide benefits beyond that of a captive broadcast technology. That's a tremendously important driver for adoption with the receiver manufacturers.

Why is the addition of surround sound to the broadcast mix an important upgrade?

The energy and movement of surround production have blown ad agencies and their clients away when they first heard it. They tell our customers that they had no idea that you can create that kind of sound on the radio with 5.1.

Surround sound breathes new life and attention into station IDs, promos and commercials in a way that has never before been approached in radio broadcast environment.

Crowd noise, sound effects and production elements can move from front to back and left to right. Station IDs swirl in sound, making call letters stand out.

What are receiver manufacturers and record labels doing to incorporate 5.1 into existing equipment or catalogs?

Receiver manufacturers report strong growth in the demand for surround sound systems, both in automotive and home theater arena despite the lack of a good solution for music content. HDTV broadcasts and upmixing of stereo music is currently driving the surround audio market.

In terms of audio, surround is a tangible benefit most consumers can understand. It is an easy feature to sell for the receiver manufacturers, and therefore a significant opportunity for 5.1 digital radio broadcasts.

Record labels already have extensive 5.1 catalogs that so far have had limited distribution or marketing opportunities. I believe they are eager to support any distribution format that has consumer adoption and can deliver surround with ease of access and low cost while protecting the artistic intent of the original mix.

Where is surround sound headed? How it will factor into the broadcast mix that radio will be offering listeners?

Looking into my crystal ball, the future of surround sound looks bright. This new format of delivery (2-D stereo) will allow for near instantaneous distribution of surround content over all existing infrastructures. This will make surround music easily accessible to the consumer and allow the labels and the artist to have a commercially viable model to produce, promote and sell surround recordings.

In the near future, there will be 7.1, 10.2 and even surround technologies that allow for loudspeakers above the listener (up channels), all compatible within this new delivery format. Tools that allow the artists and mixers to forge content with these capabilities are being coded as this is written.

Radio World welcomes other points of view.

NEWS WATCH

ADA to Ship HD-R Tuners

WHITE PLAINS, N.Y. Audio Design Associates expected to start shipping HD Radio tuner modules in April. The modules are compatible with existing ADA products and new tuners that are pending.

The company also is introducing two new tuners in May, one of which is designed for radio professionals, the HD Pro Tuner. This is the first "pro" product for ADA, which otherwise designs high-end home tuners.

ADA's tuner control protocol "allows for up to 27 independently controlled tuners on a single communications bus," said company engineer Philip Nubile.

The manufacturer is introducing HD-R modules compatible with its TSS-1 single tuner as well as its Duo Tuner and Tune Suite tuners. ADA also offers standard AM/FM/WX as well as XM and Sirius satellite modules. The Duo Tuner can hold two modules and the Tune Suite can hold four.

ADA tuners enabled with the HD Radio modules display frequency, album, artist and title information. For HD FM, the tuners also indicate the presence of multicast channels. The modules are RDS-capable for analog broadcasts.

Other features are a multi-line feedback option for touchscreen users, 30 presets, a front-panel LED HD indicator, stereo indicator and 10-step signal strength meter. An F-connector antenna input for each HD radio module is included.

Designed for broadcasters, the HD-Pro tuner is a dual HD Radio unit with balanced analog and digital audio outputs, output meters and phone jack. Features are relay contact warning outputs for signal loss, HD loss and audio loss, as well as a split mode capability for simultaneous analog/digital comparison. The latter can help engineers time-align analog and digital signals, Nubile said.

The Pro Tuner also includes a front-panel 15-watt headphone amplifier with A/B switch and volume control as well as a dual stereo 20-step VU meters with peak hold indicator.

The Duo Tuner, Tune Suite and HD-Pro have text displays that can include station/channel number, station name, genre, artist, album and song. Those equipped with HD Radio modules also indicate the multicast channels.

Pricing for the HD-Pro was not set at press time.

When loaded with an HD Radio Module, ADA's current models, the TSS-1 and Duo Tuner, are $999 and $2,199 respectively. Tune Suite models run at $2,399 for existing Quadritune and $4,199 for the Suite 8100, a multiroom receiver with one integrated tuner due to ship in May.

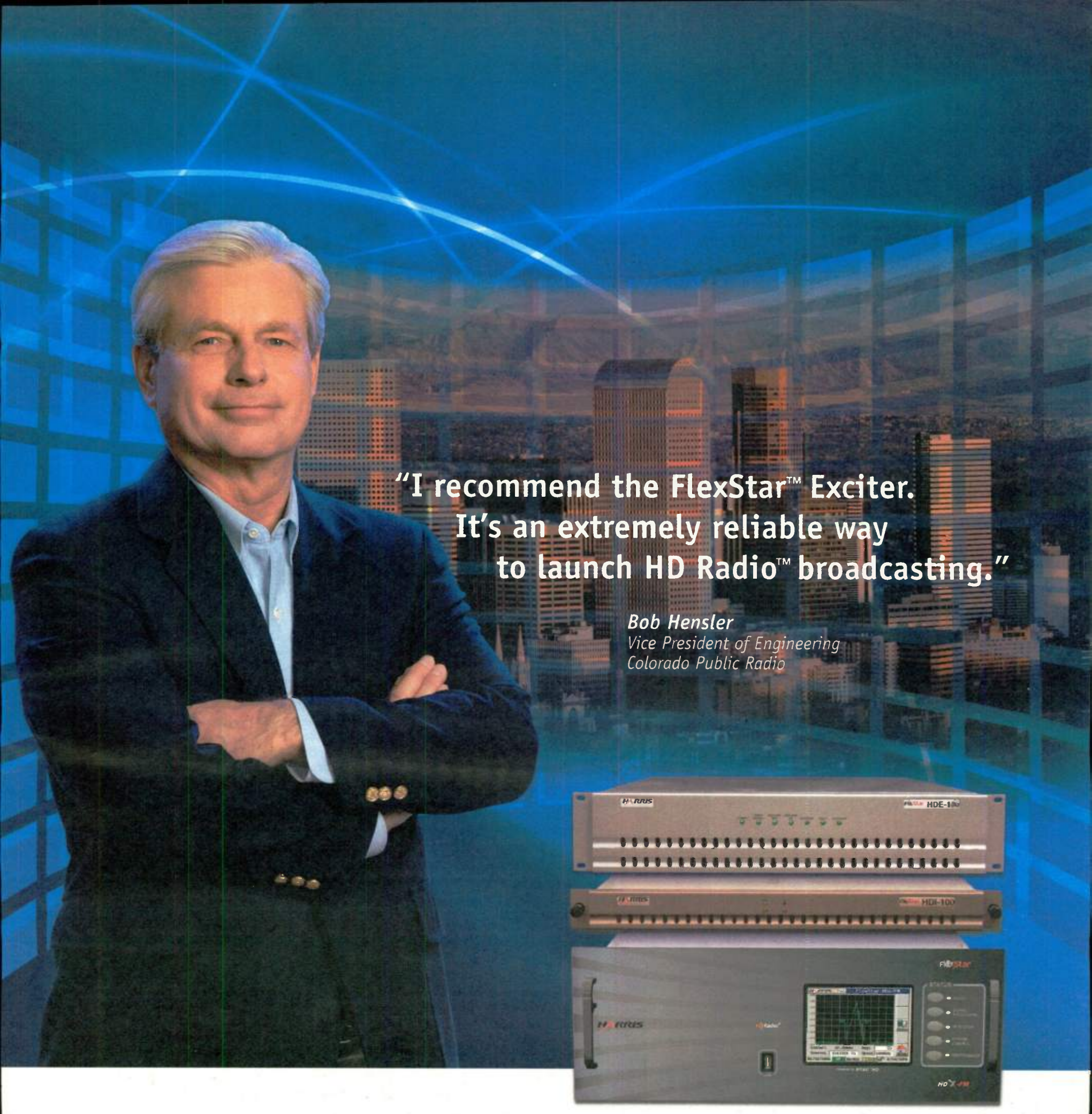
Additional HD Radio modules list separately for $599.

Register for DRM Seminar

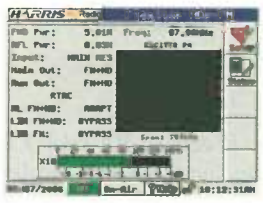
Details are available on a 90-minute DRM seminar to be presented during NAB. Reservations for the free seminar should be made via e-mail to *projectoffice@drm.org*. It will be presented in six time slots over three days at the Continental Electronics booth.

A panel of Digital Radio Mondiale representatives will present a how-to seminar aimed at broadcasters and others who may be thinking about implementation. It will feature presentations on technical, commercial, regulatory and manufacturing aspects of DRM, including updates on tests in Mexico and Europe.

— *Leslie Stimson*



FlexStar™ HDI-100 Importer HDE-100 Exporter HDX-FM/HD Exciter **Managing Content. Delivering Results.**



Real Time Spectral Display
This exclusive Harris feature provides easy verification of FCC mask compliance.

"We've found Harris' new Exciter, along with the Importer and Exporter, to be very flexible and reliable. There are more inputs on this Exciter than any other brand, allowing flexibility and minimal downtime. Plus, Harris is the first to include iBiquity's Exgine Architecture which gives us a simplified, more reliable installation. With the help of Harris, we now provide more streams and channels to the Denver population without adding transmission sites. I recommend the Harris FlexStar family to other radio groups. It's as easy as new technology can be to operate and helps us accomplish our goals."

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For information call: 800-622-0022

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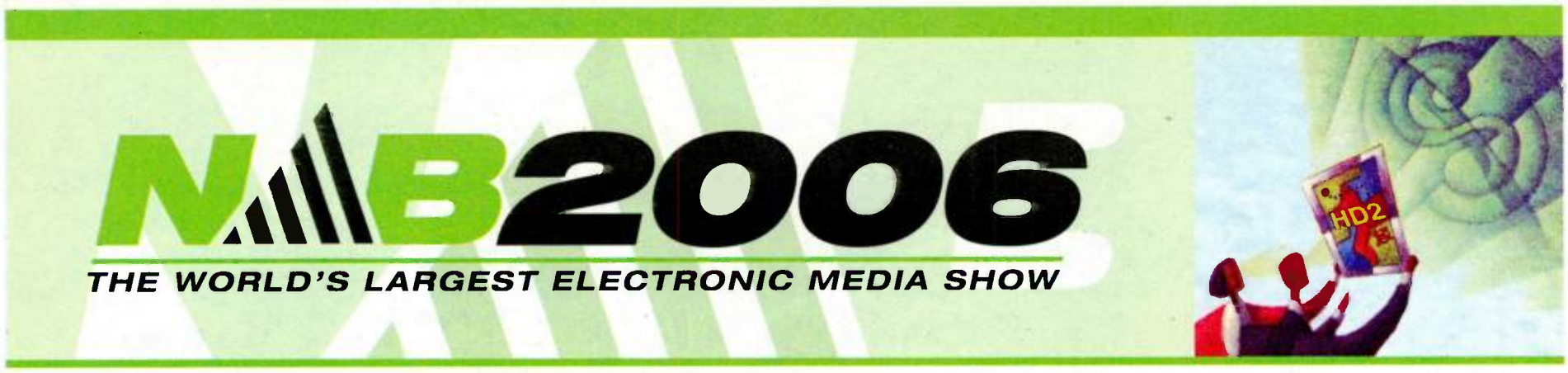

Saturday

Ennes Explores 'Everything RF'

Tutorial Program Includes RF-101, HD Radio and Fybush on Tower Sites

Saturday, April 22:
"SBE/Ennes Workshop: Everything RF — Radio and Television"

Saturday April 22:
"Connecting With the Consumer"

by Fred Baumgartner

This overview of Saturday's Ennes events is provided for Radio World readers by the SBE in lieu of its usual occasional column in these pages.

These days it is hard to say what defines a broadcast engineer or where a career might take us. From radio to TV? Vice versa? Maybe new media?

Until a few years ago, the "broadcast" in "broadcast engineer" had to do with analog, high-power RF systems. Quickly, we found ourselves broadcasting via digital signals over the air and via the Internet — not necessarily in real time, and almost certainly a variety of programs all at once.

Nonetheless, the means to broadcast our content seem to favor the mobility of RF. Terms like single-frequency network and IBOC have entered our vocabulary. The world of RF has become considerably more interesting than when everything was simply AM or FM.

SBE's Ennes Educational Foundation Trust, PBS and NAB have put together an intensive tutorial — actually two programs — for the Saturday before the NAB show floor opens. The workshop will be held in Room S226 in the South Hall of the Las Vegas Convention Center.

Tutorial

For the broadcast engineering side, the Ennes Workshop has "Everything RF." This broad program starts with an intensive early-morning tutorial and continues with topics that cover a spectrum of RF matters.

The key word is *tutorial*. Each year we seek out and ask the industry's experts to put together lectures focusing on a topic that engineers most need at the time. Many recognized names in engineering have consented to present. These are the engineers, technology suppliers and broadcasters who design, build and implement our technology. Everyone on this program has spent a night or two "at the transmitter"; most answer to amateur radio call signs.

RF not your thing? PBS has provided a concurrent session that focuses on "Connecting With the Consumer." Details of both sessions are below.

To attend the Ennes Workshop, you must be registered with an NAB Broadcast Conference package. The full conference package includes the Broadcast Engineering Conference, exhibit floor and a ticket to one of three industry lunches. Members of SBE whose stations/employers are not members of NAB are eligible for a special NAB Partner registration rate of $695, which is $200 less than the Non-member rate.

Last year, 500 broadcast engineers attended the Ennes Workshop. If you have only one day to devote to sharpening your engineering skills, this would be it.

[TV-only presentations are summarized here briefly; for details see Broadcast Engineering Conference information at *www.nabshow.com*.]

EVERYTHING RF

"Tutorial: RF-101 — A Brush-Up for Broadcast Engineers"

Dana Myers, principal engineer of television transmission systems at Harris Corp., has a fast-moving, two-hour tutorial that covers RF basics from couplers and hybrids to multi-channel combining.

Designed as an introduction for broadcast engineers and a refresher for practicing engineers, this session is aimed at taking the mystery from complex RF systems and associated measurement techniques such as VSWR and isolation. From Smith chart impedance plots to modern pulsed

See SATURDAY, page 28 ▶

About This Section

The NAB Broadcast Engineering Conference is of even more than usual interest this year, with a great deal of material emerging about the practical implications of HD Radio, among other topics. In this section, Radio World previews the radio-related portions of the conference, day by day.

In addition to the sessions detailed here, the following events within the Broadcast Engineering Conference are of interest. See NAB's Web site for other sessions including TV-oriented engineering presentations.

Broadcast Engineering Conference Opening Keynote
Sunday, April 23, 9 a.m.
Tomlinson Holman, professor of cinema-television and electrical engineering at USC, discusses "How Home Theater Raises Expectations of Broadcasters."

IEEE/BTS "Delivering Television to Handheld Devices: A Technology Tutorial"
Monday, April 24, 1 p.m.

Technology Luncheon
Wednesday, April 26, noon
NAB Engineering Achievement Awards are given to Ronald Rackley, Benjamin Dawson and S. Merrill Weiss. Keynote speaker Chris Anderson of Wired Magazine talks about his upcoming book. NAB also presents its Awards for Innovation in Media.

Amateur Radio Operator's Reception
Wednesday, April 26, 6 p.m., sponsored by Heil Sound.

NRSC: A Report on Its Activities
Thursday, April 27, 9 a.m.
David Layer, director of advanced engineering, NAB.

Exclusive BSW Offer!!

Hurry!! BSW Special Offer Expires May 31st.

AUDIOARTS® ENGINEERING

FREE Phone Module! with Audioarts Modular Console (a $657 Value)!!

Audioarts R-55e Series Modular Consoles

FEATURES:
- Two VU meter pairs (program and switched); 8-channel R55E one VU pair - switchable
- Built-in cue speaker, timer and Talkback
- Two stereo program busses, two mono busses
- Low Profile Countertop installation
- Rackmount Power Supply
- Built-In Cue Speaker With Amplifier and External Cue Line Output
- Flip-up meterbridge and A/B Inputs

R55E	8-channel modular console	List	$4,890.00
R55E-12	12-channel modular console	List	$6,420.00
R55E-1812	18/12 modular console	List	$7,135.00
R55E-18	18/18 modular console	List	$10,190.00

Modules/Accessories:

SPN55E	Phone input module	List	$657.00
SS55E	2nd studio monitor module	List	$547.00
LS55E	6-position stereo line selector	List	$342.00
SL55E	Spare stereo line input module	List	$578.00
TR55ESS	Tape remote, full-function	List	$276.00

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Saturday

▶ Continued from page 26

reflection analysis, this tutorial also provides information on where to learn more.

"How HD Radio Works"

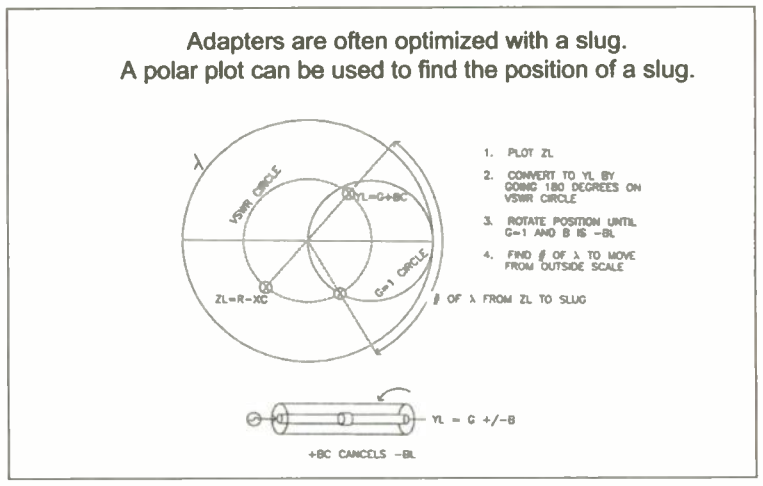
Gary Liebisch, applications and product line engineer for radio transmission products at Harris, covers the principles of OFDM modulation for HD Radio and the structure and generation of the AM and FM HD waveform. Also covered are linearity considerations in AM systems, transmitter and antenna considerations and the NRSC-5A AM mask, as well as combining options in FM systems and the NRSC-5A FM mask and signal quality assessment and measurement.

"Engineering Considerations for Digital Microwave STL, TSL and ICR"

Scott D. Nelson is director of product management and business development for the Alcatel Wireless Transmission Division.

Digital microwave radios play a crucial role in broadcasters' transition to DTV, allowing them to relay high-quality digital program material between studios, transmitters and remote sites. However, digital microwave links have different propagation characteristics than traditional FM BAS links. Impairments due to multipath as well as adjacent-channel and co-channel interference can render a digital microwave signal unusable without aggressive countermeasures.

Fortunately, the 30-year history of digital microwave has led to electronic technology and engineering design methods that deal effectively with these impairments and enable broadcasters to use digital microwave with capacities up to 155 Mbps over long paths.



Engineers often talk of 'slugging' a line to improve VSWR. Dana Myers of Harris will cover the concepts and theory required to understand that technique as part of the 'Tutorial: RF-101' presentation.

"Towers I've Known"

Scott Fybush, America's biggest tower fan, has published a yearly "Tower Site Calendar" since 2002. This short presentation looks at a variety of historic, technically unusual and special antenna systems that Fybush has documented in his travels all over the United States, Canada and beyond, to several thousand radio and TV transmitter sites.

He is a contributor to Radio World and is editor of the online trade journal NorthEast Radio Watch.

"Tutorial: Making DTV Measurements"

This session is presented by Greg Best, principal of Gregg Best Consulting Inc., and John D. Freberg, president of Freberg Communications Corp.

"Inside the MediaFLO Transmission System"

Tom Mikkelsen, senior director of production for Qualcomm MediaFLO, talks about that project, which is in the later stages of development and the early stages of deployment.

The mobile video system uses satellite and what was previously UHF(TV) Channel 55 on a nationwide basis to distribute a complex RF waveform designed to deliver live and pre-positioned video and audio content to cell phones. MediaFLO is a "forward-link-only architecture" that employs advanced compression techniques, gracefully degrading transmission link techniques and processing for broadcast — both in the pre-compressed ASI domain and baseband SDI video.

This system is targeted at mobile multi-channel-TV and audio distribution for both linear and non-linear content.

"Transmitters I Have Known"

James O'Neal, technology editor of RW's sister publication TV Technology magazine, has come across a fair amount of RF gear in his 40 years in broadcasting. His short session offers a chance to look at some of the historical and special rigs around the world.

O'Neal joined TV Tech this year after a distinguished career with VOA.

"Designing the Transmitter Facility"

Scott Barella is director of systems engineering for Burst Video. The session aims to educate those who want to learn the fundamentals and make-up of a sound DTV transmission plant or who want to shore up an existing facility.

"Consumer Over-the-Air DTV Antennas"

Kerry W. Cozad is senior vice presi-

See SATURDAY, page 29 ▶

Saturday

▶ Continued from page 28

dent for market development at Dielectric Communications. The "take-away" is a more in-depth understanding of what happens when the signal eventually reaches the viewer's home, with a focus on what can be done to improve reception to viewers who may be new to over-the-air reception.

"RF Delusions"

Doug Lung, VP of engineering for Telemundo Group, will look at accepted practices and why they don't match reality, including tips on avoiding common problems. Lung handles RF and transmission issues and projects for NBC and Telemundo; he writes an RF column for TV Technology.

CONNECTING WITH THE CONSUMER

"Eye of the Beholder: Consumer Display Technology Update"

Pete Putnam of ROAM Consulting offers an update on the latest display technologies and the impact on consumer choices and purchasing challenges.

"New Players, New Content Delivery Systems: IPTV and the Consumer"

Greg Doyle of Azcar Technologies provides a look at the architecture behind a major IPTV installation.

"Consumer Expectations, the Coming Consumer Experience"

Ken Morse, VP of client architecture for Scientific Atlanta, on how the coming settop box technologies will impact the consumer experience.

"HDMI Tutorial"

Stevan Eidson, Silicon Image covers the HDMI consumer interface.

"Preparing for Blu-Ray"

Sony describes the Blu-Ray format and its capabilities.

"HD DVD"

Kilroy Hughes of Microsoft explains HD DVD and the Microsoft view on the latest consumer choice of format.

Fred Baumgartner, CPBE, CBNT, is trustee of the Ennes Educational Foundation Trust and moderator of the Ennes Workshop. He is director of broadcast engineering for Qualcomm MediaFLO.

Write to RW

Send e-mail to *radioworld@imaspub.com* with "Letter to the Editor" in the subject field; fax to (703) 820-3245; or mail to Reader's Forum, Radio World, P.O. Box 1214, Falls Church, VA 22041.

Crystal Finalists

Winners of the NAB Crystal Awards will be named at the upcoming convention. The awards honor stations for outstanding commitment to community service.

Last year's winners were KBBX(FM), Omaha, Neb.; KLOS(FM) in Los Angeles; KNOM(AM) in Nome, Alaska; KOIT(FM) in San Francisco; WCMT(AM) in Martin, Tenn.; WJBC(AM) in Bloomington, Ill.; WLEN(FM) in Adrian, Miss.; WTMX(FM) in Chicago; WTOP(AM) in Washington; and WUGO(FM) in Grayson, Ky.

The NAB announced 50 finalists for 2006:

KCVM(FM) Cedar Falls, Iowa
WGHT(AM) Pompton Lakes, N.J.
KFOG(FM) San Francisco
WHAI(FM) Greenfield, Mass.
KGO(AM) San Francisco
WHIZ(AM) Zanesville, Ohio
KHOW(AM) Denver
WHUR(FM) Washington
KIOA(FM) Des Moines, Iowa
WIBC(AM) Indianapolis
KLVI(AM) Beaumont, Texas
WILV(FM) Chicago
KMOX(AM) St. Louis
WIVK(FM) Knoxville, Tenn.
KOZT(FM) Fort Bragg, Calif.
WIZM(AM) La Crosse, Wis.
KPPV(FM) Prescott Valley, Ariz.
WJJY(FM) Brainerd, Minn.
KPRS(FM) Kansas City, Mo.
WJON(AM) St. Cloud, Minn.
KQRS(FM) Minneapolis
WLHT(FM) Grand Rapids, Minn.
KRBE(FM) Houston
WMRN(AM) Marion, Ohio
KRSP(FM) Salt Lake City
WPHI(FM) Philadelphia
KSL(AM) Salt Lake City
WQCS(FM) Fort Pierce, Fla.
KTOZ(FM) Springfield, Mo.
WQMX(FM) Akron, Ohio
KTSY(FM) Boise, Idaho
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KZBR(FM) San Francisco
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WBEB(FM) Philadelphia
WTUZ(FM) Uhrichsville, Ohio
WDAY(AM) Fargo, N.D.
WWWQ(FM) Atlanta
WDRV(FM) Chicago
WXKS(FM) Medford, Mass.
WFBQ(FM) Indianapolis
WYLD(FM) New Orleans

Sunday

Spell Radio 'HD' and 'IT'

Digital Moves Into the Real World, While Radio Gets Savvier to Information Tech

Sunday morning, April 23:
"Making Radio Work, Part I"

Sunday afternoon, April 23:
"The Evolution of IT in Radio Broadcasting"

by John M. Lyons

"Making Radio Work, Part 1" the morning session, is "really all about making HD Radio work in the real world of radio station operations," said organizer Milford Smith, vice president of engineering for Greater Media and winner of the NAB Radio Engineering Achievement Award last year.

Smith said the morning nuts-and-bolts sessions will offer insight into the resolution of typical HD implementation and propagation issues from the perspective of people who have "been there and done that."

Image from presentation by Henry Downs of Dielectric.

"Additionally, there will be glimpses of the next-generation IBOC technology as well as of the first low-profile AM antenna design formally recognize d by the FCC as routinely usable by broadcasters," Smith said. (The second part of "Making Radio Work" will be held on Wednesday; see related story for details.)

HD Radio and AM/FM antenna systems will be the focus Sunday morning. Here's a capsule summary of scheduled presentations of interest to the radio reader:

MAKING RADIO WORK

Kicking off the morning will be Paul Shulins, director of technical operations for Greater Media in Boston. He presents *"HD Radio — Dealing With the Delay."*

Air talent can be temperamental at best; if they can't hear themselves, talent can become impossible to deal with. Shulins said he will discuss the significant impact to broadcasters when an audio diversity delay is implemented for HD Radio broadcasting.

"Items like studio monitoring, mix-minus feeds for remote broadcasts and verifying your station is on the air and sounding good, are all issues that surface when HD Radio is properly implemented," he said.

He'll discuss his experiences in Boston with five FM stations, along with practical solutions that were developed for overcoming many of the hurdles that were encountered during the first couple of years of HD Radio.

One solution was to develop a telephone/Web-based frequency coordination system implemented to help broadcasters coordinate RPU frequency usage and scheduling of remote broadcasts that in many cases require multiple channels in each direction to feed mix-minus back to the broadcast venue.

"Design Considerations and Real-Life Performance of a Multichannel Analog/Digital FM Antenna/Combiner System" will be discussed in detail by Henry Downs, technical director of Dielectric Communications.

"One of the most forceful things revolves around the fact that during the evolution of master antenna systems, the symmetry of the antenna elements has been altered to provide 'enhanced performance,'" he said.

"This asymmetry has proved to be a major issue when it comes to the introduction of the HD Radio digital side bands. It gives rise to lousy isolation and poor digital signal match. By returning to a symmetrical set of dipoles it has been proven that excellent match and isolation is achievable."

Tom King, president of Kintronic Labs Inc., will present *"A New Efficient-Low Profile AM Antenna."* Terrain, climate and proximity effect are some of the questions facing AM broadcasters. King will address these issues and how low-profile antennas address them. He will present the theory, test results and computer modeled results of the new KinStar low-profile AM antenna, which was recently type-approved by the FCC for full-time non-directional operation in the U.S. market. The antenna concept was honored in 2003 by Radio World's "Cool Stuff" Award judges.

Continuing on this morning's session theme, Geoffrey Mendenhall, vice president of research and development for the Harris Broadcast Communications Division, will address the issues of a *"Multi-Dimensional HD/FM Exciter With Dual RF Outputs."*

"The addition of HD Radio to an FM station has been a complex process and a daunting task for the radio station engineer, involving the set-up of multiple exciters and elaborate remote control setups, and it often requires external RF components," he said.

"I will introduce a new concept that will greatly simplify the integration of HD Radio into an FM broadcast station."

Mendenhall — who, like moderator Milford Smith, is a recipient of the NAB Radio Engineering Achievement Award — will describe the technology that enables a third-generation, Exgine exciter to replace both the conventional FM exciter and the HD Radio exciter. The Exgine is a single platform that contains two independent, multi-mode exciters that provide the functionality required to implement an FM/HD Radio transmission system, including common amplification and high-level, split-level and space combining.

The digital technology, which creates both the FM signal and the HD signal from a single UDP/Ethernet data stream as well as real-time, digital, adaptive pre-correction of multiple RF channels, will be explored.

Wrapping up the morning, *"Rebuilding the FM Transmitter Site for HD, Step 1: Evaluating Your HD Radio Coverage"* is presented by Sidney Shumate, senior appraiser and broadcast engineer for BIA Financial Network.

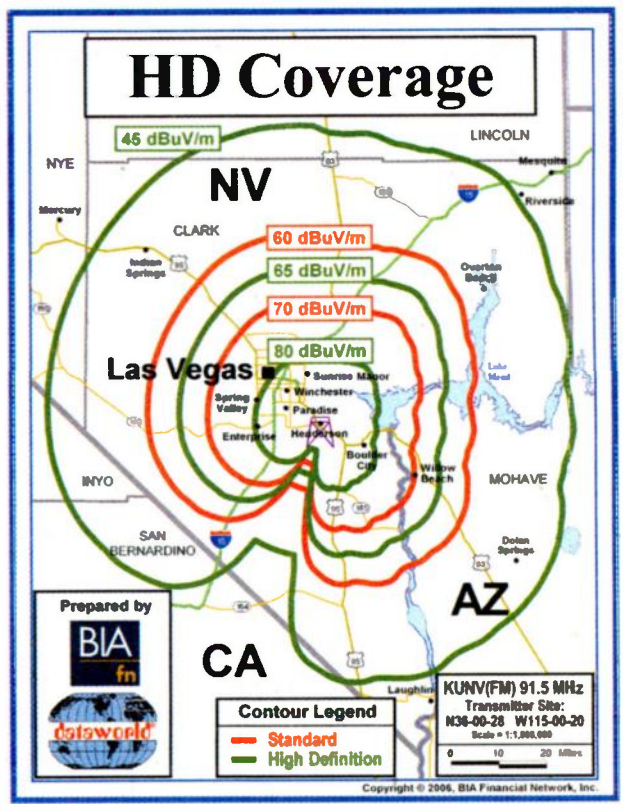
This will be of interest to broadcasters thinking of adding HD to their facilities.

"What contours should you be looking at for FM in the first conversion, to hybrid mode?" Shumate said, listing questions that face managers in this situation. "What will be your main channel and multicast channel coverage?

"What options for converting your transmitter site to HD are working best? While making this major change or upgrade at the transmitter site, what options should you consider? Should you move, change height or upgrade in place? Should you link together stations with booster sites and other co-channel stations to improve coverage in a large region?

"We will provide a step-by-step framework for planning your FM station's HD hybrid future, and a look at the planning tools that can be used to answer the questions."

This is a presentation to which chiefs and directors of engineering can bring along owners and general managers, to hear a checklist and guidelines for maximizing and developing a realistic look at an FM station's future.



HD and standard FM coverage of KUNV in Las Vegas. Sidney Shumate of BIAfn will discuss how to evaluate HD Radio coverage.

IT EVOLUTION

The chairman of this year's Broadcast Engineering Conference is Thomas Ray III, vice president and corporate DOE of Buckley Broadcasting/WOR Radio, New York. He also hosts the afternoon sessions on Sunday, *"The Evolution of IT in Radio Broadcasting."*

"With the explosive growth in information technology in our broadcast facilities over the past several years, this is a 'can't miss' session for engineers," he said. "Having personally installed a completely IT-based studio facility recently, I can say that this session will be very informative."

Federico Grau of Radio Free Asia gives his insight on *"Free Software Low-Cost Replacement of a Commercial Internet WAN Router."*

"The Internet is about sharing information, and has a wealth of knowledge and tools available for free," he said. "My paper summarizes the resources we found and used, so other broadcasters may help themselves and their facilities."

Thomas Hartnett, vice president of engineering and technical director of Comrex, will present *"BRIC in Action-Real World Experiences With the Broadcast Reliable Internet Codec."*

See SUNDAY, page 34 ▶

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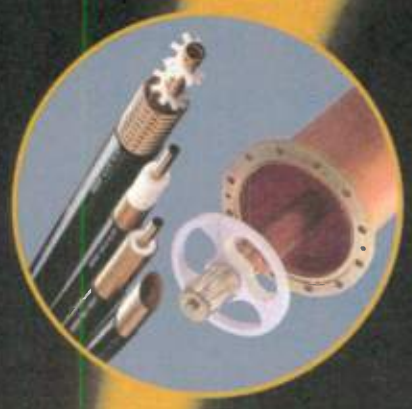

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Monday
The Lessons of Katrina

Monday April 24, all day:
"Disaster Preparedness for Broadcasters"

Monday morning April 24:
"Digital Radio Worldwide"

Disasters Come in Many Forms; Lessons For Radio and TV Engineers Are Discussed

by Tom Osenkowsky

One year ago, the Broadcast Engineering Conference featured a series of presentations about disaster prep. One of those papers, by Joseph Pollet of Entercom in New Orleans, was titled "Hurricane Preparedness in a City Below Sea Level."

The ensuing months brought New Orleans broadcasters the chance to find out just how prepared they were. The lessons of Katrina are a major theme of an expanded disaster preparation track this year.

Marty Hadfield, vice president of engineering for Entercom, chairs the daylong Monday panel on "Disaster Preparedness for Broadcasters."

"With the manmade disaster of 9/11 and the back-to-back natural disasters of Hurricane Katrina and Hurricane Rita, broadcasters are faced with the necessity to prepare for the worst as well as plan for resuming normal operations after a disaster strikes," he said.

"The presenters on this panel will offer their personal experiences in advance preparation as well as rebuilding facilities after the hurricanes.

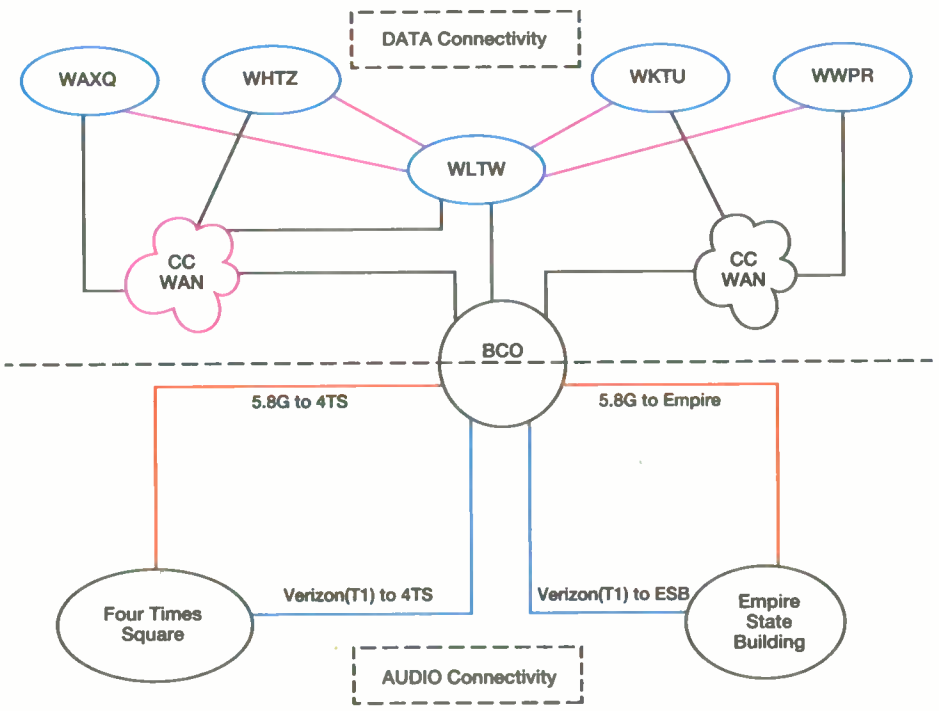
"Disasters can be weather-related, affecting studio and transmitter facilities, towers and utilities. They can also be manmade in the form of sabotage, hazmat spills, vehicular contact with buildings or towers, fire or collateral damage from nearby events. Some events are beyond the broadcaster's control, such as a telco office power outage following a malfunction of their generator, air conditioning failure in an ISP server room following improper electrical rewiring after an expansion and similar circumstances."

Hadfield and several of his panelists have personal experience that can help attendees, whether in radio or TV, manage such efforts.

DISASTER PREP

The role of digital television in delivering real-time weather maps, emergency alerting and other critical data will be addressed by SpectraRep Executive Vice President Mark O'Brien, in *"Emergency Response Applications for DTV."* This is a demonstration of how new technology is adapted and employed in alerting the public of impending disaster as well as relaying critical information necessary for safety and security.

It is said experience is the best teacher. In *"Hurricane Katrina: Disaster Preparedness,"* Rick Barber, director of technology, broadcast media at CBS affiliate WWL(TV) in New Orleans, will share his experiences and tactics in keeping the station on the air continuously through the worst disaster in a hundred years.



Josh Hadden uses this graphic to illustrate how Clear Channel in New York leveraged its infrastructure to create multiple robust paths to transmitter sites from five studio locations and its Broadcast Continuity Office.

Michael Patton of Michael Patton and Associates will share the experiences of engineers in getting stations back on the air following the devastation in the New Orleans metro area. The presentation is *"Katrina —- Hurricane Damage and Emergency Measures."*

Being resourceful by building makeshift studios using spare parts, improvising satellite dish and STL antenna mounts and other extreme measures are expected to be discussed. Attendees will learn techniques and how to get the job done under extreme conditions.

No matter how much preparation one undertakes for an impending disaster, some things are always overlooked. WPXL(TV) Chief Engineer Ernest Harvey Jr. will present *"Maintaining and Restoring Broadcasting in New Orleans After Hurricane Katrina."*

"We are always prepared for hurricanes in this part of the country," he said, "but this disaster was of such magnitude that we had to think outside the box to get service restored to our audience and viewers.

"Much of the restoration was aided by current technology that was not around when New Orleans was severely hit 40 years ago. We not only get into that aspect, but also consider other items of an operational nature that most may overlook in planning their facilities," Harvey said. Methods of delivering programming to the transmitter site also will be addressed.

"Common-Sense Rules to Uncommon Events" is a presentation by Andrew Janitschek, director of production support for Washington-based Radio Free Asia.

"From Hurricanes Katrina and Rita, to 9/11, these and other disasters forced radio and television stations off the air," Janitschek said.

"No engineering staff can plan for all emergencies or outages; yet there are many steps engineering management can take now to better prepare their stations for a major emergency, whether it is man-made or natural. Following these steps will reduce the likelihood your station will be forced off-the air."

He said his presentation will revisit specific disasters and how they affected radio and television broadcasting, how stations handled them, what worked well and what did not, and what broadcasting engineers and management can do to ease the strain on resources and minimize the effects of future disasters.

"The current state of the Emergency Alert System will be addressed, along with the use of backup programming, support agreements and more, all of which must be part of a station's master emergency plan," he said.

Josh Hadden, director of engineering and IT for Clear Channel in New York, will discuss *"Disaster Preparedness and Business Continuity: Ideas, Financing, Implementation."*

"The public interest is most often highest during times of crisis, events that often have a deleterious effect on our ability to broadcast," he said. "As broadcasters, we need to think about the perfect storm scenario and develop plans to

See MONDAY, page 34 ▶

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Monday

▶ Continued from page 32

ensure that we can get through it. But ignoring the more mundane problems can be just as costly as ignoring the major ones.

"As engineers we also need to be able to translate this need for preparedness into a valid, strong and persuasive financial argument to 'sell' the project, since often money can be difficult to come by and owners or managers can be reluctant to authorize an expense that they do not fully understand or appreciate," he said.

His paper will discuss what the Clear Channel New York cluster has done since 1997 to prepare itself for the expected and very unexpected, how the company analyzed various threats in order to implement plans for a disaster recovery and developed a business continuity scheme and financial impact plan.

"The conclusion: While there is no good time to go off the air, you can quantify the financial impact of going off during a stop set, or other paid programming, and also get a feel for what the ratings impact could be expected to be."

"Designing a Robust and Resilient Broadcast Center — ESPN's Digital Center" will be discussed by Ted Szypulski, senior director of project development at ESPN.

The design goals, backup systems and redundancy employed in the design are applicable to broadcasters in various situations. A facility that is designed to be fault-tolerant and operate during such events in a predictable and graceful manner results in minimal, if any, impact to the public and sponsors.

One of the most important elements of a broadcast station is its antenna. Kerry Cozad, senior vice president of engineering and technology at Dielectric, will focus on details of alternative use of antennas and transmission lines in *"Disaster Recovery Plans for Antenna Systems."*

Crew sets 3.8-meter dishes on rebuilt mounts on a rooftop at WWL in New Orleans, in this photo provided by Michael Patton. 'Note the improvised gin-pole used to raised the heavy dish into position,' he wrote. 'All the old dishes and their mounts were destroyed and scattered in the storm; one mount lay on the ground between the building and the sidewalk for almost six months before anyone got around to salvaging it. I would not have wanted to be there when that 400-pound mount went flying.'

Operations, will discuss *"Disaster Recovery Preparation: A Summary of the FCC's MSRC Toolkit Committee Work."*

Both MSRC-1 and -2 activities will be discussed in detail. Background on the council's formation will be addressed. MSRC-2's two main objectives are forming a liaison between media and disaster recovery activities and cooperation between members of the media with actual cases cited. The presentation also will cover the formation of the Toolkit Working group, headed by Ross, which includes a cross-representation of media such as terrestrial radio, XM, television, cable, DBS and manufacturers.

The goal of this group is to develop and refine a template to assess a facility and develop a customized disaster recovery plan to return to normal operations as quickly as possible by employing practice drills as well as drawing upon the actual experiences of Katrina and other disasters. Real experiences — such as the inability to deliver generator fuel, failure of a local telephone exchange and other such incidents — will be discussed along with suggested workarounds.

This disaster was of such magnitude that we had to think outside the box to get service restored to our audience.

— Ernest Harvey Jr.

"The goal of my presentation is to provide a planning outline for being prepared when a catastrophic failure occurs at a broadcasting transmission site," said Cozad, who examines often-overlooked critical components that allow the broadcaster to deliver its product to the audience.

"Catastrophic events can range from pinched O-ring in the transmission line to multiple downed towers," he said. Minor to widespread aspects of RF transmission will be addressed.

Many broadcasters may be unaware of the FCC's Media Security and Reliability Council Toolkit Committee.

Jay Adrick, vice president of broadcast technology at Harris Broadcast Communications Division, and Bob Ross, senior VP of CBS East Coast

"Digital Emergency Alerting System With FM Infrastructure Case Study" is a presentation by Matthew Straeb, vice president at Lafayette, La.-based Global Security Systems.

"Alerting your listeners to an impending disaster or emergency is the most important responsibility of any broadcaster. We will examine a digital alerting system that can save lives and property," said Straeb.

The events of Katrina in Mississippi and along the Gulf Coast reinforce the conclusion that a new digital all-hazards alert and notification system is required to deal with disasters and homeland security emergencies, he argues; and the digital alerting system has to include many facets in order to minimize property damage and loss of life. A key to effective response to identified threats or emergencies is not just trained response and intervention teams; it is getting the right information to the right people at the proper levels of public safety and homeland security entities, Straeb says.

"Media Delivery From An Inflatable Ball?" is the provocative title of a presentation by Paul Gierow, president of GATR Technologies.

According to conference organizers, the angle here is "how do you get communications and media content delivery out when there is no power, no phone lines and no buildings left?"

Gierow, the association says, found out when Katrina hit Biloxi, Miss.

"He was working on an inflatable 2.5-meter antenna for the Department of Defense and was called to deliver a communications link at a Red Cross Shelter in Biloxi," its summary states. "The invention under development was put into real-time use over a week in Biloxi, sending media content and providing the only high-speed Internet connection in the entire county." The presentation will discuss how the inflatable antenna can be combined with emerging power amplifiers and satellite modems to provide a high-bandwidth5 Mbps link from a small trunk.

Gierow said, "This presentation will be about a radically different antenna design that was developed to package a large antenna used in remote broadcasting and network communications systems into a easily transportable crate or even a backpack. The antenna system is an inflatable sphere with a flexible parabolic dish protected inside the sphere. We have made antennas as large as

See MONDAY, page 38 ▶

Sunday

▶ Continued from page 30

He'll discuss how the technology helps users navigate the complex remote broadcast venues.

"Since the concept of reliable broadcasts over the Internet has been introduced, I've been floored by the imaginative ways people envision using the technology," he said. "In the past year, I've literally run tests from planes, trains and automobiles. I'll be talking about how remote broadcasters are saving money with BRIC as well as generating live programming from some very interesting and diverse locations." The Comrex codec using BRIC earned a Radio World "Cool Stuff" Award last year.

"A Primer on IP Audio Networking," with Bob Band, international channel sales manager of the Harris Broadcast Communications Division, follows the theme of the afternoon's session.

"Broadcasters today have to deal with sending real-time data in a coherent fashion over a network that was not designed for it," he said. "My goal is to show how to monitor and control your data streams using a managed platform for professional audio transfer via IP."

Media archiving is a topic of discussion as platform-independent streaming comes into its own. Oleg Uskov, computer engineer for Radio Free Asia, will share their experiences in the development of a media archive server and system inter-operability in his paper *"Experiences Writing a Media Archive Server Which Is Flexible and Can Easily Interconnect with Other Software Systems."*

"Linking the media files with schedules and scripts that have meta-data makes for a good media archive," said Uskov. He will discuss platform-independent audio streams that can be played from any known computer media player.

Steve Edie, project manager for Intraplex at Harris, will discuss audio transport systems in his presentation *"Advantages of An Integrated Audio Transport System."*

"If you want and are ready to share audio with your affiliates, consider the pros and cons about building that infrastructure," he said.

"IP Audio Networks in the Real World: How MPR, Univision and the University of Indianapolis are Using IP Audio to Solve Problems" will be discussed by Clark Novak of Axia Audio. He will discuss how IP audio has helped broadcasters facing the challenge of moving audio around their facility, from facility to facility, and globally.

"It was only about a decade ago that computer technology transformed the broadcast plant with PC-based playout systems. Now, another transformation is poised to occur, and once more it's tech from the computing world that will make it happen," Novak said. "Audio-over-Ethernet routing networks are rapidly gaining visibility as an easily configurable, cost-effective way to distribute real-time audio. The revolution is coming."

John M. Lyons, CPBE, NCE, is assistant vice president and director of broadcast communications for the Durst Organization.

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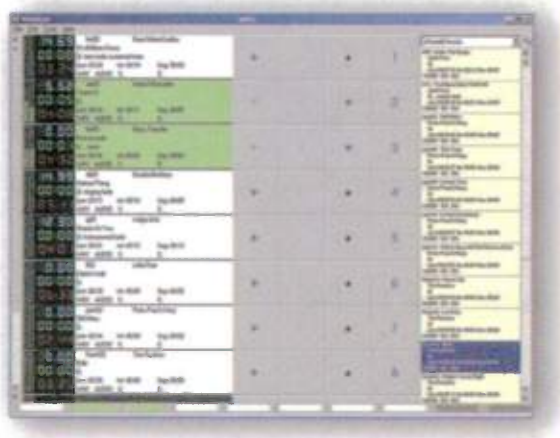

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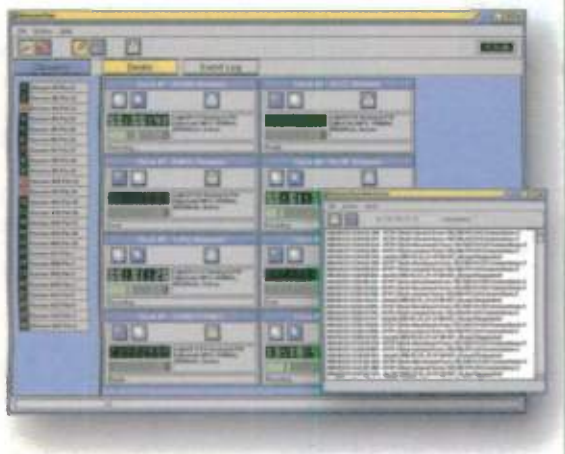

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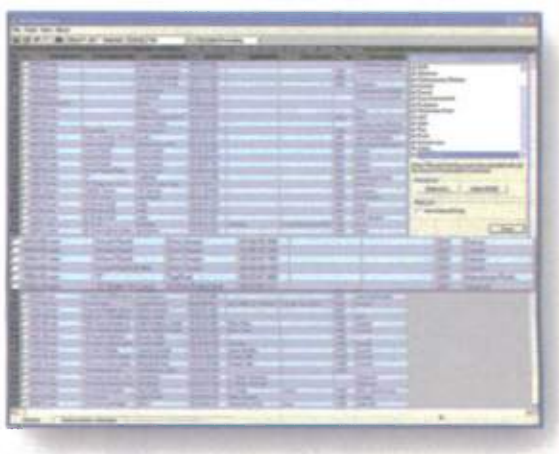

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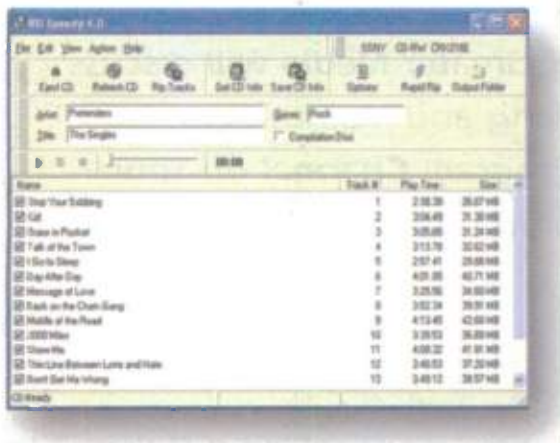

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BSI

Tuesday Bandwidth, Safety & New Tech

A Grab Bag of Recent and Yet-to-Emerge Technologies Highlights Day's Sessions

Tuesday morning, April 25:
"Managing Your Digital Radio Bandwidth"

Tuesday morning, April 25:
"Towers and RF Safety"

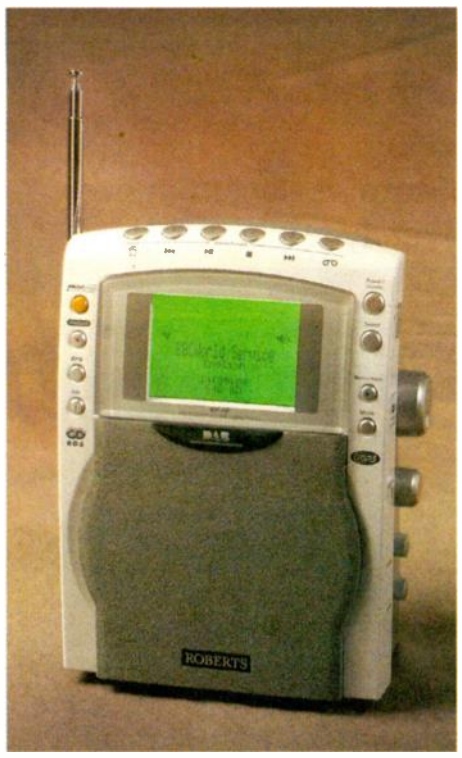
Tuesday afternoon, April 25:
"Emerging Technologies for Radio"

by Michael LeClair

"Towers and RF Safety" is one of two groups of Tuesday morning sessions in the NAB Broadcast Engineering Conference. The chair is John Lyons, assistant vice president and director of broadcast communications for the Durst Organization.

Tower regulations affect almost all radio broadcasters, whether they own or simply lease space on a tower shared by multiple users.

"The new G tower standard affects all new tower work as well as any retrofits contemplated for HD conversions or a hybrid program and demands your attention now," said Lyons. RF safety remains an important consideration, he said; "Notices of Apparent Liability affect all users of the site and the site itself. Your knowledge of the rules is truly in your best interest."



John Sykes, project director for digital radio at the BBC World Service, will introduce a new, open standard for an AM signaling system. Shown: A first-generation DRM/DAB digital/analog radio, receiving AMSS Service ID on the BBC's 648 kHz analog service to Europe.

TOWERS AND RF SAFETY

"Monitoring RF Safety at a Multi-User Broadcast Communications Site" will be presented by Lyons to open the session. This paper will present information on how RF safety and remote control monitoring was accomplished at the new 4 Times Square broadcast site in New York City.

This site features a comprehensive monitoring system that is available, "both locally and anywhere you can access the Internet worldwide," said Lyons.

The requirement to certify compliance with the FCC Rules for Radio Frequency Radiation at radio broadcast sites is familiar to anyone that has completed a license renewal application. Certification can be complicated at sites with multiple transmitters, particularly if the frequencies involved are widely separated and thus subject to different levels of regulation.

"RFR: Fads and Fallacies," presented by James Hatfield and Steven Lockwood of Hatfield and Dawson, Consulting Engineers, will discuss compliance with the rules and proper techniques for using measurements to demonstrate compliance.

"There is a lot of misinformation floating about regarding RF exposure at broadcast sites and what to do about it," Hatfield said.

To wrap up the session, Ernie Jones, vice president of engineering, structural for Electronics Research Inc., will review the newly released TIA-222-G standard for towers, which affects the amount of permissible load for both new and existing towers if modified.

The session, *"Structural Standards for the Design, Construction, and Operation of Broadcast Towers,"* will also discuss the upcoming construction standard for how towers are built.

BANDWIDTH MANAGEMENT

The other morning session is "Managing Your Digital Radio Bandwidth," chaired by Steve Davis, vice president of engineering for Clear Channel Radio. This session is about "providing support for the new services and capabilities which IBOC digital broadcasting makes available to the radio broadcast industry," he said.

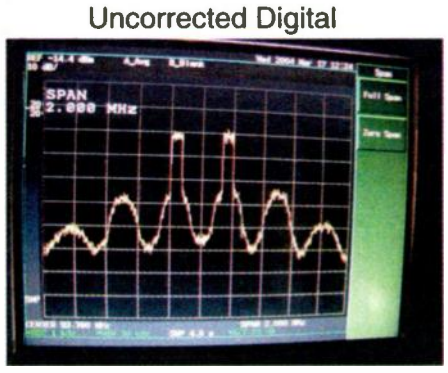
HD Radio offers a multitude of new services to broadcasters in its ability to partition the available data stream into multiple, discrete channels. In *"Delivering the HD Radio Data Stream From Studio to Transmitter,"* Ted Nahil, channel manager of network solutions for the Harris Broadcast Communications Division, covers an often-misunderstood piece of the "digital puzzle": how to get all the additional content (secondary audio channels, program associated data, traffic and information, etc.) from the studio/origination point and out to the transmitting site.

"Spectral Re-Growth in Analog Transmitters," presented by Bob Surette, manager of RF engineering for Shively Labs, will investigate the causes of spectral re-growth, how it is manifesting itself and what can be done about it.

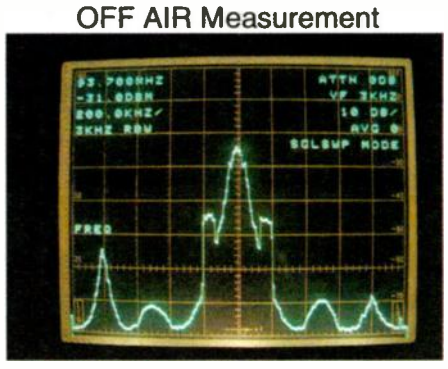
"Not all HD installations are the same," said Surette. "Engineers need to be aware of spectral re-growth and techniques to minimize it in their systems for best performance of HD Radio."

Surround sound will the be the subject of two papers: *"Creating Live Concert 5.1 Surround Broadcasts for HD Radio,"* by Mike Pappas, chief engineer of KUVO Radio, and *"5.1 Multi-Channel Audio Contribution and Distribution — Matrix, Watermark or Discrete — APT Presents a Working Example of Each Requirement,"* by Jon McClintock, commercial director, APT Audio Processing Technology.

Uncorrected Digital



OFF AIR Measurement



Bob Surette of Shively will speak about the causes of spectral regrowth in analog transmitters.

In the first paper, Pappas presents practical examples and techniques to demonstrate how surround technology can be used to make live broadcasts more compelling. Although not widespread at present, surround is being deployed by broadcasters using the expanded capabilities of HD Radio.

Paul Shulins of Greater Media will discuss 'HD-2: Installing and Maintaining the Secondary Program Channel on Your High-Definition FM Radio Station.'

"At KUVO we've done over 300 hours of live 5.1 surround broadcast," said Pappas.

McClintock will discuss surround and live broadcasting in his paper, which aims to document various solutions for broadcasters that are researching the use of 5.1.

Joseph Reed, CIO of Traffic.com, will present *"Real-Time Traffic Data — The Value Proposition,"* a discussion of how traffic information provides a strong connection to listeners and the extended possibilities offered by HD Radio.

One of the hottest technical trends is the rapidly growing deployment of multicasting using HD Radio. To round out this session, Paul Shulins, director of engineering for Greater Media, Boston, offers *"HD-2: Installing and Maintaining the Secondary Program Channel on Your High-Definition FM Radio Station."* This paper is a nuts-and-bolts exploration of the deployment of HD Radio at the Greater Media stations in Boston. One of the difficulties encountered was the need to monitor three different program streams for each station, a total of 15 in this case.

"Monitoring these stations becomes a whole science in and of itself," Shulins said.

NEW TECHNOLOGY

The pace of technical change in radio has accelerated over the last 10 years. The afternoon session "Emerging Technologies for Radio," chaired by David Layer, director of advanced engineering for the NAB, will address s the latest technical concepts to debut.

"Podcasting, single frequency networks, surround sound, advanced data services — these are all cutting-edge topics for radio broadcast engineers," said Layer.

Opening the session will be John Gardner, digital radio worldwide product manager for Texas Instruments, with *"Navigating the Transition to Digital Radio."* HD Radio has the ability to add features to the conventional receiver, changes that may transform the industry, including surround, rewind/pause capabilities and recordable radio. Gardner will discuss these changes from the perspective of a semiconductor manufacturer that is developing the integrated circuits necessary to fuel them.

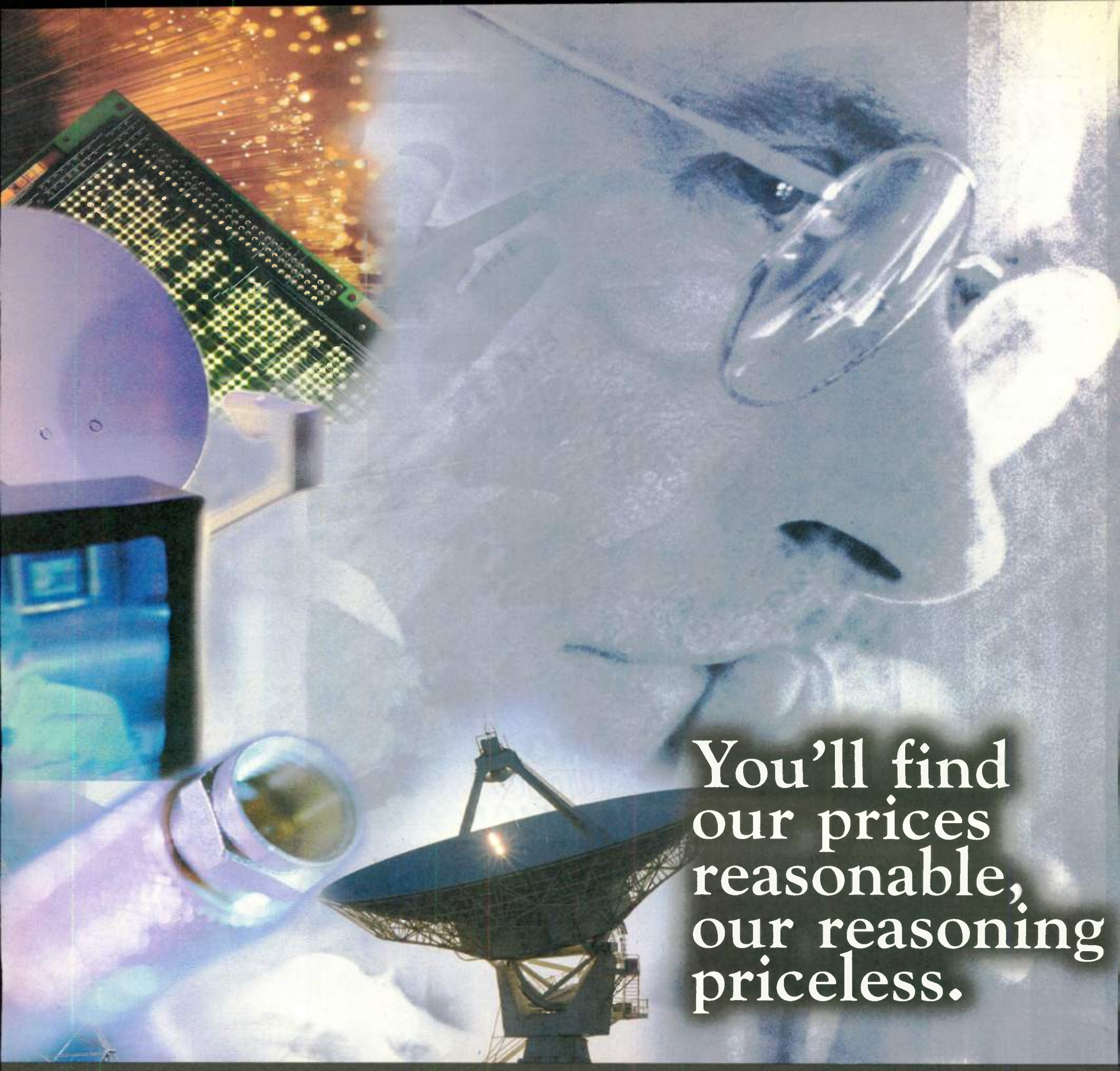
Skip Pizzi, manager of technical policy for Microsoft and contributing editor to Radio World, will discuss the topic of surround sound in detail in the following paper, *"Prospects for Surround Sound Broadcasting in IBOC Digital Radio."* Pizzi will explore the challenges of implementing surround sound into today's radio station facilities and discuss a number of possible solutions.

AM directional stations have been in use for over 50 years, but the design of phasing equipment has made only incremental improvements over that time.

In *"Digital Phasor for AM Directional Antenna Systems: An Update,"* Mario Hieb, president of Phasor Physics Inc., proposes a new technique for phasing systems that may offer benefits with AM IBOC digital.

He says the digital phasor provides a new way to control the phase and amplitude of power in multi-antenna systems that eliminates conventional phasors and antenna tuning units. "Digitally modulated systems, like AM-IBOC, require high-performance loads. When you get rid of the complex reactive networks, it is easier to meet the standards required by AM-IBOC," he said.

See TUESDAY, page 38 ▶



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Tuesday

▶ Continued from page 36

Anders Mattsson, principal engineer at Harris Broadcast Communications Division, will present *"Single-Frequency Networks in Digital Radio."*

The potential advantages of digital single frequency networks are improved coverage, reduced interference and enhanced reliability, all while operating with lower power. However, the hybrid mode of transmission used by IBOC digital radio presents additional considerations for this type of deployment, which will be discussed in the paper.

While initially cool to the idea, broadcasters have in recent years rushed to install RBDS equipment to bring station ID information to their listeners with suitably equipped radios. But this technology was available only for FM radio stations, leaving AM out of the party.

John Sykes, project director for digital radio at the BBC World Service, will introduce a new, open standard for such an AM signaling system in *"An AM Signaling System."*

The presentation *"Advanced Services for HD Radio"* will discuss new features that are becoming available this year in HD Radio.

"Receiver chips and transmission software will be available to open up a host of new data services," according to Joe D'Angelo, vice president of advanced services at Ibiquity Digital. He will talk about the potential for electronic program guides, conditional access receivers, timeshifting of programs and pure data functions such as traffic reports. D'Angelo also will preview services that are in development.

In the final afternoon paper, podcasting will be the topic as Brian Parsons, VP of technology for Clear Channel Radio, presents a *"Podcasting How-To."*

Podcasting offers intriguing potential as a method to reach listeners who are unable to listen to specific programs at a scheduled time. Parsons promises a comprehensive treatment of podcasting, from its definition to the details on how to create podcasts and monitor them.

The author is technical editor of Radio World Engineering Extra and chief engineer for the WBUR Group in Boston.

Monday

▶ Continued from page 34

5 meters in diameter that weigh less than 100 pounds and can be packaged into the size of a hockey bag. This is 100-to-1 better than transportable dishes that are that diameter.

"This means you could carry around a C-band dish much in the way that a small 1.2 meter Ku Band dish is transported in a suitcase. Or you could carry a 2.5-3 meter inflatable Ku/C band dish in bag along with emerging encoders and smaller power amplifiers to do high-def broadcasts from a small package vs. a news gathering truck. The technology opens the trade space for redundant systems, multiple broadcast to multiple satellites and remote broadcasts."

The application of such technology during emergencies opens possibilities for delivering programming from studio to transmitter or from the field to the studio, he said.

DIGITAL ABROAD

"Digital Radio Worldwide" is a Monday morning group of presentations chaired by David Baden, Radio Free Asia's chief technology officer. It will offer insight on Digital Radio Mondiale including progress in the VHF bands, signal reliability analysis and correlation between predicted and real-world digital radio reception.

"DRM Progress in Developing a Capability In the Broadcasting Bands Above 25 MHz" is presented by Donald Messer, chairman of the Technical Committee at DRM.

He explores the possibilities of employing the technology with or without simulcast of DRM and a traditional FM broadcast. DRM has seen success in other countries in the 26 MHz band using 10 or 20 kHz channels.

Quentin Howard, CEO of Digital One Ltd., examines the *"Correlation of Predicted Signal Strength and Real-World Receivability of Digital Radio."*

Tests were conducted in homes in the United Kingdom using a variety of common receivers; Howard says the tests have provided insight to actual consumer reception experience. The implications, he says, are relevant to all forms of digital transmission including DAB, HD Radio and DRM.

"Digital Shortwave Reliability Analyzed With Deutsche Welle's DRM Monitoring" will examine the in-house system at Deutsche Welle, a German international broadcaster, for assessing the reliability of DRM transmissions in Europe.

Andy Giefer of Deutsche Welle will present data from the summer 2005 shortwave season. The paper will also include recommendations on DRM frequency planning and frequency switching algorithms for receiver manufacturers.

The author is an engineering consultant based in Connecticut.

Clever Giveaways Reel in Delegates

Radio Booth Tchotchkes Have Another Benefit: Good Ideas for Station Promos

by James Careless

As a veteran NAB convention-goer, I am a master of promotional trick-or-treating. When the show floor opens for the first time, I'm there picking up the most useful, cool or just plain strange promotional giveaways that exhibitors offer to draw delegates into their booths.

Over the years, I have seen many lackluster promotional items, including pens, mint boxes, beer sleeves and keychain bottle openers, that fail to serve their fundamental promotional purpose: to keep the vendor's name in front of the prospective client's face long after the convention has become history.

ePromos offers a cooler with radio built in.

I also have seen inspired promo giveaways that have gained lives of their own. You probably have your favorites.

At one convention, Harris showed up with small teddy bears, each wearing shades and a sweater emblazoned with the Harris logo. The fact that I remember it was a Harris teddy bear speaks volumes about how effective a promotional item this was. My daughter kept this teddy bear in her room for years.

The 'fun' in functional

Promotional items with radio themes offer another benefit: you could get good ideas for your own station promotions.

But sending an exhibit and staff to NAB is not cheap. Why would a sales manager want to boost costs by buying promotional giveaways?

A practical giveaway is a keychain-sized USB Flash drive.

The answer, says Mark Yokoyama, director of marketing for ePromos Promotional Products, is to drive traffic to your booth, because it doesn't take long for word to get 'round as to who has the coolest giveaways.

"Fun giveaways can come in handy in drawing traffic if your booth isn't very busy," he said. The flip side is to make sure that your giveaways aren't so cool that delegates pay no attention to your booth.

What kind of promotional giveaways might work best for NAB exhibitors trying to attract radio customers?

How about radio-themed products? For instance, ePromos sells a retro "Phonograph" AM/FM radio at $13.89 per unit if you order 100 or more.

"This is great for the radio industry because A, it's a radio and B, it's designed to look like a retro phonograph," says Yokoyama, "so it reminds people of DJs back when they played records, like Wolfman Jack."

Another cool item is ePromos' 12-can expandable cooler with radio. That's right; it's an expandable can cooler with a built-in dual-speaker AM/FM radio, at $19.39 each for a 100-unit order.

In a more practical vein, ePromos' self-charging emergency AM/FM radio and flashlight is a windup, battery-free device that even has its own emergency siren. "Another one to tie into the importance of radio or being able to count on radio," says Yokoyama. "It's $19.34 per unit in a 100-unit order."

See GIVEAWAYS, page 41 ▶

The Web site of Promotional-Gift.com, www.haimei.com, is one of the author's favorites for radio gizmos.

Wednesday

Test & Measurement for HD Radio

Sessions Also Look at Radio's Mechanics From Obstruction Lighting to Ferrite Circulators

Wednesday morning, April 26:
"Test and Measurement for HD Radio"

Wednesday afternoon April 26:
"Making Radio Work"

by Mario Hieb

When it comes to test and measurement, HD Radio presents a whole new ballgame.

A Wednesday morning session of presentations, chaired by Norm Philips of Susquehanna Corp., will explore the topic in depth.

TESTING, TESTING

The *"Interaction of AM Antenna Load Impedance and the RF Power Amplifier"* is the first presentation, delivered by Ky Luu of Harris and Ronald Rackley of du Treil, Lundin and Rackley Inc. Their paper investigates the impedance matching and phase rotation requirements of the RF power amplifier to provide optimal IBOC modulation performance.

"The possibility of not being able to adjust to the optimal signal conditions while monitoring the transmitter output looms large over the HD Radio conversion process and can lead to false conclusions regarding on-the-air performance," Rackley said.

"We intend to provide a solid understanding of these principles, suggest ways to avoid the pitfalls and discuss possible solutions involving new technology."

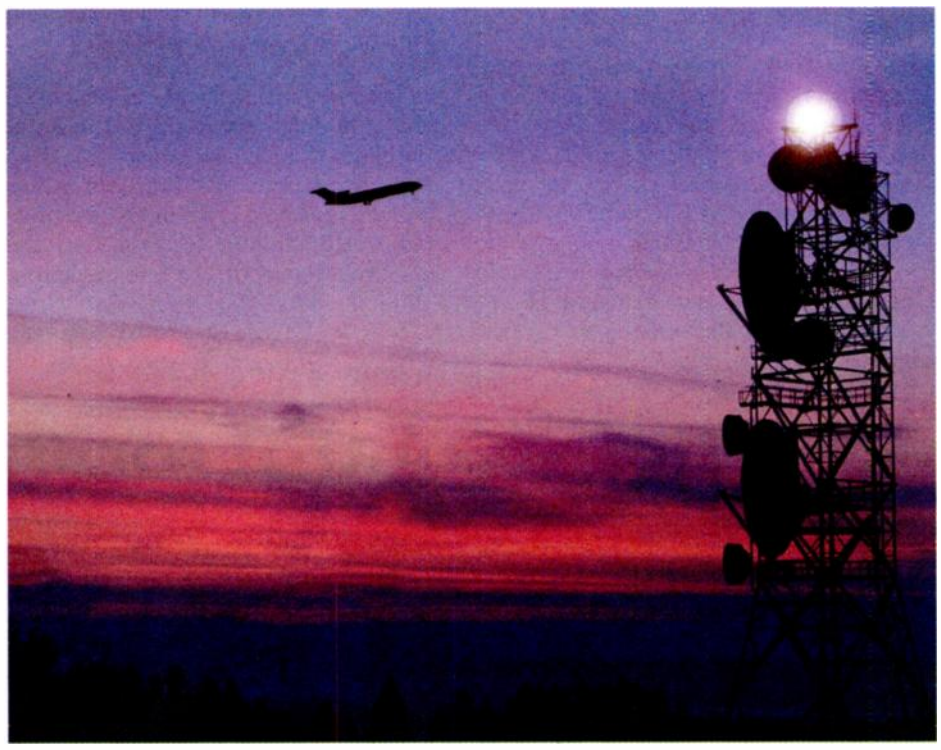
David Maxson, managing partner of Broadcast Signal Lab, will speak on *"IBOC Spectral Occupancy: An Investigation of IBOC Signal Quality Metrics."*

The quality of the digital waveform is determined by more than just the power spectral density of the signal. This waveform is modified by amplifiers, combiners, filters and load mismatches on its way to the air. This presentation will review power spectral density basics and look more deeply at the characteristics of the IBOC waveform and how they are affected by these elements.

NPR Labs has received digitized coverage data on more than 30 FM stations, possibly the largest compilation of HD Radio coverage in the industry.

In the presentation *"HD Radio Coverage Measurement and Prediction,"* John Kean of NPR will discuss collection and processing of this data and show route maps of the stations. Using its library of coverage data, NPR Labs developed customized software to analyze the properties of HD Radio coverage. They will describe these results and their signal propagation model for accurately predicting HD Radio coverage of FM stations.

"Transmitter power measurements in a digital broadcast environment continue to be misunderstood," says Tim Holt of Bird Electronic Corp., presenter of *"Transmitter Output Power Measurement in Digital Broadcast Systems."*



Dan Harris of Flash Technology at Dielectric will present a discussion of communications aviation obstruction lighting.

"Power meters that were designed for previous generation systems using analog modulation will simply not provide accurate results when used in new applications," he said. He will discuss transmitter power measurements using newer and older methods, and comparing the results of these measurements to results obtained using "first principle" heating power measurement techniques.

"Virtual Test Methods, a Better Way of Extending FM Performance Measurements" will be the presentation of Anders Mattsson of the Harris Broadcast Communications Division.

"It is difficult to impossible to measure FM performance specifications of next-generation FM exciters. Currently available test and measurement equipment is incapable of verifying the performance of these new FM exciters."

It has become possible to sample the RF signal thanks to the increasing speeds of A/D converters. His presentation will cover advantages of this technology compared to what he sees as the limitations of traditional measuring equipment.

Tom Walker of Ibiquity Digital will deliver *"Monitoring the Real World of HD Radio."*

"As more and more broadcasters are turning on their HD Radio signals and more listeners are turning on their HD Radio receivers," he said, "it is extremely important that the stations pay attention to the key operating parameters such as audio time alignment and audio level alignment between the analog and digital steams.

"I will be stressing the importance of these functions during the initial rollout of HD Radio and how it can affect the consumer and the future of HD Radio." He said HD provides a unique opportunity for broadcasters and consumers to transition from analog to digital broadcasting without existing service disruption.

WORKING RADIO

"'Making Radio Work, Part 2' is a continuation of a topic from a previous day," said Chairman Thomas Ray III of Buckley Broadcasting/WOR Radio, New York.

"With all the changes being thrown at the typical engineer as of late, we will cover topics such as HD Radio, new regulations for aviation obstruction lighting and audio processing; and we'll discover how HD Radios really work."

With FM-IBOC going on the air, many engineers are looking into various implementation methods and defining best practices. One such methodology will be discussed in *"Applying Ferrite Circulators to Better Isolate HD Radio-Combined Transmitters,"* presented by Keith Mullin, senior technical communicator for Harris Broadcast. When analog and digital transmitters are combined, it is helpful to improve the isolation between the transmitters using ferrite circulators, he states. He will address circulator theory and application to HD Radio systems.

Broadcast towers and airplanes need to co-exist; new FCC and FAA regulations have been implemented to make that existence more amicable.

Dan Harris, product manager of aviation obstruction lighting for Flash Technology at Dielectric, will present *"Communications Aviation Obstruction Lighting: OEM Parts — New Regulations and Their Impact."*

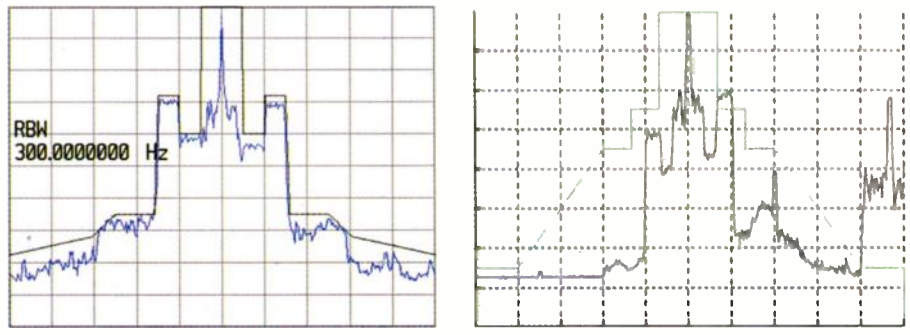
Any frequent flyer will be happy to know that a great deal of thought has gone into obstruction lighting systems and that these particulars will be discussed in detail during this presentation.

Nothing will snap a radio engineer out of a post-lunch slumber quicker than a spirited discussion on the topic of audio processing.

David Reaves, co-owner of TransLanTech Sound LLC will expound on the subject *"Separating Processing From Its Effects,"* which he describes as a who, what, where, when and why discussion of the black art of audio processing. What happens when your pristine program audio enters that mysterious black box. Why are PDs obsessed with loudness? Do listeners really care?

Quite a few things can mess up an FM signal before it leaves the antenna, and now something can be done about these artifacts. *"Improvements to FM and IBOC Signal Quality Through the Use of Pre-equalization"* is the subject discussed by Michael Woods, FM project leader for Nautel Ltd. In addition to traditional FM, the new FM-IBOC technology works best when certain technical standards are met and transmission chain equalization may be just the thing for your FM plant.

And *"Pre-correction of Analog FM Signals to Correct for Filterplexer Distortions,"* will be discussed by Anders Mattsson, principal engineer for the Harris Broadcast Communications Division. Despite their many advantages, transmitter-combiner systems introduce distortions to the FM signal. This presentation investigates the limitations FM transmitters impose on the pre-correction system and what can be done to negate them.



IBOC spectrum at transmitter output, left, and IBOC spectrum in far field. 'You have to be very careful how you sample an AM transmitter's output when setting it up for HD-Radio,' Ron Rackley said.

Finally, HD Radio wouldn't be much if there weren't HD Radio receivers, so Mike Bergman of Kenwood USA, John Crisco of Polk Audio, Dave Wilson of the Consumer Electronics Association and Bruce Young of Radiosophy will share their collective knowledge in a group presentation, *"IBOC Digital Radio Receiver Fundamentals."* Will manufacturers make an AM/FM IBOC receiver with an 8-track tape player? Find out here.

Mario Hieb, PE, is a Salt Lake City-based consulting engineer and founder of Phasor Physics Inc.

Giveaways

▶ Continued from page 39

Three Marketiers offers a desktop FM auto scan radio with clock, calendar and a custom scrolling message displaying 112 characters that advertisers program to promote their products. With this radio on your clients' desktop, "no one will forget you or your powerful message," says the company's Rose Johnston. After a one-time $50 charge for setting up the message, Three Marketiers sells the radios at $13 each in a 100-unit order.

The 'Boombox Stressball'

ePromos and Three Marketiers aren't the only companies selling radio-related giveaways. Just Google the words "radio promotional products," and you'll come up with all kinds of vendors. One of my longtime favorites is *www.haimei.com*, a Chinese web site that offers an incredible range of radio-related items. It includes FM scanner radios that look like bottle caps, soccer balls, soft drink cups with lid and straw, credit cards, watches, batteries, pop cans and shampoo bottles.

You can get foam blocks shaped and painted like tiny '80s ghetto blasters, which delegates can squeeze to relieve stress.

Exhibitors on a tight budget can still buy effective radio-themed products. For instance, ePromos offers FM scan radios attached to their own lanyards for $3.36 for a 100-unit order, or $2.08 if you buy 1,750 units. You can even get foam blocks shaped and painted like tiny '80s ghetto blasters, which delegates can squeeze to relieve stress, for $1.74 each per 1,000-unit order.

Get creative

Despite the appeal of radio-related giveaways, a case can be made for offering giveaways that don't beat the radio drum so heavily. For exhibitors considering this route, the key is to choose items such as USB data keys and hubs that are of real use to delegates.

Whatever the item, "a successful promo is going to convey a message because the target audience finds it valuable, and because it makes an impact on them," said Yokoyama. "Especially at trade shows and other events, it's part of a greater experience and needs to support that experience because it's the one thing that people will still have with them next week.

"I was just reading about a company that gave out scarves at a search engine conference," he said. "As a product, scarves had nothing to do with the company, but folks from California who flew up to Chicago in mid-winter probably appreciated them. The key is using the creative to tie a product that the audience will appreciate to the message you want to convey as a brand."

And if you've got a really big budget and money is no object? Mark Yokoyama can fix you up with whatever you need.

"In the past I know we used to have a kayak and a golf cart on our site, although I don't think anyone ever ordered them," he said. In the world of promotional giveaways, anything is possible.

James Careless is a frequent contributor to Radio World.

WE GIVE YOU LECLAIR

Name: Michael LeClair

Occupation: Chief Engineer, WBUR Group; Technical Editor, Radio World Engineering Extra

Certification: SBE Certified CPBE

Your mentor: Jim Bonney, an engineer at WBUR for more than 40 years. His work ethic and attention to detail set the standard for me.

Favorite station growing up: Early memories are of hit stations like KDWB(AM) Minneapolis and WABC(AM) New York. As FM came into its own I was a fan of experimental formats like WNEW(FM)'s.

Most rewarding project: Building a multi-studio complex for NPR show production.

Favorite technical toy: Spectrum analyzer; power inverter for the car.

Radio World's pages are home to the finest writers and columnists in the industry. Like Michael LeClair. Just one more reason we're the newspaper for radio managers and engineers.

Comedy With a Community Twist

Dick Purtan Is Newest Radio Member Of the NAB's Broadcasting Hall of Fame

by Jeff Borden

You don't spend 40 years as a top-rated personality in a major market without knowing what your audience enjoys.

Dick Purtan has known since Day One, when he first arrived in Detroit at a small, 5,000-watt station with a spotty coverage area, just as he knows today as the morning drive guy at CBS Radio oldies station WOMC(FM).

"I've never been too concerned about the music," said Purtan, who has worked in a variety of formats from traditional top 40 to hot A/C.

"I'm not too much into profiling artists and how songs were made. I concentrate on what comes between the songs. I want to be comedic, but not controversial. And I've been lucky I've changed formats and stations, but I'm still working because the audiences have followed me."

Purtan's Army

That's one of the reasons Purtan will be enshrined in April in the NAB Broadcasting Hall of Fame, the latest of many honors he has collected including achievement and personality awards from radio programming magazines and the title Michiganian of the Year from the Detroit News in 1993.

Another reason is Purtan's achievements for charitable causes. Since 1988, he has worked extensively with the Salvation Army of Eastern Michigan, where his annual radiothons have generated more than $12 million. Last year, he raised almost $1.8 million; this year, the 19th, the event surpassed that level despite donor fatigue after Hurricane Katrina and a less-than-stellear economy in Detroit.

Most of that money funds the Bed and Bread Club, a program that feeds as many as 7,000 hungry people a day from roving vans and Salvation Army facilities and offers shelter to up to 1,700 people every night.

Purtan's profile is so high and his reputation so stellar, he was asked to succeed the iconic J.P. McCarthy when the legendary WJR(AM) morning personality for 30 years passed away in 1995.

Not bad for a guy whose father expected him to follow in dad's footsteps and become a furniture salesman in his native Buffalo, N.Y.

The life of a salesman never really appealed to Purtan, who earned both bachelor's and master's degrees in speech and dramatic arts from Syracuse University. He was drawn to broadcasting even while in the Army, where he rose to the rank of captain in the Army Reserves. At Fort Monmouth, N.J., he was the program director at the base TV station.

After early radio jobs in Syracuse and Buffalo, Purtan and his wife Gail moved on to Jacksonville, Fla., and Cincinnati, Ohio, before his first gig at Detroit. He joined WKRN(AM), replacing an old buddy from Buffalo named Gary Stevens, who later went on to found a successful brokerage firm.

After three years in Motown, Purtan was hired at WBAL(AM) in Baltimore in 1968. On paper, it looked like a sweet move — trading a weak signal for a 50,000-watt powerhouse — but it turned out to be a rare misstep for him. Purtan, whose humor seems gentle and non-controversial, was judged "too wild" by WBAL management, who gave him his walking papers after just five weeks.

"I still had the tar and feathers on my shoulder when I got a call from WXYZ(FM) in Detroit," Purtan said with a chuckle.

The Motor City embraced Purtan in a big way and he enjoyed a 10-year run at the FM station before moving across the river to work at CKLW in Windsor, Ontario for a four-year stint. From there, it was back to Detroit and a 13-year run on WKQI(FM).

When McCarthy died, Purtan was offered his time slot, but the more serious nature of the show didn't feel like a good fit. Instead, when Infinity boss Mel Karmazin offered him a gig at WOMC, Purtan was given a free hand to do his humor-based show.

"Mel promised me I wouldn't have to do my 'B' material," Purtan said.

Voices

A Purtan show is chock-a-block with characters. Up to seven people contribute to the program every day including Jackie, one of his six daughters, and long-time newswoman Dana Mills and engineer John "Ankles" Stewart.

The real star, Purtan insists, is Alan Muskovitz, known to listeners as Big Al Muskovito. Muskovitz is a natural mimic, who slides easily from President George W. Bush to Michael Jackson to Queen Elizabeth as the comedy bits require. The characters frequently comment on events of the day, but because they are recognized by the audience as characters, there's less sting and little backlash, Purtan said.

"We start each morning with four scripts, which are written by Jackie and Al. After that, it's all ad libbed, working off the front page," Purtan said. "The

See PURTAN, page 43 ▶

Purtan

▶ Continued from page 42

less we prepare, the better off we are. A programmer once referred to our show as 'The Tonight Show' but in the morning. That's not to say we won't talk about serious things, but we are trying to have fun."

It's testimony to Purtan's staying power that CBS just signed him to a new deal that will keep him at the station for another five years.

Though he loves his industry, Purtan isn't wearing rose-colored glasses. The waves of consolidation that put so many stations into so few hands irk him. He's convinced the tight hold a handful of companies exerts over radio is stifling the emergence of new personalities.

"It's come to the point where if you tick off the wrong four or five guys, you'll never work again," he said. "The opportunities are just a lot more limited. I think that's unfortunate. I think consolidation was a bad idea."

Meanwhile, he's watched the explosion of new music delivery systems from satellite to Walkmans to iPods.

"There's a big revolution going on," he said. "People are listening on a more individualized basis. But the most important thing is still content. You will always turn to someone you find more entertaining or more informative. I'm convinced we'll survive, but there's no question we're seeing a lot more factionalization."

Purtan isn't the kind of personality to engage in feuds with other radio people. He did have a disagreement with Howard Stern when the latter was working in Washington. Both men were airing parody songs to the tune of "Bette Davis Eyes" called "Liz Taylor's Thighs." Stern was adamant that Purtan had stolen the idea from him, but when the two compared notes, they discovered the lyrics were completely different.

Indeed, Purtan seems a virtual Ozzie Nelson, someone who says his greatest achievement in life is "attracting the prettiest girl in high school and remaining married all these wonderful years." Pressed again, he names his efforts on behalf of the Salvation Army as another notable accomplishment.

Shelter honor

With good reason. Major Norman Stephen Marshall of the Salvation Army of Eastern Michigan says there simply is no way the organization could minister to its many clients without the cash Purtan generates. Given Detroit's status as the nation's poorest large city — almost 34 percent of residents live below the federal poverty level — the dollars are critical.

Seven days per week, four trucks cruise regular routes through the city, serving sandwiches, energy bars and beverages to the needy. Food also is served at shelters across Detroit.

"Dick Purtan has been absolutely instrumental in getting the financial resources for us to do this," Marshall said. "There is simply no way we could do this if not for his radiothon. There are other programs beside Bread and Bed he funds. We have a children's shelter and a maternity facility for pregnant teenagers. His money funds all that."

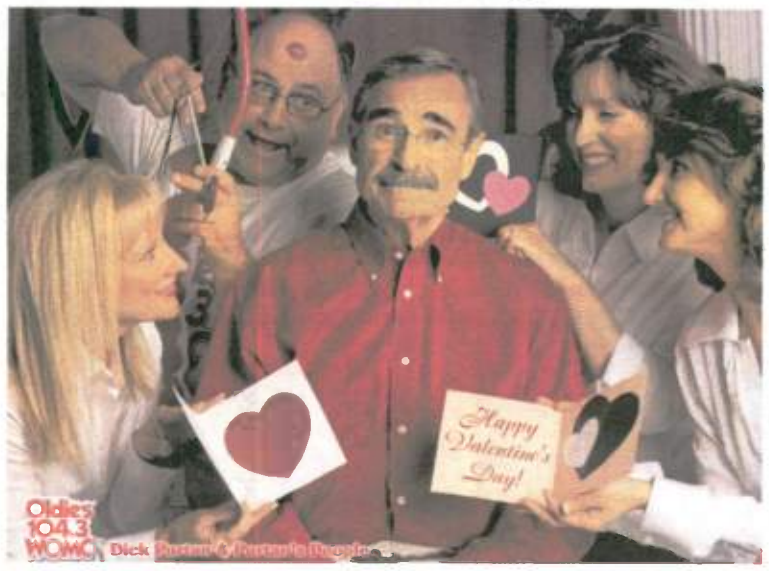
Beyond the annual fundraiser, Marshall said Purtan is a frequent visitor to events sponsored by the Salvation Army. He attends concerts and visits open houses on a regular basis.

"It's not just a once a year thing for Dick," Marshall said. "He is a very good friend to the Salvation Army all year."

After so many years of service, the Salvation Army plans a significant honor for Purtan. A new shelter to house 150 men is on the drawing boards. When it opens, it will be named for Dick Purtan.

For Purtan, that honor is as big, maybe bigger, than entering the Hall of Fame this month. So, too, is knowing that his daily radio program is doing good in smaller ways.

"More than ever, I get e-mails and calls from people who say I got them through something," he said. "Maybe it was cancer, sometimes a hospital stay. That really means something.



Dick Purtan is at the center of WOMC's 'Morning Show With Purtan's People'

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Studio Sessions

Radio World — Resource for Radio On-Air, Production and Recording — April 12, 2006

Product Guide

Inside

PRODUCT EVALUATION

VoxPro 4.0 Tools Edit Music, Voice

by Rich Rarey

Audion's VoxPro 4.0 audio editing system turned my PC into a responsive cut-and-paste editor with the ability to instantly recall and play different audio cuts — and initiate record just as quickly.

Underneath the sleek application's skin lies a cornucopia of user-friendly audio tools that allow a jock or production staffer to share and administer files, add compression and limiting to recordings and add reverb, compression, EQ, echo and special effects to their playback audio.

Positioned to be the tool-of-choice for recording and processing incoming listener phone calls while the busy jock sets up the next set, VoxPro is even an agreeable music editor.

At $999 MSRP (upgrade from v3.0 or higher for $159), VoxPro 4.0 will take the place of a number of different audio tools. Coupled with the VoxPro USB control panel from JLCooper ($999 list), the application becomes fast and functional.

Editor's choice

The heart of VoxPro is its ability quickly to import audio formats of your choosing, and make them available for non-destructive editing. It also can manage the preferences of various users and allocate virtual "partitions" for their audio files, protecting the afternoon jock's materials from the morning team's audio for instance.

If a station has multiple copies of VoxPro running on networked computers, one can swap files (if permissions are set) over the LAN. VoxPro handles locating other instances of itself and managing the file permissions, so the user doesn't have to poke around the network or remember arcane Uniform Naming Conventions.

VoxPro offers full audio control, from rapid shuttling to reverse and forward scrubbing at normal or half speed, and help in finding the right spot for placing an edit marker. Pressing the Zoom button on the hardware control panel, or "Q" on the keyboard, zooms to a 100x waveform for tight editing.

Drop-in markers with editable text descriptions allow the user to identify important locations in the file, and can be placed in either Play or Record. VoxPro uses the "stationary play head" convention, but the user can choose in which "direction" the audio flows past the play head: from left to right (typical) or right to left.

The large VU meters respond fast during playback and recording, and the application's skin is an attractive clean metallic finish that is pleasing and unobtrusive.

I installed the VoxPro 4.0 software on an ordinary Dell OptiPlexGX270, Win2K, with 512 MB RAM, and an integral SoundMax sound card and a legacy Digigram PCX11 sound card. I plugged in the USB dongle to activate the software, and plugged in the RC-500 control panel into another USB port.

The RC-500 is powered by the USB supply, and has a pleasing backlit LCD display for quickly recalling user-selected cuts and a solid reliable feel. Its jog wheel has the right weight, and transport controls are within a hand's reach.

I had to choose the "Use Legacy WaveAudio drivers" to enable VoxPro to use my obsolete PCX11. But I was pleasantly surprised to find it worked well in Record and Play. I immediately tried to use VoxPro's integral CD Ripper, but found it wouldn't advance past an ASPI error message. Audion tech support told me there is a software error in the current version that prevents the ripper from starting, so I ripped a music CD using the freeware application CDex to prepare some WAV files for VoxPro.

The import into VoxPro was a few seconds per cut and was completed quickly. The inventory panel showed each cut's name, length, created and modified date stamps, file size and format. I could have set up an import directory for VoxPro to import the files automatically, too.

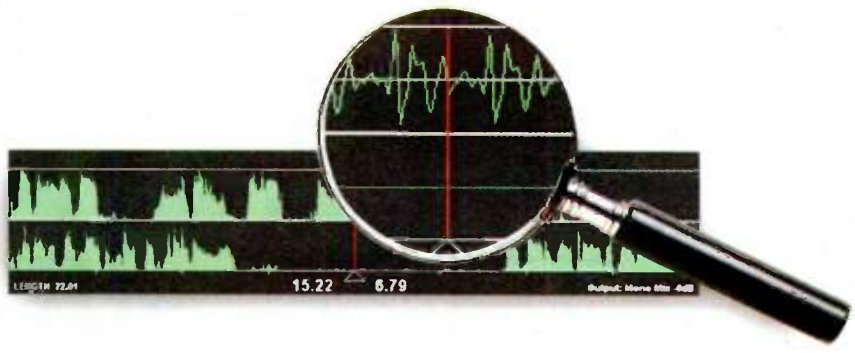
While audio files with embedded tags import easily, Broadcast Wave Files stall in the import process. In my evaluation I was using MP2/384 kbps/48 kHz BWF files. My workaround was to convert the BWF files to plain MP2 at the same bitrate and sample rate by using a converter like dBPowerAmp.

Making music

Even though VoxPro is positioned as a voice editor, I wanted to exercise it by cutting music, which is arguably more demanding and certainly more fun. VoxPro turned out to be capable for simple music editing; the cuts are butt-edits, not crossfades but the result is great for making quick and easy music beds.

When the waveform Zoom is engaged, I had trouble using the RC-500 control panel jog wheel to nudge the waveform accurately, but found repeatedly pressing the Scrub Slow Forward (or Backward) button worked much better. In everyday use, you'd probably not be faced with these extra fine trims, but it's nice to know VoxPro will work with you if you need that resolution.

Asked for comment, Audion CEO and founder Charlie Brown told Radio World, "In all fairness the reason the jog wheel responded the way it did is because, as he says, his sound card would only work with the Use Legacy Wave Audio Drivers option checked which, as stated in the option window, is not recommended. The reason we don't recommend this option is because of the exact results Rich experienced."



The Zoom function zooms to a 100x waveform for tight editing.

VoxPro can manage different users' preferences and allocate virtual 'partitions' for their audio files, protecting the afternoon jock's materials from the morning team's audio.

When it came time to record, I engaged VoxPro's Automatic Gain Control and pressed the Record button — again the VoxPro starts Recording immediately with no delay or latency — but I found I couldn't listen to the processed signal while recording. After some experimentation, it became apparent why the AGC feature can be disabled: it is powerful enough to be misused.

The AGC can be applied to one or both input channels, and I found the factory default settings to be most appropriate for most instances, especially when you cannot hear the results until after the recording. By setting the AGC to the most extreme settings, you can simulate the pumping of a pair of back-to-back UREI compressors. Caution, though; you'll want to lower your input level when you set extremes. My "extreme" recordings were quite hot, so the AGC is pleasing to play with but naughty to misuse.

If your computer is used for other tasks while VoxPro is running, it's nice to know the RC-500 control panel buttons operate VoxPro even if the application doesn't have "focus." It's also worth knowing that in Play or Record, menu items are inaccessible. If you want to adjust the AGC or browse the application's Help file, or call up the audio level panels from within VoxPro, you must open the menu items before you record or play.

Once you have audio material within VoxPro's realm, you can apply any number of useful effects to the selected audio, and undo them as easily as pressing CTRL-Z. Standard effects include echo; reverb; reverse; adjust pitch, tempo, rate or level; and insert a bleep or silence.

VoxPro also incorporates Microsoft DirectX Media Objects for advanced effects such as a simple and effective parametric EQ, Interactive 3D Audio Level 2 reverberation effects with presets, distortion, flanger, compressor and other treats. I easily made a Poltergeist-type effect by selecting some spoken words, clicked Reverse, then clicked Reverb (adjusting for taste) and then clicked Reverse again. Voilà! Spooky reverse reverb with just a few mouse clicks.

See AUDION, page 47 ▶

Product Capsule:
Audion VoxPro Version 4.0

Thumbs Up

- ✓ Speed
- ✓ Quickly imports audio formats
- ✓ Variety of audio tools/effects
- ✓ Responsive VU meters

Thumbs Down

- ✓ Software error prevents CD Ripper from starting
- ✓ BWF files stall in the import process

PRICE: $999 MSRP

CONTACT: *Audion Laboratories in Washington state at (206) 842-5202 or visit* www.audionlabs.com.

PRODUCT EVALUATION

Screens Silence Snap, Crackle and Pop

The Popless Voice Screen Comes in Three Sizes, Has Mounting Hardware and Doesn't Block Copy

by Ty Ford

Brian Gunn of Popless Voice Screens says he saw the need for a better version of the wire-hanger-and-pantyhose-type pop filter while working in the pro audio field in the 1980s. He began testing acoustic materials for the right combination of sonic transparency and pop filtering capability. The acoustic material he found was stretched over an embroidery hoop and coupled to a gooseneck and mic stand clamp. The gooseneck and clamp enabled the system to be attached to the same mic stand as the mic, and positioned in front of the mic.

Gunn had been reading my mind. On my workbench — from at least three years ago — is a 3-inch wooden embroidery hoop I used to concoct the "smaller is better" pop filter. I called it "The Peter Piper Pop Filter." I never had time to develop the attaching hardware. But now I don't have to because Gunn has done that for me, and he's done it better.

The Popless Voice Screen comes in three models: 3.5-inch (the VAC-s3.5) and 6-inch (VAC-s6), and a model called the VAC-re20. These range in price from $35 to $57. Replacement screens cost $16. The 3.5-inch version interests me most. Why? Because smaller is better for voiceover and radio work. A 6-inch pop screen takes up too much space and gets in the way of the copy.

Each model comes with mounting hardware and two screens. On the VAC-s3.5 and VAC-6s, the mounting hardware is designed to fit most U 87-type spider suspension mounts, but you may have to be creative in where you decide to clamp on to the suspension mount. Fortunately, Gunn has provided enough hardware to make that happen.

The VAC-re20 model is designed for the RE20/27 309/A suspension mount. A lightweight plastic arm attaches to the suspension mount and holds the screens in front of the headgrille. That means less hardware weighing down the boom arm.

The design has something else going for it. You can put up to three screens in the mounting bracket to increase further the resistance to popping.

VAC-re20

VAC-s3.5

Screen spacing is important. The screens on the Popless hoops can be arranged to be 1/4-inch to 3/4-inch apart, depending on how many you use and which way you insert them, which also gives you some room to experiment.

For example, two screens 1 inch apart and 1 inch from the mic may work better than three screens 1/4-inch apart and 1/2-inch from the mic. Position the backside of any mesh pop filter closer than an inch to the mic and its effectiveness diminishes.

The fact that the rims of the screen are as thin as they are also helps to make these assemblies more acoustically transparent. In previous experiments with embroidery rings and other plastic ring pop filters, I could hear some sort of minor coloring from the pop filters that had thicker plastic rings.

I see a future in which foam balls — and all the crud that ends up living in the foam — begin to disappear. It's a healthier future. Although I didn't try it, I suspect you could dip the screens in Listerine periodically and shake them dry to decontaminate them.

Ty Ford has been a Radio World contributor since 1986. Visit www.tyford.com.

Product Capsule:
Popless Voice Screens Pop Filters

Thumbs Up

✓ Lightweight
✓ Unobtrusive
✓ Replaceable parts

Thumbs Down

✓ May take minor finagling to mount on some mic mounts
✓ Keep the talent from actually eating the microphone

PRICE: $57–67 MSRP

CONTACT: *Popless Voice Screens in New York at (800) 252-1503 or visit* www.popfilter.com.

PRODUCT GUIDE

Marantz CDR632 Records CD-R, CD-RW

Features of the CDR632 rackmount CD recorder from Marantz Professional include sync (level-dependent) recording, and programmable auto fade-in and auto fade-out recording. Tracks may be incremented manually from the front panel or the included remote control, or by using Minute Track Mode to set time- or level-dependent auto track increments.

CD-R recordable or CD-RW re-recordable disc media may be used for recording, and the CDR632 plays back unfinalized CD-R and CD-RW discs. Users also can unfinalize CD-RW discs and add to them. Data and digital audio disc formats are supported for CD-R and CD-RW. MP3 playback is available from CDs, which the company says allows for log playback times.

The MP3 directory feature eases navigation to the file the user wants to play. CD text display is supported, and CD text may be entered from the front panel.

Features such as power-on play allow audio to begin playing back once the unit is powered up. There are four playback modes: continuous, shuffle, programmable and single-play, which plays back just the selected track and then stops.

For more information, contact Marantz in Illinois at (866) 405-2154 or visit www.d-mpro.com.

PRODUCT GUIDE

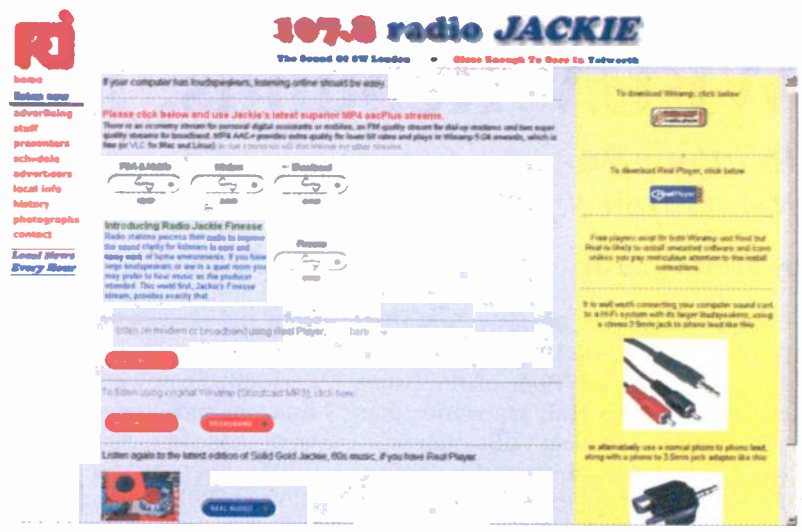
Radio Jackie Adds Unprocessed MP4 Stream

A radio station in the UK is targeting hi-fi enthusiasts, audio purists and record producers with "unprocessed" Internet streaming. The station, 107.8 Radio Jackie, "The Sound of South West London," is licensed by Ofcom. It has added what it calls the "Finesse" stream, an unprocessed MP4 stream that it says further preserves audio program quality. Streaming is provided by *www.mouselike.org*.

Radio Jackie has a range of MP4 AAC+ streams; in its marketing it says the Finesse stream will appeal to those who want to experience the full dynamic range of the music, letting listeners with large loudspeakers or who are in a quiet room hear music as the producer intended.

"I'm not going to claim this to be necessarily 'better' [than other streaming techniques], rather it is an alternative stream which people may prefer sometimes," said Trevor Brook, Radio Jackie's engineer. "The loud and quiet passages of music are preserved and give the full dynamic range experience, which you can enjoy particularly if you are in a quiet room."

The station said the name Finesse was chosen to describe this type of streaming for its connotations of refinement, grace and delicacy of performance. To sample Radio Jackie Finesse, click Listen Now at *www.radiojackie.com*.



Finesse and other streams on Radio Jackie's Web site.

Audion

▶ Continued from page 45

Version 4.0 gives users some new features, compared to previous issues, including AGC with the ability to compress or expand the caller's channel or the talent's or both, with settings control through the admin account. The new peak program VU meter with accuracy to –72 dB is a nice companion feature.

Auto-Network allows engineers to network VoxPro machines without setup or configuration. In fact, the only configuration required is if you do not want the VoxPro workstation to have network access, or if you want to restrict access to only a few other VoxPro workstations. The VoxPro network allows any user to log in to his/her personal account from a VoxPro workstation on the LAN, and access (play/edit/record) files from that workstation.

Other new features include Auto-Import, which imports media files that appear in a folder specified by the user, allowing engineers to network VoxPro machines without setup or configuration; EZ-Export, which allows users to export files to a particular folder in a particular format; improved effects such as time stretching and pitch shifting; markers, which let users add tags and labels whether recording, playing or in standby; and normalization, in case you forget to turn on the AGC.

The company also says it abandoned the proprietary file format used in VoxPro 3.0 in favor of the standard WAV file format. This means higher fault tolerance, as there's only one file to open instead of an edit file that references a master file. Incorporating all file information into one RIFF WAV file gives VoxPro more stability.

VoxPro is a tight software package, incorporating some great software libraries under the GNU Lesser General Public License and enhanced with audio effects from Microsoft's DMO, but its real strength is its speed and responsiveness on even a plain PC; and as a plus, it's an attractive performer in the studio.

Rich Rarey is the Master Control audio engineering supervisor for National Public Radio.

FACILITY PROFILE

WFUV Rebuilds, Ends Tower Debate

Buildout Provides Extra Studio Space; Tower Relocation Squashes Fight With Botanical Garden

by Scott Fybush

When Fordham University's WFUV (FM) signed on in 1948, the space it occupied on the top floor of the Bronx school's Keating Hall was more than sufficient for a student radio station — 3,000 square feet of space for studios, offices and a transmitter feeding an antenna on the roof.

Meanwhile, the station was making national headlines for its prolonged fight with the nearby New York Botanical Garden over a new tower. The Garden derided the tower as an eyesore; the structure ended up sitting half-completed on the edge of the campus until the fall of 2005, when a deal was reached that allowed WFUV to move its transmitter to a new tower several miles away.

Old WFUV Studio Newsroom

WFUV New Voiceover Booth

A half-century later, WFUV had become one of New York's major public broadcasters, with well-known names such as Vin Scelsa and Fordham alumnus Pete Fornatale hosting shows, musicians making live appearances and a crowded schedule that included triple-A music on weekdays, ethnic programming on weekends and a strong commitment to covering local news and sports.

By then, the station had long since begun to outgrow its narrow suite of offices along, and even in, the third-floor hallway of Keating Hall. WFUV's membership staff ended up in a house off-campus, and an aging melange of studio equipment was crammed into every imaginable space, with CDs stored in drawers in the hallway and a sports office in what had once been the transmitter room.

Even as the fight over the tower raged, says George Evans, WFUV's chief engineer and director of technical operations, the station was looking for a solution to its studio issues.

College try

At the NAB Radio Show in 2003, Evans and other WFUV staffers began surveying what was on the market. It took another year, until October 2004, for Fordham to give WFUV the go-ahead for a complete rebuild.

"Suddenly, the decision was made — 'let's do it,'" Evans recalled. In less than a year, WFUV had to build and equip new studios in a 6,000-square foot space in the renovated basement of Keating, while keeping its existing plant upstairs on the air.

Evans quickly made one decision that would shape the rest of the project; instead of building new studio spaces, WFUV purchased eight prefabricated "V-Room" studios from Wenger Corp.

"It's low-cost," Evans said, "and you're guaranteed to have a good room. No contractor has to get involved." Evans said the studios arrived as crates full of panels, which made them easy to get into the basement and easy to assemble. They also can be knocked down and moved if the station's configuration changes in the future.

The studios — a performance studio, four main control rooms, a talk studio and two voiceover booths — sit on 4-inch concrete slabs, which in turn rest on 2-inch rubber "pucks" that serve to isolate the rooms acoustically.

The installer was Creative Studio Solutions Inc.; studio design was by HA Design Group, out of Springfield, Va. Evans oversaw the project. Consulting engineers on the job included Willy Halla from HA Design Group and Bud Aiello at NPR.

Evans said Fordham University essentially lent the station the money and it is in the process of paying it back through a capital budget campaign. Member donations were not used to fund the building of the studios.

WFUV outfitted its new studios with SAS routers and Rubicon control surfaces, a pair of Broadcast Electronics AudioVault II servers and 27 desktops' worth of Digidesign Pro Tools Digi 002 audio editing software, allowing staffers to accomplish many of their production needs without even entering a studio.

That was a critical factor in an environment that remains more cramped than WFUV would have liked.

"We actually lost a bit of office space, even though we gained a lot of studio space," Evans said. The office space, including a newsroom, a sports office and an office for WFUV's music programmers, now includes a workstation at each desk, incorporating Pro Tools and access to the router system.

WFUV's new home also includes a video system to feed material from the new performance studio to the student lounge just outside, and eventually to feed webcasts. For the first time, the station also has ample studio space in reserve for the eventual arrival of HD Radio multicasting, which will allow WFUV to keep its "City Folk" AAA programming going on weekends, when the main channel now airs specialty programs.

WFUV New Newsroom

WFUV Lobby Skylight

The only gear that made the move downstairs were Sony DAT machines, which are being used to play archival material.

There are some touches to remind visitors they're in a 1930s college class-

See WFUV, page 49 ▶

WFUV

▶ Continued from page 48

room building. The renovations to the basement uncovered the original, ornately patterned terrazzo floor, which has been restored and left visible in the station's lobby and the adjoining conference room.

Above the lobby, a skylight brings in natural light from the courtyard in the center of the building. Throughout the facility, the original tiled corridor walls have been kept as well, providing an ideal spot to mount a shelf outside each air studio to hold drinks and food that aren't allowed inside.

WFUV midday host Darren DeVito on air in the new studio.

Less than a year after the project began, WFUV made its move from the third floor to its new home in September, with Fornatale signing on from the new facility.

"The first reaction was 'Wow,'" Evans said. "Everyone was totally bowled over. It's just a bigger, cleaner environment to work in."

The station has since installed a combined transmission system from BE, consisting of two FMi 703 transmitters, which BE has called the FMi 1405D. The main antenna is a 10-bay antenna, the aux is a two bay, both manufactured by Dielectric.

The transmitter is located at the new tower site off-campus about 1.37 miles away. The STL is a Moseley 950 MHz system.

Not only will the new site put an end to the long battle with the Botanical Garden, it also will significantly increase the station's reach, the station believes.

Scott Fybush is a frequent contributor to Radio World.

WFUV outfitted its new studios with:

SAS Rubicon consoles
SAS 32KD router (two cages)
Broadcast ElectronicsAudioVault II (two servers)
Avocent KVM switchers
Digidesign Pro Tools Digi 002
Digidesign Pro Tools HD
HHB CDR830 BurnIt CD recorders
Sony PCM-R50 DAT recorders

PRODUCT GUIDE

Vorsis AP3 Adds Air Chain Option

Wheatstone added software enhancements to the GUI interface of the Vorsis AP3. Users of the remote monitoring software now have the choice between two processing modes: Production and Air Chain.

The Air Chain option prompts a Multiband Limiter screen, which displays revised functions with expanded clipping capabilities on the low, middle and high bands. Vorsis also increased functions on the Input menu screen including a pre-emphasis filter submenu, M/S and symmetry controls.

The Output screen menu features emphasis and filter submenus, and the options of M/S, Clip Enable and Stereo Link along with Positive Modulation and Clip Backoff tuners.

Production mode, an existing feature, prompts the Compressor screen, which like the Multiband Limiter screen includes drive, AGC attack, AGC release, makeup, thresh, ratio, attack, release and a swap screen option.

Vorsis units are currently shipping with the upgrades.

For more information, contact Wheatstone in North Carolina at (252) 638-7000 or visit www.wheatstone.com.

USER REPORT

Royer Ribbon Mic Picks Up the Sound

by Steve Barker
Contract Engineer
BBAT Productions

Royer's SF-24 stands guard over the Henry Mancini Orchestra.

LOS ANGELES Contrary to general perception, ribbon microphones such as the Royer Labs SF-24 phantom-powered stereo ribbon microphone can be used effectively in both live and broadcast applications.

Because much of my work involves the recording of live music performances for radio, I frequently find myself directly involved in both radio and sound reinforcement and recording. I handle a variety of projects for clients including National Public Radio, the Pacifica Radio Foundation, a number of independent community radio stations as well as KMZT(FM), L.A.'s classical music station.

When recording live music for broadcast, the one issue that requires particularly careful attention is knowing where the anti-polarity zones of the microphone are, and using them effectively.

It's important to avoid utilizing the area where the microphone's plus and minus patterns come together. If this occurs, you'll likely find that a performer who accidentally entered this "zone" is canceled out of the mix. You won't notice this if you're monitoring in stereo, but if you're monitoring in mono, that performer will simply disappear. If this is not the case, you'll certainly find the performer's sound terribly thin and emaciated.

If I'm planning on using a stereo ribbon mic for a performing group, I'll literally place an X on the floor, and instruct the performers to stay within the plus part of the microphone's pattern. I also create a line that represents the axis of the main pickup so that the performers know where the center is. Hence, you'll see an X with one straight line through two of the quadrants that represent the mic's main pickup area — front and back. You essentially have two centers, plus two left and two right fields to work with. The other portion of the X, which represents the anti-polarity area, is essentially marked as "off limits." This is the dead zone. Performers need to stay clear of these two quadrants.

Polarity

On any ribbon microphone, one side produces an in-polarity (plus polarity) signal with an increase in air pressure. This means that an increase in air pressure on the ribbon on that side of the mic produces an increase in voltage in the positive direction on the output of the microphone. Conversely, the opposite side of the microphone produces a negative voltage with an increase in pressure. This is the out-of-polarity side of the microphone. Both sides of the microphone are perfectly useable.

Over the years, I've found that music tends to sound louder on the plus polarity side of the mic as opposed to the out of polarity side. Why is this important? These two fields can be quite effective as a balance tool — with the more dominant voices assigned to the side of the microphone that is out of absolute polarity and the softer voices assigned to the side of the mic that produces the plus polarity signal. It's surprising how well these two fields can balance out the overall level of a performance.

A single Royer SF-24 used in this type of arrangement can be effective for upwards of four performers, vocalists and instrumentalists alike, making this an exceptional choice for small-ensemble performances.

I've also used the same microphone as a single pickup for a drum kit. I was recording Alex Acuña and the Unknowns live at the Hollywood Highland as part of NPR's KJZZ Summer Street Music Series. That SF-24 was the principle pickup for the entire drum kit, and it was actually placed in front of the kit and somewhat to the left of the kick drum between the rack and floor tom, aimed at the snare drum.

Even though the SF-24 is a bi-directional microphone, for that particular application, we only used its front side. The backside was free to capture whatever ambient sounds existed. While we supplemented the SF-24 with a separate dynamic mic on the kick drum, the SF-24 picked up everything brilliantly, so I barely used the dynamic.

Because the SF-24's patterns are so well defined, by bringing the mic in under the cymbals I was able to minimize the amount of high-end sizzle. The result was a huge stereo drum sound. I prefer using a stereo ribbon mic on drums, as this allows me to better control the imaging. It also enables me to circumvent the lost sense of time relationships among the various instruments within the kit that can occur with multiple individual microphones. I find this type of miking technique particularly effective in a jazz environment.

Miking skills

Like so many other aspects of music, recording and the creative arts in general, time and experience are essential in terms of gaining a true feel and understanding of one's craft. My hope is that the information provided here gets the creative juice flowing for those interested in furthering their live miking skills

See ROYER, page 52 ▶

USER REPORT

KUVO Jazzed Over Neumann Mic

by Mike Pappas
Chief Engineer
KUVO (FM)

DENVER KUVO(FM) has been using the Neumann BCM-104 on the air since it was released in 2003. I had been looking for a large-diaphragm condenser microphone that could take the day-to-day use and abuse that public radio dishes out for quite a while. When the BCM-104 became available we ordered one up for a demo. I figured the best way to demo the BCM-104 was by putting it on the air and taking it for an auditory on-air test drive.

KUVO has a fair number of volunteers whose mic techniques can be described with a range of adjectives, from "professional" to "the announcer is somewhere in the same room as the mic is."

I have seen some of our "semi-pro" announcers work a mic 60 degree off axis and think nothing of it.

Additionally, studies I conducted a couple of years prior to our testing of the BCM-104 indicated that we had about a 24 dB SPL range between our loudest announcer and our quietest. This is a huge SPL range and coupled with wildly varying microphone technique

Our male announcers like the subtle proximity effect making them a bit bigger than life.

can really test the ability of a microphone.

We got the BCM-104 in and put it on the air. My PD and I fired up the air monitor and took a listen. Would the Neumann be up to the challenge? Would our collection of announcers prove to be more than it could handle?

Smooth sound

We listened to our toughest bunch of announcers over the next week and we were really happy with the Neumann's performance.

It's smooth-sounding, even way off-axis; and the built-in POP filter is effective. Feedback from our announcers was positive. Our male announcers like the subtle proximity effect making them a bit bigger than life; female announcers liked how smooth they sounded.

I found if the air staff worked the BCM-104 slightly off axis they could read copy easily and minimize any potential p-popping issues. At the end of the week my PD came to me and told me to order up additional BCM-104s to replace all of our mics.

Over time, having the BCM-104 on the air for almost three years, we found that the announcers typically worked the BCM-104 at a couple of inches from the windscreen. This really helped out on the mic hygiene front.

The hygiene problem with microphones can be an issue during flu season. We used to have foam windscreens for each of our announcers with our old mics. It didn't seem to help much; our announcer ranks would be decimated with dozens of sick days every year at the height of the flu season. Being able to work the mic at a couple of inches

KUVO PD Carlos Lando
Works the BCM-104

makes it hard for the flu bugs to get handed off between announcers.

Additionally the BCM-104 windscreen is swappable; so if you are really concerned about microphone hygiene you can purchase one for each of your announcers. I found that with the announcers working the BCM-104 at a couple of inches we didn't have any direct contact and the flu didn't decimate the air staff like it used to with conventional foam windscreens.

Shock-mounting

To keep unauthorized fingers at bay, the Neumann BCM-104 has an internal low-frequency roll-off switch and pad. The LF roll-off switch can be used to compensate for the proximity effect or acoustical rumble. The –14 dB pad switch reduces the output to match that of typical dynamic microphones, making swapping them with existing dynamics relatively painless. It has a built-in shock mounting system, which is effective isolating noise from the mic arms and transmitted vibration through the studio furniture.

After we had the BCM-104 on the air for a couple of days I received a call from a chief from one of the top-rated stations in the Denver metro area. He was listening to KUVO and wanted to know what mics we were using. A week later he had replaced all of his dynamic microphones with BCM-104s.

For more information, contact Neumann in California at (818) 845-8815, or visit www.neumanusa.com.

TECH UPDATES

New JBL Monitors Can Be Calibrated

Adding to its LSR series of studio monitors, JBL has introduced the LSR4300 series of studio monitors with what the company calls, "Next-Generation Room Mode Correction" technology.

"A large segment of the market is working in rooms that are acoustically less than perfect," said Peter Chaikin, director of recording and broadcast for JBL. The company designed the LSR4300 Series to address the needs of the computer recording customer, he said.

"With next-generation RMC Room Mode Correction, the LSR4300 Series delivers exceptional accuracy at the mix position in any room."

The monitors feature on-board analyzers that measure and compensate for low-frequency problems caused by standing waves and boundaries. The speakers are calibrated with an included calibration microphone. Settings can be viewed on computer using the supplied LSR4300 Control Center software.

The LSR monitors come in two sizes, the LSR4326P 6-inch system, and the LSR4328P 8-inch system. Also included are USB and network cables and a remote control. The speakers can be networked with JBL's HiQnet technology, so that the front panel of any of the speakers can control all speakers that are connected.

For more information, contact JBL in California at (818) 894-8850, or visit www.jblpro.com.

Wohler Monitor Gives Phase Info

The AMP1-DA from Wohler provides full-fidelity stereo monitoring in a 1 RU space. The speaker system is self-powered and can provide two channels of analog and digital sound. The AMP1-DA is driven by three power amplifiers for low-, mid- and high-frequency playback.

Visual levels are supplied by the 26-segment vertical LED meters. The front panel also features an LED display showing phase and polarity relationships.

For greater accuracy in metering, Wohler offers the AMP1-DA/106, which has 106-segment horizontal LED levels.The unit has extensive magnetic shielding, making it safe to mount near computers and video monitors. The AMP1-DA is designed for close monitoring of up to 3 feet. A headphone jack is provided, and headphone use mutes the speakers.

For more information, contact Wohler in California at (888) 596-4537, or visit www.wohler.com.

HHB FlashMic Eliminates Cables

The HHB FlashMic DRM85 digital recording microphone records WAV or MPEG1 Layer 2 encoded audio files, which can be transferred to digital workstations via USB cable. It uses a Sennheiser omnidirectional condenser capsule that sends the audio to a 1 GB Flash drive.

The company says a useful feature for journalists is one-touch recording. Users can customize nine settings with the provided software. The mic body features a backlit screen, which displays recording levels, time and battery power.

The FlashMic can run for six hours on two AA batteries, provided. In addition to automatic gain controls, the mic offers a variable pre-record buffer of up to 10 seconds.

HHB provides a stand clamp with the FlashMic, making it suitable for press conferences by eliminating cables and exterior recording devices. Users can monitor the audio on headphone from the mini-jack at the base of the mic. The frequency response is 20 Hz to20 kHz.

For more information, including pricing, contact Sennheiser in Connecticut at (860) 434-9190 or visit www.hhbusa.com.

Soundelux Offers Lower-Cost Cardioid

Adding to its lineup of cardioid studio microphones, Soundelux has unveiled the E251C. The mic is based on the design of its ELUX 251. The company says the E251C is more affordable due to advances in design and assembly.

The microphone does not offer pattern selection. The E251C is designed for use in production rooms and studios with less-isolated environments. Soundelux says users can expect fewer artifacts from HVAC systems and other acoustical noise than would be found in the ELUX. The output transformer of the mic features a deep low end, and a roll-off at 30 Hz.

The microphone has a multiple mode switch that allows users to switch between "brite" and "normal." An imported shockmount is supplied with the E251C.

For more information, contact the Transaudio Group in Las Vegas at (702) 365-5145 or visit www.transaudio.com.

MultiPhones Can Expand With Guest Pods

Henry Engineering's new MultiPhones distributed headphones system provides headphone facilities in studios where there are multiple producers, announcers or in-studio guests. MultiPhones gives each headphone user a conveniently located headphone jack and volume control, with a cough button and mic-on LED indicator that can interface with the studio console. A Talkback system is provided.

The MultiPhones system consists of a master unit and up to 12 guest pods. The master unit provides power and distributes audio to the guest gods, which are daisy-chained using common Cat-5 cable. The Guest Pods can be recessed in studio cabinetry, or mounted under a counter or on a desktop. Each guest god is a self-contained headphone listening station, with a built-in headphone amplifier, volume control, and both 1/4-inch and 3.5 mm headphone jacks.

Audio fed to the master unit is distributed to guest pods. Since each guest pod is independent, a mix of types or brands of headphones can be used without interaction. The system is optimized for use with modern headphones having any impedance from 24 to 600 ohms.

The master unit also has a talkback facility. When the talkback button is pressed, normal program audio is ducked, and audio from a talkback mic is fed to the guest pods. This allows a producer or engineer to communicate with the guest pod listeners. The talkback function can be activated remotely.

For more information, contact Henry Engineering in California at (626) 355-3656, or visit www.henryeng.com.

Royer

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for use in a broadcast environment.

It should also be noted that ribbon mics are capable of handling numerous tasks that one might not expect them dt handle competently. This includes use in sound reinforcement applications. With attention to the positioning of the microphone and its null points, the SF-24 makes an excellent choice for miking brass and wind sections, while using the null points to create isolation between various instruments.

The Royer SF-24 makes a great choice for concertos, where a solo instrument is up in front of the orchestra. In this scenario, I'll use it for both the recording and sound reinforcement. The SF-24 is the only stereo ribbon mic configuration I've been able to use successfully in an outdoor setting. Rycote makes a windscreen originally designed for use with a shotgun microphone. It can be easily modified to work with an SF-24 and this combination is extremely effective for outdoor use.

The SF-24 picked up everything brilliantly.

For more information, contact Royer in California at (818) 847-0121, or visit www.royerlabs.com.

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USER REPORT

Light Brigade Uses Army of AKG Mics

by Larry Berger
Executive Director
Saturday Light Brigade

PITTSBURGH "The Saturday Light Brigade" is a live, national-award-winning weekly public radio program for children and adults that has aired in Pittsburgh since 1978.

After two decades of broadcasting from conventional radio studios, SLB entered into an agreement with the Children's Museum of Pittsburgh to build a showcase studio complex within the museum that would allow us to better accommodate live musicians, hands-on workshops and studio audiences for children. The studios were completed as part of the museum's $28 million expansion project and have been in operation since November 2004.

Because "The Saturday Light Brigade" features a variety of music and special guests, we require many various kinds of microphones. This is because we need to be able to support broadcast of individual singer/songwriters, chamber music ensembles, storytellers, bluegrass bands, panel discussions, live audience programs and even the occasional 70-person choral group, sometimes on a single Saturday morning!

SLB contacted AKG Acoustics to assist us in meeting our microphone needs. We discovered that the company shared our vision for high-quality music as well as service to the community. Although AKG Acoustics is headquartered in Vienna, Austria, its product specialists and support staff in Nashville were able to provide us with strong support in selecting microphones, wireless systems and headphones to meet our varied applications and budget.

SLB Studios

Durable

A C4500B-BC large-diaphragm condenser microphone serves as our primary broadcast mic and provides natural sound and an end-address shape that allows us to make good eye contact with the hundreds of kids who visit our studios each week.

Six D880 dynamic microphones help community guests sound their best and are durable enough for us to use with children during workshops. A number of specialized condenser microphones — C1000S, C3000B and 414B-XLS — enable us quickly to mike the many musicians who visit SLB.

We have been especially impressed with the 414B-XLS and have used it as the lone mic in several difficult situations where a large chorus or orchestra needed to be captured with minimal setup time. Two C1000s models have also been used as a stereo pair in such situations. The on-air results have been great and artists have told us that the airchecks with which we provide them are as good as their studio recordings.

This wireless coverage is enabling us to roam through the museum.

SLB also uses WMS-4000 series long-range wireless microphones, receivers and body packs. We initially selected this equipment to simplify interviews with our studio audience. We have been delighted to discover that we are able to roam throughout the museum complex and achieve broadcast-quality reception at our studios. This is no small feat given that the museum includes three buildings: a 19th-century post office, a former planetarium and a connecting glass-and-steel building completed in 2004. They cover a footprint of about 40,000 square feet.

This wireless coverage is enabling us to roam the museum complex to bring more children's voices on the air while minimizing the tripping concerns posed by cords and cables.

To take advantage of this concept in the reverse direction, we also periodically connect a body pack to our studio distribution amplifier and use the body pack to broadcast our studio signal to amplified speakers fitted with WMS-4000 receivers. This gives us high-quality sound without the hazard of temporary wiring and without the expense and inflexibility of routing cables through the walls of the older buildings.

Reliable performance

As part of our educational workshops, we are building a set of kiosks that will help children experience broadcast radio.

The broadcast kiosk will contain a simplified mixer, digital hot buttons for jingles and music beds, a copy stand for live reads, and several microphones and headphones. The receiver kiosk will contain multiple headphones with volume controls.

Although the most obvious choice at first was to embed an FCC Part 15 transmitter in the broadcast kiosk and a conventional radio within the receive kiosk, we have since decided to use an embedded WMS-4000 body pack in the broadcast kiosk and WMS-4000 receiver in the receive kiosk. This will enable more reliable performance within our buildings as well as movement of the units as the need arises.

SLB Radio also has made use of the extensive AKG headphone line. Our on-air talent and production staff typically use K240 and K271 Studio headphones, while guests and workshop participants are provided with K66 headphones. The units sound great for their individual applications and in all cases provide self-adjusting headbands that are comfortable for children and adults as well as rugged construction — paramount for a public-use studio.

For more information, contact AKG Acoustics in Nashville at (615) 620-3800, or visit www.akgusa.com.

TECH UPDATE

Sony 7509HD Headphones Ready For HD Radio

Sony has expanded its MDR line of professional headphone monitors and is citing HD Radio applications in offering the new MDR 7509HD.

For stations moving into the realm of HD, Sony says the new set is designed with the frequency range of digital in mind. The drivers feature the same closed-ear design featured on the popular 7506 headphones.

"The new MDR-7509HD headphones feature revolutionary new HD driver units capable of 80 kHz ultra-wide-range reproduction," said Paul Foschino, senior manager for professional audio in Sony Electronics' Broadcast and Production Systems Division. He said the headphones also are suitable for digital recording devices and digital production.

The Sony MDR-7509HD professional headphone debuted in March at a suggested list price of $265.

For more information, contact Sony in New York at (800) 686-7669, or visit www.sony.com/professional.

TECH UPDATES

A-T Drops Mic Price, Debuts Headphones

Microphone manufacturer Audio-Technica has lowered the price of the AT3060 tube-based studio microphone. The price drops $100 to an estimated street price of $399. The AT3060 operates on standard 48V phantom power and does not require a wired power supply. The microphone contains a large-diaphragm cardioid capsule, large coupling transformer and a hand-selected, individually tested and aged tube.

Electronically, the AT3060 includes a large coupling transformer to provide linearity at low frequencies. Included with the microphone is the AT8458 shock mount, which provides isolation and protection in the studio environment and dampens mechanical noise.

Also available from Audio-Technica are the ATH-PRO700 SV professional monitor headphones, which were recently introduced in the U.S. The company touts the comfort and durability of the headphones during long listening sessions. The headphones feature proprietary large-aperture 53 mm drivers with neodymium magnet systems and CCAW voice coils. The ATH-PRO700's have a frequency response of 5 Hz to 35 kHz. A mini-plug adapter is provided for the standard quarter-inch plug, which is attached to the left ear of the headphones. Both the adapter and plug are gold-plated. The set is collapsible to fit in the provided pouch.

For more information, contact Audio-Technica in Ohio at (330) 686-2600, or visit www.audio-techinca.com.

Compact Monitors, Big Sound

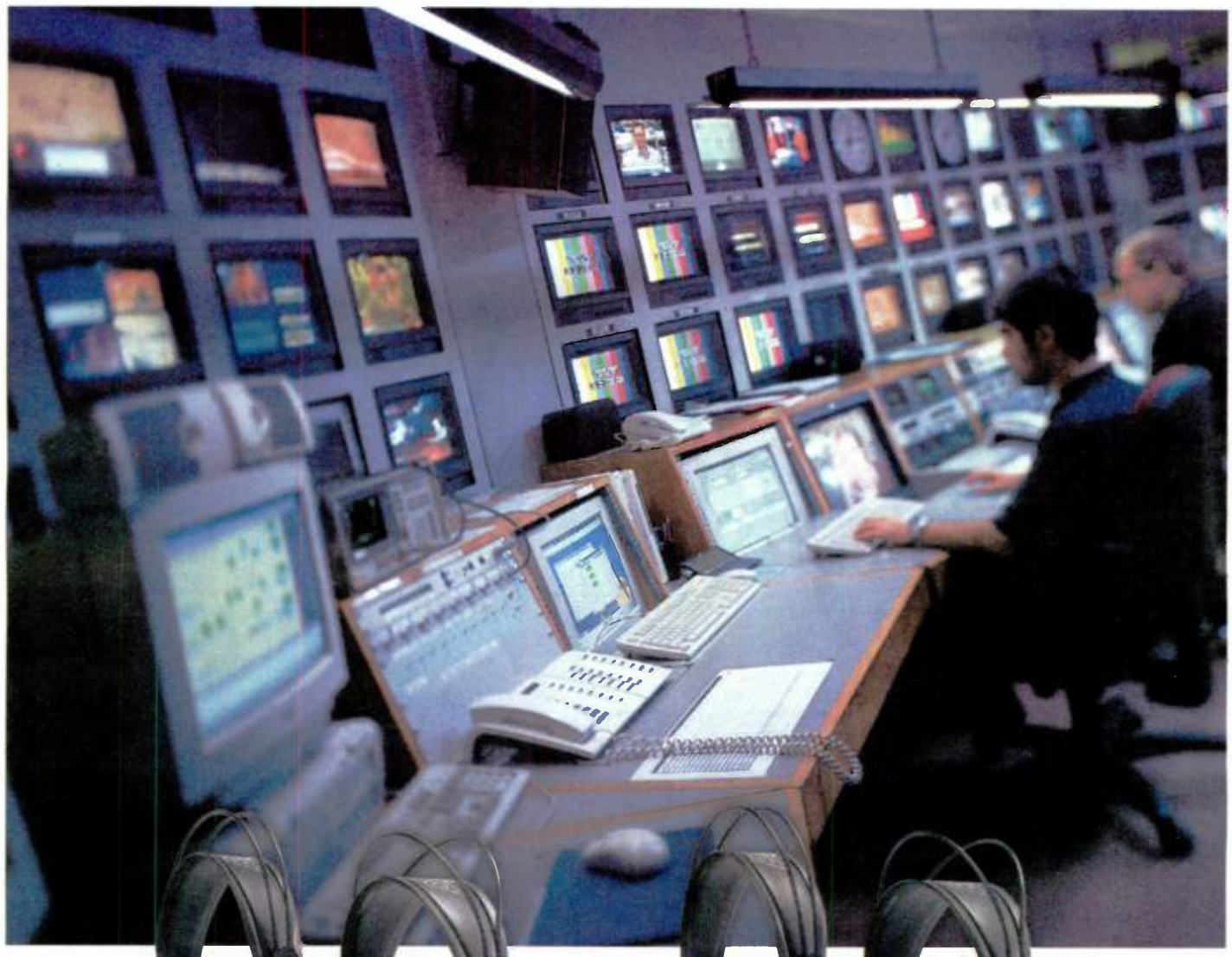
Tascam says its VL-X5 bi-amplified studio monitor can be used for studio applications, or to serve as an audio monitor in a close environment. The speakers offer 30 W high-frequency and 60 W low-frequency from its drivers. High frequencies are performed by a 1-inch silk dome driver, while low frequencies are driven by a 5.25-inch cone. The drivers are powered by dual amplified supplies.

The monitors feature magnetic shielding, allowing them to be placed in proximity to a digital audio workstation or other computer-based device. Sub frequency ports are provided to enhance the bass sound on the VL-X5. XLR or 1/4-inch jacks can be used to input audio to the VL-X5.

On the shelf, the monitor has height, width and depth about the same as a standard piece of writing paper. The height and depth are just shy of 12 inches, while the width is just under 8 inches.

The Acoustic Space Control allows the user to place the VL-X5 against a wall, or in tight corners. Tascam says the deep cabinet and ported design produces a nice amount of bass for the size of the monitors.

For more information, contact Tascam in California at (323) 726-0303, or visit www.tascam.com.



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Studio Furniture and Design
September 1

TECH UPDATES

Heil's PR 40 Dynamic Mic

The PR 40 from Heil Sound is a large-diameter dynamic mic for commercial broadcast, serious recording studio or live sound applications. It features a 1-1/8-inch diameter dynamic element with a frequency range of 28 Hz to 18,000 Hz.

The PR 40 features a dual-wound dynamic voice coil using a mixture of iron, boron and neodymium that the company says creates a magnetic field 10 times stronger that a traditional microphone magnet.

A special phasing plug assembly and tight coupling to a low-mass quilted aluminum diaphragm enable the articulate, wide frequency response with low distortion and lack of proximity effect. A second hum-bucking coil reduces noise from nearby magnetic fields.

The Heil PR 40 is delivered in a velvet-lined cherry wood case. Included is a unique adjustable zinc cast, Teflon-lined mic clip.

Available accessories are the SM-2 shock mount assembly complete with blank station call flag, PL-2T Topless articulated boom, CC-1 XLR, Heilwire connecting cable and CB-1 Classic Desk Base.

For more information, contact Heil Sound in Illinois at (618) 257-3000 or visit www.heilsound.com.

'Ralph The Wonder Mount'

Known for its ribbon microphones, Blue Microphones has added a shock mount to its line of accessories. The name of the product is — really — Ralph the Wonder Mount.

Ralph was designed as an alternative or replacement noise isolator for any microphone that fits the 19.88 mm to 22 mm diameter. Along with Blue's Baby Bottle mic, the mount will fit many popular studio mics manufactured by AKG, Audio-Technica, Beyerdynamics, Sennheiser, Shure and others.

Ralph is constructed from brass and has a wrap-around design. Suspension bands hold a mic out in front of the stand. Blue sells the mount through its vintage outlet, Red.

For more information, contact the company in California at (818) 206-8168, or visit www.vintagemicrophone.com.

Tannoy Reveals Monitors

Tannoy has enhanced the design of its Reveal Active series of speakers with the Reveal 5A. The monitor is based on a multi-fiber 5-inch driver designed for nearfield monitoring. The high-end frequency response is provided by a 1-inch soft-dome neodymium magnet system. Inputs available on the Reveal 5A include XLR and 1/4-inch jack.

Tannoy says significant advances in digital speaker measurement, such as acoustical CAD design and laser scanning interferometry, aided design of the monitor. The frequency response of the Reveal 5A ranges from 65 Hz to 30 kHz. Controls on the front of the monitor include standby, mute, volume control and an LED power light. The rear features a mains isolation switch and an external heat sink that Tannoy says provides cooler operation suitable for 24-hour use.

For more information, contact Tannoy in Ontario at (519) 745-1158, or visit www.tannoy.com.

Denon Adds DN-HP1000 Headphones

Denon has introduced a set of heaphone monitors in its line of professional DJ products. The DN-HP1000 set has a dynamic, closed-back design for sound isolation. The company says the speaker drivers are among the largest in their class, and provide excellent audio quality at high volume levels. The frequency response offered by the DN-HP1000 is 5 Hz to 33 kHz.

The headphones' soft padded ear cups can swivel 180 degrees and are designed with dual pivot action. DN-HP1000 headphones are equipped with a standard nickel-plated plug and a mini-plug adapter. They weigh about 11 ounces and come with a leather carrying bag.

For more information, contact Denon in Illinois at (630) 741-0330, or visit www.denondj.com.

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WANT TO SELL

Control Design Corporation CD-25S 25 Hz tone decoder, rack mount. $75. larryfuss@cox.net or call 702-898-4669.

Now available, radio automation for the Linux operating system. Schedule music, voice track, create shells, auto or announcer assist mode, set intro and ending cues, hit the vocal every time with your voice tracks, execute exact time events, join networks, and more. Visit digitaldevelopment.net and click on RADIO AUTOMATION for screen shots. The software is free, there is a small duplication fee. For more info call 406.665.1832.

CODECS

WANT TO SELL

2 AudioTX Communicator audio-over-IP codecs. Both work. $1,000 for dongles, or $2,200 for dongles plus computers with software pre-loaded. B. Dixon. 574-457-8181.

3 AETA Scoop Reporter POTS Codecs. All work, still in service. Two have rebuilt keypads. $3,300 for all. B. Dixon. 574-457-8181.

CONSOLES/MIXERS

WANT TO BUY

Ampex AM-10 mixer in operating condition. Bill Cook, 719-687-6357.

Teletronix LA-2A's, UREI LA-3A's & LA-4's, Fairchild 660's & 670's, any Pultec EQ's & any other old tube compressor/limiters, call after 3PM CST, 972-271-7625.

MICROPHONES

WANT TO BUY

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights, call after 3PM CST, 972-271-7625.

Radio World

MISCELLANEOUS

WANT TO SELL

360 Systems AM-16/B Audio Crosspoint Switcher, like new. $500. Second unit with M-16/E Audio Crosspoint Expander also available for $750. larryfuss@cox.net or call 702-898-4669.

Broadcast Tools DCS-20 Dual satellite Controller. $250. larryfuss@cox.net or call 702-898-4669.

RECORDERS/PLAYERS (PORTABLE/STUDIO)

WANT TO SELL

Tascam #32 Reel-to-reel, rack mounted, $600 + shipping (obo). Call Curt Marker 906-249-1423

REMOTE & MICROWAVE

WANT TO BUY

RPO gear needed for 5 African FMs in Ghana, Uganda & Sudan. **Help us** as we teach radio to young people. Will pay cash or **you can donate**. Danpeters45@yahoo.com 417-335-3532

SATELLITE EQUIPMENT

WANT TO SELL

Zephyrus 304 4-card Satellite main frame card holder. Excellent Condition. Make an offer plus shipping. Call Curt Marker 906-249-1423

STATIONS

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OWN YOUR OWN!! AM/FM Great Facilities in Super College town! Fulltime AM sleeper with limited competition & great terms! Fulltime AM in exploding small market ...great Hispanic buy! Fulltime AM in Resort area...perfect Mom & Pop-possible terms. RETIRE DOWN SOUTH-CALL DAVE!! -256-613-2630

Great opportunity. Profitable AM near Atlanta. Land and building included. New transmitter. Great retirement area. Contact wyyz1490@aol.com.

"Seattle area FM commercial translators: BNPFT 20030317BUB 154893 and BNPFT 20030317BUW 155196. Includes excellent eq package & tower relationship. E-mail your offer to CommunityPublicRadio@Prodigy .net "

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WANT TO SELL

Moseley – SL 9003 T1 Starlink system. Used for 10 months – still under warranty $5500.00 plus shipping. Call Jerry Evans 775-884-8000

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WANT TO BUY

Large or small collections of 16" transcriptions or 12" transcriptions, not commercial LPs. Bill Cook, 719-687-6357.

TEST-METERING-MONITORING

WANT TO SELL

Belar FMM-1 FM Modulation Monitor; Belar FMS-1 Stereo Monitor; Belar FM Amplifier, tuned to 92.7. All for $250. larryfuss@cox.net or call 702-898-4669.

Belar FMM-1 FM Modulation Monitor, Belar FMS-1 Stereo Monitor; Belar FM Amplifier, tuned to 103.5. All for $250. larryfuss@cox.net or call 702-898-4669.

TFT EAS-941A Remote Control/ Status Monitor for TFT EAS 911 unit. $150. larryfuss@cox.net or call 702-898-4669.

TRANSMITTERS/ EXCITERS/ TRANSLATORS

WANT TO SELL

Collins/Rockwell Transmitter - 1 Kw AM Power Pebble – works great. $1000 obo – Call Chris Wilk 540-368-502658A 03C **Elcom-Bauer 2.5 Kw transmitter** at 99.1 Very good condition with fairly new BEXT exciter. You pick up $4500. Jerry Evans 775-884-8000

QEI Quantum "E" 300 watt transmitter and exciter combo, frequency agile. Price $3000 plus shipping. Call Curt Marker 906-249-1423

RCA BTF 2-E1 – Transmitter (FM)Clean, 69404.1 FIL. HOURS. Works great. $3000 OBO – Call Chris Wilk 540-368-5026 58A 04A **Energy-Onix STL-10 Composite STL Receiver**, frequency agile. $Asking $1000. larryfuss@cox.net or call 702-898-4669.

Consultants

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Blind Box Ad	$16 additional			

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EMPLOYMENT

HELP WANTED

Broadcast Engineer, Vermont Public Radio has an immediate opening for a full-time studio and transmitter engineer with computer and network experience, preferably in a public radio environment. The ideal candidate will be a creative thinker and problem solver with skills in FM broadcasting, an understanding of HD radio and excellent communication skills. SBE certification is a plus. For more details see "Careers at VPR" online at www.vpr.net. Submit resume and cover letter to Engineer Search, VPR, 365 Troy Ave., Colchester, VT 05446 or via e-mail to jstilley@vpr.net. No phone calls please. Vermont Public Radio is an Equal Opportunity Employer.

AMERICAN BROADCASTING SCHOOL Interviewing for a Job Placement Director for Oklahoma. Broadcasting experience preferred. Fax resume to (405) 672-6488 or email to staci@radioschool.com

AMERICAN BROADCASTING SCHOOL Interviewing for a bilingual Radio Broadcasting Instructor for Dallas/Ft. Worth. Fax resume to (405) 672-6488 or email to staci@radioschool.com

POSITIONS WANTED

Dedicated, self-motivated, enthusiastic with lots of energy! Hard worker, funny, and needs little direction. Excel in production, good news and sports writer. James Houser 817-938-9917

Dedicated, reliable, follows directions, works well with others, and wiling to move. Skills in Cool Edit, boards, on-air, production, copywriting. Call me Jesse Graves 817-598-9733

Great self-motivated determined broadcaster, goal oriented, team player, production wizard, professionally refined, and vocally dominant equipped to handle any voicing endeavor. Torrance Walker 972-937-8584 torrancewalker@yahoo.com

I'm a young man who would love a job in radio! American Broadcasting School trained, but willing to learn more at your station. Will do what it takes. Willing to travel. Solomon 405-677-2561

If you need someone for voiceovers, digital, news/commercial writing and on-air work in the Dallas area - don't miss this opportunity. Jennifer Reneau 972-424-4634.

Amazing production, very eager, hardworking and dependable production and programming guru. Extensive sports knowledge and supreme news and copywriting. Will travel. Brad Williams bradtx@gmail.com 214-385-1835

Amiable, ambitious broadcaster with aptitude to learn any format. Schooled with the essential broadcasting skills, very good behind the scenes. Will travel. Tommy tomray324@sbcglobal.net 972-427-8865.

Friendly, Eager to work, ISCET Certified, Commercial FCC License with radar, NABER Certified two-way radio technician, amateur radio extra, seeks CE, asst. CE F/T, P/T Contract, AM/FM, Cable, TV. Contact: Mitchell Rakoff, mitchellrakoff@yahoo.com 718-969-5224

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◆READER'S FORUM◆

AM Memories Galore!

I have a recollection of the Gates Spot Tape, or Spotter, 101. No bones, unfortunately.

I worked for WHTG(AM-FM) in Eatontown, N.J., not too long after the stations had retired a pair of these devices in favor of cart machines. The AM went on the air in 1957 and it was the first radio station I ever saw from the inside in 1970, at which time the Spot Tapes were still in use.

There were two, stacked one on top of the other so they could play back-to-back recordings. As I recall, the primary concern with these at this station was trying not to have to do a rewind with an open mic due to the noise, but sometimes it was unavoidable.

Gates 101

Apparently, parts were not readily available for the mechanical portion of this device and they were beginning to sound pretty rough, with lots of what I can only call wow and flutter, although that would be a kind description. The announcers soldiered on with the Spot Tapes for a few more years before they were finally replaced with carts a few years short of the 20-year full depreciation.

Mike Shane
Operations Manager
KCRO(AM)/KOTK(AM)
Omaha, Neb.

This is in reply to Dan R. Hubbard, who wrote "AM Memories 101" (*Reader's Forum*, Feb. 15).

The Gates 101 spot machine I remember well. As CE and PD at a nighttime directional array in California's San Joaquin Valley, responsibility for maintenance fell to me. As the sole source of recorded spots, failure was [a serious matter].

Typically the auto rewind failed to trigger, pulling the foot-wide tape from its bottom roller. Fortunately this occurred infrequently, because the DJs (myself included) pushed rewind as soon as the commercial ended to lessen delay for double and triple spotting. The total recording time exceeded 60 seconds, I recall, probably longer than the 70-second carts which soon followed.

The photocell triggering depended on a lateral clear window allowing light passage. But wear smeared the window, resulting in "spotty" functioning, to make a pun. I tried cutting out the window, but this excessively weakened the tape. So I added a strip of clear "cellophane" tape on each side, periodically requiring replacement. And we kept a supply of spare rolls from Gates on hand.

Logistically, production was minimal because we had to record spots through the B-side of the board while records ran on the air. Friday afternoons were frantic, when the sales staff brought in new copy requiring immediate substitution.

I also worked at stations manually cueing spots on three-inch reels. One station stored them alphabetically on hooks attached to a pegboard rack beside the control board. Occasionally a jostle would send tiny tape reels rolling, unwinding across the floor.

Ron Pesha
Lubec, Maine

These things were great! I seem to recall them being made by Gates and Ampex, and they had a large, flat magnetic disc, around 10-inches, reminiscent of the old SoundScriber dictation machines media.

You would run a slider across the front to select the cut you wanted, much like the old telephone indexes that kept your address book that used a sliding arrow on the edge, visible from the cover. The slider would move to, say, the letter "S," and you would pop open the device and your "book" then displayed all the "S" addresses. On the audio unit, moving the slider to cut "17" would play whatever was recorded on that track, and you usually had a list that was constantly re-typed and updated, and kept under a plastic sheet so you could find the correct cut to match the program log.

Don Elliot
SpotsNow.com
Hollywood, Calif.

Seeing two recent articles prompted me to share a couple AM memories.

The RCA 250-watt transmitter had several interesting features (*Reader's Forum*, Dec. 21). The lever shown on the front of the transmitter was used to switch between two separate oscillators. Another interesting fact: the wiring inside the transmitter was completely enclosed inside lead sheathing.

The rig used 203A tubes in the modulator and RF sections. I encountered a mid-1920s model at WRJN(AM) in Racine, Wis., while working there in the late '60s, early '70s. It was still in service as a backup rig when I left in 1977.

The other device, mentioned by Dan Hubbard (Feb. 15), was the Gates' Spotmaster ST-101. They had one where I worked at WKTS(AM) in Sheboygan, Wis., in 1966–67. At the time it was used for intros, outros and beds of various programs more than for actual spots. Our chief engineer, Carl Hovey, kept the device well maintained and we seldom had problems with it.

For spots we had several Magnecord PT-6 decks. As Dan mentioned, one could be quite adept at rewinding, threading and cueing tapes. Dan neglected to mention the pressure one was under to get the next three-inch reels threaded and cued up while another was playing its 30-second spot.

That reminds me of another station — WPLY(AM), Plymouth, Wis. — where all our audio was funneled into a Gates "Producer" console. For those who may

See LETTERS, page 61 ▶

GUEST COMMENTARY

Broadcasters Should Rethink AM Stereo

While IBOC Won't Save AM Radio Anytime Soon, Stereo May Be the Band's Most Viable Boost

by William Norman Jr.

The author is owner of AM station WNMB in N. Myrtle Beach, S.C. In December his station added C-Quam stereo to its service.

Those of us who are AM broadcasters can sit and ponder the inequities bestowed on our medium. Some say the long list began when the FCC, in an effort to boost terribly poor FM listening, authorized FM stereo and adopted a standard for it, yet denied AM stations the same opportunity.

Then when AM stereo was authorized came the famous "marketplace" decision, which led to five competitors vying for AM stereo business while most broadcasters decided to wait and see what would happen.

Finally, C-Quam was designated as the "standard," but for many early enthusiasts, it was too late in the game. Several early AM stereo stations turned off their pilots and resumed mono operations.

Except for some niche broadcasters and the rise of news/talk radio, AM has been in the doldrums in many markets for 20 years. The latest less-than-bright spot on the horizon has been IBOC for AM digital broadcasting. Early reports have indicated problems that could spell permanent inequity for those of us in AM.

There are those who tout digital/IBOC as the salvation of AM radio. It may be so, but not now and not anytime soon. What broadcaster wants to have digital-only during daytime hours? It's what we are being told about IBOC now, and there are other serious questions. In time the problems will be worked out, but can our medium stay the course with its present trend over the next decade?

We can sit and ponder these things, become upset, watch our blood pressures rise and continue to watch the long-term viability of AM radio deteriorate, or we can do something for ourselves. We can do what we should have done in the first place — broadcast in AM stereo and promote it like crazy.

Bill Norman

Those stations that still have AM stereo available but are not using it should clean up their gear and turn it on. Those who never bothered to invest in converting to stereo should choose to do so now.

Local promotion

The truth is AM stereo sounds fantastic.

Recently in North Myrtle Beach, S.C., a listener was looking to buy a new Ford Expedition. He was becoming familiar with the sound system. He hit the button, pushed the FM side and it sounded good. He pushed the switch to AM and began to "seek" across the dial. The radio stopped at 900. A little light came on just like on the FM side and illuminated the letters "ST." Separation filled the interior of the Expedition and the sounds of "I Saw Her Again Last Night" by the Mamas and the Papas had the guy singing along in just a moment.

Then he looked at the dial and said, "Whoa, this is AM?"

Stereo. Awesome. How can it be? He called me at the radio station and I told him all about it. He drove the Expedition home, but he hasn't again touched the tuning on the radio. It's right there where that little stereo pilot light is lit.

If broadcasters endorse AM stereo and invest a little money to put it on the air, will miracles happen? Will AM be assured a continuing place in the lives of people? It is not without possibility. Most things that are accepted and win a place in society don't happen overnight. The road is a long one. But we have to make a start. The time is now.

One person listening bought a car. He's already excitedly told others. Things begin this way.

There are still new AM stereo receivers in the marketplace. Now primarily in Ford and Chrysler products, when radio stations get on with stereo and listeners become familiar manufacturers will listen too. At the moment, there are no portable AM stereo radios of any volume sold in America; however, we can buy several Sony models and have them shipped direct from Japan.

Our station in North Myrtle Beach, S.C., is doing just that and we've got a local retailer who will put them on shelves. We'll also promote by giving away some on the air. We'll also use some receivers for AM stereo by Jeff Beck, who has gone to the next generation of technical advancement.

Broadcasters can buy brand-new transmitters, brand-new AM stereo generators and mod monitors today, and they are improved greatly over the ones we bought in the 1980s, which is a major point missed by those who say of AM stereo "been there and done that."

AM stereo is doable. It is the best and most viable boost for our medium. Whatever happens with digital, we all know analog will be around for a long time.

No loss

I've been told some broadcasters turned off their AM stereo because of some reports about a slight loss of coverage area compared to mono broadcasting. Please allow me to share that I owned and operated WZKY(AM) in Albemarle, N. C., and broadcast in AM stereo every day since 1984. I never noticed any loss of coverage myself, and I never ever had the first complaint from any customer or any listener about any loss of signal.

My friend Matt Smith bought the station from me and he still broadcasts in stereo today. It's on 1580 and it's got the best high AM band coverage you'll hear anywhere.

Having just put AM stereo on WNMB, I can tell no signal coverage difference from our mono days, but I can tell a huge difference in the fidelity. The stereo is better and we were darn good in mono using an Optimod 9200.

So, fellow broadcasters, let a snowball begin now. Make an investment in your medium and in your own future. Put AM stereo on the air and start educating the people in your community.

For more information, visit the AM stereo section under WNMB Features on www.wnmb.net.

◆READER'S FORUM◆

Letters

▶ Continued from page 60

not remember this unit, it had two line-level audio channels and a set of selector switches that chose what audio fed what pot. That made life with a rack full of PT-6s interesting too. One could actually develop quite a skill at cueing records and tapes while reading live copy or news.

And I should mention we did jingles off the tapes as well.

Dave Dzurick
Tucson, Ariz.

During my days as a budding young disc jockey, I [visited] WBBF(FM) in Rochester, N.Y. sometime in 1961, and I walked into the transmitter building, which also housed the studios and transmitter at the time.

The piece of equipment installed over the leftmost two turntables was the "Gates Spot

Tape." I Googled it and found *http://mcnally.cc/spottape.htm*. The Web site has a picture and stories about the behemoth.

The Spot Tape was the hardest-working machine in the building. Of course they had to go from Spot Tape to transcription back to Spot Tape, and usually it took about 15 seconds to rewind. The tape "belt" had a hole on the left side of the beginning of the belt, and at the end. A photoelectric cell would sense the end of the tape and/or the beginning, so it was almost cued up depending on whoever dubbed a given production.

This was a successful operation, but until it was sold to Lin Broadcasting in the mid-'60s, it was still a low-budget operation. Spots were cut on a lathe disc cutter until the Spot Tape arrived.

The Spot Tape worked like a dog until about a year later when I walked into the station one day and one of the turntables had been removed and replaced by a Gates Criterion cart machine. There also was one loaded in the rack right below the RCA limiter. The station's jingles were dubbed onto a "C" (the big) cart, and they had just begun putting spots on the "A" carts.

Not only did I finally get to work for WBBF (twice), I was one of the program directors. It was a hometown kid's dream come true.

Dave Mason
KOGO(AM)
San Diego

More Letters On Page 62

How to ...

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◆READER'S FORUM◆

More AM Memories

I also have memories of the Spotcaster 101 that reminded me of a player piano roll inside the case. It had letters and numbers on the front so you could cue up the correct commercial. One of the worst adventures with the machine was when the roll inside came off the trolley and flapped away while you were doing a live bit or trying to re-cue the next commercial.

The other great feature was when you were in a hurry and wanted to record something new, usually you erased the wrong commercial and had to redo both; lots of fun in those days. My first encounter with that machine was at my first radio job in Burlington, Vt., at WJOY(AM) in 1962.

In 1963 I worked in Hartford Conn., at WDRC(AM) and we had at that time our own engineers so I got spoiled. However I returned to Burlington in 1966 and encountered the same system as referred to in Steve Hafens' letter (Feb. 15). We also had an FM in 1967 that featured the IGM automation system from Bellingham, Wash., that worked the same way.

The reels featured a small metal strip that would trigger the next reel. There also were tones on the reels that would trigger commercials played from a carousel that held about 20 cartridges with commercial content. The company then started a background music system that worked somewhat the same way, but didn't play commercials.

The younger people in today's radio stations with computers doing all the work don't know what fun they were missing.

George Goldring
Radio Vermont Group
Burlington/Waterbury, Vt.

I enjoyed the letter about the Gates 101 (*Reader's Forum*, Feb. 15).

I do have a Gates ST101 with the original instruction book and factory service updates and notes. Dates go back to 1959. The 101 worked when I boxed it and put it storage. It even has several old spots on the tape that sounded pretty good. All knobs are original and the meter looks good and works.

Bill Boyer
WA3YOX
Ocala, Fla.

KOLO(AM) 920 in Reno, N.V., had two [Gates 101s] in their master control studio in the El Cortez Hotel in the early to mid-1960s. With a pair of them you could do back-to-backs if you duplicated the commercials on each machine and didn't play any real short spots. I think they were eventually replaced by Sparta cart machines. The station at the time was owned by Donrey Media Group and was one of the best stations in the market in my opinion — a very classy station.

I saw a clever use of the 101 in the mid-1970s in Rockingham, N.C. An automated station had one of them wired as a source to an automation system. The unit sat on the receptionist's desk. The tracks were used to record an announcer giving the temperature; a different track on the 101 for dozens and dozens of temps.

Every 15 minutes or so, the receptionist would check the actual outside temperature and adjust the 101's track selector accordingly so the next time the automation called for the current temp, it would play that track.

Paul Michels
Director of Group Operations
Curtis Media Group
Raleigh, N.C.

Dan Hubbard asked about the Harris (Gates) 101 broad-tape spot machine.

We had one at WICC(AM) in Bridgeport, Conn., around 1960; it was a genuine POS — played two spots at once, two jingles at once, two of anything at once. It went back and the brand-new BE cart machines came in its place. We started replacing our homemade acetate discs and our agency-produced 16-inch ETs with carts, which our PD recorded with two seconds of dead air at the beginning; he never believed they were instant-start.

Life became immensely easier, but we told the newcomers what it was like in the Good Old Days when we had to cue 45s, album cuts, promos and commercials on four turntables.

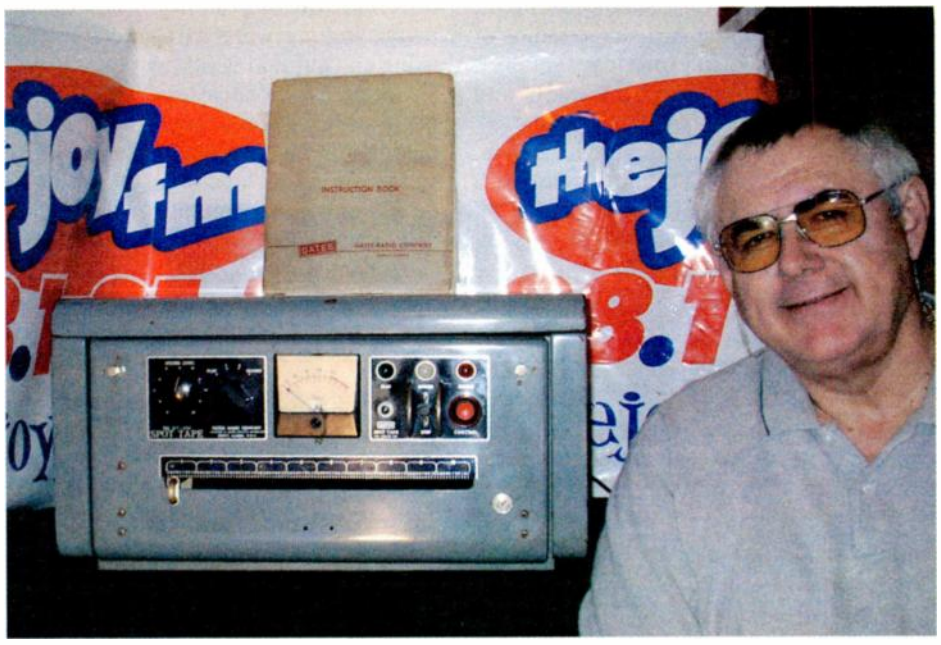
Tom Carten
Wilkes-Barre, Pa.

I enjoyed Dan Hubbard's letter. I didn't know if there was anyone left in the business who remembered the Gates 101 Spot Tape machine.

We still have two of them in our basement. I always felt they were so unusual that I didn't have the heart to throw them out.

Frank Luepke
General Manager
KIWA(AM-FM)
Sheldon, Iowa

More letters on this topic appear on pages 60-61.



Bill Boyer and his 101

Nice Job, BEC

We tip our hats to the planning committee of the NAB Broadcast Engineering Conference. The list of presentations this year is impressive.

For those of us who attend frequently, conventions seem to go in cycles. One year management tracks are burning with ideas and cool speakers, other years not. Some years you can't move on the exhibit floor without bumping into new products, others not.

This is an up year for engineering sessions, due in part to the wealth of material available involving HD Radio and last year's hurricane season. But organizing a good conference isn't simply a matter of waiting for the calendar to cycle around. It's not easy to put these events together, to keep them interesting for repeat attendees and to attract top-flight material.

Organizers at NAB, their partners at SBE and the engineers who serve on the conference committee meet twice a year to plan. They solicit papers and slog through literally hundreds of proposals. They must agree on which papers are worthy of presentation. They develop themes into which these papers fit, so we in the audience can budget our limited time.

Organizers must filter out proposals that are little more than sales pitches, which we can hear on the exhibit floor. But they can't simply dismiss a paper because it comes from someone with a sales agenda; some of the finest research and engineering is conducted by manufacturers. If a developer has a worthwhile concept, you want it on the program.

According to NAB officials, the process also gives "very high weighting" to proposals from station engineers. Case studies outline how problems have been solved at the station level, a particularly useful kind of paper.

Selection committee members are practicing engineers. The chair rotates between radio and TV representatives. This year's chairman is Tom Ray of Buckley Broadcasting; radio members include Steve Davis of Clear Channel, Marty Hadfield of Entercom and Norm Philips of Susquehanna. They volunteer their time and expertise for our betterment.

Some presenters and organizers contribute to Radio World or have written about their topics here. Others have no affiliation with us. Regardless, we think the planners of the Broadcast Engineering Conference did a great job this year.

— RW

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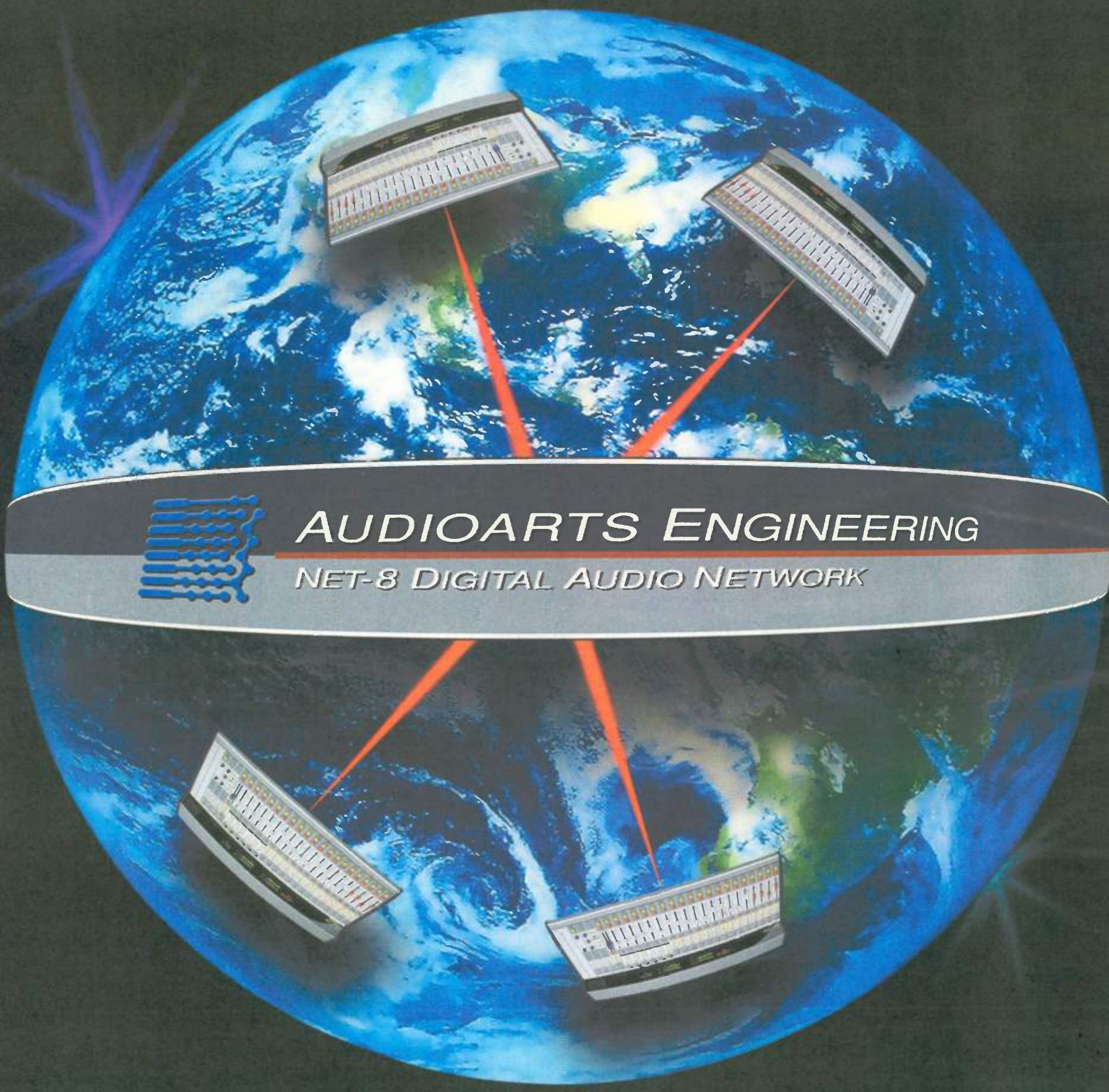

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