MISCONCEPTIONS ABOUT TOWERS & RF. Page 24

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IBOC Power Levels

Barry McLarnon says it's time to call a halt to the AM 'experiment.'

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Clear Channel Reads A WebSideStory

Group uses HBX Analytics to analyze online visitor activity.

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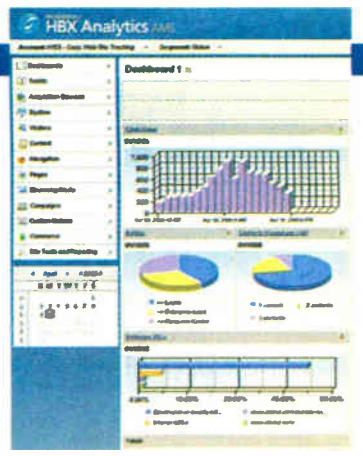

Radio World

$2.50 The Newspaper for Radio Managers and Engineers July 19, 2006

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▼ Snaptune One software allows users to identify 'that song on the radio' and record it too.

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▼ Chuck Dubé tries out the ADA HD Pro Dual Radio Monitor; Doug McLeod tries on the AKG HSC 171/271 headsets.

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Stations Seek Fix for Part 15 Overkill

Broadcasters Get Stomped, Listeners Offended

by Leslie Stimson

Some of the satellite radio plug-and-play devices flagged by the FCC for exceeding RF emission limits have been altered. But questions remain among broadcasters about how to prevent interference from these and other low-power wireless FM modulating add-on devices, including some models of iPods or MP3 players.

Broadcasters are concerned about what they say is growing interference from mobile devices as well as indoor and handheld short-range FM modulators. Indeed, tests on several devices conducted for the NAB showed several exceeded Part 15 field strength limits and were substantially wider in bandwidth than the 200 kHz-wide FM channel (see sidebar page 10).

The issue involves technical matters not usually of interest to those outside of radio engineering circles. But it erupted into public awareness when listeners and

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Need Music? CUEgle It!

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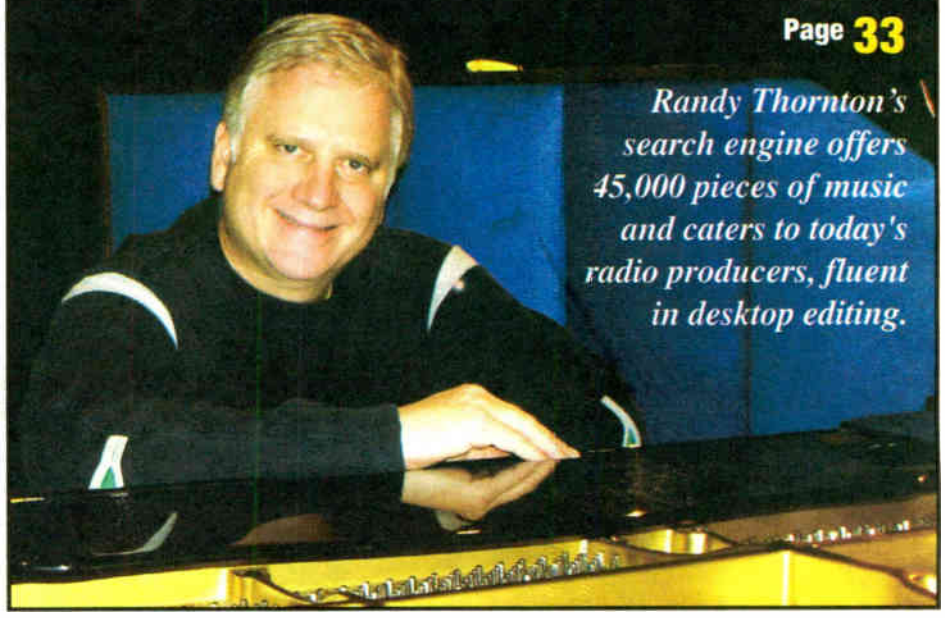

Randy Thornton's search engine offers 45,000 pieces of music and caters to today's radio producers, fluent in desktop editing.

Engineering a Major Deal

Cumulus Tackles Susquehanna Integration

by Randy J. Stine

ATLANTA Gary Kline admits to never facing a larger assignment in his 20-year career as a broadcast engineer.

Integrating the engineering and IT departments of Cumulus Media Inc. and Susquehanna Radio in a six-month span has challenged both his time management skills and resourcefulness. Kline believes his work and the efforts of others have resulted in streamlined station-level engineering and IT departments for the newly created Cumulus Media Partners.

The consolidation has, however, come at a cost to some former Susquehanna

See DEAL, page 12 ▶

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World Radio History

NEWSWATCH

Should Translators Originate Programming?

WASHINGTON Several parties weighed in on a proposal to allow stations to originate programming on FM translators. Some LPFM supporters embraced the idea.

Randal Miller, president of the Miller Media Group, has proposed that FM translators be allowed to operate much like low-power TV stations, with the opportunity to cover local events like city council meetings and more high school sports contests (RW, June 21).

NAB opposed the proposal, saying to do so would turn translators into mini stations. The commission has rejected such requests before and those who support the proposal haven't offered anything new to justify a change, the trade group argued in comments to the FCC.

Currently, FM translators operate as a secondary service to relay a full-power station's programming into areas that cannot receive the signal because of terrain obstructions or distance.

NAB asked the FCC to dismiss the petition.

NAB to FCC: Finish Terrestrial Repeater Rules

WASHINGTON NAB is urging the FCC to finalize its terrestrial repeater service rules for satellite radio. Specifically, the association wants the commission to specify that satellite radio companies are national-only services and prohibit the satcasters from using any technology to permit delivery of content that would be aired on a receiver in one location that differs from content that would be aired on a radio in a different location.

A coalition of licensees in the band adjacent to the repeaters has delayed building out advanced wireless services, due to concerns over interference from the repeaters, according to NAB.

Public Radio CEs Form Association

A number of public radio engineers have decided to proceed in forming an association, one open to technical personnel of any public radio station or related groups. It will be called the Association of Public Radio Engineers. The group has met to form a board and committees.

Vice Chair Dan Mansergh, director of engineering at KQED(FM) in San Francisco, said details would follow once he and Chair Ralph Hogan of Northwest Public Radio receive responses of interest from the board members.

Radio Board Asks How to Push IBOC

WASHINGTON The NAB Radio Board sees the HD Radio rollout as a priority and its members are reviewing options for boosting its success, according to the trade association summary of its June board meeting.

As far as its goals on Capitol Hill, association President/CEO David Rehr gave a status report on NAB activities to promote the long-term success of over-the-air radio and said the organization is working on a number of regulatory fronts

See NEWSWATCH, page 6 ▶

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Media Ownership Is Controversy Magnet

by Leslie Stimson

WASHINGTON As broadcasters, consumer groups and the public ponder what to tell the FCC about how to regulate media ownership, one thing is given: The question is controversial, perhaps even more so than the last time the commission tried to specify how many stations can be owned in a market and controlled by one company.

Agency officials wouldn't hazard a guess; but insiders peg the process as lasting at least until the end of the year.

Since passage of the '96 Telecom Act, the commission has been charged with reviewing the rules every two years and weeding out archaic restrictions in the age of multiple media outlets. In 2003, the last time the FCC voted to revise media ownership limits, grassroots groups felt they came into former Chairman Michael Powell's decision-making process late in the game.

This time, the movement has had time to gear up for a big fight. Groups such as the Prometheus Radio Project, AFTRA, Common Cause, Consumers Union and the Future of Music Coalition formed an alliance to fight media consolidation in advance of the commission's decision in June vote to review media ownership rules.

Stop big media

The coalition has created a Web site, *www.stopbigmedia.com*. It states it "will work to turn back the tide of consolidation and promote an American media system that includes the voices of people of color, women, labor, immigrants and other under-represented communities."

The group wants the agency to provide a lengthy public comment period on the issue and seek significant public input on the matter. It also wants the commission to strengthen the public interest obligations of broadcasters and tie those more heavily to license renewal.

The group has a counterpart on Capitol Hill in The Future of American Media Caucus, led by Rep. Maurice Hinchey, D-N.Y. He led the fight in the House against the 2003 effort to ease limits.

Even on the day the day in June the commission voted to re-start the process, debate was fierce, both among the commissioners and afterwards, when reactions started pouring in.

At its first public meeting since the appointment of Robert McDowell returned the commission to a full complement, all five commissioners voted in favor of conducting the review. The Democrats, Michael Copps and Jonathan Adelstein, disagreed with certain aspects of it.

In its Further Notice of Proposed Rulemaking, the agency seeks comment on local radio ownership limits, including the definition of a radio market; local TV ownership limits; the newspaper-broadcast cross-ownership ban; radio-TV cross-ownership limits; the dual network ban; and UHF discount on the national TV ownership limit.

At present, one company can control up to eight radio stations in a local market, depending on the total number of stations in that market. Congress repealed a national radio ownership cap in 1996.

In markets with 45 or more radio stations, a company may own eight, only five of which may be in one class, AM or FM. In markets with 30–44 stations, a company may own seven, only four of which may be in one class. In markets with 15–29, a company may own six, only four of which may be in one class; and in markets with 14 or fewer, a company may own five, only three of which may be in one class.

It could be my dissenting colleagues who are rushing to judgment today. I think they want to grade our performance and give us an 'F' but it's only the first day of class.

— FCC Chairman Kevin Martin

The commission is asking how to address issues raised by two federal court decisions striking down most of its 2003 rules and requiring the agency to do a better job of justifying any limits on media ownership.

The 2003 rules that were stayed pending appeals included: a local television multiple ownership rule; an increase in the national television ownership limit from 35 percent to 45 percent; and a retention of the dual network rule. The commission had also developed a single set of cross-media limits to replace both the radio/television cross-ownership rule and the newspaper/broadcast cross-ownership rule.

The revised radio market definition now in effect replaced the signal contour overlap method for determining how many signals are in a market with a geographic market approached assigned by Arbitron Radio metros as reported by BIA in rated markets.

Hearings outside Washington

Chairman Kevin Martin noted that the FCC intends to conduct independent studies to learn, for example, how people obtain news and to collect information on media competition, localism, minority participation and the impact of ownership on "family-friendly" programming.

Martin said public participation is "integral" to the process; to that end, there will be six public hearings on media ownership located outside Washington.

There will also be an extended public comment period of 120 days and the commission will devote a special Web page on its Internet site to media ownership, to make it easier for the public to keep up on what's happening with the proceeding and to more easily submit their comments to the agency.

Democrat Michael Copps said the public needs to be more included in the process and the FCC more willing to ask tough questions. He also said localism should have more prominence because it is linked with ownership. The commission should ask, for example, if "it is really good for distant powers in New York or Los Angeles to dictate so much of what we see, hear and read," he said. The most the new notice does, he said, is commit FCC staff to compile data from its "dated" localism record.

Martin is folding the formerly separate localism proceeding into the ownership review; this was a surprise to many observers. Activist groups were disappointed by that move; they've been trying to bring broadcasters' public interest obligations to the forefront of the ownership debate.

Media Bureau Chief Donna Gregg said the move means information from localism hearings and approximately 80,000 comments from the public in that proceeding will now be considered in this action.

Adelstein said the commission was launching "a shallow process." Martin responded that the process would be "neutral and even-handed."

"It could be my dissenting colleagues who are rushing to judgment today. I think they want to grade our performance and give us an 'F' but it's only the first day of class," Martin said.

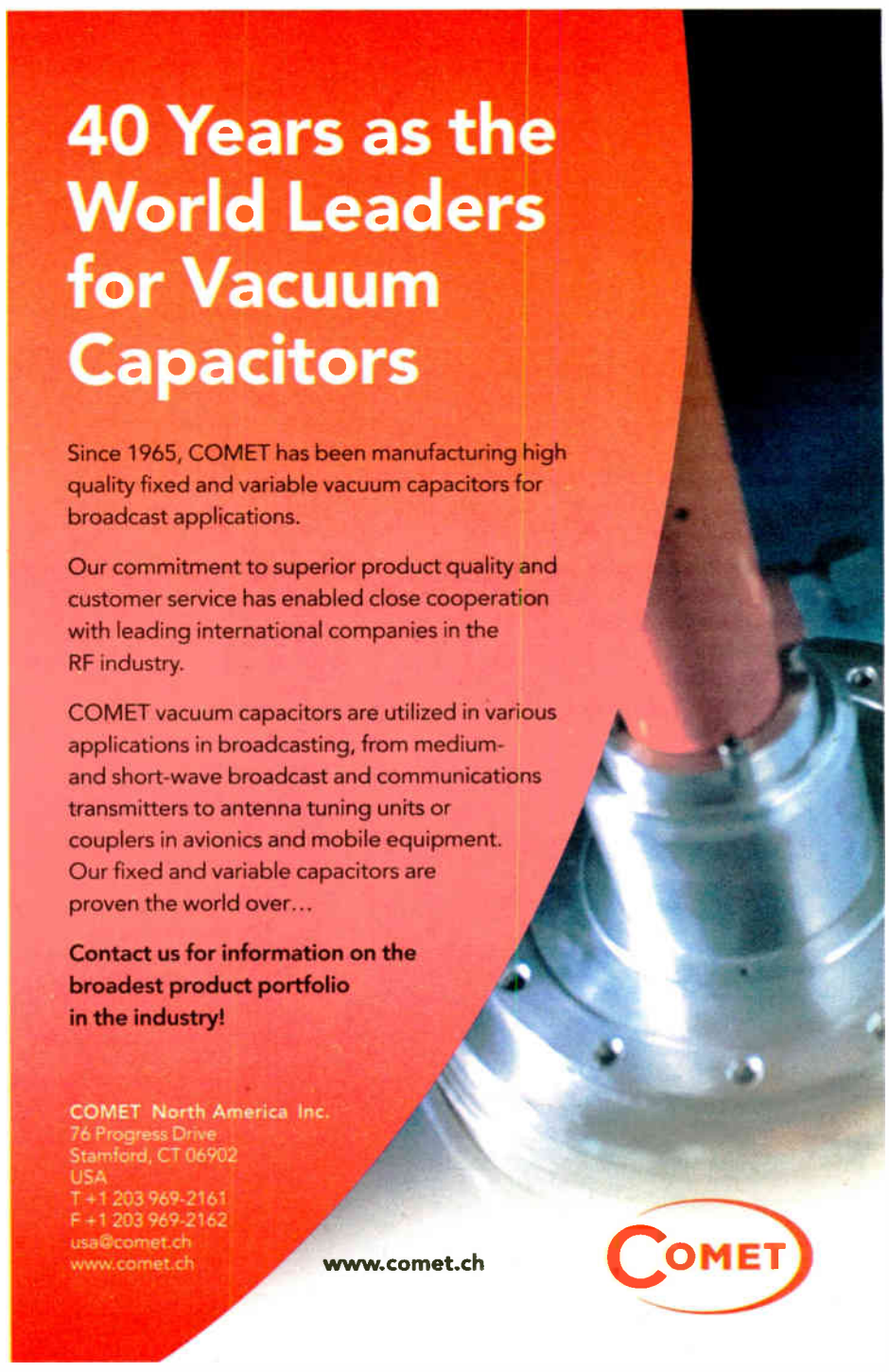
Reaction to the start of the review was strong.

Rep. Hinchey, D-N.Y said, "Chairman Kevin Martin has made it quite clear that he intends to overturn the existing rules, which are our last backstop against the concentration of print and broadcast media into the hands of a few major corporations."

In a statement, Hinchey said the public made it clear in 2003 it opposes relaxation of media ownership rules, and that by waiting until he had a majority on the commission the chairman has introduced "partisanship into an issue that is much bigger than politics."

The American Federation of Television and Radio Artists was "extremely disappointed" in the FCC's decision to launch another ownership review. AFTRA lobbyist Thomas Carpenter said in a statement that the 120-day comment period is too brief for meaningful public discourse and that six public hearings is insufficient.

NAB, on the other hand, was pleased, and said in a statement it hopes the outcome "brings greater clarity to rules that preserve free, over-the-air broadcasting's role as the premiere news, information and entertainment source for tens of millions of Americans."



World Radio History

AES to Look at Loudness, Transport

Dave Bialik is ramping up for another AES show.

"Do you realize it was 18 years ago that I threw the first AES/SBE digital broadcast symposium together?" he asked me. "That's when IBOC was first introduced; Mike Rau got shouted down for doing Eureka; Paul Donahue and Tony Masiello were the ones introducing Project Acorn.

"All the players have changed, of course. Rob Briskman retired. NAB stepped out of trying to be a proponent."

Loyal RW readers recall those debates, held at AES and other industry events. These were the arguments that shaped the industry's path to digital radio.

Today many of the names indeed have changed and debaters moved on to other issues. But autumn will roll around soon and once again Bialik will organize broadcast sessions, this time for the 121st Audio Engineering Society Convention, to be held in San Francisco.

Beyond satellite

Bialik is well situated to watch technology trends play out. I asked him for his perspective on how things have changed, including his "big picture" view of how digital radio has developed.

"IBOC has won," he said. "Players have merged. Digital Radio Express has disappeared from that side of things; so has Ted Schober. Instead of development and how it will work, [session] topics now are more about implementation, receiver adaptation and customer adoption."

In his view, XM and Sirius did things right by involving receiver companies right at the start.

"And by aligning with automotive companies, they got a hell of a foot in the door. I'd like to see the IBOC company, Ibiquity, making the same moves. We still have to remember what Eddie Fritts said in the early 1980s: Most radio listenership is in the car. You can make the nicest home receiver in the world. [But] when *you're* home, how often do *you* turn on the radio?"

Bialik ponders his own use of media. This man who makes much of his living in broadcast notes that he's listening more to streaming than anything else of late.

"I think the next big thing that's going to hurt terrestrial more than satellite radio — and hurt satellite, too — is WiMAX," the widespread implementation of broadband wireless. "Hey, I can plug my PDA into where I was going to plug my iPod, and I can listen to any radio station or audio source on the Web! Why do I need anything else?"

He finds himself listening to WAMU (FM) off his PDA interface. "If *I'm* driving around New York listening to Washington …" He doesn't complete the thought.

Photo courtesy AES

AES panels draw a variety of experts. Last year, digital radio was the topic for David Layer, Mike Lyons, Leonard Kahn and Skip Pizzi.

Bialik feels such trends could lead to more diversity in content. "I personally believe that's one of the reasons public radio has come [to the] forefront in programming, to the point they're now making movies about it," he said, referring to the recent "A Prairie Home Companion."

Another trend of note is convergence. As Bialik puts it, "Everything's a mesh now."

"I have a client, a startup with a popular Web site, enhanced with streaming audio. They want to plan to be able to do video; they want to be able to do production; and they've started a recording studio. This is what a lot of companies are doing that were not traditionally broadcast companies. They're starting their own communications hubs, for internal as well as external purposes. … Multimedia is being utilized by a lot of people."

So where does this lead Bialik as he builds the AES broadcast sessions?

On the agenda is "Innovations in Digital Radio." Topics include multicast, translators, watermarking, satellite, recorders and IBOC. He expects participants from XM, NAB, Neural Audio, Linear Acoustic, the Consumer Electronics Association, NPR Labs, Ibiquity and Digital Radio Mondiale. (Note that speaker lists are still being put together and may change by show time.)

Loud

Reprising a seminar from last year, AES will feature a "Loudness Workshop" moderated by Emil Torrick, father of the Volumax and Audimax. "We did the first one last year in New York," Bialik said. "In radio, what does the program director say? How does he get to be No. 1 fast? 'Make me loud.' Is loud good or bad? How do you use loudness properly? It's more of a concern now. People are noticing dynamic range now."

Bialik points to a recent New York Times article about a person who threw out his stereo equipment in favor of listening on his iPod, only to realize he had sacrificed dynamic range in all his music.

"The codec people are noticing that; the radio people are noticing that; the recording studios are definitely noticing that. Loudness is more and more an issue in the digital age; you can't overmodulate anymore. Loudness is important." Speakers will represent TC Electronic, Microsoft, Orban/CRL and Dolby.

Another panel will look at "Audio Transport for Broadcast Over Distance: Phone, Internet, Satellite" — essentially, "how to get there from here."

"The last time we did this, Switched 56 was just coming about," Bialik said with a chuckle. Topics include wireless T1, IP and other channels. Not only radio stations care about these. "More people are streaming now. I have a lot of corporate customers saying they want to stream and they need to get audio to their streaming provider. You can't just go to the phone company and say, 'Hey I want to talk to special services' and ask for a 15 k line. They look at you like you're nuts."

Bialik has lined up participants from the United States Telecom Association, DSI RF Systems, APT and Rainbow Broadband, with more to follow.

Also, Telos Systems and Boston's WZLX(FM) are putting together a "Broadcast Tutorial: Mixing Live Radio Morning Show for 5.1 Broadcast."

Another session looks at "Surround Sound for Digital Radio." Moderator Dave Wilson of CEA will host panelists from Neural, Dolby, Fraunhaufer, SRS Labs and Ibiquity, and there may be demos.

"Considerations for Facility Design" will be moderated by Zoe Thrall, studio manager for the Palms in Las Vegas; speakers will take part from Walters-Storyk Design Group, Meridian Design Associates, Video Corp. of America and Radio Systems.

"Broadcasting in the IP Age" will include discussions of streaming, automation, control and delivery; speakers are scheduled from AOL, PBS, Axia, Radio Systems, APT and D.A.V.I.D. Systems.

And after reading about the new Association of Public Radio Engineers in Radio World, Bialik went out and secured its participation with an informational panel on public broadcasting engineering initiatives and solicitation of input for priorities for the group.

Bialik is still looking for participants at this writing. We'll have details about the convention in a preview closer to the event, which is in October. For more about the show, visit *www.aes.org.*

From the Editor

Paul J. McLane

World Radio History

GUEST COMMENTARY

AM IBOC Power Levels = Mystery

It's Time to Call a Halt to the AM IBOC 'Experiment' and Start Talking Alternatives

by Barry McLarnon

In his article in the June 7 issue of Radio World (page 22), Steve Davis, senior vice president of engineering for Clear Channel Radio, provides some information about the power levels in the AM IBOC primary sidebands. This is a useful contribution to the IBOC lexicon, but I have to ask the question: Why aren't these details common knowledge, especially amongst those who are actively implementing the technology?

While it *is* common knowledge that the digital power level in FM IBOC is –20 dBc, most folks in the industry have simply assumed that the same number applies to the AM system, and IBOC promoters have certainly not gone out of their way to disabuse them of that notion. Davis focuses only on the primary sidebands, and doesn't give the overall power level either, so let it stated be here: The digital power level in the AM IBOC system is approximately –12 dBc (more precisely, it is –11.7 or –12.3 dBc, depending on the setting of a power control that is specified in the NRSC-5 standard).

Yes, that's right — the digital power level, relative to the analog carrier power, is fully 8 dB higher in the AM system than in the FM system.

Davis goes on to mention that the digital carriers are modulated as complex conjugate pairs, orthogonal to the AM carrier. This is done for the purpose of "minimizing interference to existing analog operations." This is true as far as it goes, but it omits some important details.

The complex conjugate modulation actually does not apply to the primary digital sidebands, the ones upon which his attention is focused. More important, he does not mention that the sole purpose of this modulation technique is to keep digital noise out of analog receivers tuned to the host IBOC station.

Two audio streams

This technique is not always successful, as both lab tests and practical experience in the field have shown. But the real point is that it does *absolutely nothing* to reduce interference to stations on adjacent channels. So the "existing analog operations" of which he speaks consist of the IBOC station itself, period, full stop.

Another fact about AM IBOC that seems to be uncommon knowledge is that the hybrid system has two audio streams, a 20 kilobits-per-second "core" stream and a 16 kbps "enhanced" stream. Stereo audio is only available when the less-robust enhanced stream kicks in. When talking about the digital coverage they're obtaining, AM IBOC enthusiasts invariably neglect to mention whether they're achieving stereo audio.

Davis also stated, "None of this guarantees that AM IBOC signals won't create interference to other AM analog stations in the field, nor does it guarantee that they will." I beg to differ. The nature of the AM IBOC modulation *does* virtually guarantee that it will create interference to other stations. If you don't accept that, well, you're simply in denial.

Let's take a step back and see how we got here. When IBOC was first conceived back around 1990, it was envisioned as a system initially for the FM band.

[Editor's note: In 1990, the concept of digital radio using COFDM was unveiled at the NAB convention in Atlanta. Project Acorn was born in 1991 to find an in-band on-channel solution for the U.S., the same year CBS and Gannett established USA Digital Radio, joined later that year by Westinghouse.]

Given the nature of the modulation (i.e., a wideband system with noise reduction properties and "capture" effect), plus its use in a VHF band where propagation is nominally line-of-sight and time-invariant (in fixed reception), it seemed plausible that stations could add digital "saddlebags" and create a hybrid analog/digital service, en route to a full digital transition at some future date. To be sure, there would be interference problems, and there would be casualties along the way; the tradeoffs involved are just beginning to come to light, and the jury is still out on whether the sacrifices will have been worthwhile.

The digital power level, relative to the analog carrier power, is fully 8 dB higher in the AM system than in the FM system.

Applying the hybrid IBOC concept to the AM band, on the other hand, is simply foolhardy. Amplitude modulation has no inherent protection against interference, and the band is already overcrowded, with about 5,000 stations in the United States and Canada shoehorned into little more than 1 MHz of spectrum.

NAB insistent about AM

The channel spacing is a mere 10 kHz, even though stations may occupy a nominal 20 kHz bandwidth, and nighttime skywave propagation complicates the interference environment immensely. If anything, the band needs to be thinned out, not overlaid with digital noise generators that lay waste to defenseless analog receivers tuned to the channels adjacent to IBOC stations.

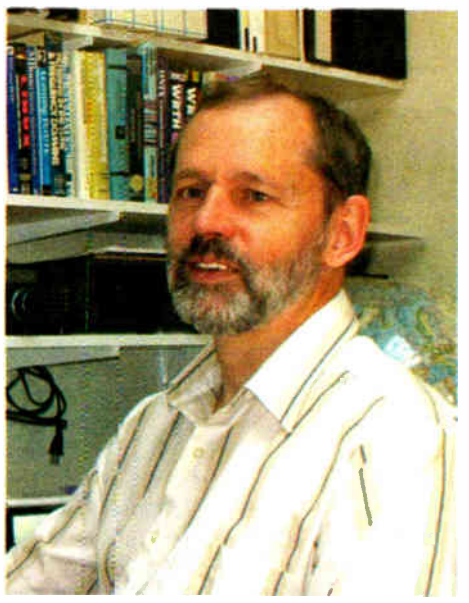
Most of the early IBOC developers did not bother with an AM system, probably realizing that it was an untenable engineering problem. However, when the NAB ended its brief fling with the Eureka-147 DAB system and hopped aboard the IBOC bandwagon, it decreed that there *had* to be an AM IBOC system, or the whole concept of digital radio wouldn't fly.

USA Digital Radio dutifully developed an AM system, though, one suspects, without a great deal of enthusiasm. The company actually subcontracted most of the development to an aerospace firm.

This was the progenitor of the Ibiquity system that we have today. It seems very unlikely that, on its own, this system would ever have seen the light of day; it got here by riding the coattails of the FM IBOC system.

Some of its problems were already quite evident in the Ibiquity lab test results, but they were downplayed in the National Radio Systems Committee evaluation of the results. Again, the heavy hand of the NAB was evident here: IBOC was the only acceptable approach for digital radio, and it would not be acceptable unless there was a system for AM as well as FM.

The number of AM IBOC stations on the air is still very small (about 2.7 percent of the AM stations in the country, by my reckoning), and there is still no FCC-authorized nighttime operation, there is still no FCC-authorized nighttime operation, yet a number of instances of serious interference have already surfaced. The reports have been largely anecdotal (comments on mailing lists, private communications, etc.) up to this point, but they represent the tip of a very large iceberg.



Barry McLarnon

Though most of the daytime problems result from groundwave signals on second adjacents, dramatic levels of interference from first-adjacent skywave signals during critical hours have also given many of us a taste of what nighttime hybrid AM IBOC would bring: a quagmire of digital noise.

Despite a certainty of across-the-board degradation of analog AM service, the backers of IBOC still see a silver lining in this cloud. What they gain is a digital service providing a single audio stream with very modest coverage and "FM-

See AM IBOC, page 6 ▶

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World Radio History

Newswatch

▶ Continued from page 2

to have the FCC deem satellite radio a national-only service.

Reports were provided to NAB board members on the status of streaming negotiations, technology advocacy and activities of the Digital Radio/Spectrum Integrity Task Force.

NAB: Public Service Is $10.3 Billion

WASHINGTON Local radio and TV stations generated $10.3 billion in public service in 2005. That compares to $9.6 billion in 2004, says NAB.

Hurricane Katrina and relief efforts after the tsunami in Asia made up much of the public service, which comprised a combination of airtime donated for PSAs and money raised for charity and disaster relief.

Not included in the total, NAB stated, were PSAs from groups like the Office of National Drug Control Policy that may have involved in-kind contributions or partial payment to stations.

The census also did not include the value of broadcast station personnel participating in community charity events such as AIDS fundraising walks, breast cancer fundraising drives and Toys for Tots campaigns.

Grimes Now Leads Continental

DALLAS Transmitter manufacturer Continental Electronics has a new president, Robert "Tony" Grimes, who was president of TRAK Microwave Corp. and served on the board of directors for Radyne Corp. He also has worked as manager of international projects for Harris Corp. His background includes 20 years of engineering design, marketing and sales, organizational development and presidential leadership, according to Continental.

He replaces John Uvodich, who had been president since 2001.

Uvodich left to pursue another opportunity in June, a spokeswoman said.

"Logitek's great support helped me get our new studios going."

"When I started working on the new studios for KAXE, I was new to radio engineering so everything was a challenge. To make things even more interesting, KAXE was the first USA installation of the Logitek Mosaic console. Fortunately, Logitek was there for me every step of the way. With help, I successfully integrated two new Mosaic-based studios and the central wiring area with our ENCO system—everything looks and operates great, and our operators love the setup. Our Logitek system has been running at KAXE for over a year now. Our studios complement the wonderful look of our new facility and the Logitek system's flexibility is fantastic."

Dan Houg, *Engineer*, KAXE
Grand Rapids Minnesota

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AM IBOC

▶ Continued from page 5

like" quality.

In other words, the AM band in effect becomes an adjunct to the FM band, with each AM IBOC station adding one more channel to the lineup in a digital receiver. It no longer needs to be identified with the AM band at all — no more AM stigma!

Go all-digital now

This strategy may make sense to the bean counters in the large markets, but the price paid in lost or degraded analog service in outlying and rural areas is far too great. Why should these players be allowed to hijack the band and turn it to their purposes, at the expense of other legitimate users of the band?

It's time to stop the madness. There is certainly merit in bringing digital transmission technology to the AM band, but the hybrid approach embodied in the Ibiquity system is a non-starter. The only reasonable approach is to convert analog stations — or unused allocations for same, perhaps in the expanded band — to an all-digital system, and to establish the protection rules needed to coordinate their introduction into the band.

The nature of the AM IBOC modulation does virtually guarantee that it will create interference to other stations.

The Digital Radio Mondiale system has already shown the way to do this right. In order to provide the same degree of protection to co-channel analog stations as an analog AM station would, the digital station must run 6-7 dB less power, so a 1,000-watt AM would become a digital station running 250 watts or thereabouts.

Unlike the Ibiquity all-digital system, which occupies a bandwidth of 20 kHz, this new system should have a bandwidth of only 10 kHz, and thus finally put to rest the nighttime first-adjacent interference problems that plague the band. Even with this narrow bandwidth, the DRM system can provide a bit rate in the neighborhood of 25 kbps, and offer very reasonable audio quality. Check out some of the audio samples on the DRM Web site (*www.drm.org*).

For those Class A stations that still want to offer secondary service via skywave at night, the DRM parameters can be altered to support it. The Ibiquity system, whether hybrid or all-digital, does not support skywave reception at all.

Are we really ready to write off this unique asset of the AM band? Multi-protocol receivers (e.g., AM/FM/HD-R/DRM) are very feasible. It's time to call a halt to the AM IBOC "experiment," and start talking about alternatives.

Barry McLarnon of BDMComm is a Professional Engineer and independent consultant based in Ottawa, Ontario. He has worked in communication systems design, including digital broadcasting, for more than 30 years.

RW welcomes other points of view to radioworld@imaspub.com.

World Radio History

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World Radio History

HD Mods

▶ Continued from page 1

broadcasters began complaining about uncensored, unwanted language being received by car radios from devices in nearby cars that were re-broadcasting satellite content onto the FM dial.

Essentially, some satellite radio-equipped cars have been turned into miniature rolling radio stations, causing interference to listeners in other cars who were tuned, typically, to the low end of the FM band.

Broadcasters want to know whether it is the devices, or the installation methods used, that cause interference to terrestrial stations.

To that end, NPR Labs planned to run tests on several satellite radio so-called FCC Part 15 devices for several weeks beginning in late June "to demonstrate the frequency of occurrence and investigate the instances of excessive field strengths from FM modulators," said NPR Vice President and Chief Technology Officer Mike Starling, who is executive director of the lab.

Testing now

"Our issue is more over power and wide bandwidth," said Starling. "There could be some [devices] running at legal power but running excessive radiation because of how they're installed in a vehicle. We're just now getting a sample of FM modulators into the lab to see if we could make some generalizations about what might be a power issue."

NPR Labs briefed the North American Broadcasters Association about the test plan. NABA is made up of broadcasters in United States, Canada and Mexico and is a member of the International Telecommunications Union.

Starling said NPR sponsored a preliminary draft recommendation through the ITU and NABA that calls for an internationally recognized policy regarding FM modulated devices. The ITU has influence on manufacturers seeking to sell products globally.

The draft states: "NABA's preliminary studies indicate that while emission limitations of FM modulators (250 uV/m at 3 meters) do not generally appear to be problematic to other receivers nearby in adjacent vehicles and rooms, some combination of installation errors and consumer misuse are becoming increasingly common ...

"In mobile settings, switching devices are commonly provided to disconnect the external FM receiving aerial when the short-range FM modulator is in use. Improper connection or omission of these switches can result in direct radiation of the short-range FM modulator emission through the vehicle's antenna system. This can result in audible detection or interference effects of the short-range modulator on nearby receivers for up to 100 meters [about 30 feet] or more."

The modulator receives the satellite signal from the antenna, recognizes and decodes the information, converts it to an RF signal and wirelessly transmits that signal into the car stereo. Newer models are frequency agile, allowing consumers to select from anywhere on the FM band, from 87.9 to 107.9 MHz. They come with instructions to the consumer to choose a frequency that's unused by stations in their market.

I suspect some listeners just gave up listening to us because of the constant irritation of interference.

— Neil Hever, WDIY

But older models can come pre-tuned to a low frequency or allow the consumer to select from only lower channels on the band, said Starling. These are the same frequencies noncom and religious stations use.

Instructions for the Audiovox Sirius model SRSIR-001, for example, available on the Sirius Web site, state that the "FM Switching Box," typically used for the signal conversion, comes with a default setting to 88.5 MHz but can also be set to transmit on other frequencies, namely 88.1, 88.3, 88.7, 88.9, 89.1 and 89.3.

Bad consumer installs

The switch box, said Dave Wilson, director of technology and standards for the Consumer Electronics Association, usually is installed behind the car radio and has one output and two inputs: the car antenna and the audio output from a satellite tuner. If XM is turned on, for example, it will take the signal and modulate it onto an FM frequency; that signal is fed into the FM antenna input. When the FM receiver is turned off, a switch in the box disconnects the FM circuit and reconnects the car antenna.

Starling believes some consumers are installing the devices improperly, stripping a wire and taking the output of the satellite receiver directly to the antenna input of the car.

"The problem with that is, when you turn on the FM radio, the satellite signal is fed into the car, but it's also sent back up the antenna and radiated out of the car antenna so the car is acting like a station," said Wilson, who said this situation doesn't mean the products themselves are not compliant with FCC's Part 15 rules specifying a power limit of 250 microvolts per meter.

CEA seeks to address poor installations through a training program for installers.

Starling said once a car is turned into a low-power station, its signal can be heard on other cars for up to a quarter of a mile.

Tuning out

NPR has heard of complaints of interference from FM modulated devices to some member stations for the past couple of years, but complaints spiked this year as people began using devices given to them over the holidays, he said.

He cited WYPR(FM) in Baltimore and WDIY(FM) in Philadelphia as having the most problems with interference from FM modulated devices.

Those stations told Radio World in June that protests are still coming.

WYPR President/GM Anthony Brandon said, "The most vocal complaints are those who have picked up Howard Stern, and the sharp contrast to us is shocking," he said. The station airs a non-commercial news/talk format.

Brandon said listeners in the fringe areas seem to be hit hardest. WYPR operates at 10 kW. A station with a stronger signal, such as WAMU's 50 kW, may get fewer complaints, he believes. Brandon turned over approximately 60 complaints to the FCC.

Neil Hever, program director of WDIY, said he's afraid interference has caused considerable damage to his listenership, but he has no way to track it. "I suspect some listeners just gave up listening to us because of the constant irrita-

See FM MODS, page 10 ▶

What Listeners Are Saying

These are excerpts of listener complaints to WYPR(FM) Baltimore received by the station in May and forwarded to the FCC. NAB released these comments to press with the personal identification removed. This text includes phrases that may be offensive to some readers.

"I listen to 88.1 (WYPR) on a regular basis, and within the past month interference has escalated. I know it's satellite radio because I can hear Howard Stern and Robin! Sometimes it lasts only a minute or two when I'm near certain other cars. But when I'm on the highway it has gone on for 5 minutes or more. It's not always possible to maneuver away from the offending vehicle."

"The interference from Sirius while listening to your programming on 88.1 FM continues to increase during my commute along the I-95 corridor daily. In the last two days, I would offer to you that approximately 50 percent of your programming is overridden by the following words, phrases and language: b*tch, c*nt, sh*t, f*ck, topic of 'golden showers,' topic of 'menstruation.'"

"It is so upsetting to drive along listening to an important news story or heartfelt humanitarian piece only to be interrupted by someone shouting out of my speaker: '...and her pussy smelled like diarrhea. Hahahaha.' I have included this quote to offer ONE example of the type of grotesque dialogue I hear bursting in on what I have chosen to tune in to. ... I no longer tune into WYPR when my children are in the car out of concern that they would witness the interruptions that occur at a daily minimum of six times during a 25-mile commute."

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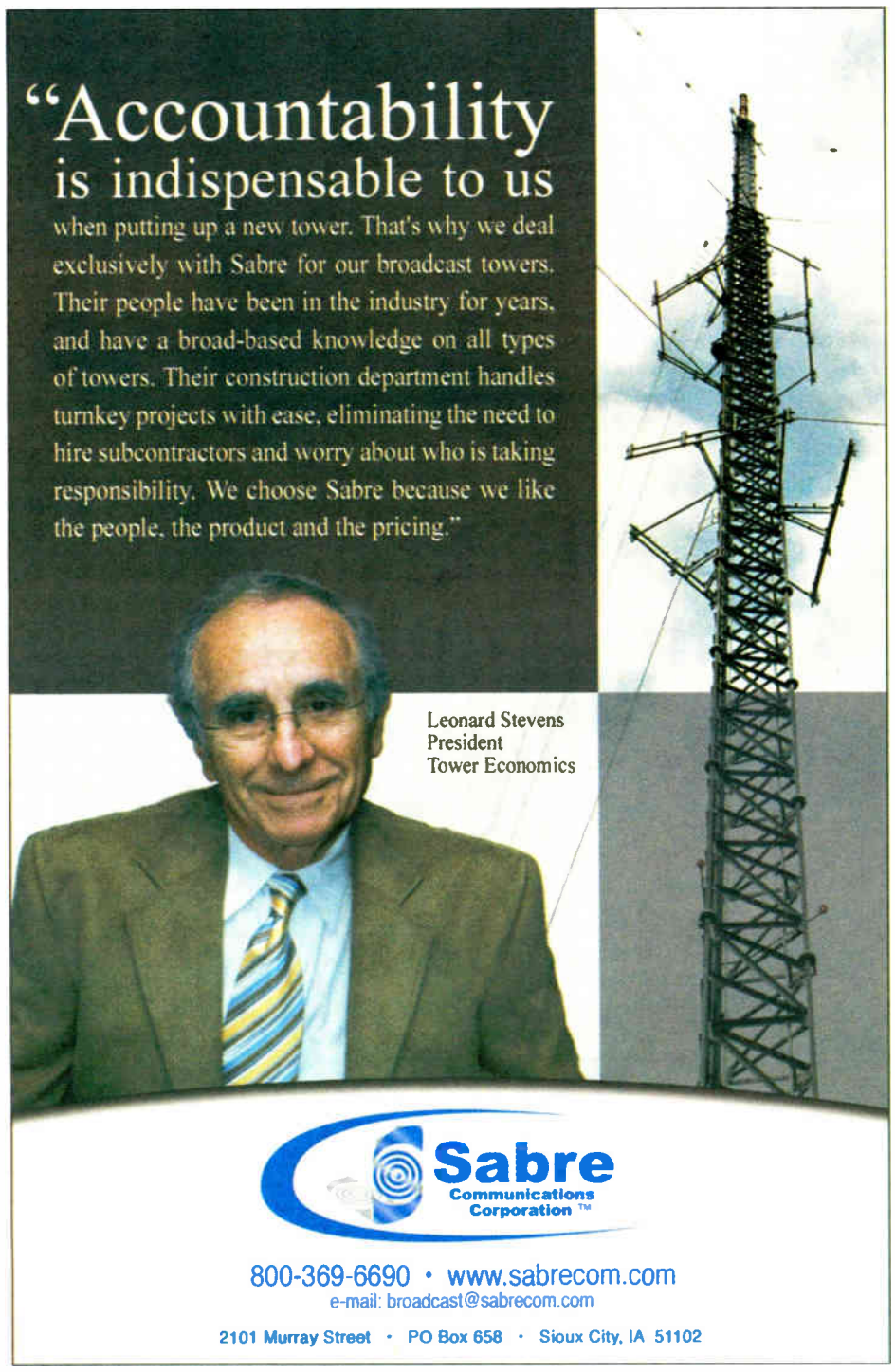

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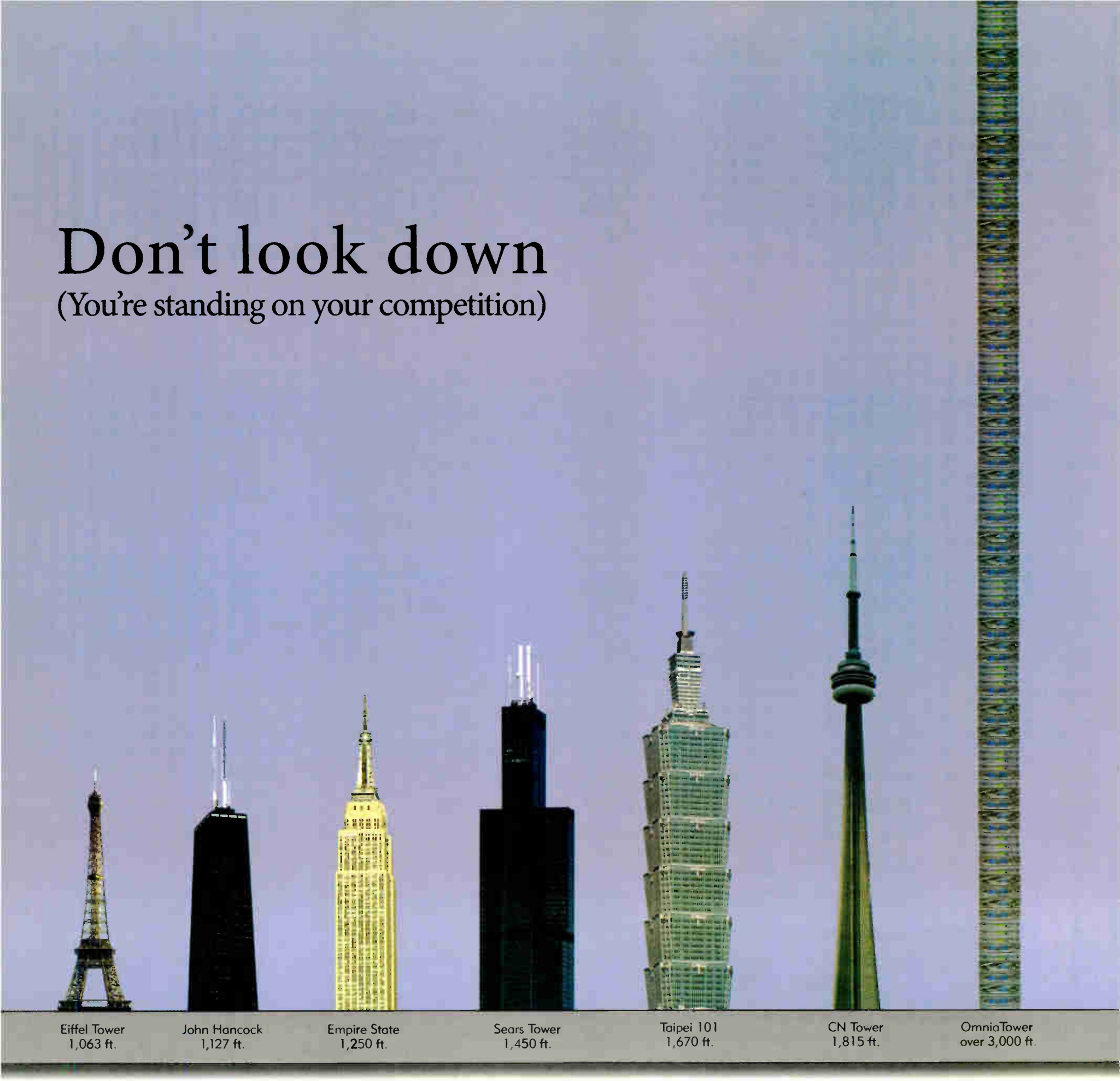

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World Radio History

FM Mods

▶ Continued from page 8

tion of interference."

His hope is that Part 15 analog devices sold as vehicle add-ons eventually will disappear once drivers switch to "new, self-contained systems."

Sources close to the commission would not confirm or deny the existence of an investigation of the satellite radio devices. They did say the agency monitors the certification process, which takes place at FCC-approved labs. Tens of thousands of such equipment certifications are issued every year. The reports are sent to the FCC for review so its engineers or lab personnel can review, for example, how the testing was done, what equipment was used and what measurements were taken, a source said.

Several models involved

XM first revealed in SEC filings this spring that the commission sent letters to some of its manufacturers asking for test data and emissions characteristics of certain FM modulated devices. Shipments to stores of several FM modulated devices stopped. Models affected included the XM RoadyXT, XM Delphi SkyFi2, Audiovox Xpress Model XMCK10 and the Sportscaster, made by AGT.

"We've been working closely with the FCC to ensure the products meet their requirements," said spokesman Chance Patterson. A ferrite bead, also called a clip, was attached to the antenna wires of the first three products to reduce RF emissions. Inventory was modified at distribution centers and new product coming out of the factory includes the modification, he said.

Cost estimates for the ferrite add-on from several sources range from 25 cents for the manufacturer to $1.50 at retail.

The Sportscaster presents a different challenge to modify; the FM modulation is done in the body of the device rather than in the wiring. That fix remained under discussion, Patterson said.

XM was also working to modify the Delphi MyFi in June.

The "fix"

After the altered devices were given the go-ahead, the commission reserved 30 additional days to continue its review process, ask further questions and conduct more tests.

Sirius Satellite Radio said a couple of its radio manufacturing partners also heard from the FCC recently about FM modulated products exceeding commission emission limits; it said those products have been fixed.

In Sirius' only public comments about the issue, David Frear, Sirius executive vice president and chief financial officer, said at a financial conference in May that the FCC had sent letters to two of its manufacturing partners "asking for their test data on FM modulated products and their emission characteristics." That data was provided to Sirius and the commission, he said.

"Some of them did test outside of the allowable emissions," Frear said.

Sirius "went into the plants and made the appropriate changes to production," he said. "All of the products rolling off the line now are fully compliant with FCC standards." He did not identify the manufacturers or the specific models.

Sirius did not respond to subsequent queries for comment. Starling said the company had been "especially responsive" to NPR in looking into the issue and answered questions about how the FM modulated products were made. NPR programming airs on Sirius.

'Unwelcome'

One broadcast RF supplier likened the ferrite fix as an inexpensive "Band-Aid" so manufacturers wouldn't have to redesign products.

No observers contacted for this article believe the satcasters would recall their products, because the problem is not deemed a safety issue.

While ferrite add-ons fix new products, they don't address devices already in consumers' hands.

The NPR testing will look at both XM and Sirius FM modulators. If it finds data "that leads us to specific conclusions, we'll share that" with the FCC, NAB and manufacturers, Starling said.

The draft NABA recommendation states FM modulators should be frequency agile and have permanently attached male and female connectors to match the respective radio input and antenna connections to prevent "inadvertent reverse connection to the external antenna." It also calls for tamper-proof antennas.

With Part 15 wireless devices proliferating, Starling suggests one possible solution: All such devices might be required to operate at 87.9 MHz. Though this is not currently a legal Part 15 frequency, some devices operate there now, he said.

Normally, radios don't extend beyond the limits of the FM band at 88 MHz, although some do tune to 87.9 or 87.7, Wilson noted.

NAB President/CEO David Rehr also called for the FCC to look into the problem, noting the "unwelcome satellite programming that could clearly fall within the FCC's definition of indecent material." NAB's timing coincided with the congressional vote to raise fines for broadcast indecency, leading XM to tag that maneuver a "desperate publicity stunt."

NAB: Three-Quarters of Devices Exceeded Field-Strength Limits

NAB says many RF modulators on the market are not only overriding terrestrial signals but have the potential to interfere with HD Radio signals as well. In letters sent to the FCC and Senate Commerce Committee leadership, the trade group urged the commission to undertake "swift action" to solve the problem and "vigorously enforce" its Part 15 rules.

Most of the devices tested were not satellite radio RF modulators, but rather, MP3 or iPod-like devices.

NAB hired engineering firm Meintel, Sgrignoli & Wallace to test 17 FM modulated devices in light of recent complaints by listeners who say their terrestrial car radios are being interfered with by the devices.

"Thirteen of the 17 wireless devices (76 percent) were found to exceed the 48 dBuV/m limits of Part 15 operation. ... Six devices were found to exceed the FCC field-strength limit by *more than 2,000 percent*," NAB wrote in a letter to FCC Chairman Kevin Martin and Senate Commerce Committee Chairman Ted Stevens, R-Alaska and co-Chair Daniel Inouye, D-Hawaii.

In addition, NAB stated: "Many devices transmitted signals that were substantially wider in bandwidth than the 200 kHz-wide FM channel, resulting in potential interference not only to the signal in the channel to which the Part 15 device is tuned but to first- and second-adjacent-channel signals as well."

The trade group says many modulators in the marketplace are violating FCC Part 15 rules and could interfere with new digital radios as well.

(Look for more about this test in a subsequent issue.)

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NEWS WATCH

News Roundup

BE EXPANDS: Broadcast Electronics has broken ground on an addition to its Quincy, Ill., plant that it says will increase its current 70,000 square feet of manufacturing capacity almost 30 percent. The company cites need for space due to BE's growing product line and market share. The 20,000-square-foot addition could be completed by December.

FOURTH BIRD FOR SIRIUS: Sirius Satellite Radio has contracted with Space Systems/Loral to design and build a fourth satellite at a cost of around $260 million to augment its three current birds. The companies expect the satellite to be completed by Q4 2008. Space Systems/Loral built the satcaster's three other satellites and says having four in a highly elliptical geosynchronous orbit will provide enhanced signal coverage and greater redundancy. As part of the deal, Loral has agreed to supply a $100 million vendor financing facility, although Sirius said it has no plans to draw from the funds.

HD-R IN BMW 5: BMW is offering HD Radio as an option in its 2007 Series 5 automobiles, which are available now. The carmaker already offers the radios in its 2006 7 Series and 6 Series models. The HD Radio option has a suggested retail price of $500.

IBIQUITY, SANYO: Ibiquity Digital Corp. has contracted with an international trader and sales rep firm to support and expand Ibiquity's presence in Japan. Sanyo Trading will supplement Ibiquity's efforts by providing in-country support to OEMs deploying HD Radio in vehicles. Although there's been no publicly stated commitment from Japanese automakers about offering HD Radios as optional or standard equipment, Ibiquity has said it has pledges from eight automakers, in addition to BMW, to install IBOC radios in new vehicles over the next few years.

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World Radio History

Deal

▶ Continued from page 1

engineering and IT employees who were let go after the merger.

The $1.2 billion deal, which closed in May, combined the operations of 33 former Susquehanna stations and some 300 Cumulus stations. The new entity owns or operates 345 stations in 67 markets.

Cumulus Media Partners is a private partnership created by Cumulus Media Inc., Bain Capital, The Blackstone Group and Thomas H. Lee Partners.

Even before the acquisition was announced in October of 2005, Kline, who is Cumulus Media's vice president of engineering and IT, was working on the project.

HD-R conversions

"I'm in a position to know about those things early on in discussions," he said. "That way I'm prepared with some feedback if asked by the executive team to share my thoughts. I also participated in the final hours of discussions in conference calls with lawyers and the corporate teams, discussing critical diligence and capital items that, as an engineer, I want to make sure were contained in the final agreement.

"For example, if Susquehanna had money already on their books allocated for HD-R conversions and money spent on upgrades like new consoles or remote vans for specific markets, I want to make sure those monies are carried over and left in their budgets and are not lost in the shuffle."

Kline said the HD Radio efforts of the newly created Cumulus Media will not be affected. "Nothing has changed with our commitment to Ibiquity and the HD (Radio) Alliance. Susquehanna had a strong commitment to HD Radio and we will continue with the conversions they had planned. We have nine additional former Susquehanna stations to convert yet this year."

Once the deal became public knowledge, Kline began to work on the specifics of the integration.

"We had six months to bring this together," he said, referring to the proposed closing date. "I did have some previous knowledge of Susquehanna's facilities and knew some of the people they had in specific positions. As part of my due diligence I visited all of Susquehanna's tower sites and studio locations. I also wanted to learn what their engineering operations were like while looking for similarities or differences that we would have to address," Kline said.

Company acquisitions and mergers often involve bringing together entities with differing philosophies. Sources familiar with both companies indicate there were some cultural differences in the radio groups. Susquehanna was seen by many in the radio industry as a broadcaster that placed an emphasis on employee relations and retention, while Cumulus Media Inc. has been viewed by some as a company that operates with leaner staffing levels.

Similarities, differences

Kline said he began by focusing on Susquehanna's IT department. What made the particular process unique is that Susquehanna Media, which handled IT for both the radio and cable operations, was not included as part of the deal.

"We began a process of discovery where over a two-month span we worked with their applications and network groups to learn every application and system they ran. We then decided which system to adopt and began the process of who we would staff here at Cumulus to handle those duties."

In the end, the decision was made to transfer all IT work from the Susquehanna data center in York, Pa., to Cumulus Media's corporate offices in Atlanta.

"It's economies of scale, really. We didn't need to maintain two separate operating systems like e-mail. We standardized on our own set of customized financial data reporting systems and tools, too," he said.

There were some similarities in audio gear used by Susquehanna and Cumulus that made systems integration a bit more straightforward. Both groups use a lot of Wheatstone gear, Kline said, adding that Susquehanna "used a sophisticated T1 line for links to transmission sites for audio and data. We use the same types at Cumulus."

We have nine additional former Susquehanna stations to convert yet this year.

— Gary Kline, Cumulus Media

However, the two companies differ on digital audio systems. Susquehanna had standardized on ENCO Systems while Cumulus Media actually owns radio automation software supplier Broadcast Software International. "There has been no merging of systems in that regard. Our stations are using what fits their needs in specific markets. We are not moving in any specific direction right now," Kline said.

Cumulus Media Inc. has committed to Harris Broadcast to provide HD Radio equipment, including transmitters, exciters and STLs. Kline said Harris will remain the exclusive supplier of HD transmission products for the newly created entity.

The two broadcasters shared only two media markets, Houston and Kansas City.

"We had to decide which facilities to keep and where to consolidate operations. There were also staffing considerations in those markets," he said.

In both cases, Cumulus stations are integrating into existing Susquehanna facilities. Office staff and management have relocated in Kansas City with "studios moved by year-end," Kline said. The newly created Cumulus Media Partners will operate six stations there.

In Houston, construction will begin this summer on an addition to the former Susquehanna building. When the project is completed by the end of the year it will house FM stations KIOL, KFNC and KRBE.

Staffing changes

Kline confirmed that Cumulus Media has made personnel cuts to the engineering and IT departments at the former Susquehanna stations.

"In rare instances we had to let people go. There were some cuts in some Susquehanna markets that couldn't justify the need.

"In cases where we made cuts, we did our best to accommodate them with jobs in other markets when possible," Kline said. "There was really an extensive review in the eight Susquehanna markets that involved local market managers as well."

Kline declined to specify how many Susquehanna engineers were laid off. A source familiar with the merger said approximately 13 Susquehanna technical employees were released out of approximately 40 technical personnel.

Former Susquehanna Vice President of Engineering Norm Philips was the highest-ranking engineering department executive to leave when the deal closed (see sidebar).

Kline said the 33 former Susquehanna stations now employ a total of 29 full-time employees in engineering, which includes engineers, IT support, web designers and remote coordinators in eight markets. In all, the newly created Cumulus Media Partners will have approximately 80 engineers and IT staffed for 345 radio stations.

"We have given the local engineers and IT folk's additional responsibilities in their individual markets. We will train them in terms of programming their own routers and give them greater control over their local market domain e-mail systems. We think anytime an engineer can learn something news and increase their experience level is a good thing," Kline said.

Cumulus will retain regionalized layers of engineering management, Kline said.

The eight markets where Susquehanna had stations — San Francisco, Dallas, Houston, Atlanta, Cincinnati, Kansas City, Indianapolis and York, Pa. — will for the time being be considered one region. Kline is "interviewing in-house" for the regional engineer to oversee the former Susquehanna stations.

The only remaining obstacles from the merger are "only things we haven't discovered yet" that might arise, Kline said.

"I have so much confidence in the experience level of the former Susquehanna engineers. I can't imagine there is anything left out there that they can't handle. They have been terrific," Kline said.

Some Susquehanna Managers Cut Loose

YORK, Pa. When Cumulus Media agreed to acquire Susquehanna Radio Corp. in the fall of 2005, Norm Philips began to wonder about his position as vice president of engineering for the York, Pa.-based broadcaster. He knew job cuts can be expected after a merger or major acquisition, as positions are trimmed to cut costs and eliminate redundancy. However, that doesn't make it any easier to live through.

Network Minded

"Cumulus never talked to me about a position," said Philips, who spent 29 years with Susquehanna in a variety of engineering posts. His last day with Susquehanna was in early May after the sale was finalized.

Philips said he enjoyed working for Susquehanna, the largest privately owned radio broadcasting company in the United States prior to the sale. The company became known for an employee-friendly philosophy, even going so far as running advertisements in various broadcast trade engineering publications touting the accomplishments of its engineers.

"There is a difference in operating philosophies between Susquehanna and Cumulus. I'm not saying that is good or bad, just different," Philips said.

He expressed pride in the engineering team he helped build at the broadcaster's 33 radio stations.

A former colleague, Chris Lawton, was manager of network services for Susquehanna Media, a division that was not included in the sale but whose employees were responsible for network IT services and digital automation systems across Susquehanna's radio and cable operations.

"We were not sure what was happening (when the sale was announced) because we were not hearing much about our futures. However, most of the things we were responsible for in Susquehanna Media were eventually rolled into Cumulus corporate responsibilities and then to some local stations," Lawton said.

He said a lot of people working in engineering and IT at Susquehanna were affected, "not only in corporate but at the station level. There were major staff cuts in many markets. Some local engineering and IT staffs were cut in half," he said.

Former Susquehanna employee Chris Lawton, center, visited MSNBC in New York doing work for ENCO Systems. At left is MSNBC Engineer Gary Frazier; Audio Director Jim Kerswell is seated.

Since his position was eliminated in early May, Lawton has focused his attention on a startup company called Network Minded Inc. The company, founded by Lawton in 2004 as a part-time business, provides professional broadcast services ranging from studio builds, HD-R installations, IT design, training and consulting.

— by Randy J. Stine

World Radio History

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Workbench

Radio World, July 19, 2006

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Solutions to AM Impedance Issues

by John Bisset

The reliability of today's broadcast equipment means many products are forgotten for many years — they just do their jobs over and over.

One of these is the Optelator from Stormin Protection Products. This protective device has been used in the AM/FM industry since 1998. The product uses a fiber-optic link to protect remote control modems from damaging surges. It's a novel idea to separate the remote control/telco link with a fiber-optic link, and it works well.

However, like any product, it does need to be checked occasionally. For example, the batteries will wear out in approximately four years. Place a label to remind you when to install a fresh set.

If you operate a Sine Systems remote control, there is a modification that's required if you use the Optelator II. Engineer Brian Hill from Back Yard Broadcasting in Williamsport, Pa., discovered a need to change the ring sensitivity of the Sine when using an Optilator. The reprogramming is straightforward.

On the RFC1B unit, access memory address 1014. Enter the value "10" and hit pound "#". This changes the Factory Default of (0) = 1.79 volts sensitivity to a sensitivity of 4.66 volts.

After the reprogramming, the Sine connected on the first ring. There's no worry that this change would permit transient surges higher than 1.79 to get through. Because of the fiber optic link, nothing above 4.66 volts will pass.

If you're not familiar with this device or would like an online catalog, visit *www.storminprotection.com*.

★ ★ ★

Jay Crawford saw our picture of two mini-flectors used to couple across the base insulator of an AM tower (Fig. 1). It reminded him of a similar project at WLW(AM). Back in the late 1980s and until the mid-1990s Jay worked for Jacor in Cincinnati, mainly as the chief engineer for WEBN, their local FM station.

He did some work on the WLW tower out in Mason, Ohio. The tower supported a shared Marti receive site, and as in Grady Moates' STL application mentioned earlier, they also had to get the 7/8-inch line across the base insulator. The cable came down to a standard Marti 450 MHz yagi that was mounted to the tower. This antenna pointed to a second identical yagi mounted to the building, which housed the tuning unit.

That yagi was connected to the coax going into the transmitter building and the Marti receivers. This was a system worked up by Jay, WLW's chief engineer at that time Paul Jellison, and Jacor Director of Engineering Al Kenyon. This site worked well and was fairly inexpensive to build. They realized the height advantage of the WLW tower as well as that of a site on the northern edge of Cincinnati area, which made a lot of remote broadcasts possible in the days before ready availability of POTS codecs and ISDN lines.

The "two-antenna" approach avoided the need for a high-power isocoupler or all the standoff/cable insulating that would have been required otherwise.

Jay now works for Cincinnati Public Radio and can be reached at *jcrawford@cinradio.org*.

★ ★ ★

I met Gary Keener back at the 1985 NAB convention. Though our career paths haven't crossed since then, Gary reads *Workbench* regularly and runs Keener Technical Services in San Antonio. He adds a few thoughts on AM power determinations, a topic discussed in the Dec. 7, 2005 column.

First, the FCC requires you to *tell* them if you discover the AM tower resistance has changed. They require you to file Form 302-AM and tell them what the new resistance is and what the new current should therefore be. This action will cause them to issue you a new

See MEASUREMENTS, page 16 ▶

Fig. 1: Not only STL dishes but yagis can be used to couple across an AM base insulator.

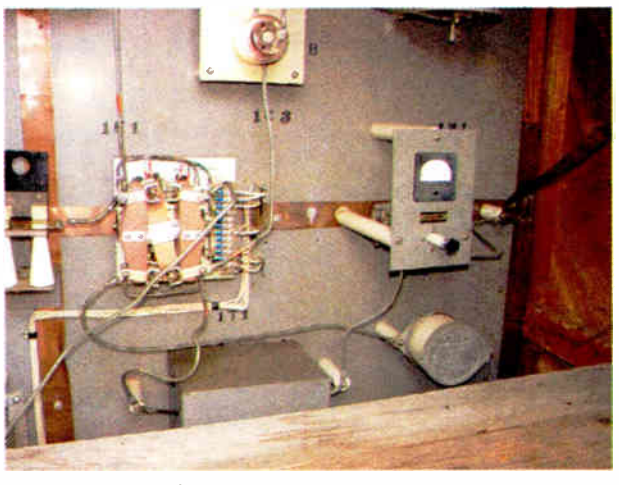

Fig. 2: DA common point measurements can be complex.

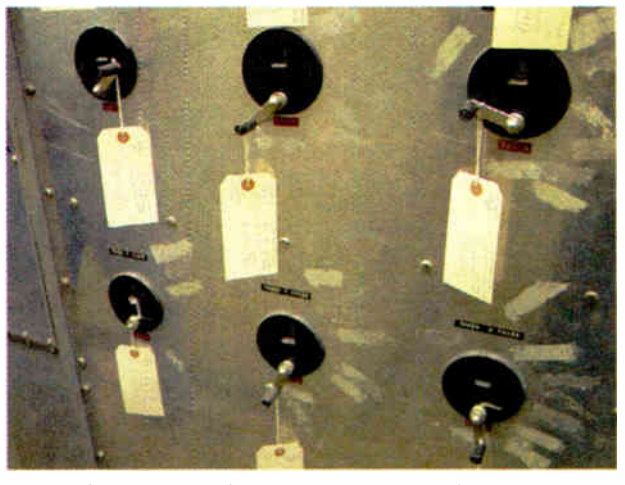

Fig. 3: Recent adjustments are handy thanks to shipping tags strung to the phasor cranks.

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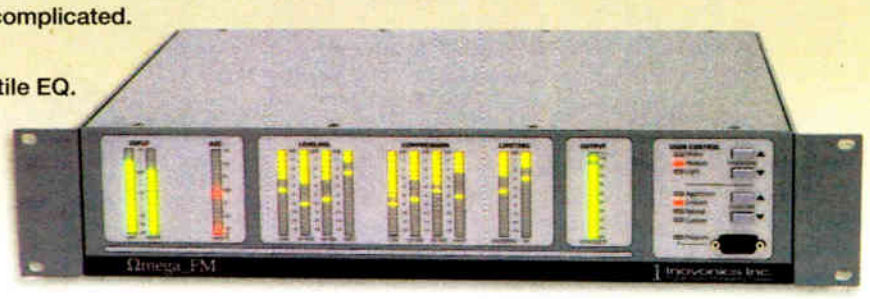

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World Radio History

"Showcase studios take time, right? Not this time."

"'Challenging' didn't begin to cover it. Our **showcase studios** were to be located in the high-visibility West Edmonton Mall. With only six weeks 'til our on-air date, our challenge was finding a manufacturer we could trust to deliver on our timeline.

"We'd almost decided on one of the traditional console/router companies; working 25/7, we could *barely* make our deadline. Then we found out about Axia IP-Audio networks.

"Axia gear goes together with RJ-45 connectors, so adding sources to the network takes almost no time. A few clicks and you're done! That produces a **substantial cost reduction** in terms of wiring from room to room.

"And because the Axia system routes audio using **ordinary Ethernet** instead of expensive mainframes, the ease of adding to the network allows it to grow and change dynamically with our operations.

"When we decided to go with Axia, the router guys had a fit. They actually tried to tell us that the IP-Audio network would catch viruses! We laughed for days about that one.

"Our studios were finished **with time to spare.** The installation came together really well, and since going on the air we've been trouble-free.

"We've had several announcers tell us how much they **love working with the Axia surfaces** and how easy they are to operate. It's great to be able to setup and **save multiple configurations** that can be **recalled at a moment's notice.**

"Our experience with Axia has been all positive; we've had no audio glitches or dropouts whatsoever. I don't know why we hadn't gone this route earlier. Where we're installing new equipment, **we're onboard with Axia."**

— *Owen Martin, Director of Engineering, Newcap Radio, Alberta, Canada*

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World Radio History

Measurements

▶ Continued from page 14

license reflecting the correct values.

When filing the form, include a short statement describing the test gear used and listing who the technician was. The station should be operated using the indirect method of power determination from the moment you discover the resistance has changed until a new license reflecting the change has been issued.

Once you've got their OK, you can "return to the direct method of measurement." See §73.51(d–f) in the FCC rules for details. When filling out the form, there is still a place for the reactance, though this is no longer required. You can leave that measurement out if you want. The same is true for DA base currents.

As for DA common-points (CP), as seen in Fig. 2, the calculation is a little more involved. The correct common-point input power to a directional antenna system is the nominal power plus 8 percent for powers of exactly 5 kW or less. From 5.1 to 50 kW, it's the nominal power plus 5.3 percent. And as we pointed out in our earlier discussion of tolerances, those percents are *power* percents, not current. So the correct *maximum* power *input* into a 5 kW DA would be the Pnom + 8% + 5%.

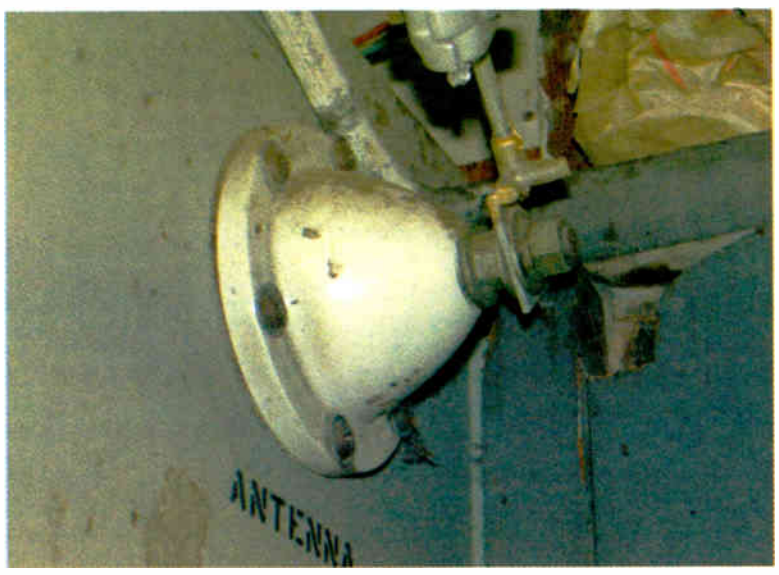


Fig. 4: Keep antenna feed-through insulators clean.

If you find that the CP resistance has changed significantly, obviously you need to go to the indirect method of power determination at that point; then find out exactly why. It's likely to be a bigger problem than you think. Fig. 3 shows an inexpensive way of keeping track of previous and present phasor adjustments, contributed by Harry Bingaman of Sunbury Broadcasting in Sunbury, Pa.

Only when you're sure the array is tuned up correctly and the CP is adjusted for the final R value should you file 302-AM. If the problem with the CP resistance was as big as the ones Gary's firm finds, you might have to attach a partial proof of performance to the Form 302-AM. See §73.51(b).

Before you make DA adjustments, though, Gary recommends a thorough inspection of the RF components. Conducted when the transmitter is off — and bypassed so it can't be accidentally turned on by an impatient jock — use a trouble lamp to visually inspect all components. While you're at it, clean and tighten connections using fresh rags and isopropyl alcohol.

The parameter shift may be obvious: a burned coil clip, hung-up RF contactor or mouse or snake across a coil or capacitor. It may also be a loose connection that has heated; look for obvious discoloration. Remember that insulators can't insulate when they are dirty, as seen in Fig. 4. Clean everything, plug holes in coupling networks and use a Sharpie or similar brand of marker on either side of a coil clip so if it falls off you know where it belongs.

Your AM station may measure power at the transmitter output terminals, and that's fine, but only under certain circumstances. Naturally, the resistance measurement should be made at that point, unless you're going to change the point of measurement. If you are, provide a schematic of the new measurement point. See §73.54(a).

Gary Keener can be reached at *gkeener@pdigm-inc.com.*

John Bisset has worked as a chief engineer and contract engineer for 37 years. He is the northeast regional sales manager for Broadcast Electronics. Reach him at (571) 217-9386 or jbisset@bdcast.com. *Faxed submissions can be sent to (603) 472-4944. Submissions for this column are encouraged, and qualify for SBE recertification credit.*

'Hands-on' Radio Engineering

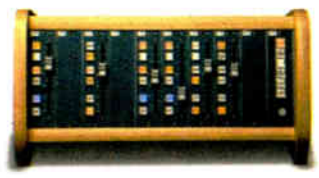
Workbench is Radio World's most popular and influential column, imitated widely but never duplicated. Did you know you can access thousands of handy tips in our archive of John Bisset's long-time column? Dipping into the archive is like taking a free training course in how to be a more effective, hands-on radio broadcast engineer.

Visit *www.rwonline.com* and click on the *Workbench* tab. But have a cup of coffee ready; you might be there awhile.

INTRODUCING THE EXPANDING FAMILY OF THE SAS CONNECTED DIGITAL NETWORK.™

New Rubicon-SL Console Control Surface — A "junior" Rubicon™ for less demanding studio applications. Offering full router source select, four mix buses, an unlimited number of mix-minus, mode, pan/balance, talkback, and more, SL is an ideal replacement for a dated analog console. Rubicon-SL fully integrates into an SAS 32KD Mixer/Router System.

New Rubi-T Mini Console Control Surface —Ideal for voice tracking rooms, news booths, edit booths, announce booths, effects mixing, and more. Just 6" high, Rubi-T's input module features a full-length 100mm P&G fader, channel ON/OFF, and 4 programmable source select or bus assignment buttons. Input, monitor, talkback, meter, remote control, and other modules are easily configured.



New RIOGrande Stand-Alone Mixer/Router — RIOLink, the SAS Remote I/O chassis for the 32KD, has grown into a full-featured stand-alone mixer/router, a junior version of the 32KD. Use it with Rubicons, SLs, Rubi-Ts, or simply as a powerful 32x32 analog and digital router. Connect two RIOGrandes with CAT5 or fiber for a great 64x64 mixer/router system.

With Rubicon, Rubicon-SL, Rubi-T, 32KD, and RIOGrande, the SAS Connected Digital Network has evolved to meet a wide range of budgets and requirements. In fact, it is now the "go-to" solution for hundreds of stations across the country moving into router-based networked control systems—providing the industry's most versatile and flexible user-friendly consoles, powerful routing of thousands of channels, integrated IFB/talkback/intercom, serial/GPI/IP control, and so much more.

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World Radio History

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There's no need for a studio-side POTS line. Your studio's Zephyr Xtream receives Xport's POTS calls via its existing ISDN line, **eliminating the cost of a second POTS codec** and delivering smooth, clear digital audio to your listeners.

And Xport **makes unexpected modem re-training extinct** thanks to custom DSP algorithms that extract stable performance from even marginal phone lines. Xport gives you **surprisingly clean 15 kHz remote audio at bit rates as low as 19 kbps.**

No wonder clients tell us Zephyr Xport is the world's best-sounding POTS codec. But don't take their word for it — hear it for yourself.

Zephyr Xport: **It's all about the audio.**

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Ethernet port isn't just for remote control: feed PCM audio right into the codec from any Windows™ laptop. Great for newsies on the go.

Xport's *aacPlus* and Low-Delay MPEG AAC deliver superb fidelity. G.722 coding enables connections with 3rd-party codecs, too.

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World Radio History

Clear Channel Reads a WebSideStory

Radio Group Is Using HBX Analytics to Measure and Analyze Visitor Activity on Its Large Online Network

by Tom Vernon

As broadband becomes commonplace and streaming media channels mature, Web sites become an important component of a broadcaster's overall marketing strategy. Clear Channel Radio's recent announcement of an agreement with Web analysis specialist WebSideStory Inc. underscores this need for a better understanding of Web activities.

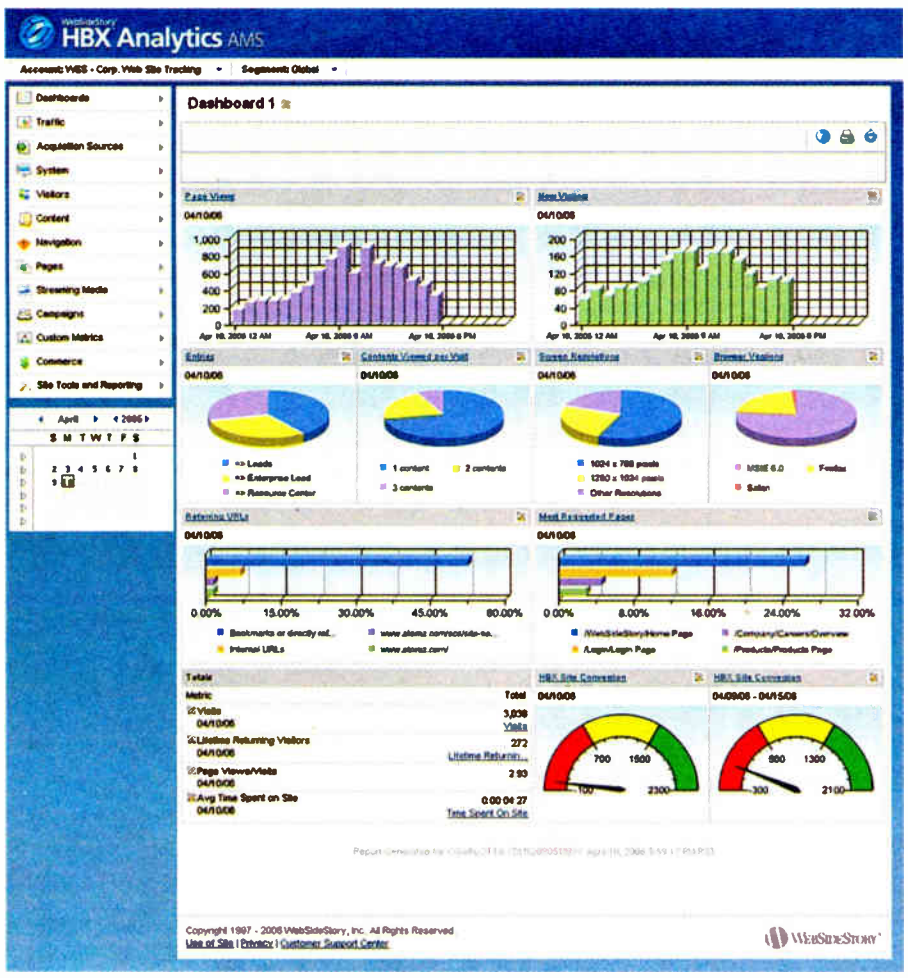
The challenges for Clear Channel and other organizations with a large Web presence include understanding the relationship between a site's usage statistics and structure; how visitors' movement between pages can be expressed in order to understand how some areas are more closely related than others; and how to track the paths that visitors take through Web sites.

operate all of the station Web sites and to provide original programming to those sites, largely in the form of video and text.

"WebSideStory's HBX Analytics will allow us to analyze what people are watching from Clear Channel Radio's video-on-demand service, the content being downloaded for podcasts and how many people are watching live station broadcasts," he said. It will also allow the company to measure the popularity of audio and video content at each site.

Prior to the agreement with WebSideStory, Clear Channel was using a variety of analytic tools.

"They provided some insights into Web traffic," said Meier, "but didn't have a good methodology or consistency of data." He said this type of application would be too complicated to develop in-house.



Historical data on contents viewed per visit, new visitors and most requested pages is available on the dashboard.

These issues are compounded because the contents of most large Web sites are changing continually, with pages being added and deleted on a daily basis, and the sheer volume of numbers generated by most Web logs can be overwhelming and difficult to interpret.

More consistent

The collaboration with WSS will allow Clear Channel to keep a close watch on user statistics for the company's 1,200 radio station Web sites in more than 221 markets.

Geritt Meier, senior vice president and general manager of Clear Channel's Online Music and Radio division, said the dual functions of his department are to manage the infrastructure required to

The partnership also allows Clear Channel to get online reporting from one source. Erik Bratt, director of corporate communications for WebSideStory, said one of the challenges was for WSS to integrate its online visitor information with server data from Akamai Technologies Inc.

"We were able to combine our reports with Akamai's Edge Control API (Application Programming Interface) to give Clear Channel a more unified view of its online business. WebSideStory has tagged all 1,200 Clear Channel Web sites to provide data on traffic, unique visits, site overlays enabling station webmasters to optimize layout and content flow."

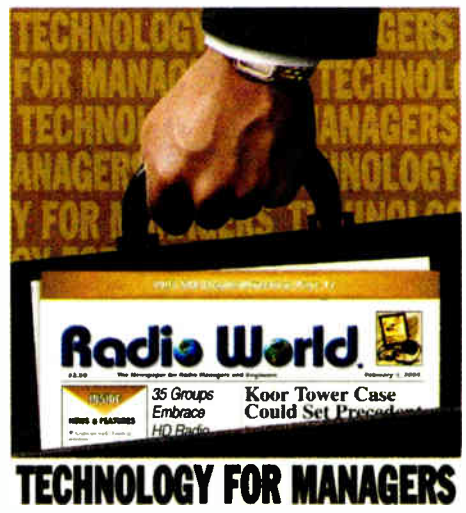
The partnership was launched in mid-December 2005 and is still in its infancy. Metrics provided by WSS will include a week-by-week growth factor. CC executives can get an overview of the 1,200 Web sites, scope down to Clear Channel's regions of operation and finally examine performance at the station level. Tools will be added by WSS as they are developed.

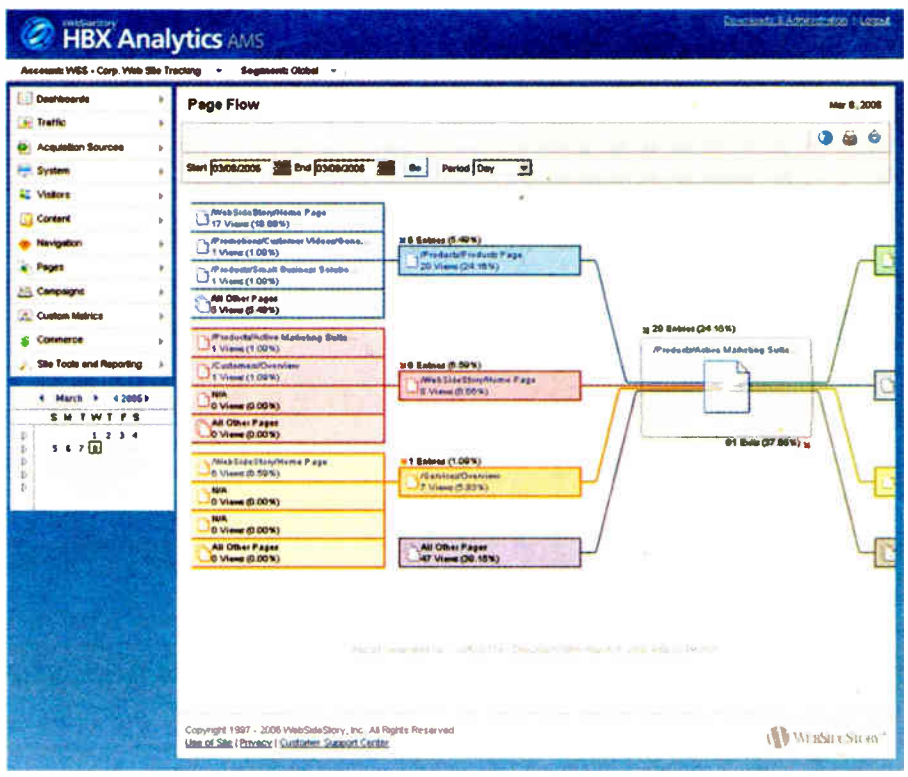
Benefits

Meier said the agreement with WebSideStory benefits not only the Online Music and Radio executives, but individual station mangers and webmasters.

"It will enable them to look at the numbers, see what is working and what isn't and to compare their Web services with those of stations in comparable markets." He said stations in smaller markets often don't have the resources to develop a top-notch Web site; now templates and materials will be available to them.

See ANALYTICS, page 19 ▶





Pageflow displays allow organizations to visualize and understand the flow of traffic through Web sites.

Web Analytics for the Rest of Us

You don't have to be a large media organization to utilize web analytics. Smaller operations can fine-tune their Internet strategies with a variety of tools and techniques.

Bryan Eisenberg, co-founder of Future Now Inc., said, "Tools for analyzing Web traffic range from Google's free software through inexpensive programs from Click Trails to more elaborate enterprise-level applications, such as those offered by WebSideStory."

He said these analytic tools are a separate category from developer programs such as Adobe's Dreamweaver, which enable users to build Web sites and manage their resources.

Eisenberg identified some simple things stations can do to boost the profitability of their sites. "We hear from a lot of advertisers who want to put ads on station Web sites, but can't get in touch with them. A surprising number of sites don't have contact information such as a telephone number and mailing address readily available."

To many otherwise Web-savvy organizations, analytics remains a black art. The slim list of educational resources on the topic is growing. Eisenberg recommends books by Eric Peterson, "Web Analytics De-Mystified" and Jim Sterne, "Web Metrics." Eisenberg and Jim Novo have penned a white paper on the topic, "The Marketer's Common Sense Guide to E-Metrics," available for free download from *www.futurenowinc.com/metricsguide.pdf.*

The University of British Columbia offers an Award of Achievement in Web Analytics to those who complete a series of four online, part-time courses; Introduction to Web Analytics, Web Analytics for Site Optimization, Measuring Marketing Campaigns Online and Creating and Managing the Analytical Business Culture. Each course is run over approximately four weeks and requires an average of four to eight hours of study per week. Information is available at *www.tech.ubc.ca/webanalytics/index.html.*

A wealth of information on analytics is available on the Web Analytics Association Web site, *www.webanalyticsassociation.org.*

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Analytics

▶ Continued from page 18

The partnership has paid benefits. Meier said rapid feedback from WSS enabled Clear Channel to take a new Web feature, the Photo Gallery, and fine-tune it for better audience response.

Looking forward, Meier said it's important for broadcasters to take and integrated view of electronic media, where radio and Web sites are a way to expand the local brand. "The Web is really an extension of a station's on-air real estate."

A recent deal finds Clear Channel exploring the relatively new discipline of Web analytics more thoroughly.

Organic information display of a Web site. White branches thicken as more users visit them or atrophy as they go unused. Orange paths depict the more erratic paths of individual users.

Web analytics is a relatively new discipline. Combining software engineering, information visualization (info viz) and statistics, its goal is to give webmasters information that can improve the effectiveness of their sites. This turns out to be a challenging task.

Traditional site representations such as trees or maps often are ineffective because most sites aren't truly hierarchical and are in a state of flux. The number of visitors to a page can be tallied, but changing traffic patterns in a Web site make this data of questionable value.

Research on these issues is ongoing at the university level. Information visualization techniques such as Organic Information Design address some of these problems by using a site's usage data to develop an implicit model of the structure in an interactive, visually refined environment. Users are then able to discern qualitative facts from large quantities of quantitative data generated by dynamic information sources such as large Web sites.

WHO'S BUYING WHAT?

SCMS, Bonneville in AM Upgrade

SCMS Inc. and Kintronic Labs are supplying equipment for what they called "significant upgrades" to Bonneville's RF plant in Wheaton, Md., which serves the Washington market.

Jim Peck of SCMS' Northeast office handled the package sale.

"A custom switching, phasor, filter and diplexer package will be installed at the distinctive Art Deco 'Mother Ship' transmission site, dating from the 1940s, for their 50 kW 1500 kHz signal," Peck said.

The station is WTWP(AM); it had been WTOP. After Bonneville's recent format shuffle in the market, it now airs Washington Post Radio.

The design will allow a second station to be added rapidly. The job includes new transmission line and interconnects.

The building is seen in a 2004 photo.

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World Radio History

TECH TIPS

Remote Desktop Can Save a Trip

Do It From Home. Here Are Simple Tips For Connecting to the Station Remotely

by Chris Prewitt

Have you ever had to come into the station in the middle of the night to perform a simple task on the computer and then go right back home? Using Windows Remote Desktop or a handful of other third-party software programs, you can often save yourself that trip.

Many people can access e-mail from any computer, but why not their desktops and all the programs and files on their computers?

Computers have become a crucial tool in a station's toolbox; employees are getting more and more uses out of them. Remote Desktop can allow your busy staff to be in two places at once.

Chief engineers can use Remote Desktop to fix problems quicker, from wherever they are, when something goes wrong. Show producers can access stored audio to edit from home. Program directors can check on or alter content before it is aired.

Doing work from home can be helpful to about any radio station employee. Even staff members who are not strong in computing skills can use the simple interface to connect, once they have been set up by their IT person.

Remote Desktop can allow you and your busy staff to be two places at once.

Setup

Each station probably will have a different setup, but often you will be connecting from one Windows XP system to another. There is software out there to assist with about any mixture of operating systems and network setups.

When using Windows XP or Windows Server 2003, you will have all the software required. There are several steps needed to ensure that the station's Windows computer is ready to receive the incoming connection.

First you will need that computer's domain name and information or its IP address. The address can be found from the Command Prompt by typing in *ipconfig*. Using the IP address is fairly simple but you need to be mindful when using this method. IP addresses often are dynamic and change periodically. If the IP changes you may be unable to access the system until you get the new address.

Next go to the Remote tab in the System Properties and check the box to "Allow users to connect remotely to this computer." You can get to System Properties through the Control Panel by clicking on System.

Now this computer is ready to be controlled. Go home and try to connect to it.

Once you are home and on the Internet, open up Remote Desktop. To access it, go to Start, All Programs, Accessories, Communications, Remote Desktop Connection; or go to the Run box and type in *mstsc*.

This brings up a small window that only asks for "Computer:". This will allow you to connect to any Windows XP Pro or Windows Server 2003 machine without installing any additional software. Fill in the computer's IP address or domain name that you wish to access and click the "Connect" button. Shortly you will see the log-on box, then the desktop of the computer to which you are connecting.

Now you are working on that computer and your home machine is just there to bridge you. The screen may look a little choppy and slow to respond, depending on the connection speeds; but all programs and files should behave just as though you were there sitting in front of that computer.

If you find yourself wanting to change the way something behaves over Remote Desktop, you can probably configure it to do what you want. Before clicking Connect on the Remote Desktop window, go to "Options." You can add some additional features and tweak the way it will work. You can adjust the display, set the log-on information and move the sound or even the printers.

Probably the most useful option is under Local Resources. By checking the Disk Drives box you will be able to copy files back and forth between the two computers.

Efficient

Every radio station is a different and unique environment. You may not find up-to-date Windows systems on both ends of a desired remote connection. Different hardware, software and network setups will cause some complications in this basic setup. Consider these factors before trying to set up Remote Desktop; you may need to take some additional steps.

Often your network will have security measures in place that require additional setup, like opening ports in your firewall or connecting to a virtual private network (VPN). Simple networks often have IP addresses that begin with 192.168 or other prefixes that indicate they are only internal addresses. In this scenario you will need to perform additional configuration on the router with MAC filtering. It is also possible to have a series of remote connections to reach the computer needed. Perhaps you will need to remote into a network server and then remote from it into an internal computer.

Different operating systems can be another hurdle, but Macintosh and Microsoft have downloads available to connect to each other. Symantec's PCAnywhere software will run on Windows, OS-X or even on Linux platforms. Microsoft has a free download that will allow you to connect from a Macintosh computer to your Windows system, available at *www.microsoft.com/mac*. It's in the "Other Products" menu. Once installed this will look and work just like the Microsoft version.

Macintosh has its own Remote Desktop software for connecting or managing other systems. Currently they are selling the Apple Remote Desktop 3 at *www.apple.com/remotedesktop*. This package gives you the same functionality discussed with Microsoft's products with several other management functions included.

By taking the appropriate steps to set up Remote Desktop in your station's computers your operation will gain functionality and flexibility. Employees can get things done when they need to and from where they need to be.

You can take care of situations more quickly and perform troubleshooting without a drive to and from the station.

The author is a support systems administrator for UMKC Information Services at the University of Missouri, licensee of KCUR(FM). E-mail him at prewittc@umkc.edu.

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MARKET PLACE

ViaRadio Receiver Detects Invalid Source Signals, Mutes Translators

viaRadio Corp. said its RD10 RDS Receiver now can automatically detect invalid source FM signals and mute translators that have been "hijacked" from capture of Part 15 rebroadcast devices for satellite radio, MP3 players and pirate stations or atmospheric skip.

This feature, which the company says also is available on viaRadio's RDS decoders, works by monitoring the RDS ID code of the source signal and closing a relay contact to disable the translator if the ID code is missing or different.

"The recent popularity of Part 15 FM devices has raised concerns among translator operators that such signals could be rebroadcast inadvertently by them," the company stated. "viaRadio has added this functionality as a result of the numerous requests it received both before and during the NAB2006 show."

The unit retails for $395.

The company sells RDS encoders, decoders and receivers and an Emergency Warning System using RDS clock-radios.

Contact the company in Florida at (321) 242-0001 or www.viaradio.com.

Nautel Redesigns V5

Nautel introduced the new release of its V5 5,000-Watt FM transmitter at NAB2006. The transmitter has been redesigned to add more redundancy in the power supply section and reduce overall size. The V5 transmitter now has an AC/DC power supply for every RF Power module, allowing the transmitter to operate from either a single- or three-phase power source by changing configuration links.

The overall size has been reduced to 72-1/2 inches high x 23 inches wide x 34.5 inches deep and weighs only 450 pounds. The V5 uses the M50 digital exciter with its integrated Exgine card for HD Radio operation.

Recognizing that RF STLs are prone to interference, a new release of the M50 also was on display that monitors the HD Radio data packets and automatically requests a resend of lost packets to maintain a lossless broadcast.

Contact the company in Maine at (902) 823-3900 or visit www.nautel.com.

World Radio History

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World Radio History

Time-Shifting With Snaptune One

Software Allows Users to Identify 'That Song on the Radio' and Record It Too

by James Careless

Is Snaptune One a clever selling tool for online music or a thinly disguised way for someone to pirate songs by recording them from FM radio?

That's a debate likely to ensue now that Snaptune Inc. has released software for free download at *www.snaptune.com.*

The company is privately held and based in Bellevue, Wash. For his part, CEO Bill Baxter has no doubts about Snaptune One's identity.

"Research shows that people who use Snaptune One to figure out what song they're hearing on the radio buy more legitimate music than those who don't," he said. "As well, we make our money by directing people to online music sites and getting a commission for doing so. After all, the quality of Snaptune One's music recordings are just FM quality at 64 kbps. That's good enough for our software to identify the song and for you to get to know it, but not good enough for ongoing listening."

What it can do

Record what's being played on FM radio, then send it to a server for identification: That's the basic thinking behind Snaptune One.

"The first stage is called 'song mining,'" said Baxter. "The Snaptune One software records the song at 64 kbps from a streamed feed of the FM station, a built-in FM tuner card on the PC or from an FM radio plugged into the PC's sound card. It then contacts our servers and effectively says, 'Okay, I have this 3:20 song with these musical characteristics: Tell me what it is.'

"If the server can identify the song, it sends the information back to the user's PC," he said. "It also provides them with additional information about the song, including the artist, album art and even links to online retailers selling it."

Up to 20 of the sampled songs can be recorded on the user's PC with the free version of the software; and you can dub these songs onto an MP3 player in MP3 or WMA music formats. For $39.95, the user can purchase a version of Snaptune One that supports unlimited song storage and transfers. Part of this money goes to pay royalties to MP3 patent holders.

Recording and then identifying individual songs is just part of what Snaptune One can do. As it records songs, the software compiles playlists of what's being aired on selected FM stations.

For consumers, the result is a sortable music library. For radio stations, Snaptune One can be used to track what the competition is playing and when. The longer the software monitors a given station, the more data it gathers on what's being played, when and how often.

Snaptune One can also record talk shows and anything else offered on FM radio. Since Snaptune One can send its feed to iTunes, and from there onto a user's iPod, it is possible for someone to schedule what they want to hear the night before, then come down in the morning to a preloaded, ready-to-go MP3 player.

"If your favorite deejay does the overnight shift, you can record him and then listen on your way to work at 8 a.m.," said Baxter.

Promotion?

Given that we live in the post-Napster era — at least from the "free music" point of view — it's not surprising that Baxter is careful to position Snaptune One as the music industry's best friend.

This is why the software directs users to online music sites and bases its revenue model on sharing revenues from online music sales. Add the fact that the downloaded songs are only FM-quality, said Baxter, "and one can see that Snaptune One isn't meant to encourage music piracy."

This doesn't change the fact that the songs being recorded from FM signals are still being captured and played back for free. This said, the possibility of listeners recording FM signals for their own use probably shouldn't cause broadcasters to lose sleep; after all, this has been possible for decades. Instead, the aspect of Snaptune One that might grab their attention is its ability automatically to generate intelligence not just on local competitors, but on their own stations.

Theoretically, Snaptune One could be used for analyzing the playlists of successful stations throughout the United States and comparing them to one's own lineup. Snaptune One could prove to be a tool for broadcasters, and for free.

The software records songs at 64 kbps from a streamed feed of the FM station, a tuner card on the PC or a radio plugged into the PC's sound card. If the server can identify the song, it sends the information back to the user's PC and provides additional information including artist, album art and links to online retailers.

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World Radio History

Safety Tips, Fads and Fallacies

Engineering Presentations Seek to Clear Up Common Misconceptions About Towers and RF

by Tom Osenkowsky

It has been said that necessity is the mother of invention. In the case of 4 Times Square in New York City, the destruction of the World Trade Center brought forth the need for new transmitter sites for FM and TV broadcasters.

Towers and RF safety were among the discussion highlights at a session of the spring NAB convention.

John M. Lyons, assistant vice president and director of broadcast communications for The Durst Organization, presented a paper co-authored by Richard Tell, president of Richard Tell Associates in Colville, Wash. "Monitoring RF Safety at a Multi-User Broadcast/Communications Site" detailed the design and construction of the transmission facility, home to 10 FM stations, four UHF and one VHF TV stations plus a standby FM antenna, in the heart of Manhattan.

An important element in the project was establishing an RF safety program. John Lyons serves as the RF safety officer.

"The role of the RF safety officer is to establish a single contact for all RF safety issues," he said. "Having the responsibility and authority from the building owner/management to ensure all aspects of the RF Safety Program are observed on a continuing basis is a key element to a successful program. The RF Safety Program must be continually reviewed and updated as changes and additions are made at the site."

A reminder about FCC rules regarding radiofrequency radiation: They apply to exposure, not emissions. This is significant; it means high RF fields that are above the limits do not necessarily mean the site is out of compliance. What counts is the high RF field level to which individuals are actually exposed and whether steps have been taken to prevent excessive exposures above the limits.

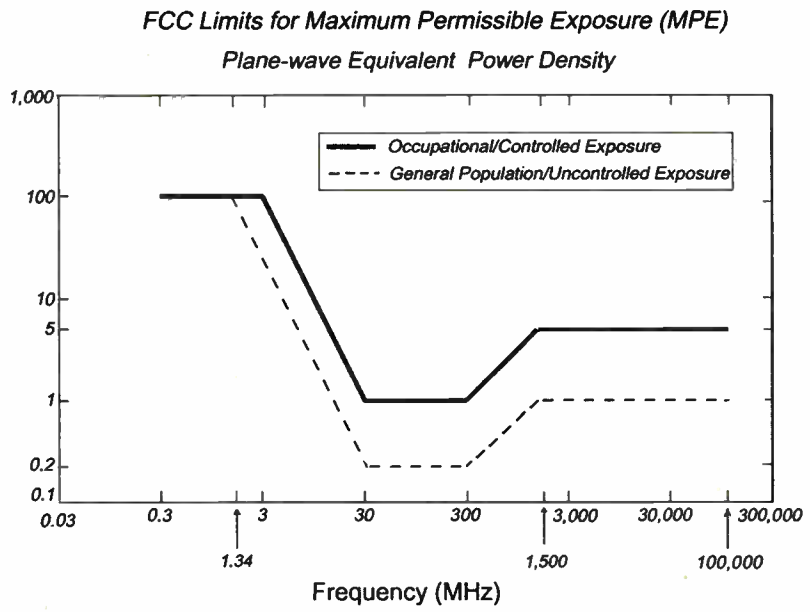
At 4 Times Square, a one-page RF Safety Awareness Information sheet is given to personnel who require access to the roof or antenna tower. This describes the hazards associated with over-exposure to RF fields, with descriptions of how signage, personal RF monitors and avoidance of restricted areas can control personnel exposures. Recipients must sign the sheet, acknowledging they have read and understood the message.

RF Safety Program elements include appropriate signage, color-coded beacon lamps, door enunciator system, lock-out/tag-out procedures, on-site RF measurements and analysis, annual program audit and retraining and continual revision of RF Safety protocols.

As an example of revision, IEEE has a new Recommended Practice titled "IEEE Recommended Practice for Radio Frequency Safety Programs, 3 kHz to 300 GHz" from the IEEE Standards Coordinating Committee 39.

False and misleading

"RFR: Fads and Fallacies" was presented by James B. Hatfield, P.E., of Hatfield and Dawson Consulting Engineers and co-authored by Stephen E. Lockwood, P.E., of Hatfield and Dawson and Richard R. Strickland of RF Safety Solutions LLC.



Graphic from the paper 'RFR: Fads and Fallacies'

The presentation discussed false or misleading claims by consultants eager to garner business, incorrect measurement techniques resulting in inaccurate readings and quasi-legal judgments based on unobtainable measurement accuracies. Also, Hatfield noted, the computational methodology used for FCC applications cannot show all situations where MPE (Maximum Permissible Exposure) limits may be exceeded.

"A primary misunderstanding is the confusion between ionizing and non-ionizing radiation," said Hatfield. "RF radiation is non-ionizing, as contrasted to nuclear energy, which is ionizing."

One fallacy is that the Occupational Safety and Health Administration has specific requirements for RF safety. In fact, OSHA has no useful rules on the subject of non-ionizing radiation, he said, and OSHA does not mandate specific training requirements for workers who may be exposed to RF.

OSHA does encourage organizations to develop and implement RF safety programs. Citations have been issued for failure to perform a hazard assessment to determine hazard avoidance or personal protective equipment requirements.

Another fallacy is that measurement techniques are unimportant.

Modern RF exposure standards, including the interpretations working group of IEEE C95.1-1991, specify that MPE compliance be determined by spatially averaged measurements. This is true where MPE limits are based on specific absorption rate, or SAR. The most important factor in performing measurements is to follow the manufacturer's directions precisely. This is especially true at complex broadcast facilities where field intensities can vary dramatically over distances of only a few inches.

Uniform rates of speed and maintaining proper direction when moving the probe are essential to obtaining correct data. The measurements should be repeated at least four times to ensure accuracy. MPE limits are frequency-dependent. Remember that there are two sets of limits: Occupational/Controlled Exposure, where workers and personnel familiar with RF hazards are exposed, and the more stringent General Population/Uncontrolled Exposure, where the general public (persons with no knowledge or control) are exposed. The Occupational exposure is time-oriented whereas the General exposure is not.

Proper signage is an important element to the RF safety program. The three most common signs are "NOTICE: May exceed FCC general public exposure limit," "CAUTION: May exceed FCC rules for human exposure" and "WARNING: Exceeds FCC rules for human exposure."

Signs, color-coded areas, fences and other barriers help ensure compliance with FCC rules pertaining to RF hazards as well as proper use of instrumentation employed in measuring fields.

Building safe

"Structural Standards for Design, Construction and Operation of Broadcast Towers," presented by Ernest R. Jones, P.E., vice president of engineering at Electronics Research Inc., discussed present and new standards for towers.

One fallacy, Hatfield said, is that OSHA has specific requirements for RF safety.

Revised standards are specified in ANSI/TIA-1019-2004. The TIA-225G revision was nine years in the making. There are notable differences in the current vs. revised standards. Revision F specified winds in the Fastest Mile map whereas Revision G specifies a full three-second gust. For comparison purposes, an 80 mph fastest wind speed is equivalent to a 100 mph three-second gust speed. Other equivalences are given in Table 1609.3.1, adapted from the 2000 International Building Code.

The former ice standard assumed 1/2-inch applied uniformly through the tower at 87 percent of basic wind speed. The revised version applies 1/4- to 1-1/4-inch at wind speeds from 30 to 60 mph three-second gust, double ice thickness on tower members and increased thickness up to 1.4 times at 950 feet.

Tower structures are categorized in order of hazard. Category I structures present a low hazard to human life and damage to property in the event of a failure; Category II structures present a substantial hazard in such cases; Category III structures present a high hazard.

Category II structures are considered the default rating and have a reliability importance factor of 1.0. Category I structures have a reliability importance factor of 0.87

See SAFETY, page 25 ▶

World Radio History

A Night on Space Mountain

The IBOC Conversion May Hit Some Unforeseen Ups and Downs, But Its Path Is Largely Predictable

by Skip Pizzi

We've seen it many times before, yet it's always a surprise when it happens again. I'm talking about the cyclical process of trend adoption.

You know how it goes: First comes the disruption in status quo caused by the new trend, followed by a rush to invest in the shift ("irrational exuberance"), followed by a backlash or crash, and finally a recovery to some rational middle ground where the new trend becomes adopted into mainstream life.

The pace of this process can vary widely, but the overall shape of the adoption curve is remarkably consistent. The initial rumblings build fairly quickly, and once the buzz gets going, there seems to be an almost irresistible attraction to embrace the new movement. Perhaps it's the fear of missing the boat that drives this, yet it is almost always an overreaction. Soon the overshoot is recognized, and there is typically an even faster rush to back away from the shift. This, too, is often an overcorrection, and eventually a return to moderate, sustainable adoption settles in.

Engineers will recognize this function as that of a pendulum, or of the characteristic "ringing" often exhibited by the start of a new excitation in a resonant circuit. The faster the rise-time, the quicker and deeper the drop on the negative side of the wave. The first wave may be followed by a few more of steadily decreasing amplitudes, but eventually a stable periodic function emerges. So perhaps there is something "natural" about the adoption cycle, no matter how oblivious we may be to it while in the midst of one.

Understanding this dynamic is important, though, because it can provide a softer landing at the end of the cycle. Successfully riding out that steep crest and trough of the initial wave is easier to do if you know it's coming and are aware of your relative position to it as the process unfolds.

Analysts have tried to capture critical elements of this phenomenon. One apt and oft-cited quote comes from Bill Gates, who wrote in his book "The Road Ahead," "We always overestimate the change that will occur in the next two years, and underestimate the change that will occur in the next 10."

Perhaps it's "episodic TV syndrome" that makes us all expect a complete story to be tied up fast, and leaves us with inadequate attention span if the ending doesn't emerge quickly enough. The saga may begin quickly enough, but the end may take more time to be revealed than we'd prefer. That's likely what's behind Gates' pronouncement that we expect too much in the near term, and don't stick around to observe the real impact later.

We've seen this in U.S. radio over the years, most recently with RBDS, which after a dozen or so years is now completing the cycle as it moves into the mainstream. Even FM itself experienced such a process, extending over three decades in its case.

See THRILL, page 26 ▶

The Big Picture

Photo: Gary Hoyer, BBC

by Skip Pizzi

Safety

▶ Continued from page 24

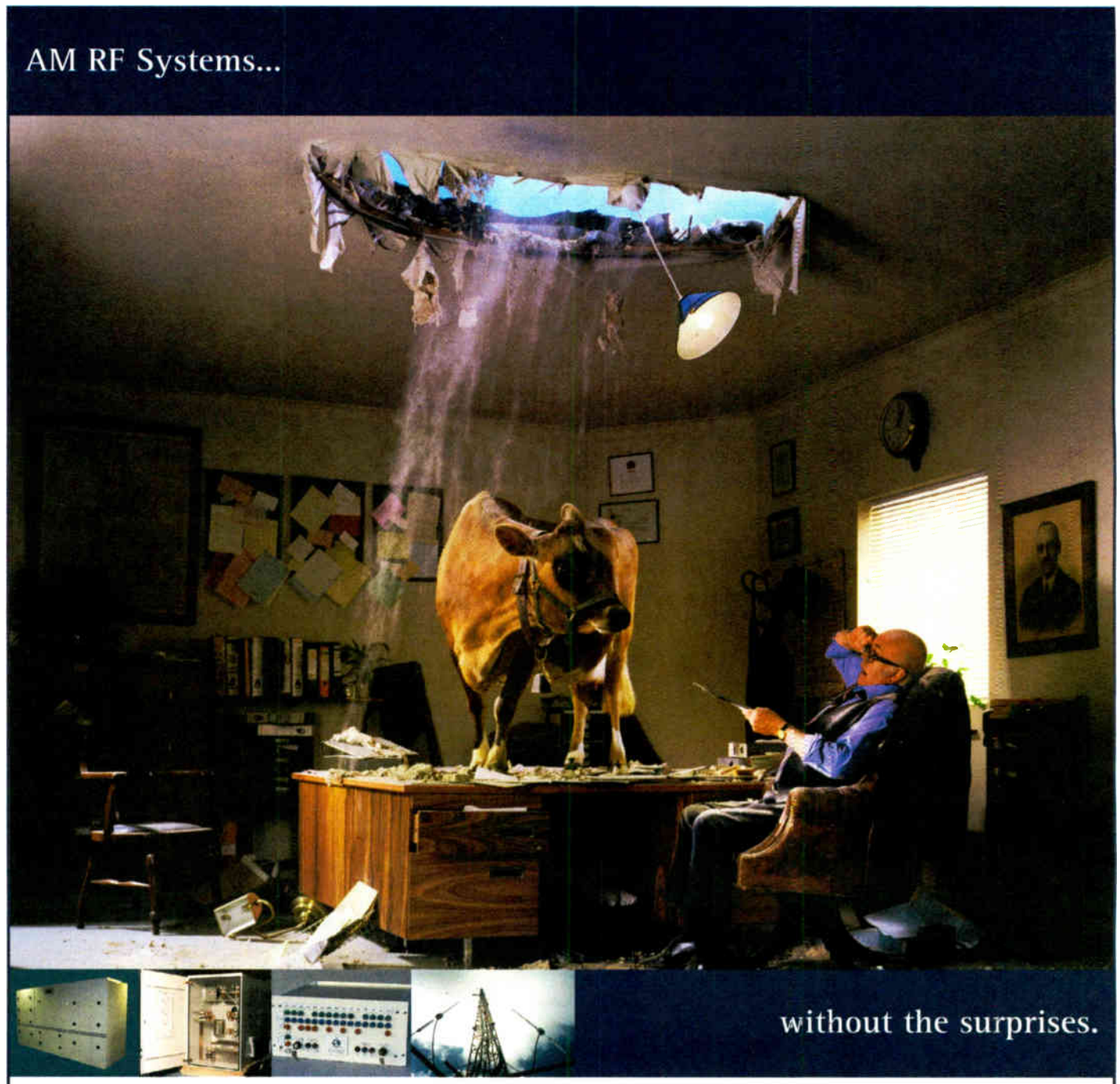
and Category III structures have a reliability importance factor of 1.15.

The effect of topographic features on wind speed was addressed. Composition of soil, terrain, natural and manmade structures near a tower can affect wind speed at various levels on a tower. The revision specifies a site investigation for Category III towers and recommends an investigation for Category I and II towers.

Earthquake zones for the U.S. are given in map form and will dictate design considerations for towers erected in areas where earthquakes are more common. Electrical grounding is specified, as are corrosion control methods given the type(s) of soil in the area of the tower.

"The latest revision contains many new specifications for both during construction methods as well as design considerations given a variety of factors not addressed in the previous standards," Jones said. "Tower safety and proper construction benefit all parties concerned."

Tom Osenkowsky is an engineering consultant based in Brookfield, Conn.



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World Radio History

MILE STONES

Bauer's 707: Radio From a Kit

by Charles S. Fitch

For many of us, it's the feeling of magic that brings us into radio. Nowhere in the panoply of broadcasting does that magic seem to reside as potently as in the transmitter room.

In days past, glowing tubes of all sizes and hues powered the station, lit the night, warmed the space, seemed to sizzle with radiant energy. Something extraordinary is vested in being able to send a message through the air to people who need information, comfort, friendship, entertainment, community.

Most of us started in the industry at low-power community stations. The heart of the transmission plant usually was a 1 kW AM transmitter, many acquired when Class IV stations were allowed to go to 1,000 watts. These classic workhorses, made for us by RCA, Bauer, Gates, Collins, Raytheon, CCA and others, had personalities.

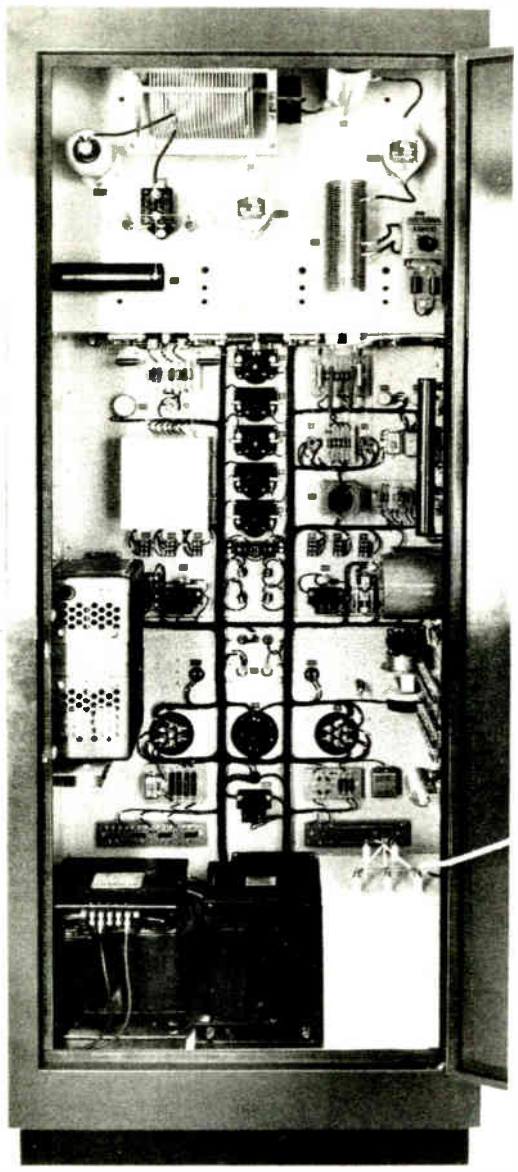
Of all those 1 kW boxes, the most interesting and innovative may have been the Bauer 707.

Fritz Bauer had been designing on his own in California for years — we wrote about the Bauer transmitter company here on Oct. 6, 2004, a story you can find on RW's Web site — but the across-the-board increase of daytime power of most Class IV stations to 1 kW created the need for a company and transmitter to meet the need for perhaps a thousand new transmitters.

In retrospect, all these transmitters seem elemental. But in their day they were considered high-tech, full of refinements and meaningful technical innovations such as remote-control capability and auto-recycling after overloads.

The major innovation that differentiated the 707 was that it was available as a kit. You could construct the transmitter on-site, Heathkit style using detailed instructions, at your own speed and then have it type certified by a traveling field engineer. Many engineers accumulated intimate transmitter knowledge, literally piece by piece, as they assembled their 707s.

As in the case of building a car or any similar big-ticket item, competition brought the "list price" of these units into a range that set the design engineer's budget. To make the price, the designer had to choose where to put the money, what features or component investment deserved the best.



Internal view of the transmitter from a 1966 company brochure

Tube manufacturers offered two "bottle" solutions for 1 kW, the 4-400 tetrode and the 833 triode. Ordinarily, two of these were operated in parallel for the RF output and two in push-pull for the audio modulator.

The Bauer used 4-400s in the power stages and selected the balance of the tube complement from types that could be obtained from the local TV repair shop.

Where did the money go in a 707? In my observation, the quality went into the transformers and the metering. Most 707s still have their original transformers — a tribute to the designers and manufacturers. On the metering side, rather than parsimony of meters with input selector switches, the 707 has a meter on every critical parameter.

An onboard dummy load substituted for the antenna as a troubleshooting and tuning aid; this was a useful feature. Usually made up of power resistors in competitive transmitters, the 707's onboard dummy was made of German toaster wire with a unique scheme to zero out the reactance from the wire coiling.

Most 707s are still ready for service. Many are on air right now, from Honduras to Utica to Viet Nam.

The real story of these 1 kW beauties is not how they do it but what they do. Providing reliable radio service to communities throughout the world. Since the 1950s, literally billions of hours or radio programming have passed through them.

Please send your 707 or any 1 kW stories and share your memories with us. We'll write about other models in future Milestone articles.

For the tube lovers out there, the schematic for the 707, a tribute to Fritz Bauer's elegant design work, is on the RW Web site as part of this article at *www.rwonline.com.*

Buc Fitch's article about Paul Gregg, Fritz Bauer and the 707 also is online at www.rwonline.com. *Click on the Special Report tab and scroll to stories from October 2004.*

All Bauer transmitters, including the 707, are supported for parts and service by Bauer Transmitter. Contact the company at www.bauertx.com.

This 1960 print ad, believed to be from Broadcast Engineering, shows Paul Gregg. The text prices a kit-form Bauer 707 at $3,495.

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Thrill

▶ Continued from page 25

So armed with some awareness, what can we forecast about radio's current transition to digital broadcasting? Well, clearly, we are just at the very beginning. Again, the engineer knows that the near-field effect will not allow a lot of accuracy in extrapolation of trends yet — not enough history. What we can say with some certainty, though, is that broadcasters are now enthusiastically embracing IBOC. As this process continues, without any immediate payback from listeners adopting IBOC at a similar pace, the process will inevitably hit a wall, and today's conversion pace may seem retrospectively like irrational exuberance on broadcasters' part.

This will likely generate a backlash movement that labels the broadcast IBOC conversion as wrongheaded or premature ("Back to FM!"), but it is just where a more disciplined, longer view should be exercised instead.

Like Ulysses, post-IBOC broadcasters should tie themselves to their (antenna) masts as they pass by these sirens, and stay the original course. While there is no guarantee that this perseverance ultimately will be rewarded, it is almost certain that there will come a time of such doubt, as the necessary offset between broadcasters' conversion and listeners' (possible) adoption runs its course. This is a natural part of any chicken-and-egg conversion process, which every broadcast format transition intrinsically involves.

How broadcasters manage themselves during this period may have substantial impact on the ultimate outcome. Consider how Eureka-147 DAB has recently fared in the U.K., compared to its fate in other DAB countries (a great example of the Gates quote above). The U.K.'s current success with digital radio would not have happened if broadcasters there hadn't pushed it to the next level with a second wave of investment, this time in new *content* rather than hardware.

The pacing and patience required by this process brings up another metaphor called "Tarzan Economics," referring to that legendary character's method of transport through the jungle by swinging from one vine to another. The tricky part is in managing the transition between vines: to maximize forward momentum you have to let go of the current vine just before it reaches the end of its arc, and then quickly grab onto the next one.

Radio broadcasters should be heartened by the fact that the IBOC transition allows Tarzan to cheat a little, keeping hold of the old vine for a while after grabbing the new one. The leap of faith is not as dramatic, but perhaps neither is the resulting speed. Once more, the seemingly natural rhythms of risk vs. reward, or pain vs. gain, may apply to the IBOC transition. Thus the IBOC conversion cycle may be a long, slow one.

Shift runs downhill

Returning to the wave model, for this process to actually work, something has to start the excitation with a pretty strong force. If the positive side of the wave doesn't reach a high peak, the trough won't hit very hard or fast, and the bounce into mainstream adoption won't ever take place.

The apt natural model in this case is the roller coaster. The potential energy of the car must be increased by pushing it to the top of the first hill, but then the natural ambient conditions (i.e., gravity, friction and centrifugal force) take over. If that first hill isn't high enough, the car won't make it through the course.

IBOC conversion investments by broadcasters are pushing the car up the hill right now. To get it to the top they will need some help from receiver manufacturers, and some effective marketing from both parties. Then the real thrill ride will begin.

Skip Pizzi is contributing editor of Radio World. Comment on this or any article to radioworld@imaspub.com.

World Radio History

GM Journal

Radio World | Resource for Business, Programming & Sales | July 19, 2006

What do recent tax law changes mean for your station?

Page 30

KFOR Family-Friendly AM Show Wins Big

by Ken R.

They're married, but not to each other. They have worked at KFOR(AM), Lincoln, Neb., for a combined total of 53 years.

Meet Ward Jacobson and Cathy Blythe, hosts of the aptly named "Ward & Cathy Morning Show."

Actually the above statistic is a bit misleading. If you add in the tenures of their colleagues, sportscaster Chuck Stevens (23 years) and news director Dale Johnson (22 years), this morning show has almost 100 years of on-air experience at the same station.

Blythe, who joined as a receptionist, in 1972 said, "We try to be mass-appeal so that everyone including grandma and the kids can listen."

The ratings bear this out. In Arbitron Market 176, Three Eagles Communications' KFOR morning show picked up some impressive shares in the fall 2005 book. In the 12+ demographic: 14.7; in the 25+ demo, 17.1. And in the 35+ age group, KFOR garnered an amazing 22.9 share, more than double the audience of its nearest competition. The team received the NAB's Marconi Award for Small-Market Personality of the Year last fall.

"If someone tried to emulate what we're doing in a different market, it might not work," said Blythe. "But I think our style of 'live and local' is worth everything."

One morning after another

In a world where "radio longevity" is an oxymoron, just how do you keep a team together this long?

"When I was a receptionist I talked on the phone with a lot of our listeners and advertisers," said Blythe. "Then when I got on the air in 1982 I had a good feeling for what they needed. Radio is a lifeline for so many people, and that made me passionate about what I was doing. While I've had opportunities to move to other markets, I have been able to bloom where I was planted."

Ward Jacobson arrived at the station in 1984 as a sportscaster and joined her in the morning slot two weeks before the events of Sept. 11, 2001.

"For weeks afterward, that dominated everything," he said. "It was a bad day and we all felt pretty helpless because normally we have a lot of laughs on the show and it was difficult to know exactly how to handle things."

Marconi Winners 'Ward and Cathy,' or in this case, Cathy and Ward

Jacobson is a journalism major from the University of Nebraska. He loves to sing, draw, play tennis and claims expertise in ping pong.

Ping pong?

"When I was eight years old we lived on a farm and my dad surprised us with a ping pong table in the basement," he said. "I've been in tournaments but haven't won any championships yet. I guess you'd say I am the 'Buffalo Bills' of ping pong, but I do love the game."

The above is probably not the sort of quote one would hear from Howard Stern.

Technology and flying chairs

Jacobson likes new audio technology, but he remembers the old days, too.

"I'm in love with Google," he said. "Radio is so spontaneous and you need the information five minutes ago."

And he has brought himself up to speed in the production room, too. "I watch some of these people who are 15 years younger than I am who have grown up with (Digidesign) Pro Tools and they work a mouse much faster than we used to splice tape. I try to do my production cold the first time without chopping it up because it's easier, but I love being able to move audio tracks around on the computer."

Blythe said that when the station computer system has a glitch, she wishes she could grab a cart and throw it in.

"When one thing goes down it all goes down; however for the most part the new technology has been great," she said. "Every once in a while I miss cueing up records."

But one memorable on-air crash didn't involve a computer.

"I was talking during my show and my chair went out from underneath me and I cracked my head," she said. "I just wanted to make sure I didn't have any broken body parts before I kept going."

Everyone seems to like Ward and Cathy, even the competition. Carol Turner is an air personality at Clear Channel station KZKX(FM), better known as country format "96 Kicks."

"I've always admired Ward and Cathy's dedication not only to their listeners but to the Lincoln community," she said. "Both of them are talented and gracious individuals."

While I've had opportunities to move to other markets, I have been able to bloom where I was planted.

— Cathy Blythe

Another competitor, Jill St. James, is midday host at Nebraska Broadcasting's KBBK(FM).

"When I started working with Cathy 15 years ago, we always joked that I wanted her job," said St. James. "But if that day ever comes, no one will be able to fill her shoes. We're competitors but we're still good friends."

On the business side

Corporate operations manager/announcer Mark Taylor said station sales are trending up. "We have the fortune to be able to focus on Main Street, not Wall

See KFOR, page 29 ▶

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THE NEWS

BURLI

World Radio History

Educators Tap Into iPod Culture

by Ed Ritchie

The growing popularity of podcasting on college campuses is following the skyrocketing sales of its namesake, Apple Computer's iPod digital music player.

The numbers are staggering. At the January 2006 MacWorld conference, Apple CEO Steve Jobs announced that the company had sold more than 42 million iPods. One industry observer, John Udell of InfoWorld, called the iPod the "new transistor radio." Then there's the millions of digital players sold by other manufacturers.

With such popularity, it's no surprise that colleges are turning to podcasting — offering downloadable MP3 encoded files by subscription — to direct a flow of information, services and entertainment content to their students' digital players.

Lectures

The term "podcast" often is loosely used for downloadable or streaming audio from Web sites, but the technology has the most impact when it's implemented with the ability for a subscription feed of automatically delivered content. And that's the method that's powering a revolution on campus.

Students can automatically download podcasts of their choosing and play them at any convenient time. Obviously for information distribution, listening to digital file is a lot easier than trying to read something while walking to a class. But why limit the audience to students? Colleges now have a communication tool to reach students, staff, alumni and even international listeners.

Duke University in Durham, N.C., is a prime example of how aggressively colleges are pursuing podcasting and the iPod culture. In April, the university announced that it had evaluated the educational uses of the iPod and would implement a new program to support technology innovation in the classroom. Called the Duke Digital Initiative, the program provides support for the use and integration of digital audio, images and video in courses. The iPod serves as the core technology, and DDI policy assures that all students will have iPods available for their use in courses that incorporate the technology.

At Swarthmore College in Swarthmore, Pa., the alumni relations office set up a podcast faculty lectures series, in response to alumni interest in being connected to the intellectual life of the campus. The college also hosts War News Radio, an acclaimed student radio program on the Iraq war and related issues, that began as a podcast [RW, June 21].

The administration at American University Washington College of Law uses podcasting to make all event content available to internal and external community members. The service allows students who miss a class or speak English as a second language to listen to class content multiple times or at a modulated speed. Administrators say it has been an exceedingly popular resource for students, faculty and staff.

According to Joshua Baron, director of academic technology and e-learning at Marist College in Poughkeepsie, N.Y., podcasting allows a Spanish professor to make his lectures available on podcasts so students can fully listen in class, then listen again at their own convenience to take notes or find out if they missed anything. About 20 students involved in Marist Abroad programs have iPods and iTalk microphones. The students interview natives of the country where they are studying and share their work with classmates around the world.

'Profcasting'

Rick Grush, associate professor of philosophy at the University of California San Diego, prepared 15 philosophy lectures and submitted the podcast to Apple's iTunes Music Store. He says his lectures showed up among the top selections in popularity. Apple is pursuing the college market with its Apple Podcasting Server and the University Channel of the iTunes Music story.

Another resource for subscribing to podcasts is the Education Podcast Network. This trend of making lectures available to the public has inspired a new term —"profcasting."

Students are just as likely to follow their professor's examples, and the possibilities seem endless. For example, at Manhattan Marymount College in New York City, students use podcasting for their "Art Mobs" project, recording tours of art galleries in Manhattan.

The popularity of podcasting is growing so rapidly that Duke University considered the subject worthy of a symposium, to focus on current trends and the future of the medium. A variety of educators and industry experts attended, and one of the hottest topics was the question of copyright law.

Such issues will continue, according to Michelle Hilmes, a professor of media and cultural studies at the University of Wisconsin-Madison, who attended. She predicted that the medium's growth will resemble radio in some respects, and may surprise traditional broadcasters.

"I think in many ways [podcasting] is fulfilling the promise of radio that got switched off a long time ago because of needs to socially control a new medium," she said. "I think podcasting is really the future of radio."

STATION/STUDIO SERVICES

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The Top 25 Radio Groups By Revenue

Here are BIA Financial Network's rankings of the top revenue-producing radio groups in the United States based on its figures for 2005.

Clear Channel continues to preside over the industry with 1,171 stations and 2005 revenues in excess of $3.5 billion. "Still, Clear Channel, the industry's largest radio company, and the country's other top 25 radio groups are not expected to experience revenue increases beyond 2.3 percent in 2006, even with small pockets of growth in several markets," BIA stated in June.

The company expects above-average growth this year in the markets of Phoenix, Tulsa, Lafayette, La., Augusta, Ga. and Lake Charles, La. It foresees below-average outlooks in Wilkes-Barre, Pa., New Orleans and San Jose, Calif.

The top radio groups by revenue, rounded off, follow. Note that Cumulus Broadcasting and Cumulus Media Partners are listed separately:

Rank	Owner	Revenue (000s)	# of Stations	# of Mkts
1	Clear Channel Communications	$3,534,880	1,171	191
2	CBS Radio	$2,241,650	179	41
3	Entercom	$486,400	104	22
4	Cox Radio Inc	$482,975	78	19
5	Citadel/ABC	$417,200	24	9
6	Citadel Communications	$412,625	215	50
7	Radio One Inc	$388,925	70	22
8	Univision Communications Inc	$382,275	73	22
9	Cumulus Broadcasting Inc	$313,210	299	56
10	Emmis Communications	$297,575	23	7
11	Bonneville International Corp	$269,250	28	7
12	Cumulus Media Partners LLC	$264,175	36	10
13	Salem Communications Corporation	$201,075	104	39
14	Greater Media Inc	$189,100	19	6
15	Spanish Broadcasting System	$188,900	20	6
16	Lincoln Financial Media	$157,075	18	5
17	Beasley Broadcast Group	$134,325	43	10
18	Saga Communications Inc	$133,875	87	15
19	Entravision Holdings LLC	$104,600	52	19
20	Regent Communications, Inc	$89,645	73	14
21	Journal Communications Inc	$81,350	37	8
22	NextMedia Group Inc	$69,175	48	9
23	Inner City Broadcasting Corporation	$66,500	18	7
24	Sandusky Radio	$63,800	10	2
25	Multicultural Radio Broadcasting Inc	$63,200	44	21

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World Radio History

KFOR

▶ Continued from page 27

Street," he said. "If you work with your local businesses to grow their clientele you will succeed."

He said the biggest obstacle he sees is clients who want to advertise in the newspaper.

"Studies indicate newspaper advertising does not work," said Taylor. "So we show potential advertisers the studies. We have to deal with the fact that they can see a print ad and radio is more ethereal."

He is quick to praise his radio competition and says that cross-town KZKX has a long-standing morning show, great promotions and a sense of community involvement.

Blythe holds a plaque from RCA Records thanking her for helping sales of the song 'Afternoon Delight' to a Gold Record in 1976.

Jacobson in 1987

It seems that people in Lincoln, Neb., support each other. The morning hosts at KFOR are no exception.

"I'm delighted we won the Marconi," said Jacobson, "but there are a lot of great shows out there and a lot of other people deserved the award too. I just like going to work and doing what I do; and if a lot of people like hearing us, that's really enough reward for me. When you operate that way, good things happen."

Incidentally, when Cathy Blythe started at the station, she planned on staying only five months before going back to school to finish her teaching degree.

"It turned out to be a long detour," she said.

Ken R. is a former radio personality who says he was as suited to being on the air as an emu is suited for ballroom dancing.

About KFOR

Here's how the station describes itself.

"KFOR began broadcasting in March of 1924 with a commitment to serve the community. That commitment remains in place today, as KFOR continues to be one of the most successful 'Full Service' AM radio stations in the country.

"Our listeners know that KFOR will give extra attention to events that effect them and our community. KFOR prides itself on daily live interviews with community leaders and dignitaries that help shape the way we live. 'Lincoln Live' is a one-hour program each day at Noon, that features Lincoln's most comprehensive Newscast, sports and a half-hour interview with a guest that enlightens or helps execute and plan new and existing fundraisers, and campaign drives that respond to the community needs. We set NO time limits that staff members can devote to Lincoln. This dedication to Lincoln has earned KFOR many awards including the highest honor a radio station can receive, the National Association of Broadcasters 'Crystal' award in 1991, and again in 2004.

"One of KFOR's main priorities is to provide local information and news 24 hours a day. Our flexible format philosophy allows any programming to be interrupted with information of local interest, need or safety. We provide LOCAL newscasts at least twice per hour prepared by a staff of four in the KFOR newsroom. KFOR's reputation for thoughtful and responsible reporting is unchallenged.

"KFOR strives to serve Lincoln through such projects as 'Operation Santa Claus,' which supplies Christmas gifts for Lincoln's less-fortunate children; the 'Governor's Call in Show,' which originates at KFOR and is aired by other stations across Nebraska; and our severe weather coverage, which links KFOR with the National Weather Service, Lancaster Civil Defense and our network of Tornado spotters. KFOR's air staff brings a caring attitude to each segment of our broadcasts."

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World Radio History

Broadcasting-Reconciled Tax Savings

What Do Recent Changes in Tax Law Mean for You or Your Radio Station?

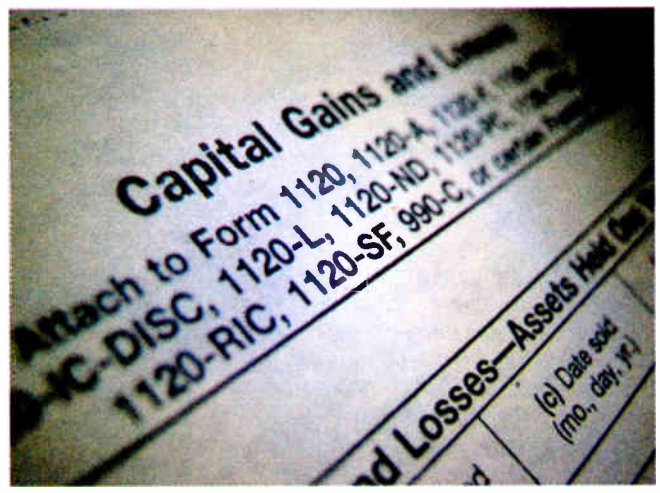
by Mark E. Battersby

After many months of wrangling, the $70 billion Tax Increase Prevention and Reconciliation Act of 2006 is now a reality.

To pay for some of the tax breaks extended or created, lawmakers included more than a dozen "revenue offsets," including one that removes restrictions on rollovers to Roth IRAs and another that affects the so-called "kiddie" tax.

Beginning in 2010, those radio station and broadcasting business owners who employ individual retirement accounts (IRAs) as savings vehicles will be able to roll over the IRA into a Roth IRA. The ability to make such a rollover is currently limited to taxpayers with adjusted gross incomes of no more than $100,000. The amount being rolled over must be included in gross income, so taxes will be due although they can be spread over a two-year period if the rollover is made in 2010. Qualified withdrawals from Roth IRAs are not taxable and Roth IRAs are not subject to the minimum distribution requirements of conventional IRAs and 401(k) plans.

When it comes to provisions that will either impact on or benefit the average broadcasting business, it is much the same story. Small businesses that buy equipment will benefit from the extended, increased Section 179 expensing allowance. Owners who receive profits from their incorporated radio stations and businesses will enjoy the lower tax rates on dividends paid by their businesses as well as from gains resulting from the sale of business property — even the business itself.



Owners who receive profits from their incorporated radio stations and businesses will enjoy the lower tax rates on dividends paid by their businesses as well as from gains resulting from the sale of business property — even the business itself.

The new bill also ended a practice that allowed high-income families to lower their tax bills by transferring assets to minor children. The new rules require taxing unearned income at their parents' rates until children reach age 18.

The Kiddie Tax

Generally, when the unearned income of a child exceeds the annual inflation-adjusted amount, it is taxed at the higher tax rates of the parents. This so-called "kiddie tax" is designed to lessen the effectiveness of intra-family transfers of income-producing property that would shift income from the parents' high marginal tax rate to the child's generally lower tax bracket, thereby reducing the family's overall tax liability.

The new law increases the age to which the "kiddie tax" applies from under 14 to under 18 years of age. These special rules apply to the "unearned" income of a child — such as that from dividends paid to them as partial owners of the parents' broadcasting business, not from wages or other income earned while performing actual services.

Since this increased age provision is in effect for 2006, a radio station owner might want to seek professional advice. If the unearned income of children under 18 is significant, some tax strategies might require re-thinking. Gifting appreciated stock to your children may, for example, no longer produce a tax saving if they sell the stock while subject to the new rules. Nor would holding dividend paying stocks or interest from bonds be as profitable in the hands of under-age children.

The dreaded AMT

The alternative minimum tax is a separate method of determining income tax for both the broadcasting operation and its owner. It was originally devised to ensure that at least a minimum amount of tax is paid by high-income corporate and non-corporate taxpayers who reap large tax savings thanks to so-called "tax preferences."

In essence, the AMT functions as a recapture mechanism, reclaiming some of the tax breaks primarily available to high-income taxpayers such as certain tax deductions, exemptions, losses and tax credits. Unfortunately, because the amount of income exempted from the bite of the AMT is not indexed for inflation, increasing numbers of owners — and radio businesses feel the pain each year.

To calculate the tentative minimum tax, a broadcaster must first determine alternative minimum taxable income (AMTI) and then subtract the AMTI exemption amount. The new tax law provides an exemption amount (an amount that is phased-out for married couples filing jointly with AMTI, or AMT income, of $150,000 or more or unmarried individuals with AMTI of $112,500 or more). While the $4,500 exemption amount in the new law will help, it is hardly a solution and for many station owners, and does not affect businesses.

The exemption amount was scheduled to decrease from $58,000 to $45,000 (married filing jointly; from $40,250 to $33,750 for unmarried individuals) for tax years beginning after Dec. 31, 2005. Instead, under the new law, for taxpayer years beginning in 2006, the exemption amounts are increased to:

- $62,250 in the case of married individuals filing a joint return and surviving spouses;
- $42,500 in the case of unmarried individuals other than surviving spouses; and
- $31,275 in the case of married individuals filing a separate return.

Plus don't forget that the Energy Tax Incentive Act of 2005 enacted, effective for 2006, a nonrefundable tax credit for alternative fuel motor vehicles and alternative fuel motor vehicle refueling property. These tax credits, along with the credit for non-business energy property, the credit for residential energy-efficient property and others fall qualify as nonrefundable personal credits. The new law extends the allowance for nonrefundable personal credits against both the regular tax and the AMT for one year, through 2006.

Capital gains and dividends

For broadcasting business owners, this is probably the most important provision in the new tax law.

The reduced tax rates on long-term capital gains and dividends were scheduled to expire at the end of 2008. Now, the owners of incorporated radio station distributing profits in the form of dividends can safely make plans to benefit from those lower tax rates on all dividend payments received.

What's more, these lower tax rates are also extended for capital gains that result from the sale of business property, even the business itself. The new law extends the reduced rates of 0 percent, 5 percent and 15 percent on dividends and long-term capital gains to taxable years beginning on or before Dec. 31, 2010. As under prior law, capital gains and dividends that would otherwise be taxed at a 5 percent rate will be taxed at 0 percent for taxable years beginning after 2007.

Equipment expensing

Since 2003, lawmakers have provided enhanced expensing or write-offs under the Tax Code's Section 179. The new tax legislation extends this unique treatment through Dec. 31, 2009, allowing larger, first-year deductions for newly acquired business equipment.

Today — and through 2009 — the maximum amount that a radio station or business may expense or immediately deduct is $100,000 of the cost of property, adjusted for inflation, of course. While that $100,000 write-off must be reduced dollar-for-dollar by the amount of qualifying property acquisitions in excess of $400,000, inflation has increased the maximum amount that can be expensed to $108,000 for 2006, with a $430,000 cap beyond which the first-year write-off must be reduced. Without the extension, the expensing limit would drop to $25,000 on a $200,000 cap after 2007.

And more

Among other provisions of interest are the following:

- Simplification of the "Active Trade or Business" Test. The provision simplifies the application of the active trade or business test to certain corporate distributions. By applying this test on an affiliated group basis, the provision applies the same standard regardless of whether a business is owned by a holding company or owned directly. As a result, the provision allows corporations to avoid costly and inefficient internal restructurings prior to engaging in certain corporate distributions to their shareholders.
- Availability of capital gains treatment for sale of self-created music works and election of five-year amortization for a created or acquired music work;
- Higher bond limits. Those qualified small issue bonds, tax-exempt state and local bond issues that have been used to finance private business property have, in the past, had limits on the amount of financing that could be provided to individual borrowers.

In general, for bonds issued after Sept. 30, 2009, the tax law permits up to $10 million of capital expenditures to be disregarded, in effect increasing from $10 million to $20 million the maximum allowable amount of total capital expenditures by an eligible business in the same municipality or country.

The new law accelerates the application of the $10 million capital expenditure limitation from bonds issued after Sept. 30, 2009, to bonds issued after Dec. 31, 2006. This higher limit on small issue bonds could enable some broadcasters to obtain additional funding from local development agencies.

Coming attractions

As mentioned, in order to reach agreement and keep within budget constraints, lawmakers removed some important provisions which will likely appear in standalone legislation, a "trailer bill," or could be tacked onto the pending pension reform bill.

Included among the additional provisions likely to be included in any new legislation is the extension of the deduction for state and local sales tax, the teachers' classroom expense deduction, R&D provisions, some employment tax credits and other popular, but temporary tax incentives.

Although these are popular provisions, when added together, they total about $90 billion in one-year tax "relief" at a time of significant budget deficits. Despite 2006 being an election year, traditionally a period when not much tax legislation passes, the months ahead may see even more changes to our tax law, changes that could affect every radio station and broadcasting business.

Mark Battersby is a tax and financial writer based in the suburban Philadelphia community of Ardmore, Pa. He wrote about energy incentives in January.

World Radio History

Your Listeners Want to Belong

The Passionate Listener: Radio Needs to Learn The Tricks of the New Social Networking

Promo Power

by Mark Lapidus

Only 20 years ago, high-passion formats had no trouble convincing listeners to put bumper stickers on their cars. Country radio, rock radio and urban formats could do bumper-sticker promotions and put hundreds of thousands of little promotional stickers on the road.

Now, at least in the major markets, it's rare to see a radio station bumper sticker in a week, let alone on a daily basis. Some in our industry say this is so because cars are more expensive and people are less likely to want to ruin a vehicle bumper or a paint job. I don't agree. Car owners 20 years ago were just as concerned about their cars as they are today.

I contend it's getting harder and harder to create passion for a format or a radio station. It's passion — or love — for a type of music or personality that drives a listener to wear his or her heart on a bumper.

Can broadcasters still create passion today? Yes. But it's much harder because we are competing with so many other entertainment diversions including cell phones, iPods, the Web, computer games and more.

Belonging

Passion often begins with a feeling of belonging to something or someone. If a radio station is just a jukebox, it's a utility. When a radio station becomes a utility, it generates zero loyalty and is unlikely to instill any kind of recall, which in turn means poor Arbitron ratings.

Now, at least in the major markets, it's rare to see a radio station bumper sticker in a week, let alone on a daily basis.

How does one encourage listeners to feel a sense of belonging? Many are now calling this "social networking."

If we can dream of ways to get listeners to interact with us based on their interests (not ours), we have an excellent shot at creating a connection — and therefore loyalty and recall. The most important way we can do this is by ensuring that our talent is relating more precisely to the target group that is listening.

It blows my mind that classic rock stations today continue to behave as if their 40- and 50-something listeners are waiting breathlessly for the next concert coming to town. Guess what? They're not! They're taking the kids to the pool, playing golf, exercising, watching DVDs at home, trying to figure out how to pay for college, going through divorces, having medical issues, playing the stock market and doing many other things; but they're not camping out waiting for Journey tickets to go on sale. If you pretend they are, you've doomed your station to being as memorable as a light switch.

Think about this carefully and you can come up with plenty of examples for your own target audience. The point is that we must create targeted entertainment.

Here's a clue: Since air personalities are not great actors — they do best just being their own bad selves — consider hiring on-air talent who already has a lot in common with your listeners.

Not sure who fits the role? Record a daypart. Write down the topics that the DJ discusses and how much time is spent on each topic. What percentage of the break are they using to make a truly relevant connection to their target?

The best air personalities create a bond that begins one-on-one. Radio is a wonderful medium for this because people listen as individuals, not as members of an audience. Relate to me well on the air and I'll begin to feel that we have a connection.

With a certain percentage of your

See PASSION, page 32 ▶

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World Radio History

Passion

▶ Continued from page 31

audience, you can take this to the next step by beginning a conversation on-air, back and forth, so that true interaction occurs. Get this going by putting lots of different listeners on the air, making them part of the process. Do you use caller ID in the control room, making it easier for your DJs to spot contest pigs and repeat callers?

Connect

Connection can also take place when folks e-mail your personalities or radio station and receive a real answer back. It can also happen when you offer free stuff and discounts.

If your listeners regularly receive useful information on the air, via e-mail or on the Web, this too can create a relationship. Tell me about a free event that my kids will enjoy this weekend — and why I might enjoy taking them — and you'll make my list of people I should remember to stay in touch with.

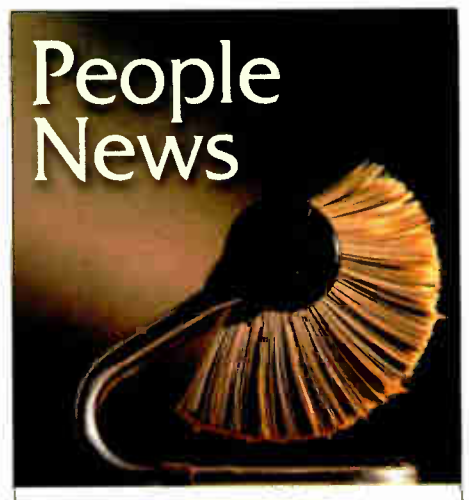
Youth formats are pretty good about taking advantage of event marketing for in-person social networking but too often hang out with the same listeners at the same places. Make that extra effort to make new friends every time you go out.

Last, do you have good sources to tell you what your listeners really want from you? Too many programmers attempt to use their intuition to figure this out. It's much better to do this by asking people through research and conversation, checking most-viewed pages on your Web site, knowing what TV shows they watch, figuring out how they practice religion, how many are married, how many are employed in what industries ... I could go on.

Do you at least look at Gallup and the other polling services to find out what your part of the populace is thinking? Or are you sure that you know it all?

Question: How many program directors does it take to change a light bulb? Answer: Only one, but he has to realize it needs changing.

Mark Lapidus is president of Lapidus Media. E-mail him at marklapidus@yahoo.com.



Tell us about your job change or new hire. We're particularly interested in hearing news about radio engineers and managers. Send news and photos via e-mail to radioworld@imaspub.com *or mail to Radio World People News, P.O. Box 1214, Falls Church, VA 22041*

Tommy Jenkins was named chief engineer of **Border Media Partners'** seven-station cluster in San Antonio. He had been an engineer at Education Media Foundation's KLOVE & Air 1 Radio in Rocklin, Calif. Prior to that, he served as director of engineering at Encore Broadcasting in Midland and San Angelo, Texas.

Tommy Jenkins

Marty Sacks joined **Axia Audio** as vice presdent, a new position. He had been national sales director for Telos Systems.

Chester Grubbs, a longtime broadcaster at KTOK(AM) in Oklahoma City, Okla., passed away at the age of 83. He started KTOK in 1964 and worked at the station until his retirement in 2002.

Prophet Systems promoted **Wes Keane** to manager of systems design engineering, a new position. After joining the company in 2004 as a software developer, he became the lead developer of the Prophet Importer, a component for broadcasting HD2.

Premiere Radio Networks promoted Vice President, Interactive **Brian Glicklich** to the new position of senior vice president, digital media. He joined the company in 1997 after having previously worked for CBS Radio, Pulitzer Broadcasting and EZ Communications.

Brian Glicklich

Radio personality **Tom Joyner** received an award from the **International Radio & Television Society Foundation** for his philanthropic achievements at the Waldorf-Astoria in New York on June 15 as part of the IRTS annual luncheon. Court TV Network Chairman Henry S. Schleiff also received an award.

Steve Borneman was appointed to the position of president and general manager of **WABC(AM)** News/Talk Radio 77. He had previously been station manager of New York's WPLJ (FM), as well provided operational oversight of WQEW(AM) Radio Disney.

"At KPWR (Los Angeles), our CCA transmitter would occasionally trip breakers and go off the air without any obvious cause. **PowerClamp solved our problem immediately.**"
Tom Koza, Chief Engineer

"At KBIG (Los Angeles) we had continuing problems of our transmitters throwing breakers, unexplainable input power glitches, and a host of other power line-related problems. **Ever since we installed PowerClamp our problems just went away.**"
Terry Greiger, Chief Engineer

"KYSR (Los Angeles) uses a pair of Continental 816 transmitters, which use internal SCR regulators to control the screen and plate voltages. When the voltage of one AC phase was high, the SCR regulators would kick in, generate harmonics on the AC power line, and knock the other transmitter off the air. **We installed a PowerClamp and it totally solved the problem.**"
Chuck Ide, Chief Engineer

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World Radio History

Studio Sessions

Radio World — Resource for Radio On-Air, Production and Recording — July 19, 2006

Product Guide In This Issue

PRODUCT EVALUATION

Click-and-Play Production Music

CUEgle Search Engine Offers Radio Stations 40 Genres of Downloadable Production Music for Spots

by Ken R.

Go online and type in "flute solo" and get 21 hits. Try something more obscure like "bagpipe." You still get six hits. Let's get crazy: try "harpsichord." There are 57 selections ranging from the classical "Brandenburg Concerto" to the funky "Bad Girl."

When you use the free CUEgle search engine for production music (*www.cuegle.com*), you will probably find what you want. In addition to handling specific custom searches as described above, there are 40 basic musical genres to peruse should you prefer to find your production music that way.

CUEgle is free; just register and within 24 hours you get e-mail confirmation that you are signed up and ready to go. The catch is that if you wish to download and use any of the production music you find, you must pay for that privilege by signing an agreement with Non-Stop Music, the parent company that designed CUEgle as its front-end search engine. Generally this agreement is a blanket, one-year license, the cost of which is based on market size, number of stations in a cluster and other factors.

While most radio-ready libraries offer endless variations in :30 and :60-second lengths of each tune, CUEgle generally provides only one record-length version and a :30-second version.

"That's because it's what our clients want," said Randy Thornton, partner. "Today most radio producers use desktop editing and it's rare that they'll take just a single piece of music for a spot. They might use three or four cues montaged together. The trend we are seeing is that they definitely like to edit their own versions of the music."

Thornton and his company have given radio production directors a wealth of music to choose from: 15 different libraries containing over 45,000 individual pieces of music. The selections come from all over the world: the Crashed library from Ireland, Gas from Australia, Groovers from Tokyo and Mathambo from South Africa, among others. Of course the U.S. is well represented.

"We update 24/7," said Thornton. "We just put six new CDs online today, for example. But we are very selective. We watch carefully what our clients download and what people type into our search engine and this helps us gauge what we need to do more of."

'We update 24/7. We just put six new CDs online today, for example,' said CUEgle partner Randy Thornton.

It works like this

The user auditions the music from CUEgle, hearing the entire song if so desired. He then downloads the music selected into folders for specific projects. Clients can be sent e-mail with metadata XML files that they can then open in CUEgle for access to the full MP3 files. This saves the need to move audio files via e-mail.

J.D. McMillin, audio assistant for Penthouse Sound in New York, is a CUEgle user who appreciates the design of the service.

CUEgle user Eric Williamson suggests Non-Stop Music should take the growing Hispanic market into consideration when releasing new music.

"The project-based organization of tracks is a great feature and it saves a lot of time," he said. "The online search engine in combo with the hard drive of AIFFs they provide makes searching high-quality tracks easy."

McMillin saw a minor drawback: because the service is Windows Media Player-based, he was unable to skip around and hear different parts of the tracks on his Mac computer. We asked Thornton, who said there is another software program McMillin could use to get around this and that he would be contacted with the information.

CUEgle users in different regions of the country have different musical needs. Eric Williamson, audio engineer at Manhattan Transfer in Miami, has his wish list written out.

"The Hispanic market is large and quickly growing nationwide," he said. "Non-Stop Music should take this into consideration when releasing new music."

But Williamson like CUEgle overall and uses it extensively.

"It makes the music searching process more pleasant for several reasons," he said. "CUEgle displays the CD cover art, and this visual cue really helps the editor and the client. Also, the playback engine is handled superbly because the entire track loads onto the local computer so skipping to the middle of a selection is almost instantaneous."

Non-Stop Music also says it is beginning to move more heavily into the radio production market, and it named Dave Noble as director of radio. He can be reached at *david@nonstopmusic.com*.

Ken R. is a frequent contributor to Radio World.

Product Capsule:

Non-Stop Music CUEgle Production Music Search Engine

Thumbs Up

- ✓ Locates music by keyword or by genre
- ✓ Downloading into "project" files makes sorting by client easy
- ✓ Music quality is good; selection is diverse

Thumbs Down

- ✓ Few :60 edits; users desiring this length often need to make their own
- ✓ Some producers may feel more comfortable with the permanence of CDs

PRICE: Free

CONTACT: *Non-Stop Music in Salt Lake City at (800) 554-6462 or* www.nonstopmusic.com

PRODUCT GUIDE

Mojave Widens MA-200 Distribution

Mojave Audio broadened distribution of the MA-200 tube condenser microphone. The mic has been available in limited quantities since its release in 2004. It is now available through more pro audio dealers.

The company says the MA-200 offers full-bodied reproductions of vocals and instruments without the shrillness and high-frequency artifacts that it says are typical of modern condenser mics. The model uses 3-micron capsules, Jensen audio transformers and military-grade JAN 5840 vacuum tubes.

Additionally, the MA-200 has a cardioid polar pattern and uses a gold-sputtered capsule that is one-inch in diameter. It comes with a carrying case, power supply, shock mount and cables. The MA-200 retails for $995.

Contact Mojave Audio at (818) 847-0222 or visit www.mojaveaudio.com.

Product Showcase

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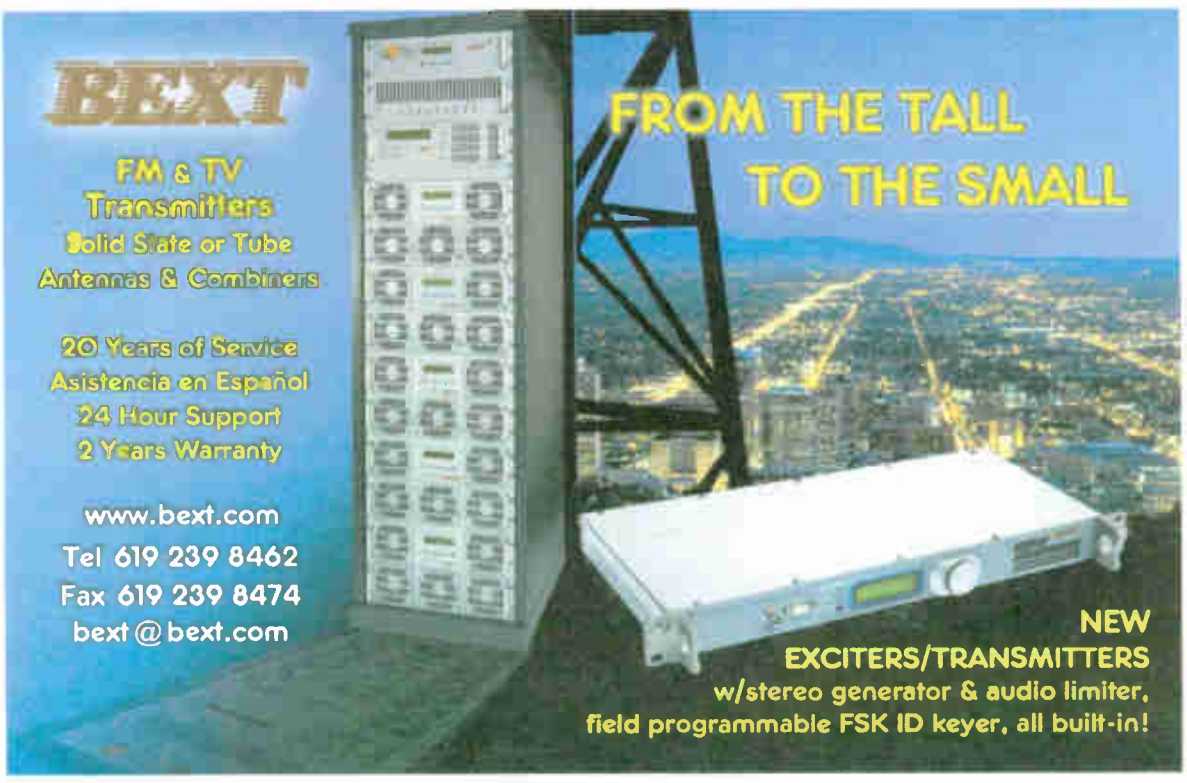

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PRODUCT EVALUATION

AKG HSC 171/271 Get It Right

HSC 171/271 Couple Mics, Phones to Produce Supraaural, Circumaural Closed-Back Sound Rejection

by Doug McLeod

There have been as many concepts for attaching a microphone to a set of headphones as there have been engineers to design them and announcers to use them. The broadcast headset has a history of being a hardy, abused beast. Some models have offered passable sound, some have not.

Over the past couple of years, a few manufacturers have re-thought the whole idea of coupling mics, especially condensers, with headphones. Some efforts have produced solid results but there have always been issues: mics too sensitive, booms too flimsy, headphones too bulky, handling noise too obvious, cable issues, feedback issues, etc.

With the effort being put forth by some of the industry's top technical minds, someone was eventually bound to get it right.

Double duty

AKG, an imprint of Harman International, offers its HSC 171 and 271 headsets, which are identical except for the type of earphone pad: supraaural (atop the ear) on the HSC-171, circumaural (around the ear) on the HSC-271. Both are closed-back headphones for sound rejection.

AKG's headphones are standard items in most recording studios and many radio stations. Variants of the venerable K240 are common, and I would be surprised to enter any audio facility and not find at least one pair. Now the company has engineered welcome design innovations and created a model that functions as both a studio and remote broadcast headset.

From a broadcast standpoint, a number of manufacturers' headsets have come up short on the microphone component. The challenge is daunting: a radio or TV headset mic must be rugged enough to withstand the abuses of daily studio use and the considerable iniquities inflicted upon it at remotes, while also providing such high-quality sound that its use can be justified over a larger studio-type microphone.

The HSC headset puts it all together: excellent headphone sound, rugged construction, dependable performance and a condenser microphone that sounds so good it stands shoulder-to-shoulder with a number of popular, high-quality studio mics. Not surprisingly, it won a Radio World "Cool Stuff" Award at the recent NAB convention.

The microphone element itself is a cardioid, pre-polarized condenser with a published frequency range of 20 Hz–20 kHz. That's superior to the most popular studio dynamics: the Electro-Voice RE 20 (published specs of 45 Hz–18 kHz), RE27 N/D (45 Hz–20 kHz), Sennheiser 421-U (30 Hz–17 kHz) and the Shure SM7B (50 Hz–20 kHz).

As for an apples-to-apples comparison to popular studio condensers, the mic in the HSC-171/271 at its stated frequency range equals that of the Neumann TLM-103 and U87, as well as AKG's own C 414. These specs tell you there's a high-quality mic element in this headset.

A major stumbling block in a headset's ruggedness is how things are connected to it, specifically the mic to the boom, the boom to the headphones and the cable to the whole package. The HSC's transducer is positioned at the end of a small, flexible ribbed rubber sleeve that serves as a shock barrier

See AKG, page 36 ▶

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World Radio History

AKG

▶ Continued from page 35

between the mic element and the boom.

This is a solid idea, and makes the HSC's boom assembly one of the quietest and most flexible I've experienced. The boom itself is really a mini gooseneck that will contort to almost any position you like and swivels through 270 degrees for right- or left-side use.

Here's a great idea: the mic automutes when the boom is raised. An intelligent switching function turns it off when the boom is pushed up to about eyebrow level, which makes this a suitable headset for busy studios and remotes where the talent must converse quickly without removing the entire headset. I've known engineers who custom-installed this function on other headsets, but it's included as standard on the HSC.

The mic also comes with a thick, removable ball-shaped foam windscreen, which is effective, not to mention necessary, for outdoor remotes and windy guys like me.

AKG's real-world contact with broadcasters is evident in the headset's inclusion of another feature that will warm the heart of program directors and chief engineers: the headphones automatically mute when the headset is taken off. So if you have some pretty good gain on the mic and your talent loves to crank up the headphones, guess what? No feedback.

HSC-HSD Boom Arm Switch

I gave this feature a run and it really works. I removed the headset with the mic fader all the way open and the headphones turned all the way up. Nothing. I set it down on the desk with the headphones propped apart. No feedback.

Noises off

A major point of weakness on many headsets comes where the cable meets the headphones. I'm happy to see that several manufacturers, including AKG, are addressing this.

On the HSC, the cable snaps into a six-pin jack on the boom side of the headphones. This is superior to hard-wiring, which is destined to fail even with strain relief. I don't know how well this snap-on arrangement will hold up under strenuous use; I would be concerned about it wearing out or loosening over time, although it is certainly easy to replace. I prefer a screw-on attachment.

In the studio, I gave the HSC 271 a lengthy real-world test. I voiced several projects in styles varying from a blistering car spot to a laid-back documentary read to character voices for a major new computer video game.

The HSC handled everything well, was responsive to tweaking with my Aphex 230 mic preamp and managed all sorts of levels and dynamics. Bypassing the Aphex, it still handled sudden changes in level and alarming peaks, with no distortion or artifacts of any kind. This is a quality studio microphone.

The HSC should stand up well to extended remote use. For sports play-by-play or other uses in high ambient noise environments, the supraaural (atop the ear) HSC 171 effectively seals out most unwanted noise so you can accurately monitor what's going down the line.

While it's an effective sound isolator, the supraaural design became somewhat uncomfortable to wear over a period of time. This is notable given that a football or hockey broadcast can easily last three hours. You might want to go with the circumaural HSC 271 if your ears are sensitive. It won't reject bellowing fans and blasting PA music quite as well, but it will feel a lot better.

By the way, there's a bit of a learning curve with any headset-mounted condenser mic. Because it is always with you at the same distance from your breathing — they're all going to be livelier with that headset mike only an inch away. Bizarre gremlins have not crept into your audio path. It's only you, magnified. Clean it up.

AKG's HSC 171 and 271 condenser headsets can cut it equally well in the studio and in the field. AKG also makes the HS headsets with dynamic boom mics, HSD 171 and 271, which carry the same list prices as the respective HSC models. They are identical to the HSC models except for the microphone element.

Doug McLeod is a long-time play-by-play announcer. He also voices local, regional and national commercials from his studio in Scottsdale, Ariz.

Product Capsule:
AKG HSC 171 and 271 Condenser Headsets

Thumbs Up

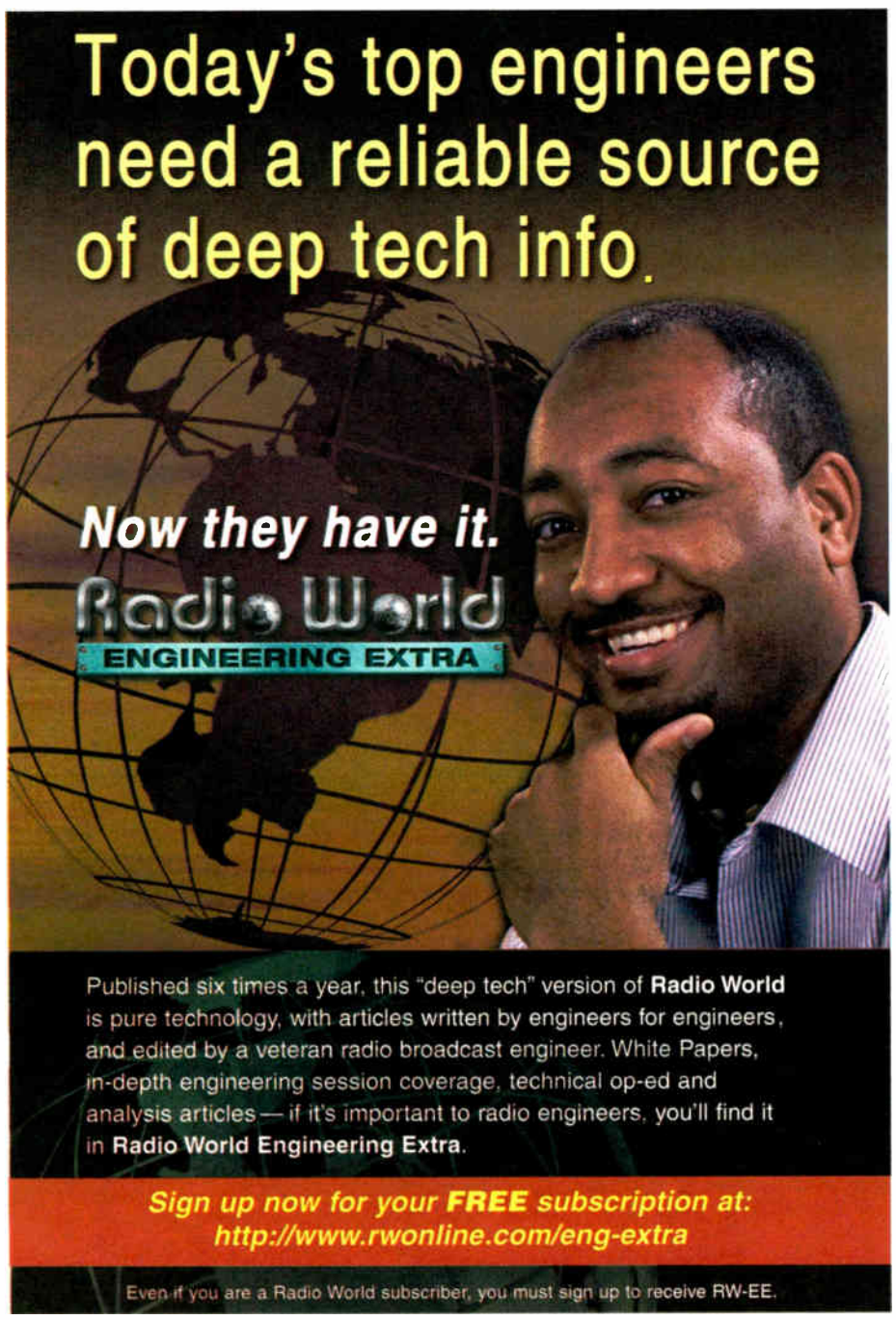
- ✓ Boom assembly
- ✓ Condenser mic
- ✓ Foam windscreen
- ✓ Auto-mutes when boom is raised
- ✓ Cable snaps into a six-pin jack

Thumbs Down

- ✓ Supraaural design became uncomfortable
- ✓ Cable snap-on arrangement may loosen over time

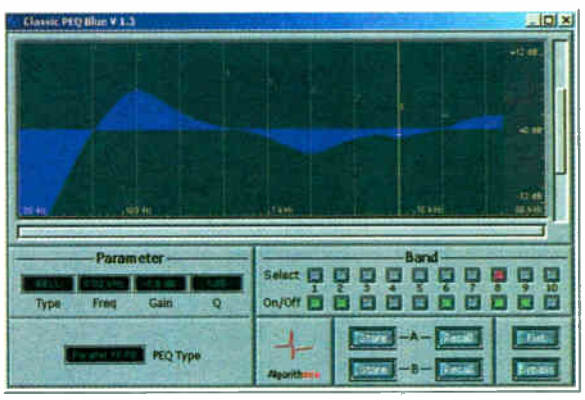
PRICE: HSC 171 retails for $479; HSC 271 retails for $549.

CONTACT: *AAKG in Nashville at (615) 620-3823 or visit* www.akgusa.com.



PRODUCT GUIDE

Algorithmix Classic PEQ Blue Links Digital, Vintage EQs



Algorithmix says the Classic PEQ Blue equalizing tool expands on vintage analog equalizers while adding characteristics for the digital domain. The collection features audio processing styles such as serial/parallel; symmetric/asymmetric; passive/active; and constant-Q/proportional-Q.

Each PEQ type has 10 bands with five assignable parametric filter types including bells, low-shelfs, high-shelfs, low-cuts and high-cuts. To avoid bell filter symmetry at high frequencies, which the company says is typical for many digital equalizers, Classic PEQ Blue uses a reference-quality unsampling technique that is automatically switchable if the sampling frequency of the input signal is 44.1 or 48 kHz.

Features include 12 equalizer types, 10 serial and two parallel. Each of the 12 equalizers can assign first- and second-order cut filters. Algorithmix says second-order filters have a Q adjustment to create resonant filter characteristics and steep brickwall filters after cascading more of them.

Shelving filters also are used. Nine of the serial equalizers use a shelving filter generation characterized by cut-off frequency defined in the middle of the transition part. Second-order shelving filters have a Q adjustment to emulate vintage characteristics with their specific bumps at higher slopes.

Additional highlights include up to 384 kHz sampling frequency, low-noise and nonlinear distortion filter algorithms, latency compensation with compatible DAWs and parameter editing via numerical fields or directly on the graphical display.

For more information, contact Algorithmix U.S. distributor Synthax at (330) 259-0308 or visit www.synthax.com.

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World Radio History

PRODUCT EVALUATION

HD Pro Detects Silence on Multicasts

WFCR Appreciates ADA Dual Tuner's 2 RU Size, Confidence Monitor for Additional Program Streams

by Charles Dubé

As more stations implement HD Radio at their transmission plants, new monitoring and test equipment becomes necessary. The broadcaster must have an accurate way to monitor what the public will be receiving in order to ensure that the product is delivered as intended.

For many stations, the way to monitor their HD Radio transmissions has been restricted to consumer receivers, as the selection of professional equipment has been rather limited. But as 2006 rolls on, new products have hit the shelves offering a variety of functions advantageous to the broadcaster.

One such product is the Audio Design Associates HD Pro dual radio monitor, which features two independent AM and FM HD Radio (plus weather band) tuners in one package.

On display

The ADA HD PRO is not a modulation monitor or diagnostic device in the fashion of displaying spectral analysis — which would be somewhat ineffectual in its price range — or bit error rates. The focus of the design is high-quality decoded HD Radio (or analog) audio, along with features useful at the TOC or main studio. There is no provision to measure SCA levels or modulation.

The ability not only to monitor programming, but to know if there is silence on a multicast channel due to an automation or transmitter failure is key. And given that many stations now must monitor FM, HD Radio, multicasting and Web streaming, a tool that will provide the confidence check on the additional program streams is valuable.

The ADA HD PRO provides such a confidence monitor, complete with relay closures to trigger external alarms should an audio loss or carrier failure occur.

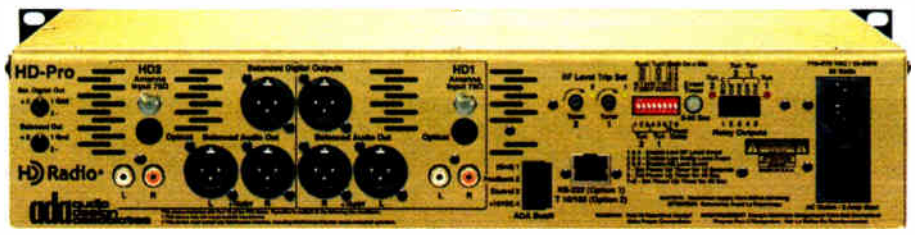
Enclosed in a well-ventilated (forced fan-cooled) metal chassis just two rack spaces high, the HD PRO tuner is a welcome addition to any equipment rack. The sleek black brushed-metal front panel is clean and simple. Two display windows encapsulate most of the function controls with exception of the power switch and headphone controls.

The first window contains a softly lit LCD display that shows station information and RBDS data. Push buttons allow the user to dedicate the display to a particular tuner, control the mode of reception (digital, analog or mono), select the band (AM and FM broadcast or VHF weather), select that band's optional filter (high-frequency for broadcast and voice-pass for VHF), and activate the RBDS portion of the LCD display while in the FM (analog) broadcast mode.

There are buttons to control the manual tuning or seek functions, while others comprise the keys for direct frequency entry and preset storage/retrieval. The buttons themselves are small but spaced so as to not become a problem to those with "big-boned" fingertips.

I found the lack of menu-driven controls to be refreshing. For instance, without undue clutter each function is immediately accessible and one doesn't have to fuss with multilevel menu selections to change the mode from FM to HD, unlike some consumer receivers.

WFCR's HD Pro Dual Radio Monitor (top)



Rear Panel

For the broadcast engineer, a "split" mode function routes the analog of the broadcast station to the selected tuner's right channel, with the HD Radio audio (if applicable) appearing on the left. And again, no multiple menu steps to get there — just one button. This is a helpful feature in audibly time-aligning or verifying the analog latency in an HD Radio installation, or for use with an oscilloscope for the same.

The larger of the two display windows contains LED bar graphs that indicate signal presence, HD Radio decoding, and left and right levels for both receivers' audio. The 20-segment VU meters, including a peak hold indicator, are valuable as a rough modulation monitor for the studio operator. The LED VU meters are bright and visible from across the room, although these could be somewhat distracting if situated in an operator's field of vision. In setting the second tuner to HD-2, one can use these meters as a constant program confidence check, or make useful comparisons between HD-1 and HD-2 levels. Signal strength is indicated by additional LED meters for each tuner, which are helpful in peaking an antenna for best reception.

When I was bench-testing the HD PRO, one of my colleagues took little time to react to the lack of activity on the meters for the tuner set to our station's HD-2 signal; she had grown used to seeing it as active. She didn't know I had disconnected that tuner's antenna for another purpose. It's a good visual indicator of whether or not all is well, without having to listen to the programming 24/7.

PC compatibility

The ADA HD PRO gives away its lineage in its PC accessibility. ADA's history is steeped in the manufacturing of tuners, preamplifiers, amplifiers and signal routing controllers for remote controlled multiroom and home theatre installations. Therefore it is natural that an ADA product of this level includes PC control compatibility.

Included with HD PRO is a TuneSuite software CD-ROM. Your PC will connect to the HD PRO tuner using the included Ethernet cable — they provide you with the cable, unlike some printer manufacturers.

After a simple installation and configuration following the easy-to-read instructions provided in the hard copy manual, you connect using the crossover cable and a user-friendly screen provides the features of the tuners' front-panel controls and text data. The data port speaks Ethernet or may be ordered with RS-232.

For those keen on being sure their station on the air stays on the air, the ADA HD PRO includes a "warning system" to alert station personnel to the loss of program or transmitter failure. The rear panel contains DIP switches that set the reaction mode of the alarm closures, allowing HD failure, low audio level or outright carrier failure to trigger the closure. The trim pots set the RF threshold for the RF level alarm. A power-up timer, set with DIP switches, helps avoid false triggers during power-up of the HD Pro.

Product Capsule:
Audio Design Associates HD Pro Dual Radio Monitor

Thumbs Up

- ✓ Versatile, fine audio quality
- ✓ Warning system function
- ✓ Dual receivers allow easy comparison of stations
- ✓ Sleek look
- ✓ Sensitive
- ✓ Uses two rack spaces
- ✓ Software (remote) controllable
- ✓ Quick acquisition of HD Radio mode

Thumbs Down

- ✓ VU Level LEDs are rather bright — perhaps too bright
- ✓ Lacks S/PDIF output
- ✓ Limited troubleshooting capabilities
- ✓ No modulation, multipath or SCA level indication

PRICE: $3,500

CONTACT: *Audio Design Associates in New York at (800) HD AUDIO (432-8346) or visit* www.ada-usa.com.

Balanced audio output for both tuners is provided, as are unbalanced RCA outputs, TOS-Link and AES/EBU digital outputs. Located on the front, headphone jack controls include the ability to toggle between the two tuner modules for audio comparison between two stations, HD and FM, etc.

A 15-watt amp drives the headphone jack. I did not listen to the HD PRO through what some would consider a "high-end' audiophile system; I did compare the audio quality to some conventional receivers and found the HD PRO to be satisfactory.

Through an NAD L53 receiver and B&W DM601-S3 bookshelf speakers, I could discern a clear difference between the NAD's FM tuner (of reasonable quality) and the HD Pro. Instruments had a clearer individuality and the soundstage was more stable. I am confident most would find the sound listenable and the resolution suitable for critical listening while adjusting station processing. Its sensitivity easily beat that of the NAD, which was pretty fair.

With the HD PRO, I was able to hear the subtle differences between our station's FM and HD (WFCR features a lightly processed classical music and jazz format).

With its ergonomic design, the HD PRO dual radio monitor is a welcome addition to ADA's line of tuners and shows the company's intention of catering to the needs of the broadcast industry.

The ADA line is built by hand at the company's White Plains, N.Y., factory; it is available direct or through retailers like Broadcasters General Store (*www.bgs.cc*) and SCMS (*www.scmsinc.com*).

At a suggested list price of $3,500, the price is well within that expected for professional quality and specialized use. It offers features not found in conventional tuners and receivers, and yet omits some of the highly expensive functions found in high-level monitoring products.

While the home audiophile will appreciate the sound quality and ease of use (as well as looks), the broadcast engineer is sure to value the "warning system" and features germane to HD Radio listening. This station monitor is a pleasure to use as well as listen to.

Charles Dubé is chief engineer for the University of Massachusetts' WFCR(FM) in Amherst, Mass.

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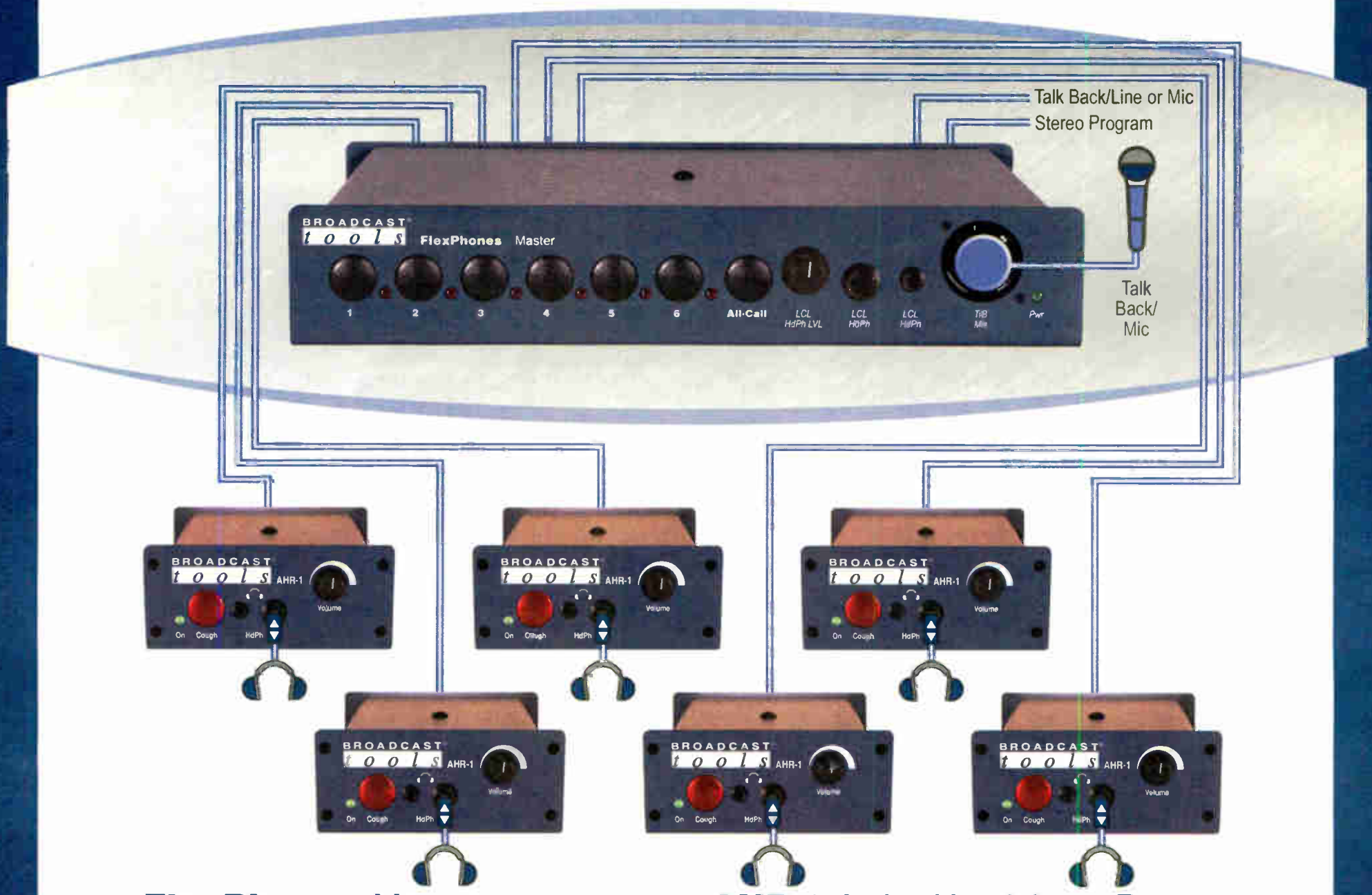

FlexPhones Master

The FlexPhones Master is a professional Broadcast/Studio six channel distributed headphone system with independent talkback capabilities. Each of the six channels provides stereo program monitoring and selective talkback with interconnection via CAT5 cable to multiple Active Headphone Remotes (AHR-1) and/or Monitor Selector Interface (MSI). Multiple masters may be cascaded to form larger systems.

The FlexPhones Master is equipped with inputs for stereo program and talkback audio. Rear panel program and talkback trimmers are provided to pre-set maximum input levels. The microphone/line level talkback input is available via a rear panel plug-in euroblock connector, while the front panel XLR connector facilitates the use of a user-provided gooseneck microphone or headset. The front panel is equipped with a level control for local headphones with both 1/4" and 1/8" stereo headphone jacks. The six front panel talkback switches allow the user to independently communicate with each AHR-1 listener and can be configured to insert talkback audio into only the left or both ears and dim either or both program channels. Any combination of switches may be pressed, while the "All-Call" interrupts all listeners. The Talkback function can be remotely controlled. Six RJ45 jacks are provided to distribute audio and power via CAT5 cable to the AHR-1's, which conform to the Studio Hub format. Low-Z balanced audio distribution is used to preclude audio degradation with long cable runs.

AHR-1 Active Headphone Remote

The Active Headphone Remote (AHR-1) contains a stereo amplifier designed to work with any combination of high-efficiency headphones with impedances between 24 and 600 ohms. The AHR-1 is equipped with 1/8" and 1/4" headphone jacks, level control, user-configured utility momentary pushbutton and LED indicator. Two rear panel RJ45 jacks are provided for connection via CAT5 cable to the FlexPhones Master. The AHR-1 may be desktop mounted, under counter or with the optional HR-1/MP or HR-1/MP-XLR mounting plates, which may be turret or counter-top mounted.

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GUEST COMMENTARY

How the (Audio) Times Have Changed

A Look Back at PAR's First 'Gear Guide' Shows That Studio Products Keep Changing

by John Gatski

The author is publisher/executive editor of Pro Audio Review magazine and former managing editor of Radio World; he founded the Studio Sessions section of RW. In his February column, Gatski wrote about how the world of audio products has changed in eight years.

When PAR launched the annual Gear Guide in 1998, the pro audio world and magazine environment were, shall we say, quite different. The Internet, as a major information conduit, was still a few years away; big recording studios were still the way to put down your tracks; and powered speakers for line arrays were pretty rare. DAT machines and CD-Rs were the dominant way to store stereo tracks, and most microphones were still made in the U.S., Germany and Japan.

I thought it would be interesting to go back to that first Gear Guide in February 1998 and see what the trends were. The cover included the future forward-looking Otari Advanta digital console, Tascam's double DAT DA-302, Fostex's D-90 hard-disk recorder and AudioControl's newly launched IASYS digital measurement system. Hafler Pro supplied us with a pair of its powered TRM-8 studio monitors and EAW loaned us a live sound speaker for a cover shot.

In the Gear Guide's new products section, Denon and Otari introduced new studio MiniDisc recorders, and Apogee Sound revealed a new linear array for the concert environment (no self-power then). Shure also had just announced its new line of mini-condenser boundary mics.

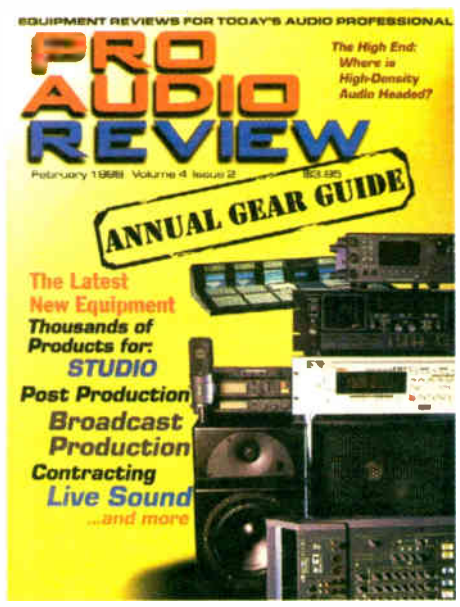
In celebrating his 35th year in the recording business, Tom Jung was pushing the new frontier of high-resolution recording with DSD and other formats that would bring both increased quality, as well as stereo and multichannel listening from one system. He is still pushing.

The recording media ads that ran back then were another interesting trend, especially CD-R. You saw ads from Sony, HHB and BASF on ADAT, DTRS (Hi8) and analog cassettes and open reel tape.

The ads have it

The Gear Guide's advertisements from 1998 were a prime indicator of the industry's current state-of-products. For example, in the six pages of B&H ads, readers saw several pre-Avid Digidesign products including Pro Tools version 4.0. Judging by the sheer number of models displayed in the B&H mega-spread, DAT decks and portables were still very popular — with models from Sony, Panasonic, HHB, Otari, TASCAM and Fostex.

CD-R was just catching on, as HHB was pushing its top-of-the-line recorder, the CDR-800 for a mere $2,195 (I still have the Fostex version). Other products of note included Mackie's (made-in-USA) analog consoles, the SR24x4 and the small format VLZs.



Most of the advertised-in-PAR studio monitors were passive in 1998 with Hafler Pro being the lone exception. Digital effects rack processors were all the rage within the B&H pages, including the TC Electronic Wizard 2000, Sony DPS-V77, Lexicon MPX-1 and Alesis Quadraverb. Eventide had its own page with the DSP 4000.

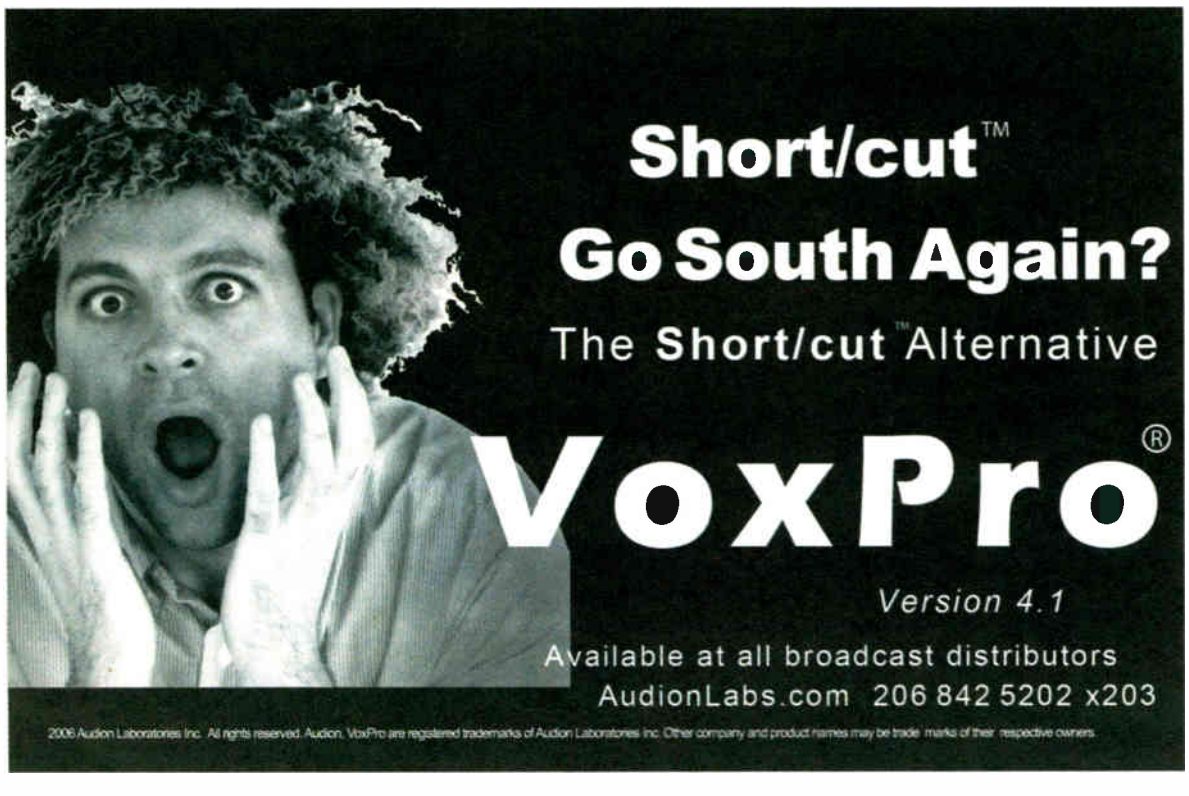
The tube gear craze was still in its zenith with ads from Manley, Aphex, Bellari, DW Fearn, Millennia Media and others. During the 1996–99 period, I remember publishing numerous tube mic/mic pre, EQ and compressor reviews.

The recording media ads that ran back then were another interesting trend, especially CD-R. You saw ads from Sony, HHB and BASF on ADAT, DTRS (Hi8) and analog cassettes and open reel tape. CD-R was really ramping up then, but the media was premium-priced (more than $5 per disc). Today, with CD-Rs a few pennies per disc and new DAT, DTRS and S-VHS tape-based machines all but gone, you hardly see any media ads.

Though analog tape still lives in specialized tasks, the DAT and DTRS and S-VHS-based recorders have been replaced by computer-based machines that record onto low-cost, high-capacity hard drive or high-density media. The portables record and store the audio on internal or removable flash-card media at capacities that were only a dream in 1998.

In another 10 years, we will take another look at the Gear Guide to see what current technologies have given away to new ones. Hey wait a minute ... In 2016, I will be 56 years old. Maybe there will be a replacement technology for me by then.

Products & Services SHOWCASE



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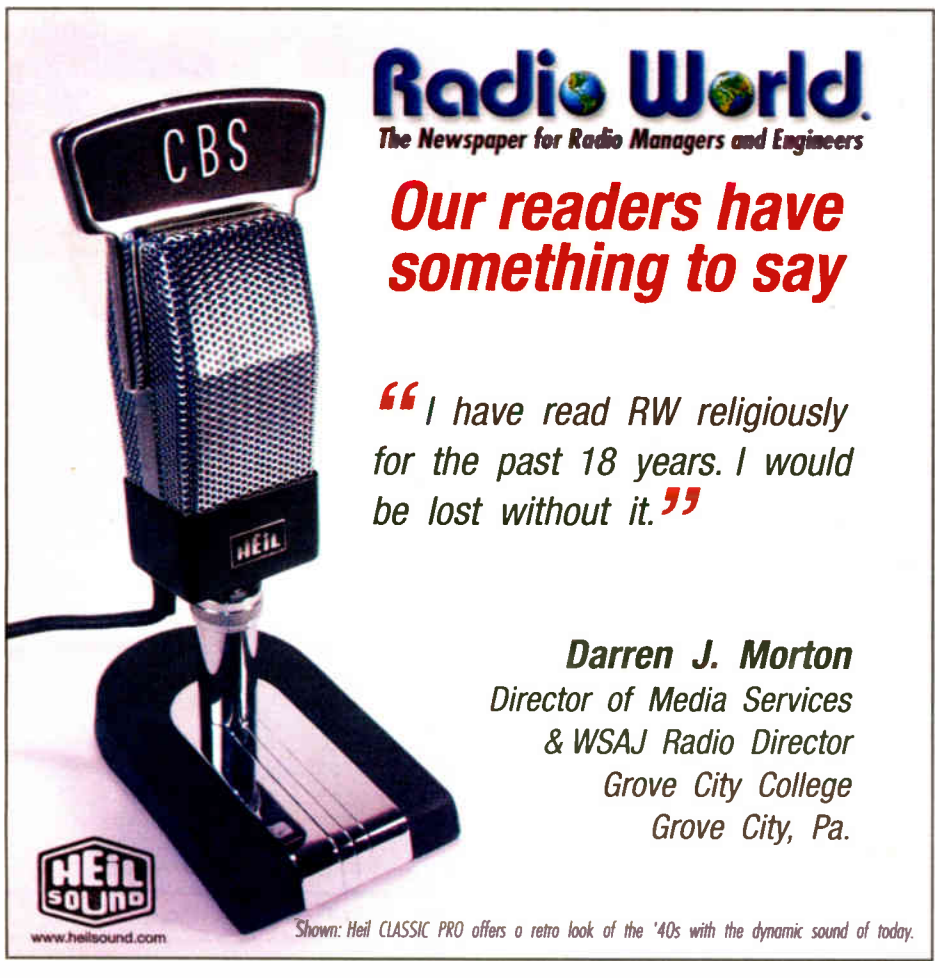

READER'S FORUM

'The Greater Good'

Mr. Montgomery makes a historically accurate point that there have always been those in our profession who have reacted with fear toward technological advances [that ultimately did not] produce the disasters imagined by them ("IBOC Naysayers Fear Change," May 24). He also suggests history is repeating itself with respect to the current advent of digital broadcasting in the U.S., namely HD Radio. I both agree and disagree simultaneously.

IBOC Naysayers Fear Change

It is true that the "Chicken Littles" are out there. Like Mr. Montgomery, I read the writings of these sincere but misguided people and wish for them an ounce of courage. However, what is not being said in all of this, and what I think should be said now, is that HD Radio's one glaring technical shortfall is not being addressed in a timely fashion.

This obstacle to success is not the interference to neighbors on adjacent channels. It is the fact that AM radio stations, the very service that HD Radio could most benefit, cannot use the technology at the time they need it most: nighttime.

I embrace the new technology. I simply wish it would embrace me back.

— Dave Richards

I own and operate an AM radio station on one of the six "local" (class D) channels who need it most. With 1 kW day and night, non-directional, nighttime receivability is extremely limited by co-channel neighbors to an extent unseen on other channels.

I was an early proponent of what became Ibiquity; I beat its drum at all opportunities and joined its early adopter program. Then, just before going to the NAB convention we got the word. The system is approved! But for daytime only. I was disappointed but hopeful, especially when I was assured by Ibiquity officials that it was only a matter of months before I could put my station on IBOC digital full time, and I was urged to move forward without delay.

[I trusted my instincts] and did not purchase the IBOC rig at the convention as I had intended.

Years have since passed since with no progress toward nighttime IBOC operations that I can see. I am not happy that history shows I was right. I am not happy that I cannot upgrade to digital without an unacceptable financial inefficiency.

Our station has been carefully prepared for the jump to digital with a completely compliant and updated studio and antenna system. But I cannot justify using one digital transmitter in daytime and promoting it as I should, only to shut it down and use the old transmitter at night when all my radio neighbors trample through my back yard and my digital listeners who bought the expensive radios say, "So tell me how great this digital thing is again?" Fifty kW stations, and those owned by large publicly traded firms, may be able to justify this waste, but I cannot.

I feel that AM station operators, especially those of smaller stations who need the help most, have been sold out for what Ibiquity deems "the greater good." What is worse, virtually no progress is being made to correct the situation.

Dave Richards
Owner/Manager, WOON(AM)
Woonsocket, R.I.

Real-World Problems With HD

WCLV(FM) was the second station in northeast Ohio and the third classical music station in the nation to transmit in HD. This was back in August of 2003, but the only people who have listened to it during the interim are our staff and the chief engineers at other stations.

The problem? Obviously, the lack of HD radios. Now that Boston Acoustics has dropped the price on its HD radio, and Radio Shack is beginning to stock HD radios that may begin to change.

The initial appeal to the consumer was to be improved quality of sound. But frankly, the difference between a high-quality analog signal, such as WCLV's classical music programming, and the HD signal is minimal. And with highly processed rock programming, you can't tell any difference.

So what will be the appeal of HD? The answer is the additional programming channels on the HD2 and HD3 channels. However, there is a serious flaw.

We were told back in the beginning that the HD coverage would be equal to the analog signal. Unfortunately, the industry is now finding out this is not the case; that the HD coverage is considerably less, something like 60 percent of the analog coverage. We've also found that, even in a strong HD signal area, a dipole antenna is required.

We were also told that the HD would lessen interference with adjacent channel signals. That also appears not to be the case.

This is really very discouraging and is leading us to wonder why we should bother to promote HD. To do so will only disappoint, and perhaps antagonize a significant segment of the audience who finds that the system doesn't deliver.

Robert Conrad
President
WCLV (FM)
Cleveland Orchestra Broadcast Service
Cleveland

World Radio History

◆READER'S FORUM◆

FCC and FM Stereo

While surfing the Web I came across the commentary "Has Anyone Thought This Through? (*Reader's Forum*, April 20, and posted at RW Online).

Jack Hannold's thesis is that the FCC made a mistake in its choice of an FM stereo system in the early 1960s, that "the AM stereo mess of the 1980s" was the result of a similar mistake, and that this process is repeating yet again in the case of IBOC.

If the author's muddled facts with respect to the FM stereo system choice are any indication, then it is hard to accept his conclusions with respect to AM stereo in the 1980s, and IBOC today. A few of these muddled facts, and the truth, follow.

With respect to the currently used "pilot tone" FM stereo system the author says, "In the stereo mode, the L+R modulation level is held to 45 percent. And remember the frequency swing corresponds to the audio signal voltage, not to power. So the power output at the detector is only slightly over one-fifth (0.2025) of that from a mono signal of equal strength, or –6.94 dB. (And it's even worse with SCAs, where it's –7.85 dB.) So there's a coverage advantage, even on mono receivers, that ignores the stereo difference and pilot."

At best, the stereo S/N ratio of the Crosby system is marginally better than that of the 'pilot tone' system, not 'much better' as the author states.

— John Byrns

This is wrong and demonstrates a complete misunderstanding of the operation of the "pilot tone" FM stereo system. In the "pilot tone" FM stereo system, the L+R component of the signal is allowed a modulation level of 91 percent, with the remaining 9 percent being devoted to the 19 kHz pilot signal. Ninety-one percent L–R modulation is possible due to the way the L+R signal "interleaves" with the 38 kHz L–R subcarrier.

The resulting degradation for a mono receiver tuned to a stereo signal is only about –0.82 dB, not –6.94 dB as stated by the author. The –6.94 dB figure cited by the author is closer to the mono performance degradation suffered by the Crosby FM stereo system, where mono receivers suffer a –6.00 dB degradation because the L+R signal is limited to 50 percent modulation. In the Crosby FM stereo system, the L+R signal is limited to a maximum of 50 percent modulation because there is no interleaving of the L+R and L–R signal components.

The author further states, "In retrospect, we should have adopted Murray Crosby's all-FM system in April 1961. With an FM subcarrier system and a receiver with good limiting in the subchannel, the stereo S/N ratio would be much better on all but the weakest signals."

As even Crosby admitted in his writings, this is hardly the case. At best, the stereo S/N ratio of the Crosby system is marginally better than that of the "pilot tone" system, not "much better" as the author states.

The Crosby FM stereo system also suffers from a fixed minimum distortion floor, a problem not shared by the "pilot tone" FM stereo system. The distortion floor in the Crosby system is caused by the necessity of filtering off some of the FM subcarrier's sidebands at the transmitter, in order to fit the FM subcarrier into the space available between 20 kHz and 75 kHz on the main carrier. The AM subcarrier used in the "pilot tone" system does not have an inherent distortion-creating effect like this.

The author says one of the reasons the FCC went with the "pilot tone" system was that "the Crosby system would have ended SCA services." While it is true the Crosby system and SCA services were mutually exclusive, there is no technical reason why the FCC couldn't have simply allowed individual broadcasters to choose whether to continue with their SCA services, or to broadcast the Crosby FM stereo signal instead.

According to the press at the time, the problem was that some FM broadcasters using SCA subcarriers were opposed to the Crosby system because the Crosby stereo decoders could be used to pirate their SCA signals. If the FCC had chosen the Crosby FM stereo system there are certainly technical measures that could have been taken to prevent the Crosby stereo decoder from properly decoding SCA signals, thereby avoiding the piracy problem.

I hope these same mistakes of fact, and reasoning, aren't being repeated today with respect to the IBOC situation.

John Byrns
Hoffman Estates, Ill.

Some interesting allegations were made in this article regarding FM coverage and potentially better early methods for FM stereo. Contrary to what Mr. Hannold says, I would like to assert that FM L+R (monaural) modulation in stereo mode is not limited to 45 percent, nor does FM coverage increase substantially — if at all — with modulation.

First, FM stereo is created by an audio matrix, with the left and the right audio input channels added and subtracted such that the mono feeds the L+R resultant (main channel) and the 38 kHz subcarrier sees the L–R subchannel derivative. L+R (mono) modulation in a stereo broadcast is not limited to anything short of 90 percent (assuming 10 percent pilot injection). The actual mono modulation (L+R) is totally dependent upon the amount of separation (and/or phase shift) in the audio signal as processed by the matrix.

It would be correct to say that if a sinusoidal tone were applied to a single channel to create 100 percent modulation of the overall carrier, the L+R and the L-R would be equal at 45 percent each (again assuming 10 percent pilot injection).

However, that is not the normal case in regular programming with complex stereo audio. In fact, if the same sinusoidal tone was placed on the air with center-channel audio (in phase and equal amplitude on both channels) the L+R modulation would be 90 percent and the L-R modulation would be 0 percent.

In the real world with program modulation (music), a simple view of the modulation monitor as set to L+R would reveal it operates well above the 45 percent level most of the time. Even with a microphone panned to left or right a few dB, the L+R will still reach 60 or 70 percent modulation and effective loudness will be maintained. In widely separated stereo audio, a mono broadcast would offer some additional perceived loudness as more energy is directed to the L–R to support that separation.

While the assertion that there is a deterioration of the signal-to-noise ratio in the Zenith multiplex system in stereo vs. monaural — especially in fringe areas — is correct, receivers have long had the blend-to-mono function, which restores a great deal of the mono S/N ratio benefit. Unlike AM, where intelligence impressed on the carrier creates additional carrier power (100 percent sinusoidal modulation = carrier + 50 percent), there is no such benefit on FM.

FM receivers operating in full limiting display excellent S/N ratios until they fall out of limiting, at which time there could conceivably be a small advantage to higher average modulation levels to mask noise. But at this point, the station will become unlistenable very quickly as it fades into the noise.

Hal Kneller, CPBE, CBNT, AMD
Harris Corp.
Manager
Public Radio Initiatives
Broadcast Communications Division
Punta Gorda, Fla.

My comment deals with Jack Hannold's excellent commentary. Jack's comments should raise the hair on broadcasters' necks. In the haste to push digital, do most broadcasters realize what they are giving up? Why isn't some broadcaster brave enough to file a lawsuit against the FCC for malfeasance in office?

As Mr. Hannold excellently states, the FCC completely bungled the AM stereo issue and is now creating an even bigger problem with IBOC. The IBOC supporters are passionate in their support, but they need to look at what the entire broadcast band will be like if IBOC is as widely implemented as they would like.

The FCC completely bungled the AM stereo issue and is now creating an even bigger problem with IBOC.

— Dave Dzurick

As for the FCC, shame on you! Why are you allowing any service to operate that creates interference with adjoining signals? Where is your responsibility to the public and to the broadcasters you are commissioned to serve?

Mr. Hannold's letter is just one of many published over the years that carefully document the problems with IBOC, yet the train keeps rolling and the critics are either discredited or ignored. What will finally wake up the broadcast community to the impending disaster?

Dave Dzurick
Tucson, Ariz.

Ham Seeks BC Tx

I'm an amateur radio operator and a retired USAF radio tech looking for a BC transmitter. I'm located in Urbana, Ohio, near Dayton, and willing to travel to pick up a good rig.

If you can point me toward one, please contact me at: *kdm@ctcn.net*.

Ken Moak, WA2JQW/8
Urbana, Ohio

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World Radio History

◆READER'S FORUM◆

On the List

As radio station owners run panic-stricken over the financial cliff from satellite and other new media, I ask [your readers] to look at the latest list of successful stations and seriously tell me the modulation mode makes a difference. I think there's an FM or two in there.

If this list doesn't make the IBOC crowd look like jerks, nothing will. It's the content of the program, not the method of modulation that makes you a winner. How can anyone think otherwise? Believe it or not, some radio people pay consultants for that very same "information."

[According to BIAfn] radio's top 10 billers of 2005 are: #1, CBS Radio's KROQ(FM), Los Angeles; #2, CBS Radio's WINS(AM), New York; #3, Clear Channel's KFI(AM), Los Angeles; #4, Clear Channel's WLTW(FM), New York; #5, Emmis Communications' KPWR (FM), Los Angeles; #6, CBS Radio's WCBS(AM), New York; #7, Clear Channel's KIIS(FM), Los Angeles; #8, CBS Radio's WFAN(AM), New York; #9, Tribune's WGN(AM), Chicago; and #10, CBS Radio's KLSX(FM), Los Angeles.

Larry Tighe
Owner, WRNJ(AM)
Hacketstown, N.J.

Playing Catchup

One of the great things about Radio World is reading stuff by and about people I've known.

I used to live in the Hartford area and knew Buc Fitch from the SBE chapter, worked with John Ramsey on many broadcast projects, and knew Tom Ray from when he engineered the Whalers hockey game radio broadcast feeds from the Hartford Civic Center. And I knew Mike Pappas from when I worked for Crest Audio and he was one of our sales reps.

I never expected a single publication [would] let me keep up with so many acquaintances.

Will you be running any more Scott Fybush tower site pieces? I love those.

Bob Lee
Applications Engineer, Technical Services Group
QSC Audio Products Inc.
Costa Mesa, Calif.

Taking Inventory

Joe Milliken's report on HD Radio visibility ("Audio Stores, Where are the Radios?," May 10) reminded me of a recent shopping experience.

When my mother went into a hospice a few months ago, she asked me to buy her a transistor radio so she could listen to classical music from Minnesota Public Radio. I went to a Super Target. Despite having row after row of electronics, they did not have a single stand-alone radio in stock.

I asked a clerk if they had any small portable radios in storage. He brought me the only set they had — a Grundig FR-200 World Band Receiver with a power generator crank. I bought it for my mom. She likes it because it includes a flashlight.

I guess the biggest surprise for me is that something so ubiquitous, the transistor AM/FM radio, is now almost impossible to find.

Ken Mills
Minneapolis

Grandpa Would Be Proud

I want it known throughout the radio world that I do indeed give my unqualified endorsement to Gakken's Emile Berliner Disc Gramophone, as fastidiously reviewed by Jack Cheese in his tongue-in-cheek "Analog CD Recorder: Best of Both Worlds (April 20)." And I also wish to express my gratitude to the editor for giving the piece a full page (in the center yet!), which of course it so richly deserves.

Unquestionably, an analog compact disc does at last offer broadcasters and other audiophiles the best of both worlds: analog's naturalness and digital's compactness. But all, or at least most, kidding aside, let me point out the amazing coincidences between Grandpa's 1887 analog disc and today's compact disc.

The Berliner patent describes a disc that's recorded on the bottom, as is the (digital) CD, though Grandpa never did it that way. The Berliner patent describes inside-out recording; Grandpa never did it but broadcasters did and the CD is recorded this way. The first discs had no paper label; neither does the CD.

The Berliner disc uses a spiral groove while the CD's recording pattern is a spiral of pits. Both have a center hole and the discs are the same diameter. Most important of all, both use Emile Berliner's concept of pressing unlimited perfect copies from a single master recording; which is what made possible the recording industry of today.

Both the analog and the digital CD prove that there's nothing new under the sun.

Oliver Berliner
Bozman, Md.

Time to Rethink Tower Lighting And Marking?

During World War II, according to some estimates, America built more airplanes — for ourselves and our allies — than have been built cumulatively in the United States since. But must aviation safety be stuck in 1945? And are broadcasters bearing the cost of that reality unnecessarily?

In 2006, why do aircraft radios use AM and not a more advanced — probably more reliable, and definitely more flexible — system such as TDMA or CDMA? And why does the aviation industry not make better use of advanced stationary object collision avoidance systems rather than lighting and marking of towers?

Even at $1,000 per box installed (in bulk purchase) for 10,000 aircraft, it would only cost $10 million to equip every aircraft with an object collision avoidance warning system. Federal programs tend to get out of hand, of course, so perhaps they'd cost $10,000 a box; but that's still a small price compares to the billions collected each year that are supposed to help advance aviation safety.

And what would that box be but a GPS, a motion sensing system and a database? If we can get it for our car, why not for aircraft, systems that would constantly evaluate the situation and alert a flyer to objects nearby — rather than having a flyer attempting to pick out red lights from a sea of lights — and yelling to the pilot with diversion instructions if a collision course has been selected? A cell phone in the box could call for data updates before flight and a screen display any changes en route.

It may not be credible to believe that a decision to implement such systems would be accompanied by a move to turn off tower lights and stop mandating markings, at least at first. It seems more likely leaders would opt to do both. But set aside the argument about saving tower owners money in the near term; that's really not the important point. Such a policy is still good sense on safety grounds.

In the civilian world, every time something moves by air an excise tax payment goes into the Airport and Airway Trust Fund, created in 1970 to provide funding for the federal commitment to aviation system — through collections related to tickets, passenger flight segments, international arrivals and departures, cargo waybills, aviation fuels and frequent flyer mile awards from sources like credit cards. The fund pays a large share of the bills for the FAA to operate the national airspace system.

Sen. Kit Bond of Missouri said recently that the fund "is slowly going broke and needs real reform," according to Aviation International News. The mechanism of the fund is under debate, and all taxes that go into the trust fund will expire on Sept. 30, 2007. The FAA wants to revamp its revenue stream, the publication reported.

We know this is mostly an aviation, not a broadcast, question. But we care about what's flying at and around our towers. Whatever happens with FAA funding, we think it's time to ask: Wouldn't it be better, safer and eventually more cost-effective to bring aviation into the 21st century and move from — or at least complement — lighting and marking to object collision avoidance by providing such equipment through the Aviation Trust Fund or some other means? While we're at it, let's put real radios into these cockpits. We can pick them up at RadioShack on the way to the airport.

— RW

Corrections

The article "Training Helps Users Reach Potential" (May 10) said Harris Corp.'s product training classes are conducted in the training center at the company's Mason, Ohio, headquarters. The classes are conducted at Harris' Quincy, Ill., location.

An RW Online NewsBytes item, "Early HD Days at the Shack" (May 22), erroneously referred to The Star-Telegram as being located in Dallas. The Star-Telegram's main office is in Fort Worth in Tarrant County, Texas.

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Telephone: (703) 998-7600 • Business Fax: (703) 998-2966 • Editorial Fax: (703) 820-3245
E-mail: radioworld@imaspub.com • Web site: www.rwonline.com

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